



2023 FALL TECHNICAL WORKSHOP

SAN DIEGO, CA

OCTOBER 23 - 26

Monday, October 23, 2023

8:00 – 9:00 a.m.

Registration & Breakfast

Location: The Terrace

9:00 a.m. – 12:00 p.m.

Tutorial I: HVDC Transmission

Location: Regency Ballroom

Moderator: James Okullo, Director of System Planning, ESIG

Background: High Voltage DC transmission technology is becoming increasingly important for the energy transition. It offers many benefits, such as lower transmission losses, reliability benefits, operational flexibility, the ability to transmit power over long distances, and competitive economics. This tutorial provides a comprehensive understanding of the latest HVDC technology, including its technical characteristics, practical applications and challenges. Whether you're an industry professional or new to HVDC, this tutorial offers valuable insights and knowledge.

Overview of HVDC Technology, its Capabilities, Use Cases, Operational and Markets Benefits, Misconceptions, Technology and Supply Chain Barriers

Johannes Pfeifenberger, Principal, The Brattle Group

Chandra Mohan Sonnathi, Lead HVDC Specialist, DNV

HVDC Fundamentals and State-of-the-Art: A Vendor Perspective

Eugen Starschich, Lead Engineer HVDC, Siemens Energy

Case Studies

Henry Abrams, Manager, Renewable Electrical Engineering, Invenergy

Jinxiang Zhu, Consulting Director, Hitachi Energy

9:00 a.m. – 12:00 p.m.

Tutorial II: High Fidelity IBR Generic Model Development and Validation for Planning, Operating and Protection Studies

Location: Mission Beach

Moderator: John Seuss, Technology Manager, US Department of Energy

Background: This tutorial presents the current state of validated models, the use of these generic models in the positive-sequence fundamental-frequency domain and electromagnetic transient domain, and seeks feedback on future improvements. The tutorial is based on the DOE-funded PV-MOD project, which develops and validates high-fidelity (generic) models of solar photovoltaic, energy storage, and other inverter-based resources for use in power system analysis (<https://www.epri.com/pvmod>). The tutorial will explore the use of generic models conforming with IEEE standards 1547 and 2800 technical minimum requirements to foster

understanding of those requirements and to generate reference traces that could be used in plant-level conformity assessment during the interconnection process.

- 9:00 a.m. Background and Motivation
Jens Boemer, Technical Executive, EPRI
- 9:15 a.m. High-level review of Power Electronics Basics for PV Inverters, IBR Controls, and Applicable IEEE Standards
Jens Boemer, Technical Executive, EPRI
- 9:30 a.m. Generic IBR Positive Sequence Models for Solar PV and Storage
Deepak Ramasubramanian, Technical Leader, EPRI
- 10:20 a.m. Break (person-to-person Q&A)
- 10:40 a.m. Generic EMT Model for Solar PV and Storage conforming with IEEE 2800-2022
Deepak Ramasubramanian, Technical Leader, EPRI
- 11:10 a.m. Potential Use Cases of Generic Models to Generate Reference Traces for Plant-Level Conformity Assessment in the Interconnection Process
Jens Boemer, Technical Executive, EPRI
- 11:40 a.m. High-level review of DER Modeling for Transmission Planning Studies
Jens Boemer, Technical Executive, EPRI
- 11:45 a.m. Additional Q&A / Overflow
- 12:00 p.m. Adjourn

10:15 – 10:45 a.m.

Break

Location: Regency Foyer

12:00 – 1:15 p.m.

Lunch

Location: The Terrace

1:15 – 2:00 p.m.

Introduction & Keynote Comments

Location: Regency Ballroom

Welcome

Mark Ahlstrom, President, ESIG Board of Directors & NextEra Energy Resources

Keynote Comments

Allison Clements, FERC Commissioner

Industry Overview

Charlie Smith, Executive Director, ESIG

2:00 – 3:30 p.m.

Opening Plenary Session: Grid Enhancing Technologies

Location: Regency Ballroom

Chair: **Julia Selker**, Executive Director, WATT Coalition

Grid Enhancing Technologies – Status and Prospects

Ken Donohoo, Consultant

A GETs Business Case

Julian Leslie, Head of Networks, National Grid ESO (UK)

Dynamic Line Rating

Brian Berry, Chief Product Marketing Officer, Ampacimon

System Reconfiguration

Pablo Ruiz, Sr. Consultant, The Brattle Group, and CEO/CTO, NewGrid

Advanced Power Flow Control

Frank Kreikebaum, CTO, Smart Wires

3:30 – 4:00 p.m.

Break

Location: Regency Foyer

4:00 – 5:30 p.m.

Session 2: IBR and GFM Studies and Tools

Location: Regency Ballroom

Chair: **Jason MacDowell**, Chief Systems Integration Officer, ESIG & GE Energy Consulting

EMT Inverter-Based Resource Plant Modeling- How Consultants, Developers, OEMs, and Grid Operators Can Create Best Practices Together

Kelsey Ciemny, Senior Power Systems Engineer, Telos Energy

Different Types of Fast Frequency Response from IBRs

Jin Tan, Principal Engineer, NREL

System Services from GFM Wind and STATCOMs

Xiongfei Wang, Professor, KTH Royal Institute of Technology (Sweden)

Benefits of GFM in West Texas Using Generic Models

Yunzhi Cheng, Manager, Operations Stability Analysis, ERCOT

6:00 – 8:30 p.m.

Board Meeting & Dinner (*only open to ESIG board members*)

Location: Mission Beach

Tuesday, October 24, 2023

7:00 – 8:00 a.m.

Registration & Breakfast

Location: The Terrace

8:00 – 9:45 a.m.

Session 3: Building Sector Decarbonization in Energy Systems Modeling

Location: Regency Ballroom

Chair: **Sean Morash**, Principal, Telos Energy

Opportunity for HVAC in the Building Sector

Lieve Helsen, Professor, KU Leuven (Belgium)

Targeting New Heat Pump Customers and Quantifying Impacts on Demand Flexibility

Brian Gerke, Director, Forecasting & Methods, Recurve

Impact of Building Electrification on the Electric System of the Future

Erik Delarue, Associate Professor, KU Leuven (Belgium)

Strategy for Building Electrification and Gas Decommissioning in CA

Ari Gold-Parker, Associate Director, Energy and Environmental Economics (E3)

9:45 – 10:15 a.m.

Break

Location: Regency Foyer

10:15 a.m. – 12:00 p.m.

Session 4: Grid Code Interconnection Requirements Assessment

Location: Regency Ballroom

Chair: **Jens Boemer**, Technical Executive, EPRI

Compliance Assessment Process

Babak Badrzadeh, Technical Director – Power Systems, Aurecon (Australia)

Generator Grid Code Compliance Using Simulation Models

Jan-David Schmidt, Senior Engineer R&D, Energynautics GmbH (Germany)

German Grid Code Compliance Assessment Practice

Jens Fortmann, Professor, Wind Energy and Grid Integration HTW Berlin (Germany)

Grid Code Compliance – A Vendor Perspective

Sebastian Achilles, Managing Director Power Systems Operation and Planning,
GE Power

12:00 – 1:15 p.m.

Lunch

Location: The Terrace

1:15 – 3:00 p.m.

Session 5: Transmission and Interconnection

Location: Regency Ballroom

Chair: **Josh Novacheck**, Transmission Planning Engineer, NextEra Energy Resources

IBR Grid Connection Studies – Lessons Learned

Babak Badrzadeh, Technical Director – Power Systems, Aurecon (Australia)

DOE i2x Roadmap for Queue Management and Cost Allocation.

Will Gorman, Research Scientist, LBNL

CAISO Interconnection Process Enhancements
Danielle Osborn Mills, Principal, Infrastructure Policy Development, CAISO

Integrating Transmission , Interconnection and RA Planning
Rob Gramlich, President, Grid Strategies

3:00 – 3:30 p.m.

Break

Location: Regency Foyer

3:30 – 5:15 p.m.

Session 6: GFM Developments

Location: Regency Ballroom

Chair: **Julia Matevosyan**, Chief Engineer, ESIG

Value of GFM DER in High Penetration Scenarios
Deepak Ramasubramanian, Technical Leader, EPRI

Future Role of Hybrid Simulations in Assessing the Dynamic Stability of IBR Dominated Power Systems
Wallace Kenyon, Power Systems Simulation Lead, encoord

NGESO Experience with Inertia Monitoring and Measurements
Julian Leslie, Head of Networks, National Grid ESO (UK)

Parallel operation of GFM and GFL IBR with Synchronous Machines
Shahil Shah, Principal Engineer, NREL

Transient Stability of GFM
Behrooz Bahrani, Associate Professor, Monash University (Australia)

6:30 – 8:00 p.m.

Networking Reception

Location: The Pool

Wednesday, October 25, 2023

7:00 – 8:00 a.m.

Breakfast

Location: The Terrace

8:00 – 9:45 a.m.

Session 7: Market Topics

Location: Regency Ballroom

Chair: **Bethany Frew**, Group Manager, Capacity Expansion & Electricity Markets Group, NREL

System Services for a 100% Renewable Power System
Mark O'Malley, Leverhulme Professor of Power Systems, Imperial College (UK)

The Value of Modeling DA/RT Uncertainty in Market Simulations
Sasha Kuzura, Research Associate, The Brattle Group

Assessing Nodal Adequacy of Large VRE Power Systems with New Adequacy Metrics
Reflecting RA Contributions of G, T & D
Selin Yanikara, Polaris Systems Optimization

Advances in Energy Storage Modeling for Improved Market Efficiency
Nikita Singhal, Senior Technical Leader, EPRI

9:45 – 10:15 a.m.

Break

Location: Regency Foyer

10:15 a.m. – 12:00 p.m.

Session 8: Transmission – From DER to HVDC

Location: Regency Ballroom

Chair: **James Okullo**, Director of System Planning, ESIG

Interregional Transfer Capability Study
William Lamanna, Senior Engineer, NERC

HVDC Transmission's Role in the Energy Transition
Henry Abrams, Manager, Renewable Electrical Engineering, Invenergy

Challenges Connecting the Interconnections
Kris Zadlo, Chief Commercial & Technology Officer, Grid United

HVDC Planning and Operations in CAISO
Ebrahimi Rahimi, Sr. Advisor - Transmission Planning, CAISO

12:00 – 1:15 p.m.

Lunch

Location: The Terrace

1:15 – 3:15 p.m.

Session 9: Power Systems Planning and Operations

Location: Regency Ballroom

Chair: **Aidan Tuohy**, Director, EPRI

System Operation with High Shares of Renewables
Caixia Wang, Senior Engineer, SGERI (China) (invited)

Realistic Modeling of Energy Storage Dispatch and Ancillary Service Provisions
Arne Olsen, Senior Partner, Energy + Environmental Economics (E3)

Modeling the Value of Existing Pumped Storage Hydro in a High Renewable Future -
Genevieve de Mijolla, Technical Leader, EPRI

Operational Readiness for Inverter-Based Resources
Scott Anderson, Director – Operational Readiness, Salt River Project

Operations Challenges Driven by Oscillatory Modes in the Southern African Region
Bonginkosi Sibeko, Chief Engineer, National Operations, ESKOM (South Africa)

Large Scale Renewable Energy Integration in the Northeast China Grid
Du Shibo, Senior Engineer, State Grid Northeast Power Dispatching and Control Center

3:15 – 3:45 p.m.

Break

Location: Regency Foyer

3:45 – 5:15 p.m.

Closing Plenary Session: Planning Implications with Large Loads

Location: Regency Ballroom

Chair: **Allison Holly**, Director of Strategy US East, Pattern Energy Group

Overcoming Market Barriers for Transmission Connected Thermal Energy Storage

Michael Walsh, RedoxBlox (Ireland)

Planning for the Interconnection of Large EV Charging Stations

Cora Walter, Project Manager, E-mobility, Con Edison

David Sohmers, Section Manager, Electric Vehicles and Distributed Generation Engineering, Con Edison

Large Loads as a Grid Resource

Andrew Reimers, Director of R&D and Regulatory Affairs, Lancium (Canada)

Interconnection Process and Reliability Requirements for Large Loads in ERCOT

Agee Springer, Manager, Large Load Integration, ERCOT

Closing Comments (5 min)

Charlie Smith, Executive Director, ESIG

6:00 – 8:30 p.m.

Advisory Council Meeting & Dinner (*only open to ESIG Advisory Council & Board Members*)

Location: Mission Beach

Thursday, October 26, 2023

7:00 – 8:00 a.m.

Breakfast

Location: The Terrace

8:00 a.m. – 5:00 p.m.

Working Group Sessions

[\(Click here to download the full Working Group Sessions Schedule\)](#)