



Power Quality in Smart Grids

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Message from the Guest Editor

The electric power grid of today is experiencing a significant change because of the rapid development of renewable energy technologies, on the generation side, and electric vehicles and plug-in hybrid electric vehicles, on the energy consumption side. The smart grid is the key to enhance the penetration of renewable energy into electric power systems and EV integration with the grid. However, due to the intermittent and distributed nature of renewable energy sources and electric vehicles as well as special role of power electronic converters for grid interconnection of both, power quality is becoming an increasingly important issue for the healthy development and growth of smart grid technology. Power quality issue also is growing on the high voltage transmission side of the smart grid due to the adoption of power electronic based new technologies in the transmission grid, such as HVDC and STATCOM.

This Special Issue focuses on recent advances of new technologies that can improve the power quality (such as voltage stability, frequency stability, and harmonic distortion) of the grid so as to strengthen the growth of smart electric power grid and accommodate interconnection of more renewable energy and EVs into electric utility systems. The Special Issue is interested in, but not limited to, the following issues associated with the power quality in a smart grid:

- 1) power electronic converter system topologies and circuit designs;
- 2) converter control technologies;
- 3) filtering technologies for power electronics based devices;
- 4) dispatchable generation reserves required to improve smart grid power quality and under what circumstances;
- 5) impact of increased sustainable energy and EV penetration;
- 6) how do impacts vary with renewable and EV penetration?
- 7) how will sustainable energy generation and EV interconnection affect system operating strategies? Energy storage, demand response, microgrids, etc.

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Special Issue