NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Agenda
NERC Quarterly Technical Session

February 12, 2025 | 2:30-5:00 p.m. Eastern

In-Person

JW Marriott Miami
1109 Brickell Ave
Miami, FL 33131
Conference Room: Grand Ballroom

Virtual Attendees
Webcast Link: Join Meeting
Webcast Password: FEB2025BRDTECHA (33220253 when dialing from a phone)
Audio Only: +1-415-655-0002 US Toll | +1-416-915-8942 Canada Toll | Access code: 2314 546 6229

NERC Antitrust Compliance Guidelines

Agenda Items

1. **Panel Session on Supply Chain*– Review**
2. **Panel Session on Large Load Integration*– Review**
3. **Other Matters and Conclude Session**

*Background materials included.

Technical Panel Session on Supply Chain

Action
Review

Panelists

- **Facilitator:** Jennifer Flandermeyer, Director, Cybersecurity Intel & Government Affairs, NextEra Energy, Inc.
- David Smith, VP of Contracts, Controls, and Workplan Development, National Grid
- Jeremy Rand, VP of Procurement, Arevon
- Betsy Soehren-Jones, Executive Director, Critical Infrastructure Security Consortium
- Dan Beans, CEO, Roseville Electric Utility

Summary

Supply chain risks have a multitude of facets, and their potential impact on the Energy Sector can be profound. As these risks evolve, particularly in terms of equipment/software availability and security, substantial efforts have been made across the ERO ecosystem, trade and membership organizations, as well as at the federal and state levels to address these challenges. The volume of publications, executive actions, legislation, regulations, and guidance surrounding supply chain issues is vast, contributing to a complex and dynamic ecosystem.

While significant progress has been made, the energy sector continues to face several critical supply chain opportunities and challenges:

- **Raw Material Volatility**: The prices and availability of essential raw materials, such as polysilicon for solar panels and rare earth metals for wind turbines, are highly sensitive to geopolitical events, natural disasters, and other disruptions. Fluctuating market conditions and budget constraints make long-term planning and securing favorable prices for large quantities of raw materials increasingly difficult.
- **Security and Provenance**: Supply chain security involves the strategies, policies, and safeguards that ensure the integrity, availability, and confidentiality of information and operations throughout the supply chain. This includes protecting products and services at every stage, from development through to delivery, and defending against threats like cyberattacks, physical tampering, and insider risks.
- **Complex Supply Chains**: The energy sector relies on a vast and intricate network of international suppliers, contractors, and transportation services. Managing the associated supply chain risks can lead to delays, cost overruns, and regulatory hurdles
- **Technological Integration**: The adoption of technologies like IoT and machine learning to enhance supply chain visibility, efficiency, and traceability presents both opportunities and challenges. While these tools are vital, their increasing use also expands the cyber-attack surface and introduces new operational risks.

- **Sustainability and Compliance**: As organizations strive to reduce waste and emissions while adhering to stringent regulations, managing these objectives becomes more complex. Geopolitical threats and evolving policy responses are reshaping procurement practices and partnerships, particularly in the context of critical infrastructure.

Addressing these facets requires a combined approach that marries risk management strategies, technological innovations, industry collaboration, information sharing, and sustainable practices to create more resilient supply chains.

Panel Objective

This panel aims to engage the audience and provide valuable insights from the broader stakeholder community, which can inform NERC's ongoing work in this area.

Bios

Jennifer Flandermeyer has worked in the Energy industry since 1997. Her most recent role, Director, Cybersecurity Public Policy for NextEra Energy and is focused on cybersecurity legislative and regulatory actions in federal and state jurisdictions. Outside of NextEra Energy, Ms. Flandermeyer serves as a Director for the Midwest Reliability Organization. She serves as the Chair of the NERC Member Representatives Committee and Chair Emeritus of the NERC Compliance and Certification Committee. In addition, she serves as the Co-Chair for several NERC technical task forces and previously served on the NERC Standards Committee and NERC Standards Drafting Teams.

David Smith is VP for Contract, Controls and Workplan Development as part of National Grid's New England electric business and, been doing this role since June 2024. This role covers our capital contract strategy and management (inc resources and materials), project controls and capital portfolio development. Prior to this role, David was VP for Digital Transformation helping build out a new set of digital products and a new way of working to develop digital transformation at scale. David's career has spanned various operational and strategic leadership roles in the UK and US, covering Electricity Transmission, Customer, UK System Operator, Gas Transmission and Gas Distribution. He also spent almost 2 years on secondment to the UK Government covering energy market reform

Jeremy Rand is the Vice President of Procurement at Arevon. His team is responsible for sourcing all capital equipment, EPC, O&M, and Service contracts. Jeremy has more than 13 years of renewable energy experience in performance engineering, EPC, Solar/BESS O&M, construction, and risk management. Prior to joining Arevon, Jeremy was the Director of Sales Operations and Fulfillment with First Solar, coordinating all shipments, deliveries, and contract management for First Solar's module, EPC, and O&M businesses

Betsy Soehren Jones serves as the volunteer Executive Director of the Critical Infrastructure Security Consortium, a grassroots non-profit working across the electric, gas, oil, water, and transportation sectors. The primary role of the Consortium is to benchmark best cyber practices, especially related to Supply Chain security. Outside of volunteering for the Consortium, Betsy works closely with utilities, Private Equity and the Venture Capital community to ensure emerging technologies are cyber safe for utility consumption and utilization. She previously served as the Chief Operating Officer for the industry's Center of Excellence for Supply Chain. In this role, Betsy worked to design, implement, and deploy guidelines for manufacturers and emerging technologies to follow with respect to cyber security. She guided the expansion of the Center to include 50+ utilities and greater than 2,000 vendors and their product catalogs. Prior to her COO role, Betsy spent almost 20 years at Exelon in various roles, with her last role as the Director of Cyber Strategy

Dan Beans, P.E., is the Chief Executive Officer at Roseville Electric Utility, he came to lead Roseville Electric in 2022. Roseville's electric utility, including their natural gas power plant, is consistently recognized for its highly reliable system, low rates, efficient operations, and innovative programs. Dan serves as the immediate past President of the California Municipal Utilities Association, and he serves on the American Public Power Association Board of Directors and Executive Committee. Dan is a current Commissioner of the Balancing Authority of Northern California and also serves on the Electricity Subsector Coordinating Council representing the electricity industry at the federal level. Dan is a licensed Professional Electrical Engineer with the State of California. Dan holds a Bachelor of Arts in Engineering Physics and a Master of Public Administration.

Agenda Item 2
NERC Quarterly Technical Session
February 12, 2025

Technical Panel Session on Large Load Integration

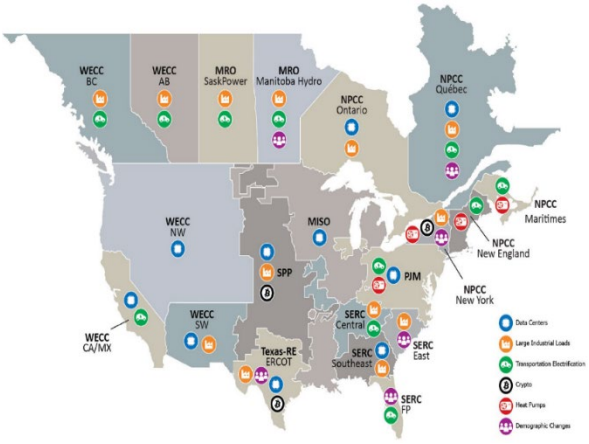
Action
Review

Panelists

- **Facilitator:** Mark Lauby, Senior Vice President and Chief Engineer, NERC
- Bobby Olsen, SRP
- Aaron Tinjum, Data Center Coalition
- Matthew Gardner, Dominion Energy
- Julie Snitman, ERCOT
- Brian George, Google

Summary

Increasing amounts of large commercial and industrial loads are connecting rapidly to the bulk power system (BPS). Emerging large loads such as data centers (including data centers for crypto and Artificial Intelligence (AI)), hydrogen fuel plants, etc. present unique challenges to forecasting and planning for increased demand (See Figure to the right from *2024 Long-term Reliability Assessment*). Serving this inverter-based demand is vital for North America's economy.



It is critical that data centers are integrated in a way that supports the reliable operation of the BPS, rather than reducing the grid's performance during events and system operations. In doing so, more data centers can be integrated, and resources built.

For instance, recent off-nominal occurrences in both Texas and Virginia have illustrated the current challenge to integrate inverter-based large loads. Specifically, after the grid experienced three voltage excursions due to auto-reclosing activity within a minute or so, large amounts of demand tripped off from the system (engaging their uninterruptible power supply plans). This reduction of demand exacerbated the impacts of this system fault on the BPS, creating imbalances in energy, frequency, and voltage. On January 8, 2025, NERC published a new *incident review* examining the risks and challenges posed by the increasing integration of voltage-sensitive large loads, such as data centers and cryptocurrency mining facilities.

Additionally, it is critical for us to better understand large load behavior to system conditions and the potential reliability implications from increasing integration and demand. Last year, NERC's Reliability and Security Technical Committee established a Large Loads Task Force to better

understand reliability impacts; identify, validate, and prioritize risks; and identify gaps and mitigations of potential risks.

Panel Objectives

This panel session will focus on integration of data centers and their behavior on the BPS during system events and occurrences.

Bios

Mark G. Lauby is senior vice president and chief engineer at NERC. Mr. Lauby joined NERC in January 2007 and has held several positions, including vice president and director of Standards and vice president and director of Reliability Assessments and Performance Analysis. In 2012, Mr. Lauby was elected to the North American Energy Standards Board and was appointed to the Department of Energy's Electric Advisory Committee by the Secretary of Energy in 2014. Mr. Lauby has served as chair and is a life member of the International Electricity Research Exchange and served as chair of several Institute of Electrical and Electronics Engineers (IEEE) working groups. Prior to joining NERC, Mr. Lauby worked for the Electric Power Research Institute (EPRI) for 20 years.

Bobby Olsen has worked for SRP for the last 18 years, where he has worked in various roles with responsibilities across different functional areas at SRP including generation, major projects, planning, strategy, environmental services, and trading/marketing. Bobby currently serves as SRP's Associate General Manager & Chief Planning, Strategy, and Sustainability Executive where he's responsible for helping establish and execute on SRP's transition towards a more sustainable resource portfolio. He holds a Bachelor's of Science in Mechanical Engineering from Northern Arizona University.

Aaron Tinjum is Vice President, Energy for the Data Center Coalition (DCC). DCC is the national membership association for the data center industry, representing 34 leading data center owners and operators with infrastructure across the country and globe. Before joining DCC, Aaron spent a decade in the utility industry where he helped advance key state policy and regulatory initiatives related to demand side management, resource planning, grid security, and utility-scale clean energy. Aaron received a Bachelor of Arts in Political Science from Carthage College, a Master of Public Affairs from the LBJ School of Public Affairs at The University of Texas at Austin, and a Certificate in Financing and Deploying Clean Energy from Yale University.

R. Matthew Gardner, Ph.D., P.E. Vice President–Electric Transmission, Dominion Energy Virginia. Gardner is responsible for over 6,700 miles of electric transmission lines and more than 800 substation assets at Dominion Energy Virginia, serving 2.7 million customers. Since joining in 2008, he has held various roles in planning, operations, maintenance, and engineering. Gardner serves on the board of the North American Transmission Forum and the executive advisory council of IEEE and its Power and Energy Society. He is President Elect, Cigré U.S. National Committee and is an active supporter of several academic institutions within the Commonwealth, including George Mason University (College of Engineering Industry Advisory Board), Virginia Commonwealth University (Executive Engineer in Residence) and Virginia Tech.He holds a Ph.D., M.S., and B.S. in Electrical Engineering from Virginia Tech where he was a Bradley Fellow.

Julie Snitman is the Supervisor of the Large Load Integration team at ERCOT. In this role, she is responsible for managing ERCOT's large Load program in collaboration with Transmission Service Providers and Market Participants. Ms. Snitman oversees the reliability standards and requirements for the interconnection of large loads, including coordinating with Operations and Planning teams to ensure visibility into challenges that large loads present. Included in this function, Ms. Snitman engages in large load task forces across the industry, including the NERC LLTF. Her experience in transmission planning and economic planning includes involvement on the ERCOT Regional Transmission Report (RTP). Previously, Ms. Snitman held roles with the Ameren Corporation and Boeing. She holds a P.E. license in Texas and earned her bachelor's degree of science in electrical engineering from Texas A&M University.

Brian George is responsible for energy regulatory and policy engagement across the federal government, including Federal Energy Regulatory Commission (FERC) and the Department of Energy. In addition, he is responsible for energy regulatory and legislative engagement across PJM and the mid-Atlantic region, where Google datacenters represent a large and growing commercial load. Brian has extensive experience in wholesale electricity market design and energy policy. Prior to Google, Brian was the Senior Director for Strategy and Government Affairs at the Electric Power Supply Association where he led policy development and federal legislative engagement for a membership consisting of over 150,000 MW of competitive power generation across the US.

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Bulk Power System Awareness

Situational Awareness Q1 2025

Darrell Moore, Director, Situation Awareness and Personnel Certification/Credential Maintenance, NERC

NERC 1st Quarter Technical Session

February 12, 2025

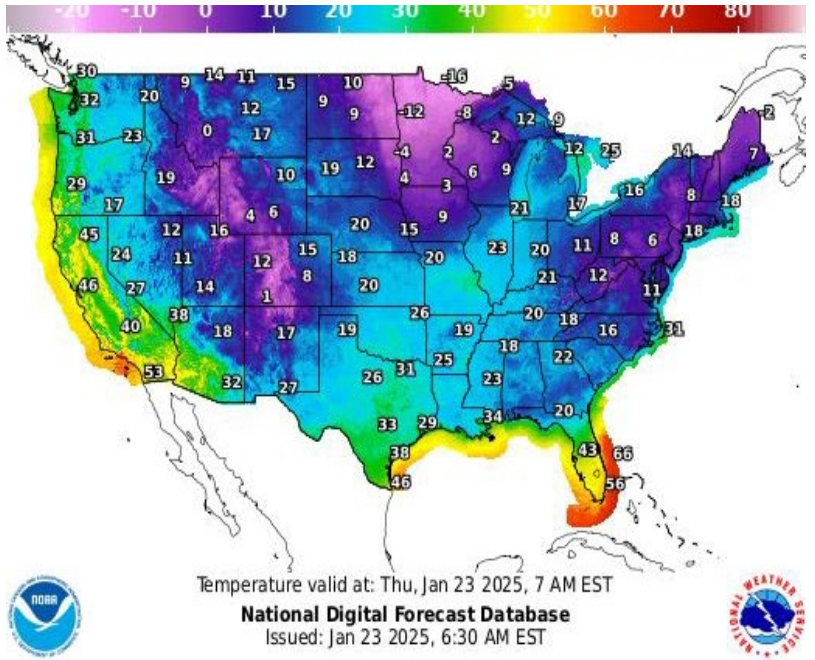
Notable Recent BPS Threats

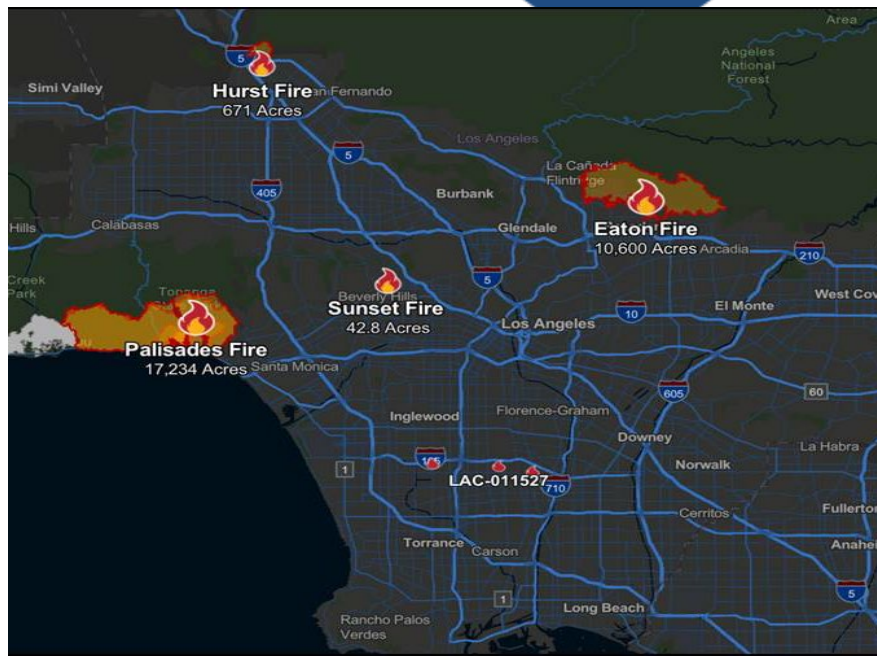
Helene Outages (Department of Energy EAGLE-I)

State	Peak Outages	Current Outages
South Carolina	1.37 million	733k
Florida	1.32 million	113k
Georgia	1.10 million	571k
North Carolina	1.00 million	442k
Ohio	330k	28k
Virginia	243k	95k
Kentucky	226k	17k
Tennessee	128k	10k
Indiana	114k	6k
West Virginia	91k	22k
Total	5.92 million	2.04 million

Atlantic Hurricane Season

Multiple Cold Arctic Weather Systems

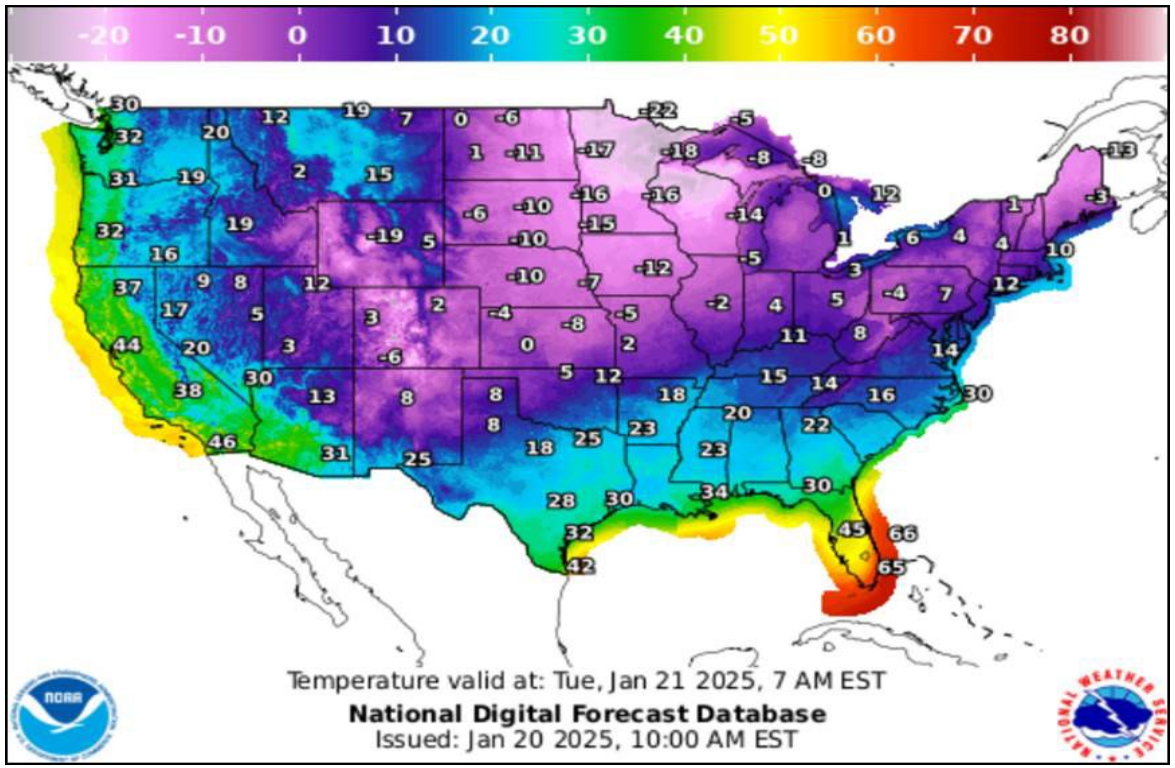


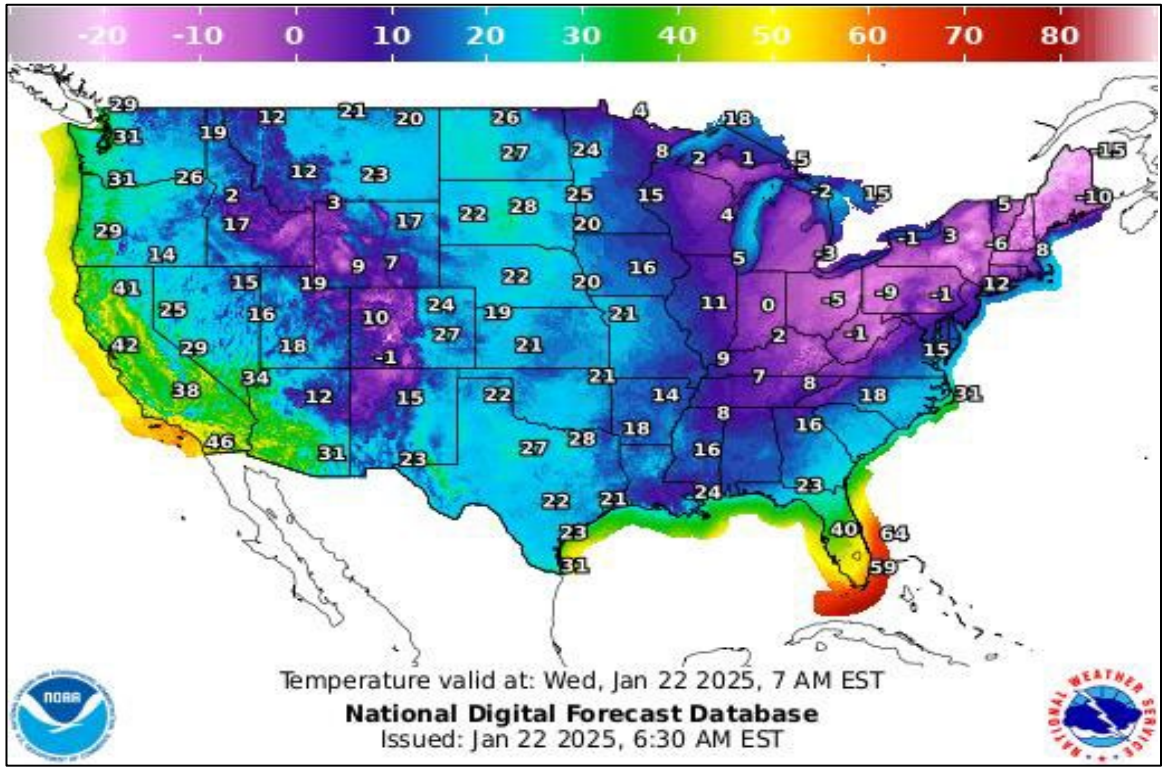


Southern California Wildfires

Extreme Cold Weather

- A well of cold Arctic air positioned itself over Canada. This cold air, prevailing upper-level winds, and various lows pressure systems brought multiple extreme winter weather events to the eastern two-thirds of the United States throughout January.

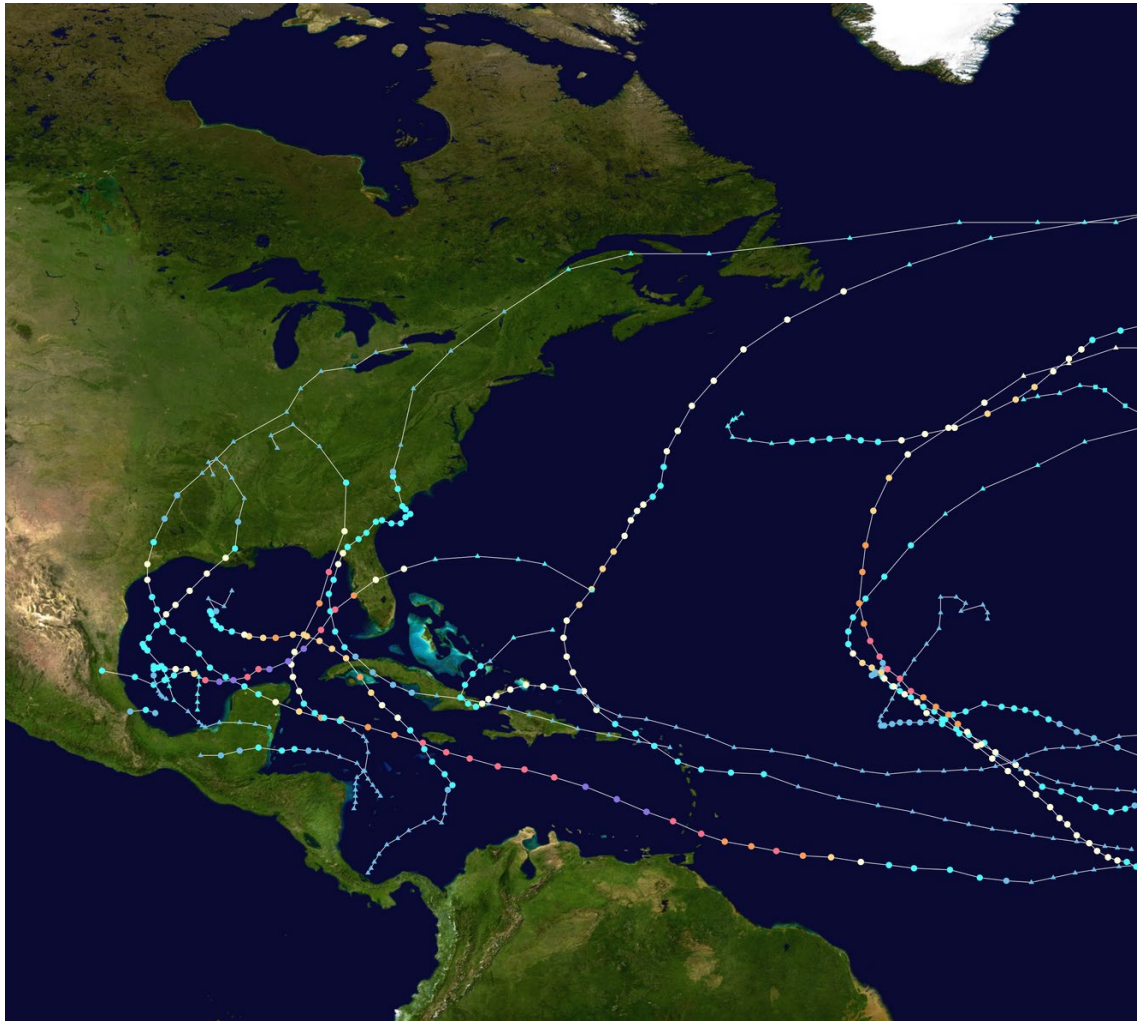




Southern California Wildfires

- Very unfavorable fire weather conditions (dry vegetation, low humidity, and very strong Santa Ana Winds fostered the rapid development of multiple wildfires in Southern California in January, especially in and around Los Angeles. Registered entities operated the system to ensure reliability.

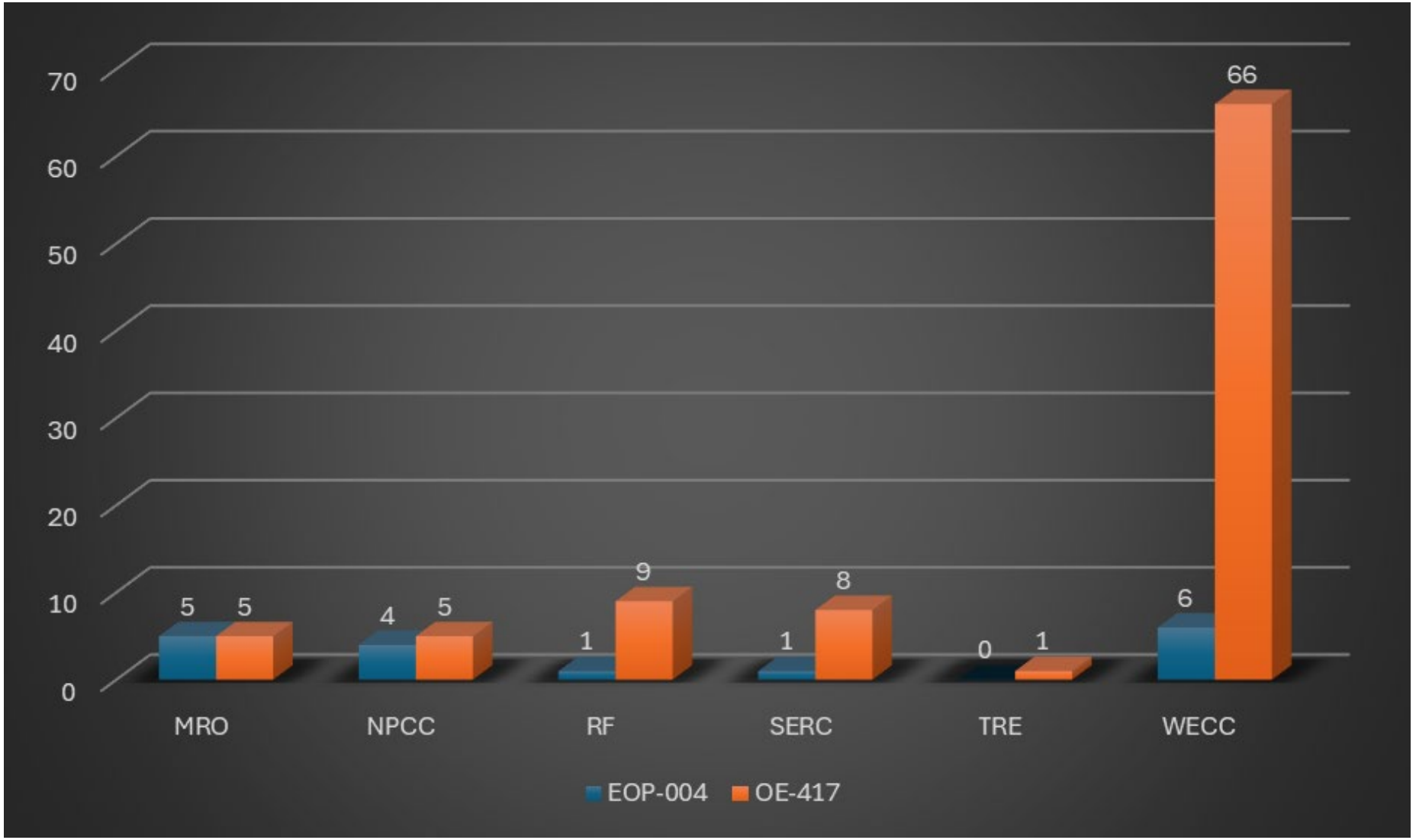
Atlantic Hurricane Season



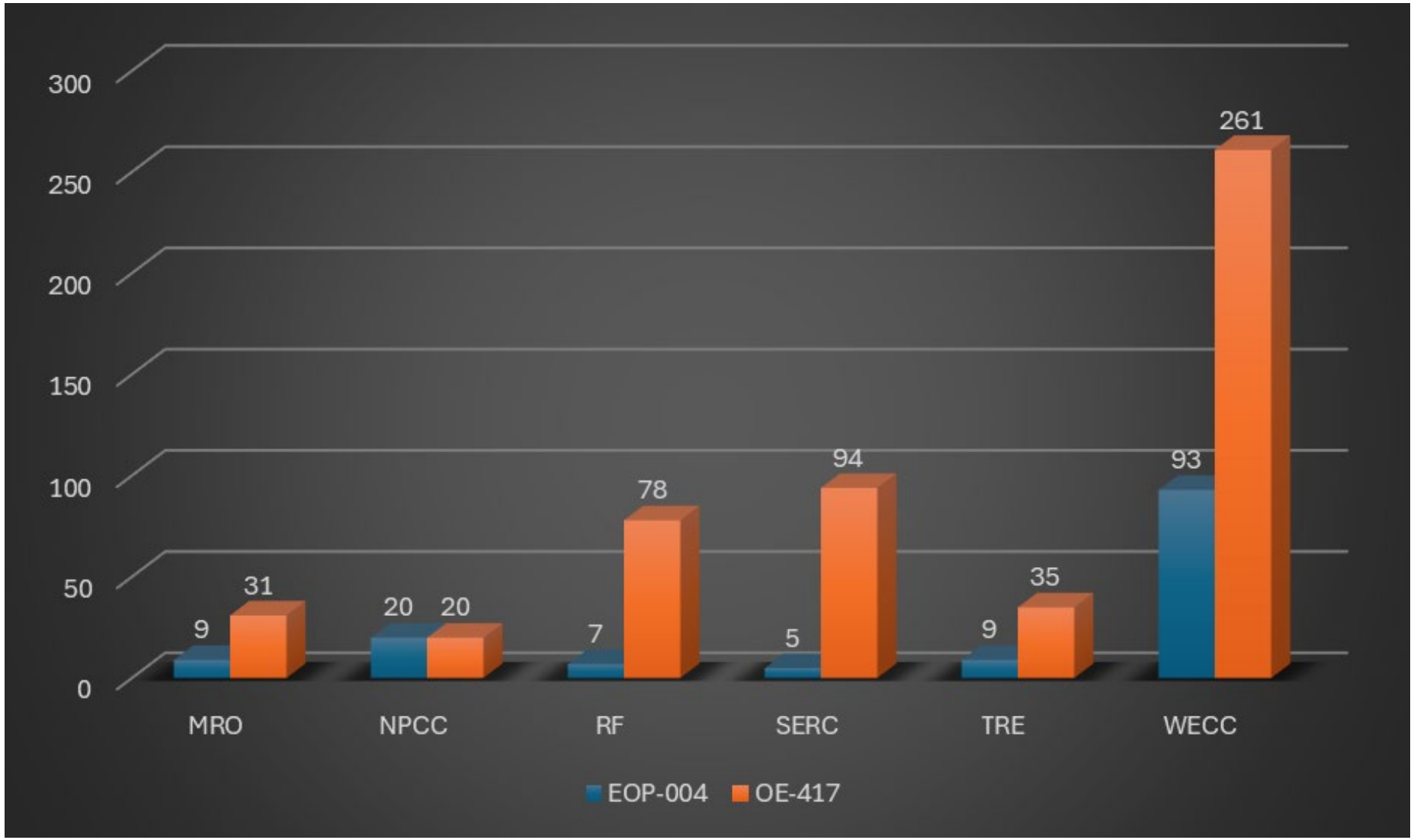
Forecast Accuracy

Forecaster	Named Storms	Hurricanes	Major
Actual	**17**	**11**	**5**
The Weather Channel	24	11	6
Colorado State University	23	12	6
Meteorological Office (UK)	22	12	4
Tropical Storm Risk	23	11	5
University of Arizona	21	11	5
NOAA	17 to 25	8 to 13	4 to 7

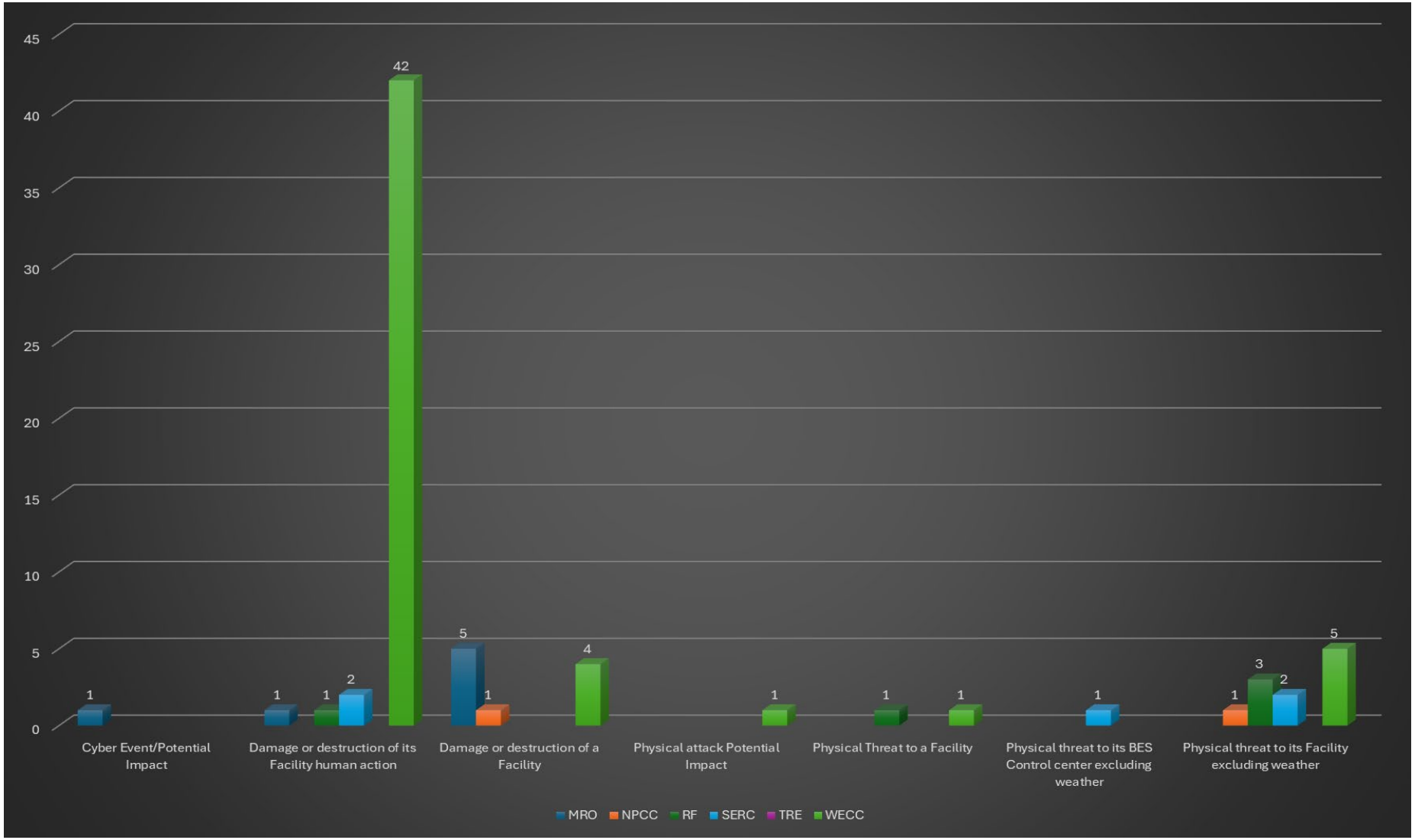
2024 Q4 Mandatory Reports by Region



2024 YTD Mandatory Reports by Region

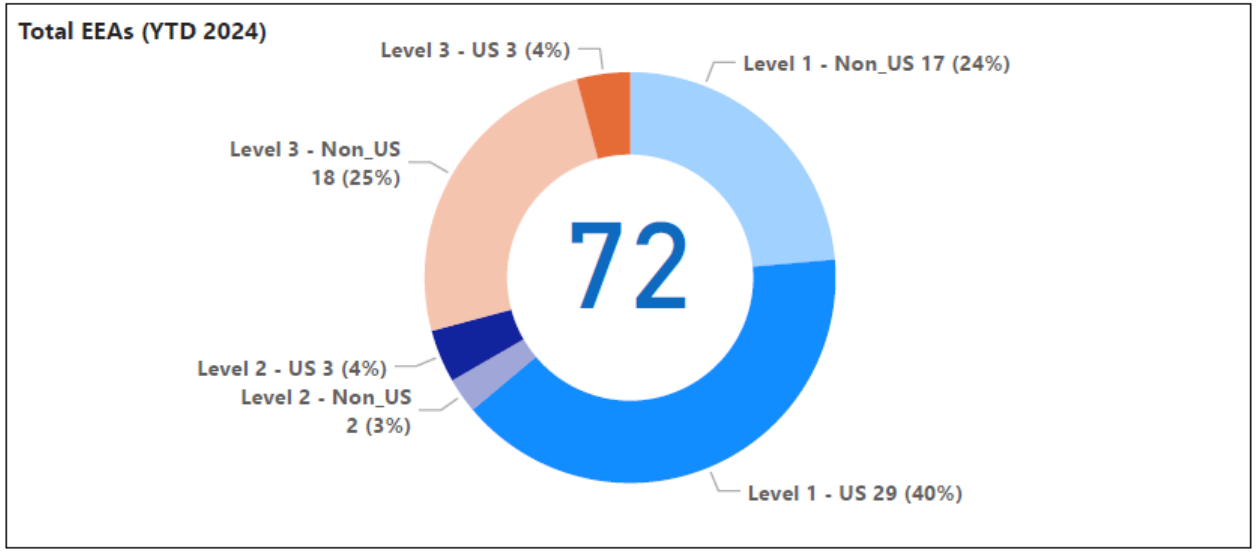


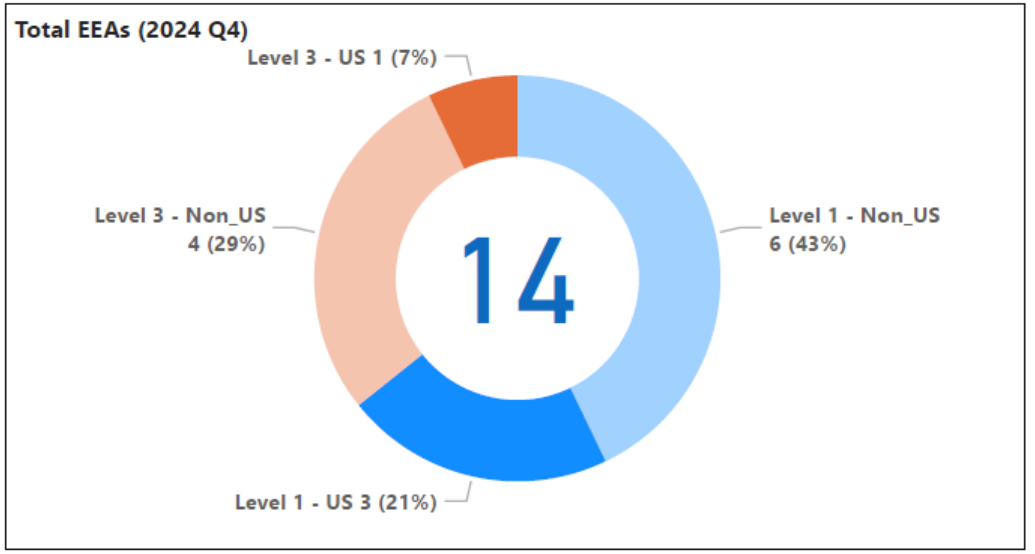
2024 Q4 Cyber & Physical Security Reports by Region

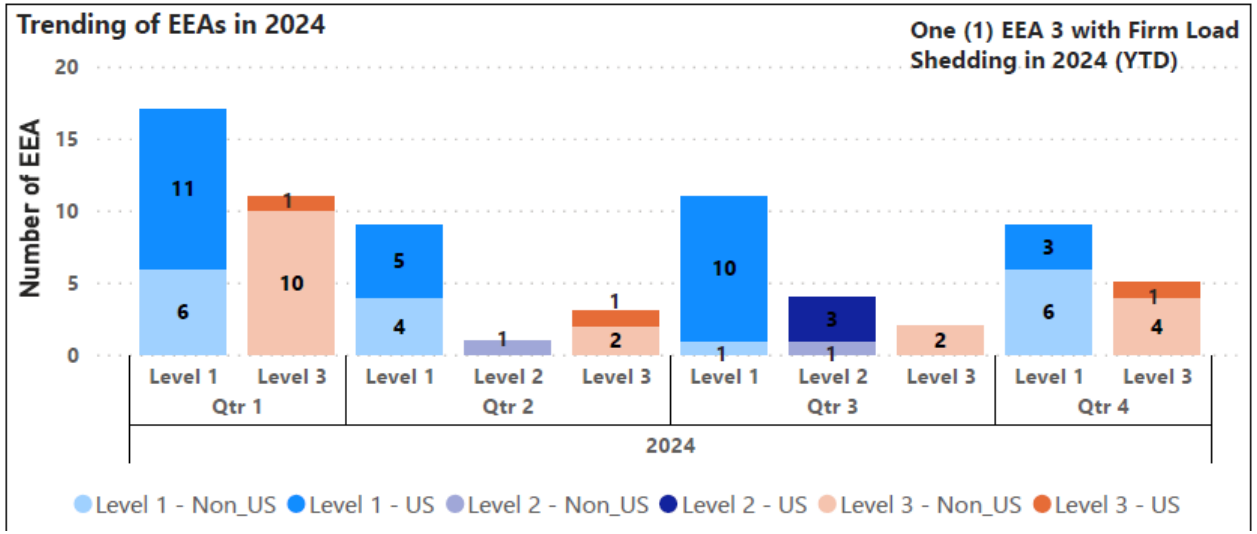


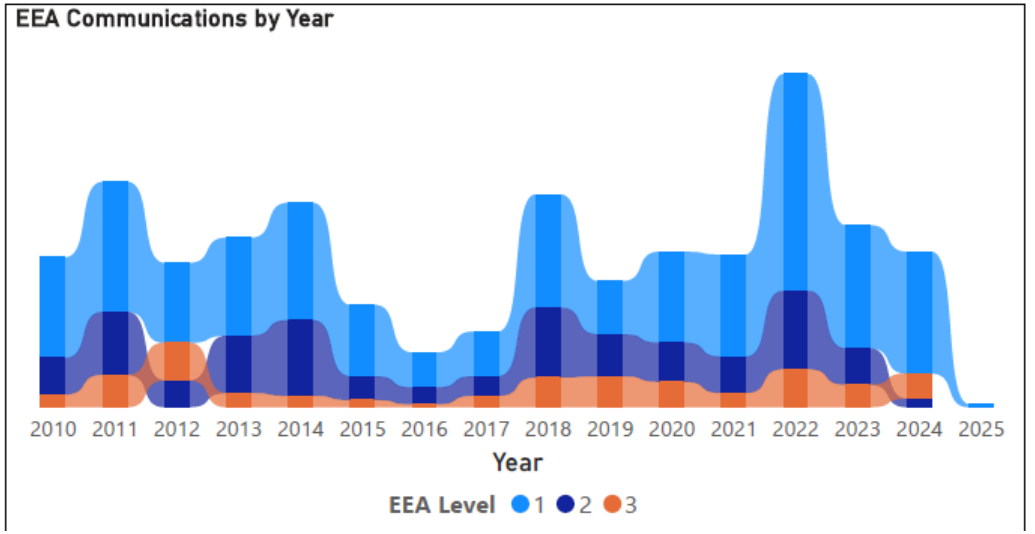
Energy Emergency Alert (EEA) Level 3

EEA Overview Public

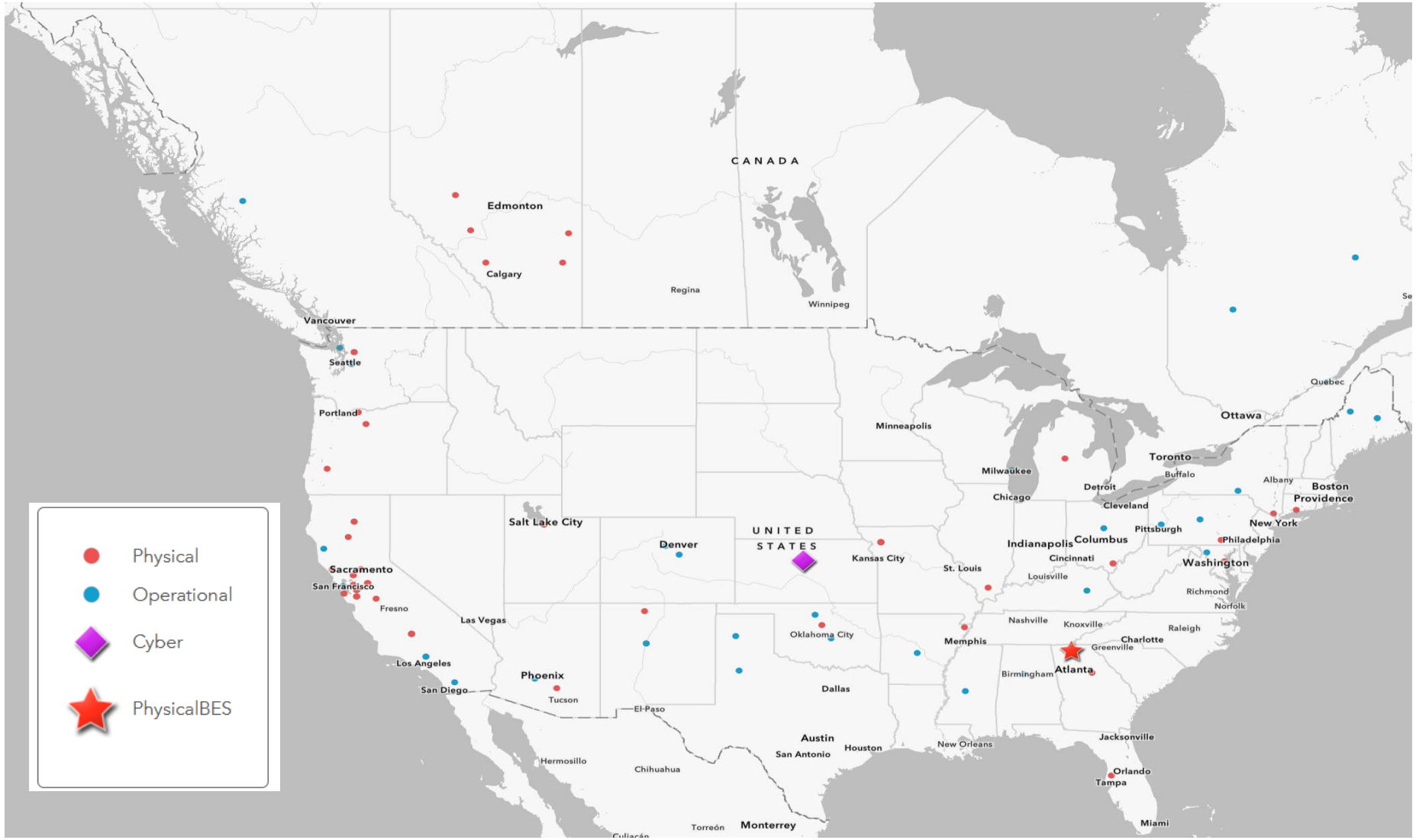








2024 Q4 Events United States & Canada



Questions and Answers

Informational Item
Board of Trustees Technical Session
February 12, 2025

NERC Bulk Power System Awareness Update

Action
Information

Background

NERC's Bulk Power System Awareness (BPSA) group acquires and disseminates timely, accurate, and complete information regarding the current status of the bulk power system (BPS) and threats to its reliable operation, to enable the ERO Enterprise to effectively assure the reliability of the BPS. During major system disturbances, extreme weather, fires, hurricanes, physical events, and geomagnetic disturbances, etc. the BPSA facilitates effective communications between the ERO Enterprise, industry, and government stakeholders.

NERC BPSA, in collaboration with the E-ISAC and the ERO Enterprise Situation Awareness teams, maintains a near real-time situation awareness of conditions on the BPS. Notifies the Industry of significant BPS events that have occurred in one area, and which have the potential to impact reliability in other areas. Maintains and strengthens high-level communications, coordination, and cooperation with governments and government agencies regarding real-time conditions.