

Tutorial: Overview of Wind and Solar PV Technologies

Date: Monday, December 6, 2010

Time: 8:00 am to 12:00 pm

Cost: \$100/person thru the end-October, \$125/person after October

Tutorial Registration Limit: None

Description: This tutorial will be structured to include three distinct segments to discuss: 1) solar energy technologies; 2) power electronics; and 3) wind energy technologies.

Solar Energy Tutorial Segment

Solar energy is considered one of the primary sources of alternative energy, and rightfully so. The sun delivers more energy to the earth in an hour than the population of the world uses in an entire year, but it accounts for less than 1% of the renewable energy produced in America. This tutorial will describe the basic physics of a solar cell, review the various classes of solar cell technology, and summarize the current state-of-the-art in the field. Additionally, the tutorial will describe how solar energy is produced, distributed, and utilized on a commercial scale. Lastly, future research directions will be presented that address current technical challenges and offer long range goals designed to help solar energy achieve grid parity.

Power Electronics Tutorial Segment

Power electronics utilize semiconductor-switching devices to control electrical power flow and convert it from one form to another to meet specific needs. These devices represent a fundamental building block for a variety of applications and can be assembled into converters, such as inverters and rectifiers, having more built-in system intelligence for applications with grid interface. Additional components can be integrated for power flow control at the system level. Each of these areas has technical challenges that need to be addressed before widespread deployment of distributed generation and solid-state devices can occur. This tutorial will start with the introduction of basic power electronics concepts, including power electronics switches and power converter functions required for renewables integration. It will continue with a description of power conversion needs for solar, wind, microturbine, and fuel cell applications. In the last segment of the tutorial, an overview will be given on the control of grid interface inverters.

Wind Power Tutorial Segment

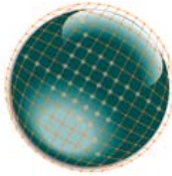
The wind power tutorial segment will provide an overview on wind power technologies including design approaches, important siting parameters, and electrical grid interconnection and operating issues. Key components of a wind turbine will be outlined and their characteristics discussed. Also, future advances in wind will be described.

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Agenda:

Time Slot	Topic	Speaker	Session Description
08:00 – 09:30 am	Solar Photovoltaics	<i>Chad Duty</i> , Oak Ridge National Laboratory <i>Jay Jellison</i> , Oak Ridge National Laboratory <i>John Wohlgemuth</i> , National Renewable Energy Laboratory	A basic review of the physics of a solar cell, the various classes of solar cell technology, and current state-of-the-art.
09:30 – 10:00 am	Basic Power Electronics Concepts	<i>Burak Ozpineci</i> , Oak Ridge National Laboratory	Overview of power electronics and power converters for renewables integration
10:00 – 10:30 am	Power Electronics Control	<i>Leon Tolbert</i> , University of Tennessee	Discussion surrounding control of grid interface converters
10:30 – 10:45 am	Break		
10:45 – 12:00 am	Wind Energy 101	<i>Kirsten D. Orwig</i> , National Renewable Energy Laboratory <i>Ben Karlson</i> , Sandia National Laboratory	Overview of wind power technologies, including different designs, important siting parameters, and electrical grid interconnection and operating issues
12:00 pm	Adjourn		

For more information: Thomas King Jr., Director, Energy Efficiency and Electricity Technologies Program at Oak Ridge National Laboratory, (865) 241-5756, kingtjr@ornl.gov.

To register for this event: <http://4thintegrationconference.com/register.asp>