

President's Report - 2025



ESIG

ENERGY SYSTEMS
INTEGRATION GROUP

2023

The ESIG Team



Staff

- **Debbie Lew**, Executive Director
- **Julia Matevosyan**, Associate Director, Chief Engineer
- **Charlie Smith**, Principal Consultant
- **Ryan Willis**, Director, Marketing & Operations
- **Matthew Schuerger**, Senior Fellow
- **James Okullo**, Director of System Planning
- **Erik Ela**, Director of System Operation and Electricity Markets
- **Alex Shattuck**, Director of Grid Transformation
- **Karin Matchett**, Director of Publications
- **Lacey Jamison**, Assistant Director, Marketing
- **Brooke Brown**, Operations and Maintenance Users Group Director

ESIG Board of Directors - 2024



- Mark Ahlstrom, President
NextEra Energy Resources
- Obadiah Bartholomy, VP
Sacramento Municipal Utility District
- Joe Lang, Secretary
Omaha Public Power District
- Rashid Abdul, Treasurer
WEG Transformers USA
- Jennifer Curran
MISO
- Bjorn Hedges
NAES Corporation
- Aidan Tuohy
EPRI
- Cristin Lyons
ScottMadden
- Tracey Kutney
Natural Resources Canada
- William D'haeseleer
KU Leuven University
- Karen Onaran
Electricity Consumers
Resource Council
- Ric O'Connell
GridLab
- Bethany Frew
NREL
- Jeff Bladen
Verrus
- Stephen Martz
Xcel Energy
- Will Kaul
Ex Officio (GRE, retired)

Advisory Council Members

**John Di Stasio**

President, Large Public Power Council

Emily Fisher

General Counsel & Corporate Secretary, Edison Electric Institute

Rob Gramlich

Founder & President, Grid Strategies

Bryan Hannegan

President & CEO, Holy Cross Energy

Ben Hobbs

Director, Johns Hopkins University
Environment, Energy, Sustainability & Health
Institute

James Hoecker

former Federal Energy Regulatory Commission
(FERC) Chair

Caixia Wang

Vice Director of Renewable Energy Department,
State Grid Energy Research Institute
A division of State Grid Corporation of China (SGCC)

Peter Markussen

CEO, Associated Activities, Energinet

Sonya Twohig

Secretary-General, ENTSO-E

Martin Keller

Laboratory Director, National Renewable Energy
Laboratory (NREL)

John Moore

Director, National Resources Defense Council,
Sustainable FERC Project

Rolf Nordstrom

President & CEO, Great Plains Institute

Allen Schriver

(retired), Former Chief Operating Officer, North
American Generator Forum

Daniel Walsh

Senior Power Supply and Generation Director,
National Rural Electric Cooperative Association
(NRECA)

Bryn Baker

Director, Policy Innovation, Clean Energy Buyers
Alliance

ESIG Differentiators and Mission



DIFFERENTIATORS

Stellar Technical Reputation | Best in Class, Global Reach | Independent and Trusted

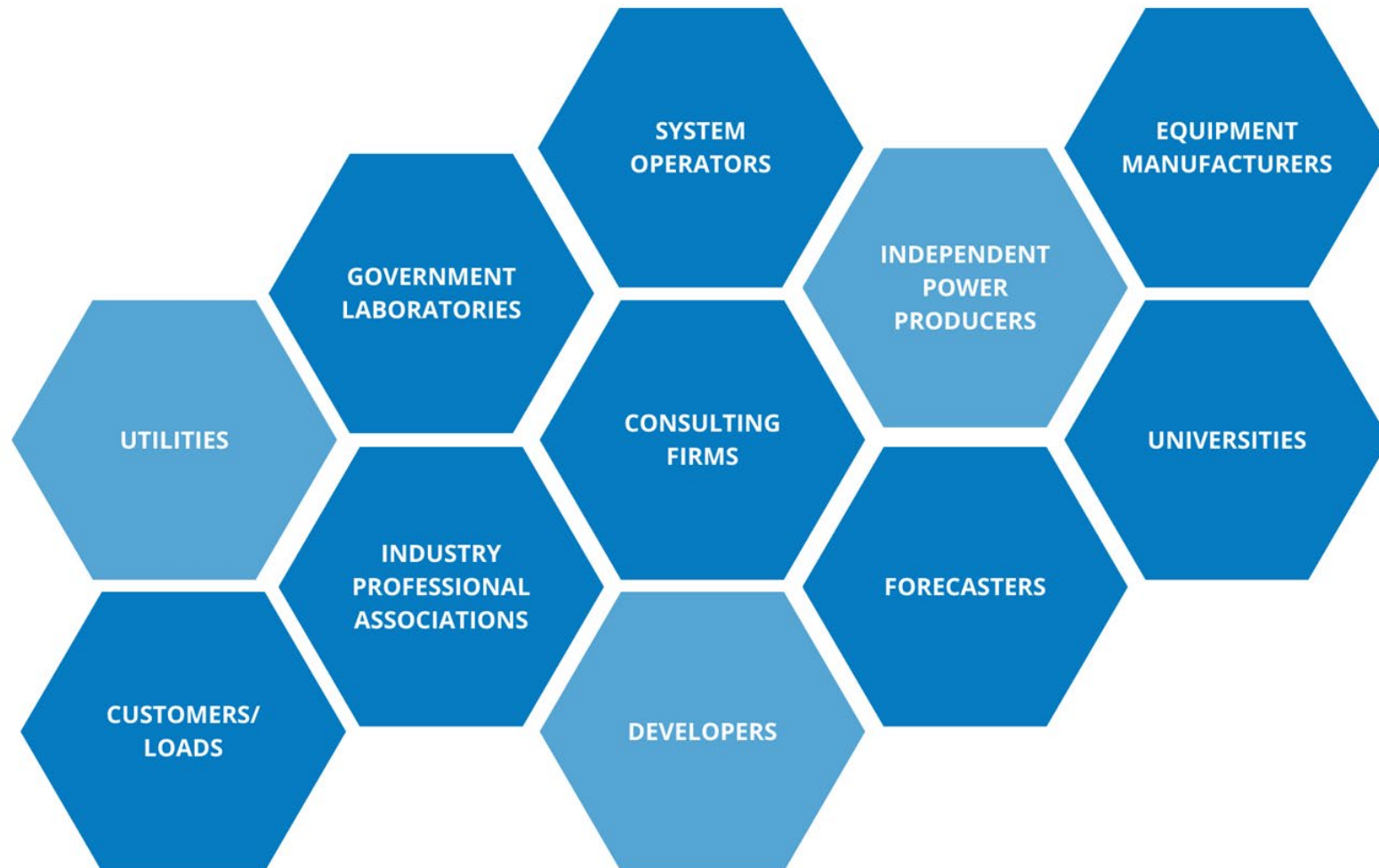
MISSION

- Address the technical challenges for transforming energy systems through collaboration, education and knowledge sharing
- Work with all industries, energy vectors and applications globally
- Forward leaning, but not advocating, keeping everyone at the table
- Working at the cutting edge of the technical pathways toward 100%
- Pragmatically progressive—reliable, economic and sustainable transformation

ESIG Membership



270+ Members Globally



2024: In-Person Meetings



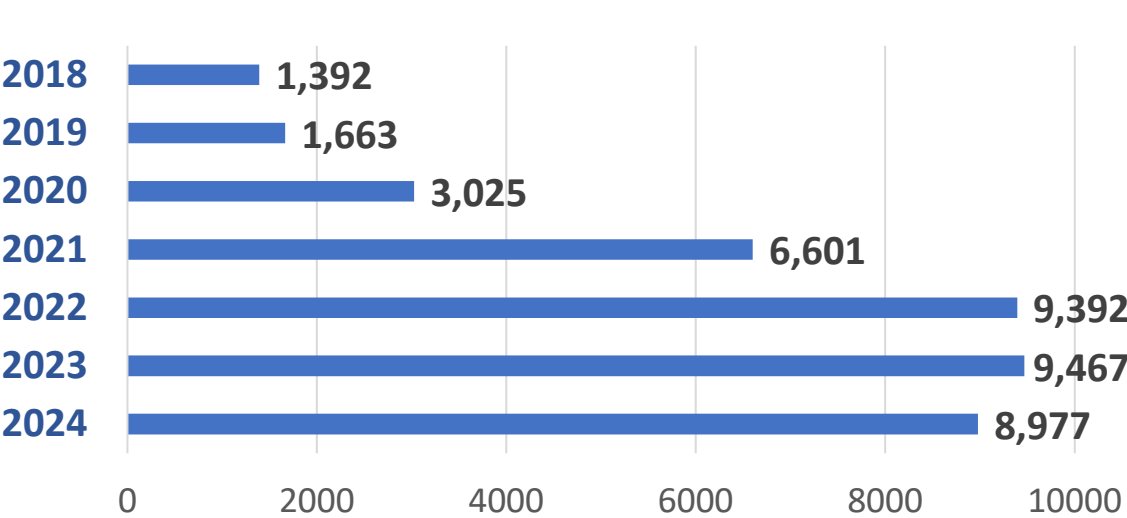
- Spring Technical Workshop (March - Tucson, AZ) – **257 attendees**
- Spring O&M Users Group Meeting (April – Orlando, FL) – **122 attendees**
- Forecasting & Markets Workshop (June – Salt Lake City, UT) – **148 attendees**
- Fall O&M Users Group Meeting (September – Boston, MA) – **82 attendees**
- Fall Technical Workshop (October – Providence RI) – **350 attendees**

Total Number of Attendees: 959

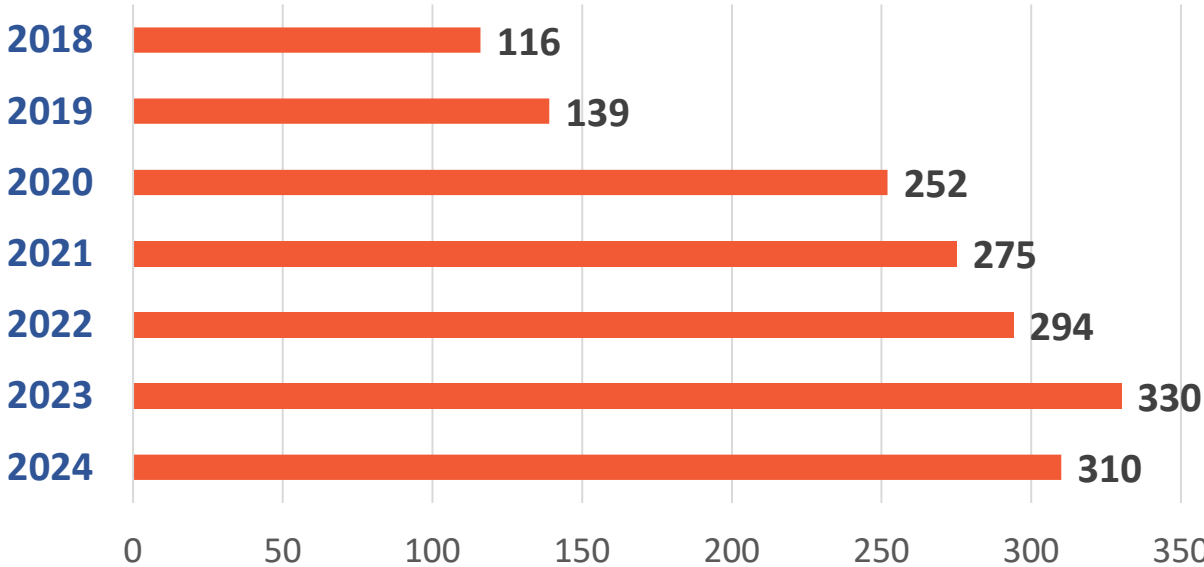
Monthly Webinars



Monthly Webinars (Total Attendees)



Monthly Webinars (Avg # of Attendees Per Webinar)



Working Groups and Task Forces Structure



System Planning WG Josh Novacheck

Resilience Benefit Quantification for Transmission Planning TF

Warren Lasher

Integrated Planning TF (joint with DER&RWG)

Aaron Burdick

Planning for 100% Clean Energy TF

Elaine Hart

Long-term Load Forecasting TF (joint w/ DER)

Julieta Giraldez

Integrating Across Siloes of Transmission Planning

Ahmed Rashwan

System Ops & Market Design WG Justin Sharp

Resource Adequacy TF

Derek Stenclik

Markets for 100% Clean Electricity TF

Robin Hytowitz

Flexibility TF

Aidan Tuohy

Large Loads Task Force (Joint with SPWG, SOMDWG, RWG)

Sam Morris

DER WG Obadiah Bartholomy

Demand Response Project Team

Derek Stenclik

Buildings TF

Sean Morash

EV Load Forecasting Guide

Matt Schuerger

Reliability WG Dustin Howard

High Share of IBR TF

Julia Matevosyan

GFM Testing Project Team

Shahil Shah

Oscillations Project Team

Nick Miller

Services Project Team

Matt/Julia/Deepak

Benefits of GFM BESS Project Team

Ryan Quint

i2X Forum for Implementation of Reliability Standards for Transmission

Julia Matevosyan

Research & Education WG Tom Acker

Users Groups Structure



Operations &
Maintenance

Ninowska
Bosworth

Probabilistic
Forecasts in
Planning &
Operations

Nitika Mago

Grid Enhancing
Technologies

Ken Donohoo

Operations & Maintenance Users Group Conferences



Spring 2025 O&M Users Group Conference

April 1-3, 2025

Denver, CO

Opening Plenary Session

Topics are generally inclusive to all members' fleet machines, including converters, blade damage and other topics

Off-site Tours and Networking Reception

Roundtables offered:

- Balance of Plant
- Vestas (V100 & Legacy)
- GE (1X & 2X)
- Siemens Legacy
- SGRE 3X
- Gamesa
- Blades
- Solar
- Energy Storage
- Cybersecurity

System Planning Working Group



[Resilience and Transmission Task Force](#) – June 2024

[DER Impacts on Transmission Report](#) – Feb 2024 (Updated May 2024)

Launching [Task Force](#) following [Long-term Load Forecasting workshop](#) – 2023

[Integrating Energy Equity into Power System Planning and Operations Workshop](#) – Nov 2022

[Capacity Expansion Modeling for Transmission Planning Workshop](#) – Oct 2022

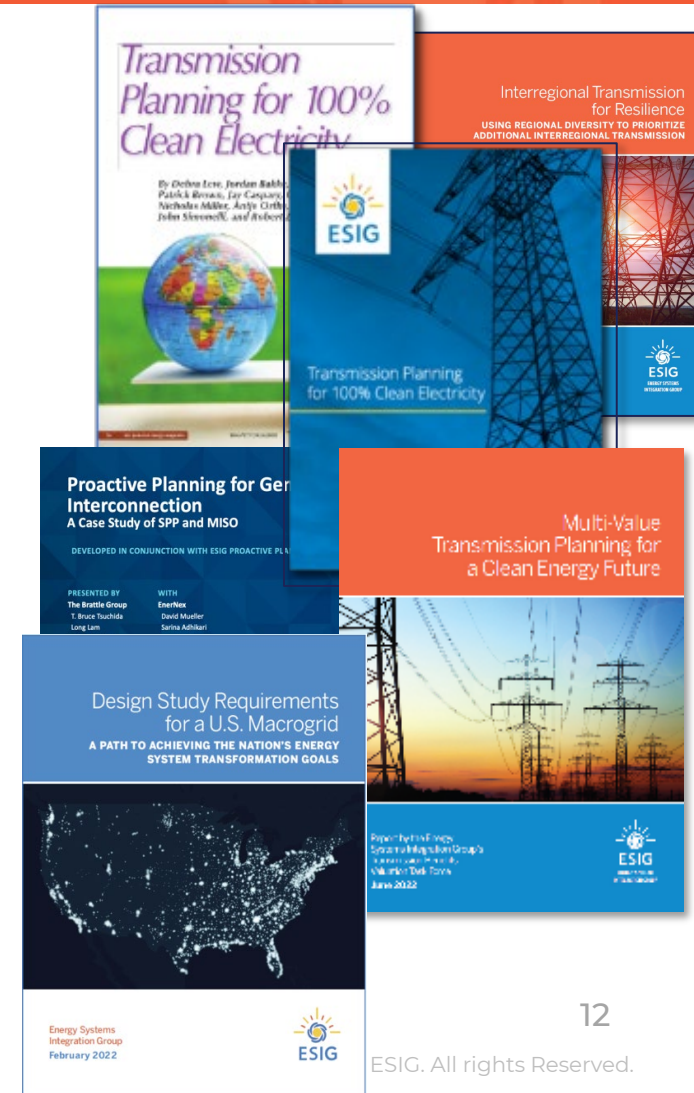
[Proactive Planning for Generator Interconnection](#) - Sep 2022

[ESIG/NERC/EPRI/NAGF Generator Interconnection Workshop](#) – Aug 2022

[Multi-Value Transmission Planning for a Clean Energy Future Report](#) – July 2022

[Macrogrid Design Studies Report](#) – March 2022

[Transmission Planning for 100% Clean Electricity Report](#) – Feb 2021



Integrated Planning (SPWG, DERWG, RWG)



[Capacity Expansion Modeling for Transmission Planning Workshop](#) – Oct 2022

[Integrated Planning Workshop](#) – Oct 2024

[System Expansion Modeling Workshop](#) – Nov 2024

[NARUC trainings on Integrated Planning](#) – Feb/Mar 2025

Breakthrough/GPST/ESIG/Sequoia Workshop on Multi-Model Workflows for Integrated System Planning – Feb 2025

Guidebook for Planners – May 2025

Optimizing expansion of generation, transmission and distribution – May 2025

Foundations of Integrated Planning – May 2025

System Operation & Market Design Working Group (Resource Adequacy)



[New Resource Adequacy Criteria for the Energy Transition: Modernizing Reliability Requirements](#) - March 2024

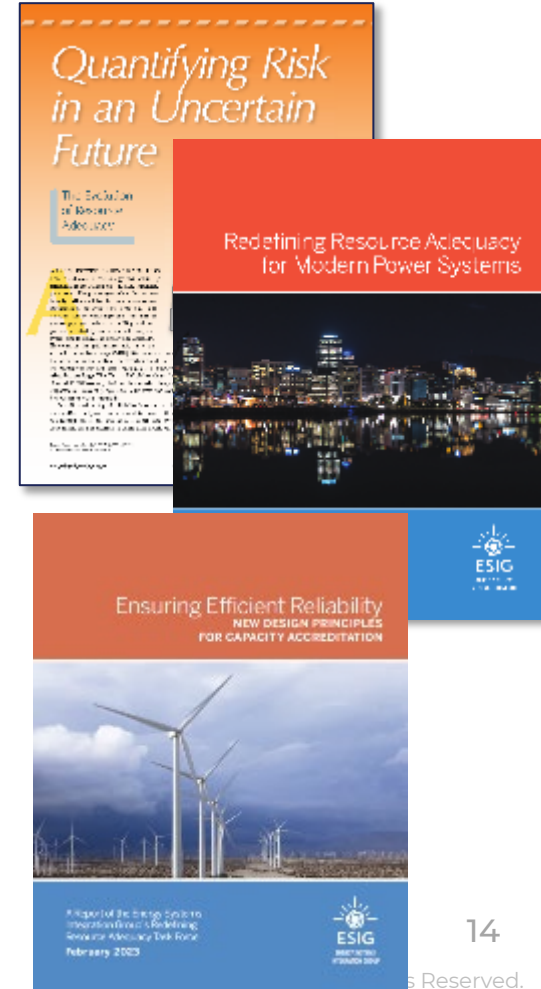
[Ensuring Efficient Reliability: New Design Principles for Capacity Accreditation Report](#) – Feb 2023

[Redefining Resource Adequacy for Modern Power Systems Report](#) – Aug 2021

Resource adequacy comments to the [FERC Technical Conference to Discuss Climate Change, Extreme Weather, & Electric System Reliability](#) and CPUC

Resource adequacy work presented at many events including NERC, the [Hawaii](#), [Texas](#), and California PUCs, and a FERC briefing. Other work was presented at WIEB, CREPC, and the Future Power Markets Forum.

IEEE Magazine article on [Resource Adequacy](#)



System Operation & Market Design Working Group



Markets for 100% Clean Electricity Task Force – [1st workshop Feb 2023](#);
[2nd workshop Dec 2024](#)

[Weather Input Datasets for Power System Modeling: A Gap Assessment and Best Practices Guide](#) – Oct 2023

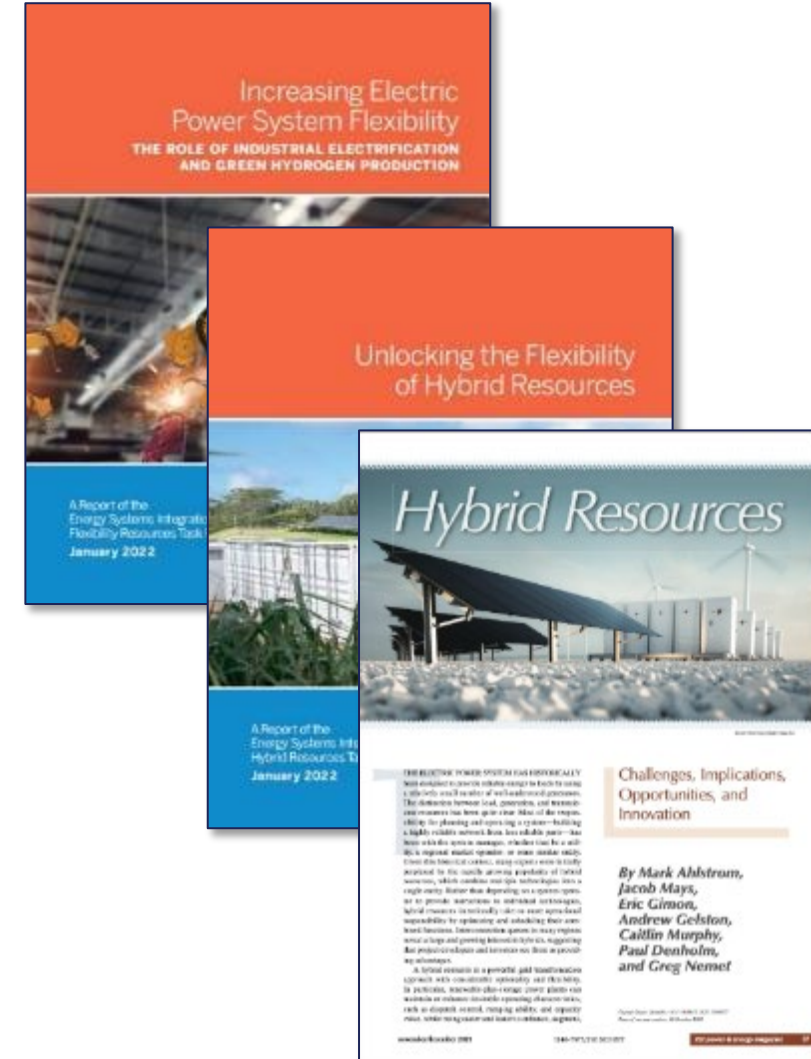
[Aligning Retail Pricing and Grid Needs](#) White papers - 2023

[Unlocking the Flexibility of Hybrid Resources Report](#) – March 2022
IEEE Magazine article on [Hybrid Resources](#) Oct 2021

[Modeling the Flexibility of Green Hydrogen in Power System Models](#) – Apr 2024
[Increasing Electric Power System Flexibility Report](#) – Jan 2022

IEEE Magazine article on [Future Markets](#)

[Gaps, Barriers, and Solutions to Demand Response Participation in Wholesale Markets](#) - Jan 2025



Reliability Working Group, Recent Work



[Summary](#) of the 'Panel on the Status of Inverter-Based Resource Standards Development and Integration Efforts' at the IEEE Power and Energy Society General Meeting 2024 - Nov 2024

Assessment of Inverter-Based Resources' Ability to Provide Voltage and Frequency Services [Phase 1 results](#) - Oct 2024

IBR Interconnection Requirements; Status and Need [Decisionmaker Brief](#) and [blog post](#) - Oct 2024

[Diagnosis and Mitigation of Observed Oscillations in IBR-Dominant Power Systems: A Practical Guide](#) - Aug 2024

Capturing the Benefits of Grid-Forming Batteries: A Unique Window of Opportunity – [Blog](#) and [Decisionmaker Brief](#), Feb/March 2023

[ESIG/NERC/EPRI/NAGF Generator Interconnection Workshop](#) – Aug 2022

[Grid-forming Inverter Workshop](#) – June 2022

The Role of Grid Forming Technology to Enable Energy Systems Integration [white paper](#) – Mar 2022

ESIG is referenced in the final report of Great Britain's [Minimum Specification Required for Provision of BG Grid Forming Capability](#) (first technical specification for grid forming)

[SPP Workshop on Interconnection of IBRs in Weak Grids](#) – May 2021


[WECC Workshop on Grid-forming IBRs](#) – Oct 2021 ; Support to GPST with [System Needs and Services for Systems with High IBR Penetration](#) and [IBR Research Team Stability Tools Inventory: Status and Needs](#) – 2021; IEEE Magazine article on [A Future with Inverter-Based Resources](#)

Reliability Working Group, Ongoing Work



DOE i2X FIRST Forum For Implementation of Reliability Standards for Transmission – March 2025
Benefits of Grid Forming Project Team – December 2024
System Services and Grid Forming Testing Project Teams – December 2024 and September 2024
Stability Project Team – July 2024
Grid Forming Landscape facts webpage – May 2024
Guest Editors of IEEE Power and Energy Magazine, Issue March/April 2024 on Operation of IBR-dominated Power Systems
Benefits of Grid-Forming Energy Storage Resources: A Unique Window of Opportunity in ERCOT white paper – February 2023

Benefits of Grid-Forming Energy Storage Resources: A Unique Window of Opportunity in ERCOT



Julia Matevosyan, Chief Engineer

Synopsis


As of September 1, 2023, 6 agreements were in ERCOT's existing stability constraints installing these resources in likely further reduce transfer constraints. This will lead to overall energy costs. To reduce transmission costs or transmission.

A low-cost alternative is available—tapped grid-forming stabilizing effect on the grid transfer limits or fully eliminate.

This is a unique window of opportunity for grid-forming capability from all E

Stability and Invert

The majority of the inverters (GFL). They need the voltage signal. However, instability relative to conventional synchronous plants. One issue is the current injection, making it instability. Another issue is generators that tend to be for IBRs are from synchronous grid strong voltage resources. This areas attract continued development in South Texas.



DER Working Group



[Gaps, Barriers, and Solutions to Demand Response Participation in Wholesale Markets](#) - Jan 2025

[Grid Planning for Building Electrification](#) Task Force report - Oct 2024

[Grid Planning for Transportation Electrification](#) Task Force report – 2024

[Three-part series](#) on DER Integration

1. [DER Integration into Wholesale Markets and Operations Report](#) – Jan 2022
2. [Lessons Learned from UK & Australian Initiatives](#)
3. [US initiative to transition to high DER system](#) – Sep 2022

Long-term Load Forecasting Task Force (joint with SPWG) - Apr 2025

IEEE Magazine articles on high DER futures and on retail pricing



Research & Education Working Group/ Global Power Systems Transformation Consortium



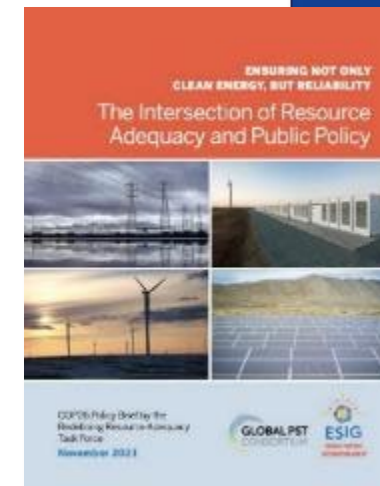
Lead [Pillar 1 of Global Power Systems Transformation Consortium](#), providing research to leading RTOs globally

IBR research team:

- [System Needs and Services for Systems with High IBR Penetration](#) – Oct 2021
- [IBR Research Team Stability Tools Inventory: Status and Needs](#) – Aug 2021

Resource Adequacy research team:

- [The Intersection of Resource Adequacy and Public Policy](#) for COP 26 – Nov 2021
- Resource Adequacy Workshop – Sep 2023



Large Loads Task Force



- Investigate the rapidly changing field of large step loads (data centers, hydrogen, industrial heat, EV fleets), focusing on grid impacts, challenges and solutions to streamline deployment without negative impacts on the grid
 - Data collection
 - Load Forecasting
 - Interconnection Process
 - Interconnection performance requirements
 - Modeling requirements for interconnection
 - Transmission Planning
 - Wholesale market options
 - Resource Adequacy

Other Activities



[NARUC/NASEO/NASUCA Reliability of the Bulk Power System](#) Training – spring 2021; spring 2023, winter 2025

Hosting [3 technical workshops](#) and 2 O&M workshops annually on energy system integration with special topic conferences held as appropriate

Engagement with FERC/NARUC:

- Presentations at multiple FERC Reliability and special topic Technical Conferences
- Presentations at multiple NARUC conferences and to special topic Committees
- Briefings for FERC and NARUC on ESIG reports and findings

Industry communication and education activities with webinars, blogs, reports, fact sheets, etc.

[IEEE Magazine Nov/Dec 2021](#) on Energy System Integration and [IEEE Magazine Jul/Aug 2022](#) on 100% Clean Energy

Participate in [IEA Wind Task 25](#) on VRE integration, NERC IRPS, DOE NTPS, IEEE, CIGRE, IEC and other industry activities

Your Votes Today



- The Nominating & Governance Committee nominated the following candidates:
 - **Bethany Frew** - Group Manager and Senior Engineer, Grid Planning and Analysis Center, National Renewable Energy Laboratory
 - **Bjorn Hedges** - Plant Manager at White Creek Wind I, and Harvest Wind Project
 - **Elizabeth Cook** - Vice President of Technical Strategy, Association of Edison Illuminating Companies (AEIC)



THANK YOU