



# Power Systems Engineering Research Center

## Challenges in Integrating Renewable Sources into the Electric Power Grid: A Power Electronics Perspective

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PSERC Public Tele-seminar

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2:00-3:00 p.m. Eastern Time (11:00-12:00 p.m. Pacific)

### **Description:**

Renewable energy portfolio standards are requiring higher penetration of renewable energy sources in the years ahead. Such large-scale integration of renewable generation sources into the electric power grid is raising critical issues. Many issues are at the system level, such as how to address the variability in output from renewable generation sources. Other issues are at the layer of a generator's interface to the grid where power electronics is commonly involved either due to the inherent necessity of or for the sake of improved controllability. The critical functionalities carried by power electronics include: 1) provide the necessary voltage and frequency compatibility between the renewable source output and the power grid; 2) optimally control renewable sources for maximized energy yield among other objectives; and 3) provide active and reactive power support to the power grid during normal operation or disturbance events. Coupled with the multi-functionalities are the requirements for a broad operating range, high reliability, and cost effectiveness, which collectively present significant challenges to the design and control of the power electronic interface. This presentation will give a closer look at some of the issues and solutions.

### **Biography:**

Bingsen Wang received his PhD degree in electrical engineering from the University of Wisconsin-Madison in 2006. From 1997 to 2000, he was with Carrier Air Conditioning as an Electrical Engineer in Shanghai, China. Upon his graduation with PhD, he joined General Electric Global Research Center in New York as a Power Electronics Engineer. While being with GE, he was engaged in various research activities in power electronics, mainly in the high-power area. Since 2008, he has been on the faculty in the Department of Electrical Engineering at Arizona State University. His research interests include power conversion topologies, in particular multilevel converters and matrix converters, dynamic modeling and control of power electronic systems, application of power electronics to renewable energy systems, power conditioning, FACTS and electric drives. Dr. Wang is a Senior Member of IEEE and a Member of Sigma Xi, the Scientific Research Society.

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Shmuel welcomes feedback on the tele-seminars and suggestions for future ones.