While the international community demands and produces more renewable energy, which is attractive in terms of sustainability, the larger amounts of energy available from sun and wind resources also pose a number of challenges to electric power grids. These challenges were the focus of the IEEE Workshop on Electronic Transmission and Distribution (eT&D) hosted by Aalborg University, Denmark. A total of 143 participants from 18 different countries convened at Musikkens Hus in Aalborg on 7–9 November 2017 to take part in the workshop, the stated goal of which was to resolve the challenges our electricity supply faces as more and more renewable energy enters the power grid.

“Our energy supply is currently undergoing a transformation that is happening faster than had been imagined just ten years ago. This is due to the increasing production of renewable energy from sun and wind and the fact that we are looking at a future where the sale of electric cars will explode. These developments place new demands on how our power grid will function,” said Prof. Frede Blaabjerg, general chair of the 2017 eT&D workshop. In the future, having the ability to store and control large amounts of energy, which was not previously necessary due to planning based on known consumption curves, will be crucial. “We need to find a solution so that the electricity supply works even when the sun is not shining or when there are a few days without wind. In those cases, we need to get our energy another way,” noted Prof. Blaabjerg.

Electrical Manufacturers, Researchers, and Grid Operators Join Forces

Due to the increasing production of renewable energy, there is a greater need for power electronics technology that controls and converts solar and wind energy to electricity. So far, representatives of power electronics and the utility grid have discussed the future of energy supply separately; the eT&D workshop aims to change that. “What is unique about this workshop is that we are bringing together people from both sides: those who understand power electronics and those who operate the grid. In this way, we can discuss a joint solution,” stated Xiongfei Wang, associate professor at AAU and technical program chair of the workshop (Figure 1).
Prof. Wang was delighted by the large amount of international interest in the workshop where world-renowned experts, industry leaders, and representatives of the U.S. government were involved.

A Transformation of the Grid
Another speaker at the workshop was Don Tan, IEEE Fellow and past president of the IEEE Power Electronics Society. He affirmed that the progress of the grid in recent years has been limited and that it is necessary to transform the grid to make it electronic. “Only when the power grid is electronic will it be possible to manage it and build intelligence into the system and to do it smarter,” stated Tan.

The workshop also provided the opportunity to open Prof. Blaabjerg’s new research center, the Reliable Power Electronic-Based Power System (REPEPS), located on the campus of Aalborg University. The center was established with a grant of 38 million in Danish kroner from the Villum Foundation, and, over the next six years, it will employ 20 researchers who will focus on how to ensure future availability of the reliable power we will need, when we need it. “REPEPS is our new effort where we combine research on the reliability of electronic components with how the grid can be better managed in the future. Based on this, we will be able to come up with new predictions as to how stable the grid will be in the future,” asserted Prof. Blaabjerg.