PRESS RELEASE

IEEE PowerTech 2025 in Kiel: Power electronics and digitalisation as the key to grid stability

Kiel, 7 July 2025 – From 29 June to 3 July 2025, Kiel, the capital of the German state of Schleswig-Holstein, was transformed into the European centre for power electronics and smart grids. IEEE PowerTech 2025, the IEEE Power & Energy Society's flagship European event, brought together around 750 experts from academia, industry, and politics. The conference focused on the important issue of blackouts, which were impressively demonstrated by the events on the Iberian Peninsula in spring 2025, and how modern grids are reaching their limits. The conference discussed how power electronics solutions combined with digital technology can contribute to stable and resilient energy systems.

Blackout on the Iberian Peninsula - a wake-up call for Europe

The widespread power outage in April 2025 highlighted the vulnerability of grids with a high proportion of renewable energy sources. The causes were voltage fluctuations, inadequate protection coordination, and a lack of controllability — classic challenges of modern energy infrastructures. Participants at PowerTech 2025 agreed that power electronics are key to ensuring stability and protection, thanks to their ability to regulate voltage rapidly, control digitally and use intelligent sensor technology.

Political commitment to the energy transition

In his opening speech, State Secretary Joschka Knuth emphasised the role of Schleswig-Holstein as a model region:

'In Schleswig-Holstein, the energy transition is not just a political vision; it is a major engineering project, with grid expansion forming the lifeline. We are the pilot region for the energy transition. With 180 per cent gross electricity generation, we are an electricity-exporting state. Technical innovations such as the grid booster in Audorf support this trend, and we are utilising the grids more

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efficiently thanks to our unique load monitoring system. Our long-standing efforts to expand the grid are paying off — and that is good news for the climate, as well as for people and companies in the region. The federal government must now maintain a clear course for the energy transition, rather than entering into new debates about the sense or nonsense of grid and RE expansion."

This clear political mandate was well received in the context of practical and technological discourse — a key message from the conference.

Science meets application: Fraunhofer ISIT at the forefront

With Prof. Dr Marco Liserre, Head of the Chair of Power Electronics at Kiel University and Director of Fraunhofer ISIT, at the helm, the technical focus was set and innovative research was presented. Prof. Dr. Liserre is enthusiastic:

"The 'PowerTech 2025' conference clearly showed how energy grids have developed over the last ten years. Microelectronics — especially power electronics and sensors — and digitalisation are now the key technologies."

He continues: 'I would like to thank Dr Marius Langwasser, Head of the Hybrid Grids Group at Kiel University, and Prof. Giovanni De Carne, Professor at KIT and Head of the Real-Time Systems for Energy Technology Group. The two of them played a pivotal role in organising the conference as co-chairs, and their passion was instrumental in ensuring its success.'

At Fraunhofer ISIT, Liserre operates at the interface between basic and applied research, working on projects ranging from intelligent converters and power quality monitoring to the integration of batteries and sensors in grid infrastructures.

Technical highlights and solutions

The extensive conference agenda featured top-class keynote speeches by Shay Bahramirad (PGE), Lisa Hebenstreit (SH-Netz), Dr Hendrik Neumann (Amprion) and Dr Detlev Ruland (GFGBA), to name a few. Exciting panel discussions covered topics such as wide-band-gap semiconductors and their role in fast voltage responses, smart transformers and MVDC systems as flexible grid elements,

digitalisation via sensors, and AI-supported monitoring systems, as well as protection and control technology to prevent blackouts.

Outlook: Stability, innovation and climate protection

IEEE PowerTech 2025 clearly demonstrated that power electronics and digital technology are at the heart of modern energy systems, being crucial for grid stability, efficiency, and flexibility. Research institutions such as Fraunhofer ISIT are laying the groundwork for a robust, climate-neutral energy future through transdisciplinary innovations.