



## 2023 SPRING TECHNICAL WORKSHOP

**March 27-30, 2023**

Loews Ventana Canyon Resort – Tucson, AZ

### PROGRAM AGENDA

#### **Monday, March 27, 2023**

8:00 – 9:00 a.m.

##### **Registration & Breakfast**

Location: Foyer

9:00 a.m. – 12:00 p.m.

##### **Tutorial: Integrating Planning Tools and Processes for Effective Planning of Future Power Systems**

Location: Catalina JK

Organizers: **Aidan Tuohy**, Senior Program Manager, EPRI; **Bethany Frew**, Group Manager, Capacity Expansion & Electricity Markets Group, NREL; **Julia Matevosyan**, Chief Engineer, ESIG; **Jason MacDowell**, Chief Systems Integration Officer, ESIG

As the power system continues to decarbonize and add more renewables, energy storage and demand side resources, planning methods have to evolve to ensure continued reliability and economic effectiveness. At the same time, they must meet new requirements for decarbonization, resilience and customer preferences. This will require revisiting how we currently plan the power system, as different modeling tools and processes have evolved over the years to study different aspects of system planning. This includes capacity expansion, production cost and resource adequacy, power flow and dynamics, distribution planning and other study areas. While there has always been some linkages between these areas, industry now needs to revisit and strengthen these linkages to better reflect issues that cut across multiple areas.

For example, using production cost modeling data to inform transmission planning cases requires more detailed consideration, now that simply studying peak and off-peak cases may no longer shed light on the highest risk periods, and results from the power flow and dynamic studies may have greater impact on how the system should be dispatched. Similarly, new technologies such as energy storage and various demand side resources can provide a greater range of services across generation, transmission and distribution and therefore need greater tool and model integration. This session will describe the need for more integrated planning, discuss the latest developments in the area and identify gaps.

First, researchers and power system study experts will provide an overview of the main challenges and current leading-edge practices with a set of detailed presentations. Then a panel of utility and ISO experts will provide their view on specific areas of the integrated planning discussion. Questions to be answered include the following:

- What does an analytical framework for integrated planning look like, and how does it change depending on the regulatory structure of the region studied?
- What tools can be used to integrate planning processes?
- How is data shared between tools and information transferred from one tool to another, particularly in a two-way fashion?
- What changes are being made in companies to better structure their organizations to respond to integrated planning needs?
- What tool capabilities are going to be more useful and necessary as the system evolves?

Introduction to Session

**Aidan Tuohy**, Senior Program Manager, EPRI (5 mins)

Integrated Strategic System Planning – What Are the Needs, What Does a Framework Look Like?

**Anish Gaikwad**, Senior Program Manager, EPRI (30 mins)

Linking Modeling Tools for Analyzing High Renewable Systems  
TBD, NREL

10:15 – 10:35 a.m.

**Break**

Location: Foyer

Advanced Linkages Between Power Flow and Production Cost

**Gene Hinkle**, Managing Director, Business Operations & Power Economics GE Energy Consulting (30 mins)

Panel (7-10 mins per panelist)

Starting Up Integrated Planning Processes

**Angie Bond-Simpson**, Director, Integrated System Planning & Support, Salt River Project

Data Management and Linking Tools

TBD, MISO

Tool Integration to Study Future Energy Systems

**Carlo Brancucci**, Co-founder/CEO, encoord

Linking Planning Processes

TBD

Panel discussion (15-25 mins)

9:00 a.m. – 12:00 p.m.

**Special Event: An Introduction to G-PST**

Location: Catalina L

**Session Purpose:** The Global Power System Transformation Consortium (G-PST) is an international collaboration whose mission is to catalyze a rapid clean energy transition at unprecedented scale and speed. G-PST provides a coordinated and holistic approach to the necessary knowledge, education and support to power system operators across its 5 Action Pillars or workstreams. G-PST has a strong education and collaboration component to it; one goal of this peer learning is to share the learnings of those farther along with those just coming up the learning curve in order to circumvent the need for everyone to learn the same lessons over again. To that end, today's event will describe the operation of the G-PST and feature system operators from Ukraine, Vietnam and Colombia who have been participating in the

program, the challenges they are facing, the advances they have made, and the challenges which remain before them. The panel session seeks to engage system operators with a range of experience in decarbonization in the conversation, to better understand the path ahead and stimulate ideas for better sharing of experience and lessons learned to help accelerate the energy transition.

**Who should attend:** Anyone who would like to know more about the Global Power System Transformation (G-PST) consortium; utilities and system operators who are on the early part of their journey to transformation of their own system and would like to share experiences with other like-minded system operators; those who are further along the journey and would like to offer guidance and assistance; anyone curious about the challenges and opportunities facing these system operators and interested in contributing to the discussion.

Chair: **Karin Wadsack**, Program Manager, Innovation and Entrepreneurship Center, NREL

GPST Overview (including short descriptions of G-PST five action pillars)  
**Karin Wadsack**, Program Manager, NREL

Introduction to International Activities through Pillar 2, Country Partnerships  
**Amy Rose**, Energy Analyst, NREL

“Ukrenergo Synchronization with ENTSO-E: Recent Experiences and Power System Repair/Restoration Activities.” Presenters from Ukrenergo will review challenges of power system operation during the war, and discuss the role of last year’s synchronization with ENTSO-E in maintaining power supply during critical stress periods.

**Kateryna Deikun-Stepanchuk**, Ukrenergo (Ukraine)  
**Liubov Lapko**, Ukrenergo (Ukraine)

“Variable Renewable Energy Challenges and Considerations on the Colombia Power System.” XM will present on the Colombia system to provide the context for challenges including a) the need for real-time inertia calculation considering anticipated decrease, b) flexibility adequacy for a changing set of power generation assets, and c) current calculation of reserve requirements and approach to new methodology including dynamic information processing for, specifically, secondary frequency reserves with uncertainty of solar and wind contribution.

**Laura Yulieth Agudelo**, XM (Colombia)  
**Jorge Andrés Mola**, XM (Colombia)

10:15 - 10:35 a.m.

**Break**

Location: Foyer

“Vietnam, a system in rapid transition.” Vietnam has experienced massive growth in rooftop and utility-scale solar over the last 4 years. NLDC, the power system operator, will share challenges, lessons learned, and the solutions they are implementing for planning, operation, and the deployment of new tools on their system.

**Thanh Hai Tran**, NLDC, Vietnam  
**Linh Duy Bui**, NLDC, Vietnam

Middle East Renewables Integration Study, EPRI - (leveraging the interconnection between 6 countries to better integrate renewables, share capacity and flexibility, integrate energy storage)

## Facilitated Panel Discussion and Q&A with audience

- How have the training and capacity building needs of your SO staff changed with the energy transition? What are you doing to address these emerging needs?
- How has peer exchange with other SOs helped overcome challenges and accelerate the deployment of solutions? What specific technical challenges or solutions lend themselves to peer exchange with other SOs?
- What additional types of technical assistance from those further along in the energy transition would have the most benefit?
- What opportunities exist for regional cooperation to help accelerate the energy transition in your region?

12:00 – 2:00 p.m.

### **Lunch**

Location: Bill's Grill

2:00 – 5:00 p.m.

### **Introduction & Keynote Comments**

Location: Catalina Ballroom

2:00 - 3:15 p.m.

Welcome

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

Keynote Comments: Planning for the Energy Transition

**Alice Jackson**, SVP, System Strategy & Chief Planning Officer, Xcel Energy

Meeting Overview

**Charlie Smith**, Executive Director, ESIG

3:15 – 3:45 p.m.

### **Break**

Location: Foyer

3:45 – 5:00 p.m.

### **Opening Plenary: A Panel Discussion: High VRE Future – A Way Forward**

Chair: **Danielle Merfeld**, VP and Chief Technology Officer, GE Renewable Energy

- **Alice Jackson**, SVP, System Strategy & Chief Planning Officer, Xcel Energy
- **Jaquelin Cochran**, Director, Grid Planning and Analysis Center, NREL
- **Debbie Lew**, Associate Director, ESIG

6:00 – 8:30 p.m.

### **Board Meeting & Dinner**

Location: Executive Boardroom

## **Tuesday, March 28, 2023**

7:00 – 8:00 a.m.

### **Registration & Breakfast**

Location: Foyer

8:00 – 9:45 a.m.

### **Session 1: Interregional Transmission**

Location: Catalina Ballroom

Chair: **Debbie Lew**, Associate Director, ESIG

Interregional Transmission – A Landscape Analysis  
**Michael Skelly**, CEO, Grid United

National Transmission Needs Study  
**Adria Brooks**, Transmission Engineer, US Department of Energy

National Transmission Planning Study Update  
**David Palchak**, Transmission Group Manager, NREL

European Transmission Planning with Offshore Networks  
**Antje Orths**, Chief Engineer, Energinet (Denmark)

9:45 – 10:15 a.m.

**Break**

Location: Foyer

10:15 a.m. – 12:00 p.m.

**Session 2: Scaling EVs - Grid Considerations**

Location: Catalina Ballroom

Chair: **Obadiah Bartholomy**, Manager, Distributed Energy Strategy, SMUD

Utility EV Forecasting Grid Expansion

**Andy Eiden**, Principal Planning & Strategy Analyst, Distributed Resources, Portland  
General Electric (invited)

Value of EV Managed Charging to Bulk Power Systems

**Elaine Hale**, Senior Research Engineer, NREL

Evolution of Distribution Planning for Utilities

**Dom Fuda**, Director – Future of Electric, National Grid (invited)

Reliability Considerations with Large-scale EV Charging

**Joe Eto**, Senior Advisor: Electricity Markets & Policy Department, LBNL

12:00 – 12:30 p.m.

**Annual Meeting**

Location: Catalina Ballroom

12:30 – 1:45 p.m.

**Lunch**

Location: Bill's Grill

1:45 – 3:30 p.m.

**Session 3: GFM Requirements and Specifications**

Location: Catalina Ballroom

Chair: **Ben Kroposki**, Director - Power Systems Engineering Center, NREL

ENTSO-E Requirements for Generators 2.0 Including GFM Specifications

**Mario Ndreko**, Electrical System Design, TenneT TSO GmbH (Germany)

GFM Batteries: A Unique Window of Opportunity

**Julia Matevosyan**, Chief Engineer, ESIG

UNIFI GFM Performance Requirements

**Deepak Ramasubramanian**, Technical Leader, EPRI

NG ESO GFM Specification Best Practice Application Guide  
**Nick Harvey**, Head of Network Operability, National Grid ESO (United Kingdom)

AEMO Draft Grid Forming Specifications  
**Nilesh Modi**, Specialist, AEMO (Australia) (invited)

3:30 – 4:00 p.m.

**Break**

Location: Foyer

4:00 – 5:30 p.m.

**Session 4: Power Systems Operation**

Location: Catalina Ballroom

Chair: **John Simonelli**, Managing Director, Flashover LLC

Optimal Real-time Operations of Storage and Hybrids  
**Gary Dorris**, CEO, Ascend Analytics

Lessons Learned from 20 Years of International Renewables Integration Consulting  
**Thomas Ackermann**, CEO/Founding Partner, Energynautics (Germany)

New Valuation and Opportunities for Pumped Storage Hydro  
**Nick Miller**, Principal, HickoryLedge LLC

System Balancing in China with Higher Shares of Renewables  
**Caixia Wang**, State Grid Energy Research Institute (China) (invited)

6:30 – 8:00 p.m.

**Networking Reception**

Location: Bill's Grill

**Wednesday, March 29, 2023**

7:00 – 8:00 a.m.

**Breakfast**

Location: Foyer

8:00 – 9:45 a.m.

**Session 5: IBR Studies and Tools**

Location: Catalina Ballroom

Chair: **Jason MacDowell**, Chief Systems Integration Officer, ESIG

Dynamic Stability Screening Approaches for High IBR Systems  
**Matt Richwine**, Founding Partner, Telos Energy

Analysis of 19.5 Hz Oscillation on Kaua'i Island System  
**Jin Tan**, Principal Engineer, NREL

Dynamic Performance Optimization for 100% Inverter-based Power Systems:  
Experiences from Hawai'i Island.  
**Ulrich Münz**, Principal Key Expert - Control Systems with Focus on Energy Automation  
and Grid Control, Siemens AG

New System Strength Metrics  
**TBD**

9:45 – 10:15 a.m.

**Break**

Location: Foyer

10:15 a.m. – 12:00 p.m.

**Session 6: Different Aspects of Resource Adequacy**

Location: Catalina Ballroom

Chair: **Tom Acker**, Sr. Principal Engineer, Salt River Project

Climate and Weather Impacts on Resource Adequacy

**Justin Sharp**, Principal/Owner, Sharply Focused LLC

Probabilistic Operational Reserves Strategy with Increasing Solar and Storage

**Sean Morash**, Principal, Telos Energy

A New Resource Adequacy Methodology

**Gord Stephen**, Grid Systems Research Engineer, NREL

Modeling Transmission and Demand Side Resources in RA Studies

**Irene Danti Lopez**, EPRI

RA Reform: Uncertain Heterogenous Markets

**Leah Kaffine**, Director of Energy Market Fundamentals, Pattern Energy

12:00 – 1:30 p.m.

**Lunch**

Location: Bill's Grill

1:30 – 3:00 p.m.

**Session 7: Planning Implications with Storage and IBRs**

Location: Catalina Ballroom

Chair: **Aidan Tuohy**, Senior Program Manager, EPRI

Energy Storage Developments and Application in the Northeast China Grid

**Sun Yu**, Northeast China Branch of SGCC (China)

Long Duration Energy Storage

**Babu Chalamala**, Manager of Energy Storage Technology and Systems Department, Sandia National Laboratory

Application of GFM Batteries in Australia

**Luke Robinson**, Group Manager Modelling & Engineering, AEMO (Australia) (invited)

Renewables and Pumped Hydro for the Alaskan Railbelt

**Jonghwan Kwon**, Energy Systems Engineer, ANL

3:00 – 3:30 p.m.

**Break**

Location: Foyer

3:30 – 5:20 p.m.

**Session 8: Closing Plenary Session - Flexibility in Sector Coupling**

Location: Catalina Ballroom

Chair: **Anders Bavnhoj Hansen**, Chief Engineer, Energinet (Denmark)

ENTSO-E/G Long-term Scenarios for a Sector Coupled System  
**Antje Orths**, Chief Engineer, Energinet (Denmark)

Sector Coupling System Design Towards Carbon Neutrality and Market Challenges – a German Perspective  
**Ralph Pfeiffer**, Head of National and European Grid Planning Processes, Amprion GmbH (Germany)

Power Market Solutions for a Highly Sector Coupled System - a US LMP Perspective  
**Alex Rudkevich**, President, Newton Energy Group

Integrated Energy Sector Planning  
**Carlo Brancucci**, Co-founder/CEO, encoord

System Development Towards a Highly Sector Coupled Energy System – Strategy and R&D Roadmap for Denmark  
**Anders Bavnhoj Hansen**, Chief Engineer, Energinet (Denmark)

5:20 – 5:30 p.m.

**Closing Comments**

**Charlie Smith**, Executive Director, ESIG

**Thursday, March 30, 2023**

7:00 – 8:00 a.m.

**Breakfast**

Location: Foyer

9:00 a.m. – 12:00 p.m.

**Reliability Working Group**

Location: Salon J

Chair: **Jason MacDowell**, Chief Systems Integration Officer, ESIG

Stability Task Force – Oscillations Guide (45-60 min)

**Nick Miller**, Principal, HickoryLedge LLC

Services Task Force (30-45 min)

**Deepak Ramasubramanian**, Technical Leader, EPRI

GFM Landscape Paper (10-15 min)

**Julia Matevosyan**, Chief Engineer, ESIG

GFM capabilities/performance with different GFM controls (20-30 min)

**Shahil Shah**, Senior Research Engineer, NREL

GPST GFM Technical Council update

**Jason MacDowell**, Chief Systems Integration Officer, ESIG

I2X project update (10 min)

**Julia Matevosyan**, ESIG and **Jason MacDowell**, ESIG

Group Discussion (10-15 min)

9:00 – 11:00 a.m.

**System Planning Working Group**

Location: Salon K



Chair: **Aaron Bloom**, Sr. Director of Regulatory Affairs, NextEra Energy Resources and **Josh Novacheck**

Transmission Resilience Task Force  
**Warren Lasher**, President, Lasher Energy Consulting

DERs and Transmission  
**Keegan Moyer**, Principal, Energy Strategies

Integrated Planning  
**Josh Novacheck**,

Group Discussion

10:00 – 10:30 a.m.

**Break**

Location: Foyer

11:00 a.m. – 12:00 p.m.

**New Resource Adequacy Task Force**

DOE Resource Adequacy – Tools and Data  
**Bethany Frew**, Group Manager, Capacity Expansion & Electricity Markets Group, NREL, **Debbie Lew**, Associate Director, ESIG, and **Aidan Tuohy**, Sr. Program Manager, EPRI

Overview of project (10 min)

Past work and how this new task force fits in (30 min)

Interactive topics and polling (10 min)

Task Force expectations and vision (10 min)

12:00 – 1:00 p.m.

**Lunch**

Location: Bill's Grill

1:00 – 4:00 p.m.

**System Operations and Market Design Working Group**

Location: Salon J

Chair: **Aidan Tuohy**, Senior Program Manager, EPRI and **Erik Ela**, Principal, EPRI

DOE Resource Adequacy – Tools and Data  
(continued discussion)

Capacity Accreditation Task Force  
**Derek Stenclik**, Founding Partner, Telos Energy

Markets for 100% Clean Energy Task Force  
**Erik Ela**, EPRI and **Debbie Lew**, ESIG

Flexibility/Hydrogen Task Force  
**Aidan Tuohy**, EPRI

Extreme Weather Task Force  
**Justin Sharp**, Sharply Focused

Group Discussion

1:00 – 3:00 p.m.

**DER Working Group**

Location: Salon K

Chair: **Obadiah Bartholomy**, Manager, Distributed Energy Strategy, SMUD

Grid Planning for Transportation Electrification Task Force (30 min)

**Sean Morash**, Principal, Telos Energy

Transmission-Distribution-Customer Coordination Initiative (30 min)

**Brian Levite**, Senior Manager, ICF and **Paul DeMartini**, Consultant

Group Discussion

Buildings Task Force (30 min)

**Obadiah Bartholomy**, Manager, Distributed Energy Strategy, SMUD

Group Discussion

2:30 – 3:00 p.m.

**Break**

Location: Foyer