RELIABILITY & SECURITY

Workshop - Portland, Oregon

October 29–30, 2024


RELIABILITY
& SECURITY
Workshop - Portland, Oregon
October 29–30, 2024
Wi-Fi Details
Network: Marriott_Bonvoy_CONFERENCE
Password: WECC24

Safety Message

WECC

Welcome

October 29, 2024

Steve Noess
Vice President, Reliability & Security Oversight, WECC

Antitrust Policy

- All WECC meetings are conducted in accordance with the WECC Antitrust Policy and the NERC Antitrust Compliance Guidelines
- All participants must comply with the policy and guidelines
- This meeting is public—confidential or proprietary information should not be discussed in open session

Meeting Guidelines

- This webinar is being recorded and will be posted publicly
- By participating, you give your consent for your name, voice, image, and likeness to be included in that recording
- WECC strives to ensure the information presented today is accurate and reflects the views of WECC
- However, all interpretations and positions are subject to change
- If you have any questions, please contact WECC's legal counsel

How to Ask Questions During the Workshop

- **In-person Attendees:**
  - Use an aisle microphone and ask your question
- **Virtual Attendees:**
  - Submit your questions through Webex or Whova
  - If time permits, questions will be asked live
  - Questions not answered live will be responded to later

<Public>

The Armando J. Perez Outstanding Contributor Award

Western Interconnection Compliance Forum (WICF)

Accepted by: Layna McVay, WICF Chair

<Public>

Reliability & Security Outreach Update

Spring: Program Focus

Who should attend

Primary Compliance Contacts, compliance program staff, including those newer to industry or compliance roles

Focus Objective

Provide programmatic guidance for NERC CMEP, WECC priorities, and industry best practices

Value

Targeted topics, WECC's interconnection-wide perspective, leave armed to develop and improve a compliance program

Reliability & Security Workshop

Purpose: Support Registered Entities compliance programs with robust, relevant content promoting the reliability & security of the Western Interconnection

Autumn: Technical Focus

Who should attend

Subject-matter experts, developing technical staff, Primary Compliance Contacts

Focus Objective

Provide technical guidance on Reliability Standards, lessons learned, and industry best practices

Value

Targeted, robust technical discussions, WECC's perspective of industry best practices, leave equipped to tackle NERC standards

Ruby Reliability
Reliability Compliance Manager

- Ruby manages a team of compliance analysts and engineers.
- She is designated as her organization's Primary Compliance Contact.

Ellie Energy
Compliance Engineer

- Ellie recently transferred from an engineering position to her entity's compliance team.
- She is so excited for her new job and eager to get up to speed.

- Paul is a veteran of the electricity industry.
- He loves to dive into the technical side of things.
- He works closely with his company's compliance team.

Paul Power
Senior Engineer

- Sammy works for small shop, meaning he wears many hats.
- He is responsible for the day-to-day work and for meeting compliance objectives.
- He has been with his company for a few years but is new to this role.

Sammy Security
Compliance Officer

Reliability & Security Outreach

R&S Workshops

- Spring: Program-focused workshop
- Fall: Technical-focused workshop
- Attend workshop(s) that best fit your role
- Hybrid format
- Recordings available after workshop

R&S Oversight Monthly Updates

- Third Thursday of each month
- Outreach on compliance, monitoring, and enforcement topics including quarterly updates from Standards and Internal Controls
- Attend to keep apprised of a variety of topics
- Catch replay if unable to attend each month
- Virtual

Ad Hoc Outreach

- Stand-alone events
- Can meet foundational needs or emerging topics
- Can be targeted to specific audience
- Flexible format; will match needs of topic and audience

Howard Gugel

Vice President, Regulatory Oversight, NERC

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A Changing Risk Environment Requires Extraordinary Action

Howard Gugel, Vice President of Regulatory Oversight

Hyper Complex Risk Environment

Rapidly Changing Resource Mix

- Retirements of traditional generation
- Natural gas interdependencies
- Inverter-based Resource (IBR) integration
- DER performance and visibility

Extreme Weather Complexities

- Extreme not infrequent
- Broader deeper longer

Energy & Environmental Policy

- Electrification
- Emissions
- Transmission

Rapidly Evolving Threat Landscape

- S/W vulnerabilities
- Supply chain
- Ransomware
- Physical attacks

Hyper Complex Risk Environment Results in Increased BPS Reliability Risk

Rapidly Changing Resource Mix

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Rapidly Evolving Threat Landscape

- S/W vulnerabilities
- Supply chain
- Ransomware
- Physical attacks

Fuel assurance/uncertainties

- Natural gas
- Renewables

Loss of key "essential reliability services" with retirements

- Inertia/frequency response
- Reactive Power/voltage support
- Dispatchability

Appropriate level of investment in infrastructure for hardening & resilience

- Extreme weather
- Coordinated Physical attack
- Insufficient transfers

Expanding cyber attack surface

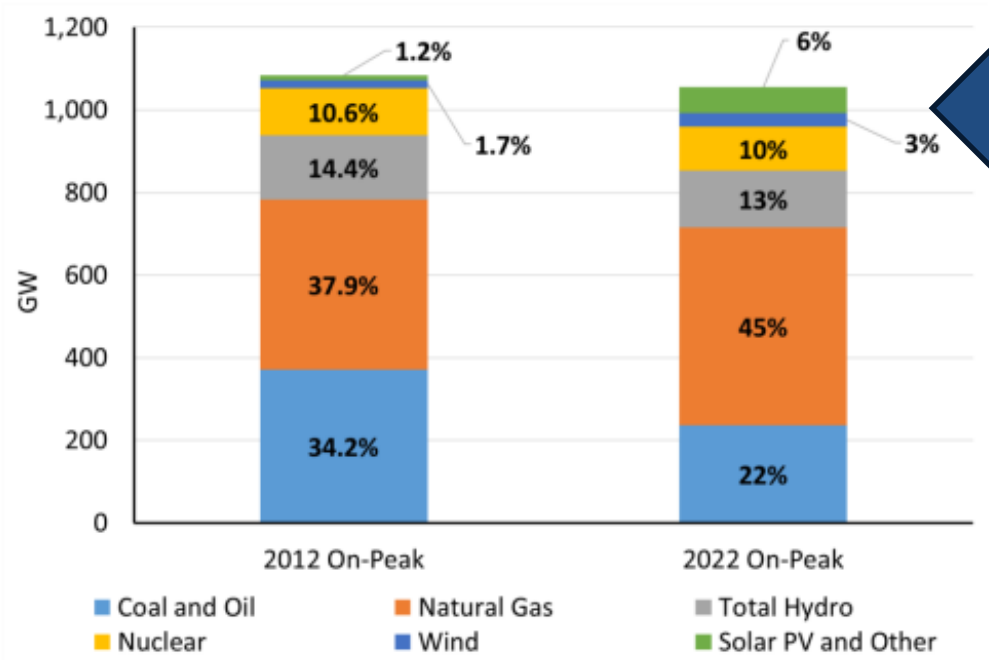
- Industry Control Systems (ICS)
- IBRs/DERs/EV Charging

Sophistication of recent cyber attacks

- SolarWinds (one to many)
- Pipedream, Industroyer malware

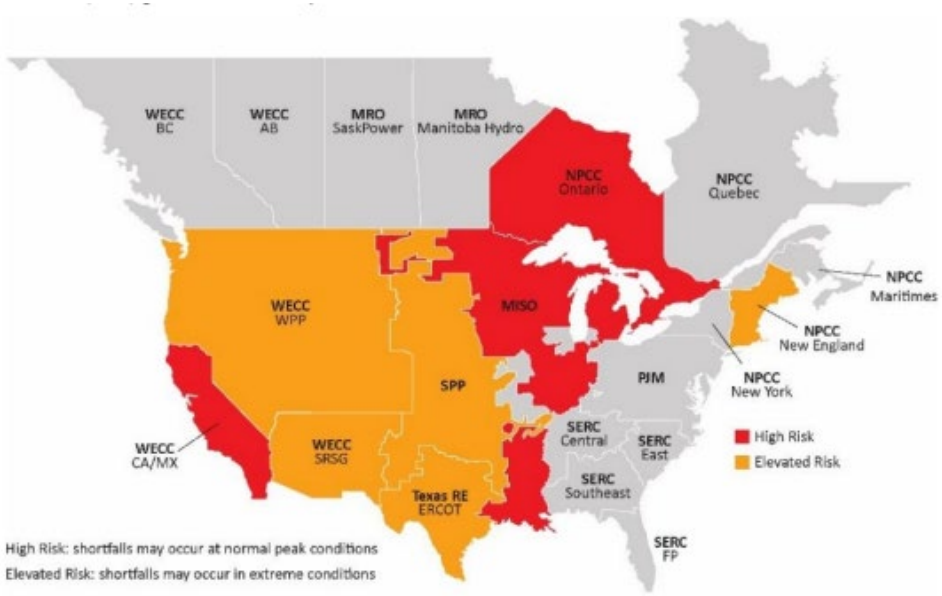
Across an Interconnected System: Less Resources Means More Reliance on Neighbors

2012 and 2022 Peak Capacity Resource Mix NERC-Wide

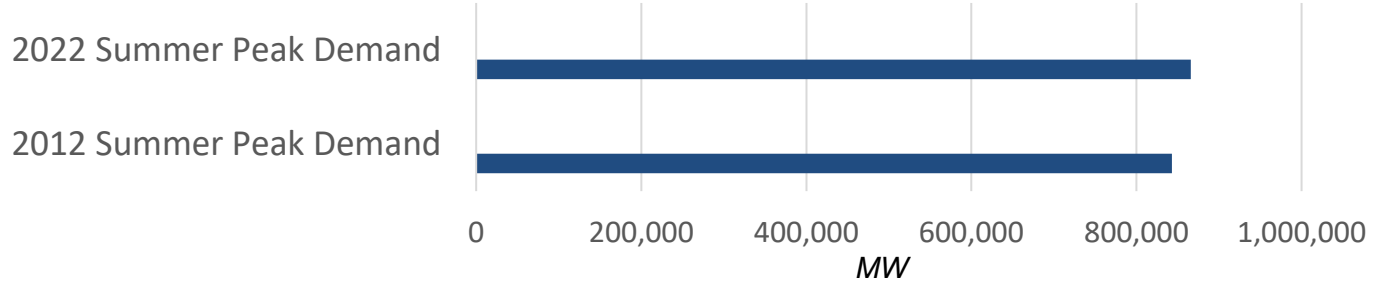


4% Decrease

2025 Risk Areas



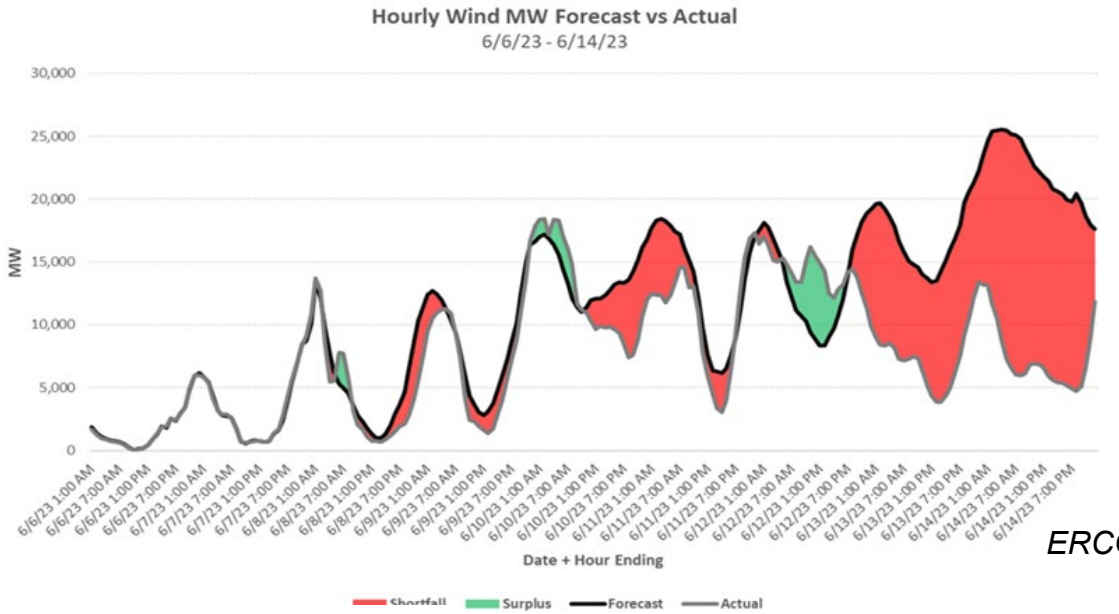
NERC-Wide Summer Peak Demand Changes 2012 and 2022



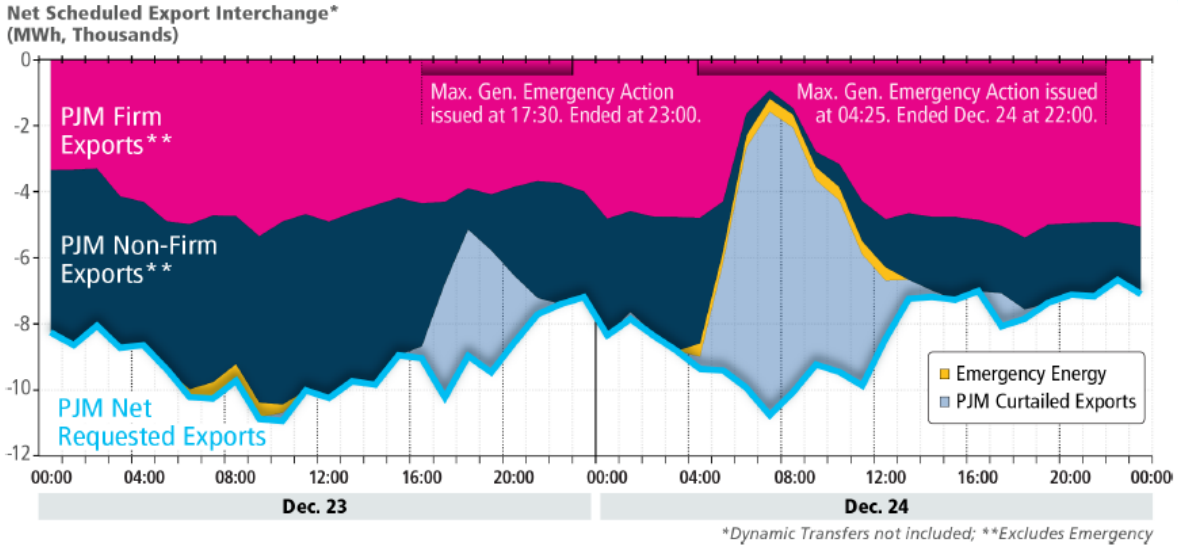
3% Increase

Recent Examples Highlight Need for Wide-Area Energy Assessments

ERCOT, SPP, MISO: *A "wind drought" caused 60 GW of installed wind capacity to generate 300 MW*



ERCOT

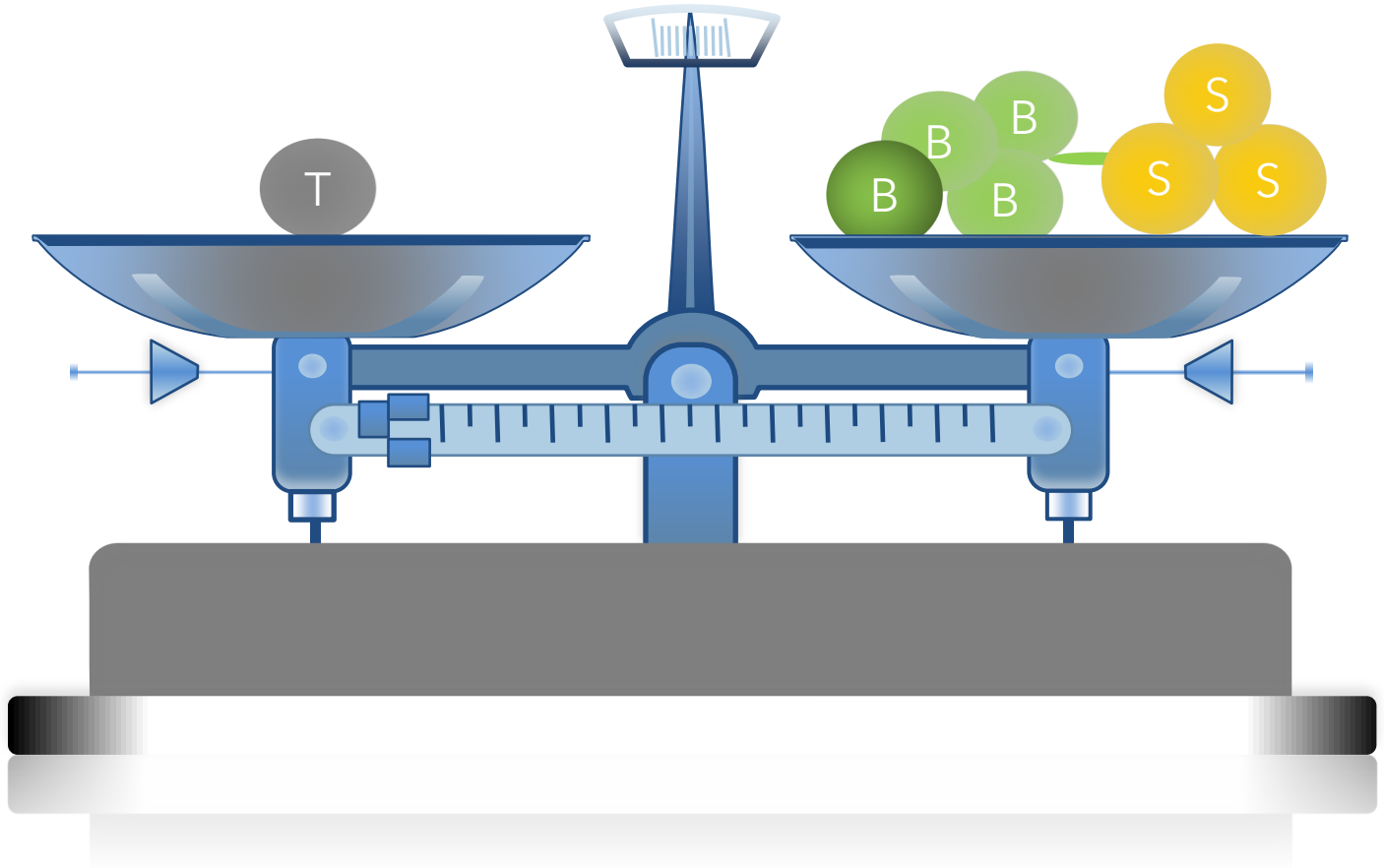


PJM: *Transmission system during extreme cold weather limited the ability to export to support southern neighbors*

Base load compared to hybrid

Retire 100 MW Base Load Generation

- *100 MW Traditional Base Load generates 2400 MWh*



300 MW Solar + 400 MW Batteries

- *Assume 8 hours of sunlight*
- *Assume no losses in conversion*

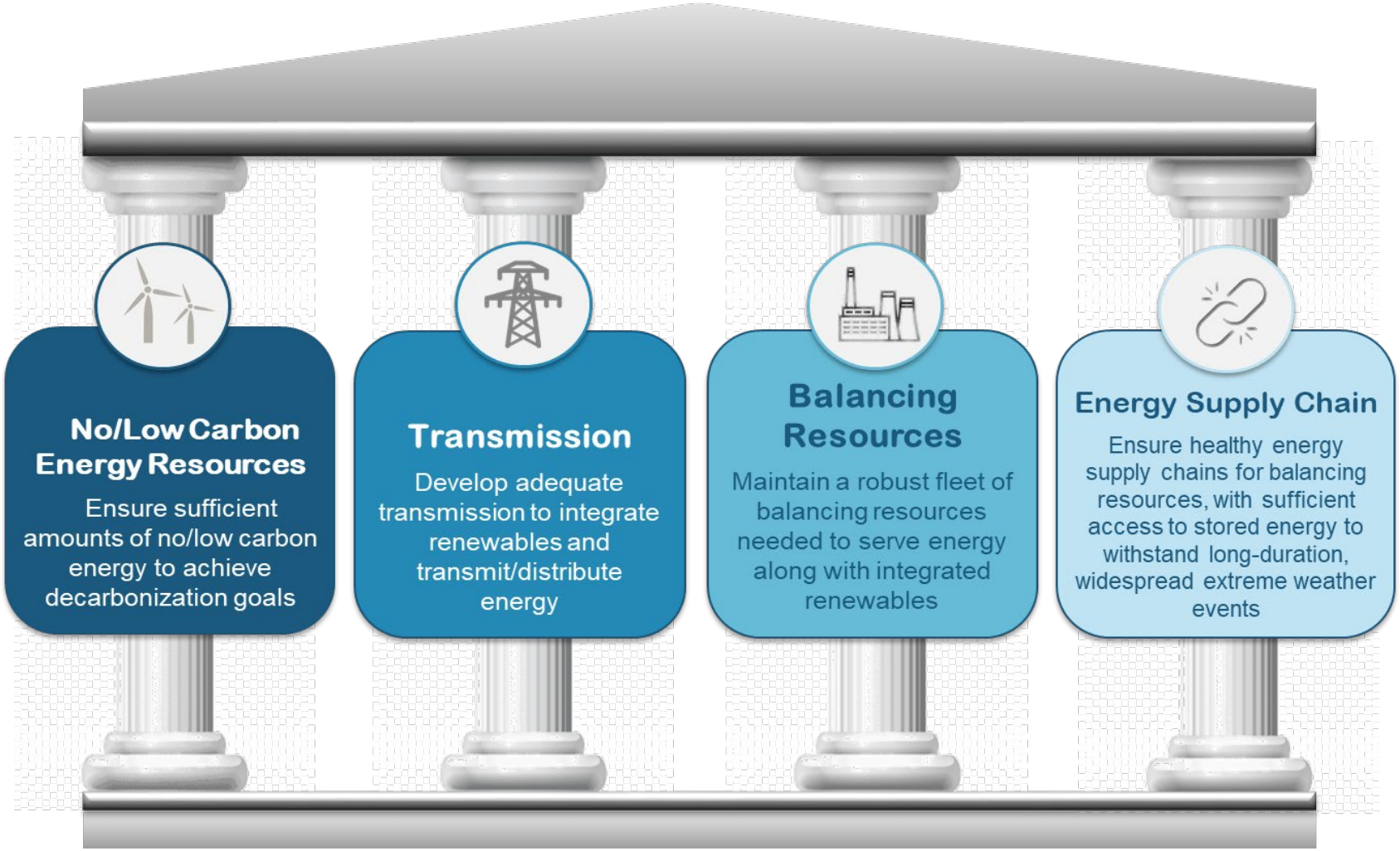
Usage

- *100 MW **solar** for 8 hours (800 MWh)*
- *400 MW **storage** for 4 hour discharge (1600 MWh)*

Storage

- *200 MW **solar** to charge storage 8 hours (1600 MWh)*

Moving Forward: The Four Pillars of the Energy Transition



A Changing Context for the BPS

Must Wins:

1. **Manage the pace of transformation** through market mechanisms and inter-agency coordination on policies that affect generation
2. Develop sufficient **transmission**, to integrate renewables and distribute them, make the system more resilient
3. Maintain a robust fleet of **balancing resources**, with an ability to provide **Essential Reliability Services**
4. Ensure a robust **energy supply chain** for the balancing resources, with sufficient access to fuel and stored energy to withstand long-duration, wide-spread extreme weather events
5. **STATES:** Refine resource adequacy requirements that preserves energy assurance

Implications for Compliance

- **Risk-based** Compliance Monitoring and Enforcement Program
- Changing risks may lead to changing focus
- Consider how standards work together
- Trigger for registration/compliance

Lines of defense framework

- Standards developed/revised to ensure Adequate Level of Reliability
- Registration of entities to comply with standards
- Certification of critical functions for capability
- Risk informed compliance engagements for assurance
- Enforcement to ensure due process and send the appropriate message

NERC Reports on IBR-related Disturbances

- Numerous ERO Enterprise reports determine that operational characteristics of IBRs may cause reduced power output.
- Potential for IBRs to have a material impact on BPS, which is not limited to larger IBRs that typically register with NERC.

https://www.nerc.com/pa/rrm/ea/Pages/Major-Event-Reports.aspx

Problem Statement & Risk Mitigation Strategy

Problem Statement: *Analysis by NERC and the REs found that integration of IBRs onto the BPS have material impacts on reliability that must be mitigated.*

Risk Mitigation Strategy: *NERC undertook two initiatives to mitigate IBR risk. At the direction of FERC, these steps include: (1) Revising NERC rules governing the registration of IBRs so these resources will be subject to NERC Reliability Standards, and (2) Revising and developing Reliability Standards applicable to IBRs.*

The Solution

NERC seeks to register Generator Owners (GO) and Generator Operators (GOP) of non-Bulk Electric System IBRs with aggregate nameplate capacity ≥20 MVA connected at a voltage ≥60 kV.

With this proposal, **97.5%** of BPS-impactful IBRs would become subject to NERC Reliability Standards, commensurate to the **97%** of BPS-impactful synchronous resources currently subject to these standards by nameplate capacity.

Steps in Regulatory Process

IBR Registration Milestones

Phase 1: May 2023–May 2024

- Complete Rules of Procedure revisions and approvals
- Commence Category 2 GO and GOP candidate outreach and education (e.g., through trade organizations)

Phase 2: May 2024–May 2025

- Complete identification of Category 2 GO and GOP candidates
- Continue Category 2 GO and GOP candidate outreach and education (e.g., quarterly updates, webinars, workshops, etc.)

Phase 3: May 2025–May 2026

- Complete registration of Category 2 GO and GOP candidates thereafter subject to applicable NERC Reliability Standards
- Conduct specific Category 2 GO and GOP outreach and education (e.g., quarterly updates, webinars, workshops, etc.)

What IBR Registration Candidates Can Expect

IBR Registration candidates will be connected to the appropriate **Regional Entity staff** and will be provided educational materials explaining the NERC Registration process, Reliability Standards development, compliance obligations, and more.

While this will be an ongoing effort with continued development, existing candidate entities are expected to be registered by **May 2026**.

Standards

All **GO/GOP standards** have been reviewed, and NERC has determined that no Reliability Standards will be applicable to IBR meeting the new registration criteria prior to **May 2026**.

Following this date, NERC will work with each drafting team to encourage a reasonable rollout strategy of new or modified standards to spread out the applicability to these IBR throughout May 2026 and beyond.

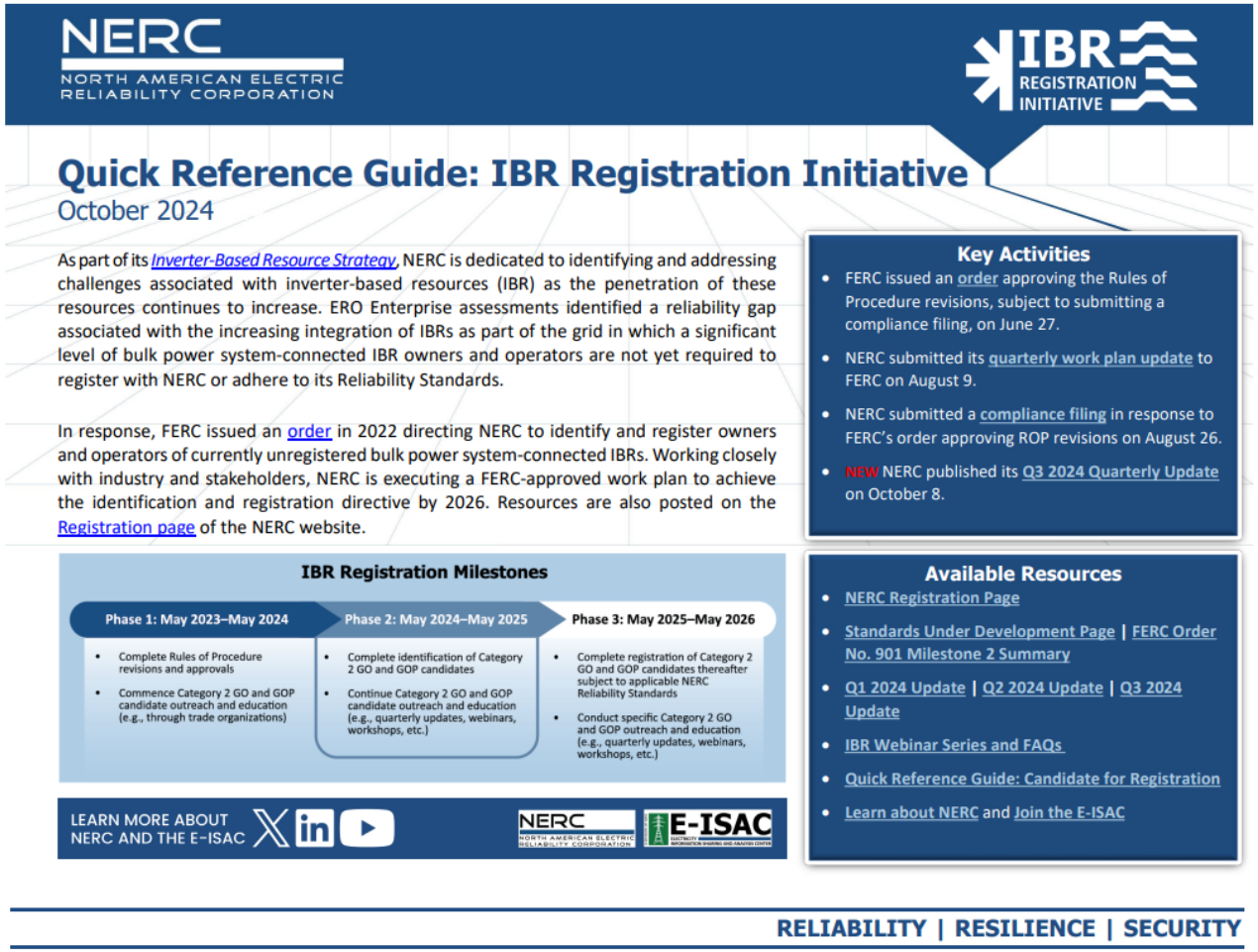
Order No. 901 Milestones

Resources

- Quarterly Updates: Q1 2024, Q2 2024, Q3 2024
- Quick Reference Guides and FAQS:
  - IBR Registration Initiative
  - IBR Activities
  - Candidate for Registration
  - Proposed Revisions to NERC ROP to Address Registration
  - IBR Webinar Series

Coming Soon

- NERC and E-ISAC 101: Guide for New Entrants
- Educational Videos



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IBR REGISTRATION INITIATIVE

Quick Reference Guide: IBR Registration Initiative

October 2024

As part of its *Inverter-Based Resource Strategy*, NERC is dedicated to identifying and addressing challenges associated with inverter-based resources (IBR) as the penetration of these resources continues to increase. ERO Enterprise assessments identified a reliability gap associated with the increasing integration of IBRs as part of the grid in which a significant level of bulk power system-connected IBR owners and operators are not yet required to register with NERC or adhere to its Reliability Standards.

In response, FERC issued an order in 2022 directing NERC to identify and register owners and operators of currently unregistered bulk power system-connected IBRs. Working closely with industry and stakeholders, NERC is executing a FERC-approved work plan to achieve the identification and registration directive by 2026. Resources are also posted on the Registration page of the NERC website.

Key Activities

- FERC issued an order approving the Rules of Procedure revisions, subject to submitting a compliance filing, on June 27.
- NERC submitted its quarterly work plan update to FERC on August 9.
- NERC submitted a compliance filing in response to FERC's order approving ROP revisions on August 26.
- NEW NERC published its Q3 2024 Quarterly Update on October 8.

IBR Registration Milestones

Phase 1: May 2023–May 2024	Phase 2: May 2024–May 2025	Phase 3: May 2025–May 2026
• Complete Rules of Procedure revisions and approvals • Commence Category 2 GO and GOP candidate outreach and education (e.g., through trade organizations)	• Complete identification of Category 2 GO and GOP candidates • Continue Category 2 GO and GOP candidate outreach and education (e.g., quarterly updates, webinars, workshops, etc.)	• Complete registration of Category 2 GO and GOP candidates thereafter subject to applicable NERC Reliability Standards • Conduct specific Category 2 GO and GOP outreach and education (e.g., quarterly updates, webinars, workshops, etc.)

Available Resources

- NERC Registration Page
- Standards Under Development Page | FERC Order No. 901 Milestone 2 Summary
- Q1 2024 Update | Q2 2024 Update | Q3 2024 Update
- IBR Webinar Series and FAQs
- Quick Reference Guide: Candidate for Registration
- Learn about NERC and Join the E-ISAC

LEARN MORE ABOUT NERC AND THE E-ISAC

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RELIABILITY | RESILIENCE | SECURITY

Questions and Answers