



Department of Electrical & Computer Engineering
Florida International University

In Conjunction with the

Institute of Electrical and Electronics Engineers, Inc.
Industry Applications Society

Hybrid AC/DC Power System Control with Solar Energy, Battery and Pulse Load

By: Tan Ma

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Place: ECE Department, FIU
10555 W. Flagler Street, Miami, Florida
Energy Systems Research Lab. (EC3960)

Abstract:

Micro hybrid AC-DC grids are becoming popular due to the increasing need for renewable energy sources such as solar and wind energy. Energy storage devices, such as Lithium Ion batteries, will play a more important role in the future of our power grid systems. Simultaneously maintaining and stabilizing the AC and DC sides of these hybrid power systems for maximum clean energy utilization will require DC-DC converters and AC-DC inverters that are designed with fast reaction speeds, high reliability, and good transient response under critical loads. Implementing wireless controls into their design would also reduce any redundancies in the hybrid power grid.

In this presentation, the design of a hybrid AC-DC power grid system consisting of solar energy, batteries, and pulse loads will be detailed. The design and implementation of each component will be presented along with illustrations of their hardware and simulations. Various experiments were conducted in order to validate the system's high efficiency, reliability, stability, and low harmonics. The presentation will conclude with the wireless transmission of signals using XBEE transceivers to control the various DC-DC and AC-DC converters.

