



Grid of the Future™



November 11-14



QUANTA  
TECHNOLOGY

**Tours and Tutorials will be held on  
Thursday, November 14, from 8:00AM-1:00PM**

Register today! For more information,  
visit the [Cigre USNC website](#).

## Tour

### ***North Carolina State University FREEDM Center***

At the FREEDM Center, they're building the internet of energy: a network of distributed energy resources that intelligently manages power using secure communications and advanced power electronics. Their research priorities include power electronics packaging, controls theory, solid state transformers, fault isolation devices, and power systems simulation and demonstration. Hitachi Energy will be sponsoring lunch following the tour in their customer experience room at the Hitachi Energy offices. Their offices are on the NC State campus and a three minute walk from the FREEDM Center.

K. Dulaney - North Carolina State University

## Tutorial

### **Addressing Integration Challenges of Voltage Source Converters (VSCs)**

This tutorial is intended for an audience with a general background in power systems working in transmission planning, operations, or protection and control. It will provide attendees with an introduction to reliable grid integration of Voltage Source Converters (VSCs), such as Inverter-Based Resources (IBRs), Flexible AC Transmission Systems (FACTS) and High-Voltage Direct Current (HVDC) Systems, within the context of the "Modern" power system. The tutorial will cover key concepts related to VSC electrical characteristics and control architecture [i.e., Grid-Following and Grid-Forming] as well as challenges related to planning and operation of power-systems with grid conditions or high-penetration of VSCs [i.e., impedance-based stability and electromagnetic transient modeling].

D. Roop, A. Sparacino, A. Jenkins - Mitsubishi Electric Power Products, Inc.

## Tour

### ***Smart Wires Laboratory***

Tour of grid enhancing technology provider, Smart Wires', global Research and Development, testing and validation laboratories located in the Research Triangle of North Carolina, approximately 30 mins from the Raleigh Convention Center. The whole tour will take 2 hours and cover an intro to Smart Wires' advanced power flow control technology (APFC), a tour of the lab itself (including our RTDS equipment, High Current Testing System, and Environmental Chamber), and light refreshments. No prior technical knowledge or understanding of APFC is required.

T. Bloch-Rubin - Smart Wires

## Tutorial

### ***Quanta Technology: Value of Hardware-in-the-Loop (HIL) Testing***

The power industry is rapidly evolving with the integration of inverter-based resources (IBRs) and new system loads such as electric vehicles and data centers. Protection and control equipment is also evolving to make the grid smarter and more reliable. New methodologies are required to ensure that protection and control philosophies continue to meet the requirements of the grid. Hardware-in-the-Loop (HIL) testing is a methodology that enables this evolution by allowing the simulation of real-world scenarios such as fault situations encountered in power systems as well as providing insights into system performance and reliability. This workshop will cover how HIL supports the integration of new technologies: 1) The impacts of IBRs on the transmission protection, and 2) The modernization of substations via IEC 61850. It will also include a tour of Quanta Technology's HIL lab.

J. Holbach - Quanta Technology