CIGRE: GRID OF THE FUTURE 2019

MITSUBISHI ELECTRIC
Changes for the Better

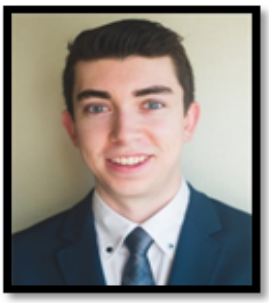
SPEAKERS

Donald Shoup

Donald Shoup, P.E., is the General Manager of the Power Systems Engineering Division (PSED) within Mitsubishi Electric Power Products, Inc. (MEPPI) He graduated from Rensselaer Polytechnic Institute (RPI) in 2000 with a MSEE and focused on electromagnetic transients phenomena during his early years with MEPPI and then pursued power electronics and transient stability initiatives.

Adam Sparacino

Adam Sparacino is a Senior Engineer in the Power Systems Engineering Division (PSED) within Mitsubishi Electric Power Products, Inc. (MEPPI). He has performed electromagnetic and electromechanical transients analyses on the specification, design, and performance verification of transmission class power electronics equipment (SVC and STATCOM) interconnected at voltages ranging from 115 kV to 765 kV. He has also performed dynamic model development and validation (PSCAD/PSSE) for transmission class FACTS devices (SVC/STATCOM) and Inverter-Based Resources (PV and BESS). Adam is a member of the NERC Inverter-Based Resource Task Force (IRPTF). He obtained his MS degree in Electrical Engineering from the University of Pittsburgh where he performed research on the analysis and computer simulation of power electronic conversion devices, battery energy storage systems, AC/DC hybrid power systems, and smart grid technologies.



David Roop

David Roop is a Senior Engineer in the Power Systems Engineering Division (PSED) within Mitsubishi Electric Power Products, Inc. (MEPPI) He worked in Japan for 2.5 years with Mitsubishi Electric Corporation (MELCO), MEPPI's parent company. His primary activities were focused on power electronics, including the Static Var Compensator (SVC), Modular Multi-Level Converter based Static Synchronous Compensator (MMC-STATCOM), Hybrid (SVC+STATCOM), as well as Voltage Source Converter (VSC) based MMC-HVDC efforts. His focus included: System design, specification development, transient and dynamic analyses, control performance studies, feedback controller tuning, harmonic filter design, harmonic impedance and resonance analyses, main equipment specification, multi-device control interaction, integration with renewable resources, and Real Time Digital Simulation (RTDS). David has performed on-site field testing and calibration studies toward North American Electric Reliability Corporation (NERC) MOD (Model) testing for the verification of renewable generating plant dynamic models and data related to MOD-025 (Real/Reactive Power Capability), MOD-026 (Plant Volt-Var Control), and MOD-027 (Active Power/Frequency Control) at both the plant and individual inverter/turbine level. He is a member of the NERC Power Plant Modeling and Verification Task Force (PPMVTF) and Inverter-Based Resource Performance Task Force (IRPTF) initiatives. He is also a member of the Western Electricity Coordinating Council (WECC) Model Validation Working Group (MVWG) and contributor to the High Voltage Direct Current Task Force (HVDCTF) on VSC-HVDC generic dynamic model development. David is the CIGRE US National Committee (USNC) Regular Additional Member Representative for Study Committee (SC) B4 on DC Systems and Power Electronics.

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PRESENTATIONS

Introduction and Inverter-Based Resources (IBRs) Challenges

2 hours plus breaks and Q&A (8:00 AM – 10:30 AM)

Don Shoup, David Roop, Adam Sparacino

This section will kick-off with a review of the fundamentals of Inverter-Based Resources (IBRs), covering key concepts impacting grid reliability and stability of interconnecting wind generation plants, solar generation plants, and energy storage. The complexities of each of the types of IBRs and difficulties in planning will be explored including harmonics, modeling, settings, protection, and expected performance. This module will shine light on key grid challenges associated with wind, solar, and energy storage.

Addressing IBRs Challenges using FACTS and HVDC

2.5 hours plus breaks, Q&A, and lunch (10:30 AM – 2:00 PM)

David Roop, Adam Sparacino

This section will provide mitigation options to the challenges associated with IBRs covered in the prior section. FACTS technologies, such as SVC and STATCOM, synchronous condensers, and HVDC will be reviewed, compared, and key characteristics of each highlighted as potential solutions to the grid issues caused by interconnecting IBRs. The benefits of shunt compensation will be illustrated, drawing comparisons between LCC and VSC technologies. The goal is to demonstrate industry-proven and reliable technologies that are able to provide mitigation to the challenges experience by increasing penetrations of IBRs.