NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Agenda
Reliability Issues Steering Committee

June 15, 2022 | 11:30 a.m.-1:00 p.m. Eastern
Virtual Meeting

Attendee WebEx Link: Join Meeting

Introductions and Chair's Remarks

NERC Antitrust Compliance Guidelines

Agenda Items

1. **Risk Identification*** - **Review**
   a. Summer Reliability Assessment and State of Reliability Report Previews
   b. Reliability Indicators
   c. Risk Prioritization
   d. RISC Response to May 2022 Board of Trustees Policy Input
2. **2023 RISC Reliability Leadership Summit*** - **Review**
3. **Other Matters and Adjourn**

*Background materials included.

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Antitrust Compliance Guidelines

I. General

It is NERC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. This policy requires the avoidance of any conduct that violates, or that might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition.

It is the responsibility of every NERC participant and employee who may in any way affect NERC's compliance with the antitrust laws to carry out this commitment.

Antitrust laws are complex and subject to court interpretation that can vary over time and from one court to another. The purpose of these guidelines is to alert NERC participants and employees to potential antitrust problems and to set forth policies to be followed with respect to activities that may involve antitrust considerations. In some instances, the NERC policy contained in these guidelines is stricter than the applicable antitrust laws. Any NERC participant or employee who is uncertain about the legal ramifications of a particular course of conduct or who has doubts or concerns about whether NERC's antitrust compliance policy is implicated in any situation should consult NERC's General Counsel immediately.

II. Prohibited Activities

Participants in NERC activities (including those of its committees and subgroups) should refrain from the following when acting in their capacity as participants in NERC activities (e.g., at NERC meetings, conference calls and in informal discussions):

- Discussions involving pricing information, especially margin (profit) and internal cost information and participants' expectations as to their future prices or internal costs.
- Discussions of a participant's marketing strategies.
- Discussions regarding how customers and geographical areas are to be divided among competitors.
- Discussions concerning the exclusion of competitors from markets.
- Discussions concerning boycotting or group refusals to deal with competitors, vendors or suppliers.

- Any other matters that do not clearly fall within these guidelines should be reviewed with NERC's General Counsel before being discussed.

III. Activities That Are Permitted

From time to time decisions or actions of NERC (including those of its committees and subgroups) may have a negative impact on particular entities and thus in that sense adversely impact competition. Decisions and actions by NERC (including its committees and subgroups) should only be undertaken for the purpose of promoting and maintaining the reliability and adequacy of the bulk power system. If you do not have a legitimate purpose consistent with this objective for discussing a matter, please refrain from discussing the matter during NERC meetings and in other NERC-related communications.

You should also ensure that NERC procedures, including those set forth in NERC's Certificate of Incorporation, Bylaws, and Rules of Procedure are followed in conducting NERC business.

In addition, all discussions in NERC meetings and other NERC-related communications should be within the scope of the mandate for or assignment to the particular NERC committee or subgroup, as well as within the scope of the published agenda for the meeting.

No decisions should be made nor any actions taken in NERC activities for the purpose of giving an industry participant or group of participants a competitive advantage over other participants. In particular, decisions with respect to setting, revising, or assessing compliance with NERC reliability standards should not be influenced by anti-competitive motivations.

Subject to the foregoing restrictions, participants in NERC activities may discuss:

- Reliability matters relating to the bulk power system, including operation and planning matters such as establishing or revising reliability standards, special operating procedures, operating transfer capabilities, and plans for new facilities.
- Matters relating to the impact of reliability standards for the bulk power system on electricity markets, and the impact of electricity market operations on the reliability of the bulk power system.
- Proposed filings or other communications with state or federal regulatory authorities or other governmental entities.
- Matters relating to the internal governance, management and operation of NERC, such as nominations for vacant committee positions, budgeting and assessments, and employment matters; and procedural matters such as planning and scheduling meetings.

2022 Summer Reliability Assessment and State of Reliability Report Previews

Action
Review

Summary
2022 Summer Reliability Assessment
The NERC 2022 Summer Reliability Assessment (SRA) identifies, assesses, and reports on areas of concern regarding the reliability of the North American bulk power system (BPS) for the upcoming summer season. In addition, the SRA will present peak electricity supply and demand changes, as well as highlight any unique regional challenges or expected conditions that might impact the BPS. The reliability assessment process is a coordinated reliability evaluation between the Reliability Assessment Subcommittee (RAS), the Regional Entities, and NERC staff.

The final report reflects NERC's independent assessment and is aimed at informing industry leaders, planners and operators, as well as regulatory bodies so that they can be better prepared to take necessary actions to ensure BPS reliability. The report also provides an opportunity for the industry to discuss their plans and preparations for ensuring reliability throughout the upcoming summer period.

Pursuant to the delegated authority from the Board of Trustees (Board), NERC Management published the 2022 SRA on May 18, 2022.

2022 State of Reliability Report
The State of Reliability Report (SOR) is prepared annually to provide objective, credible, and concise information to policy makers, industry leaders, and the Board on issues affecting the reliability and resilience of the North America BPS. Specifically, the report:

- Identifies system performance trends and emerging reliability risks;
- Determines the relative health of the interconnected system; and
- Measures the success of mitigation activities deployed.

The key findings and recommendations of the report serve as the technical foundation for NERC's range of risk-informed efforts addressing reliability performance and serve as key inputs to the ERO Reliability Risk Priorities Report prepared by the Reliability Issues Steering Committee. The metrics measured in the report address the characteristics of an adequate level of reliability.

In developing the 2022 SOR, NERC staff and the Performance Analysis Subcommittee continue to tailor content for the policy maker and industry leader audience. NERC management expects to issue the 2022 SOR in July 2022.

NERC management will provide a review of the SRA results and a preliminary review of the SOR results and potential impact on the RISC's annual work.

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2022 Summer Reliability Assessment and State of Reliability Report Previews

Status and Preliminary Findings

John Moura, Director, Reliability Assessment and Performance Analysis

Reliability Issues Steering Committee Meeting

June 15, 2022

RELIABILITY | RESILIENCE | SECURITY




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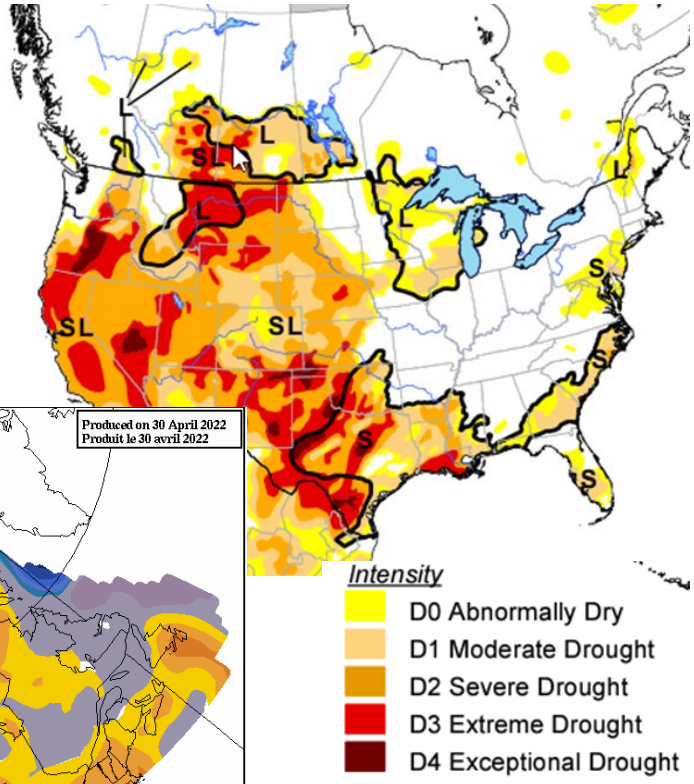
Summer Reliability Assessment

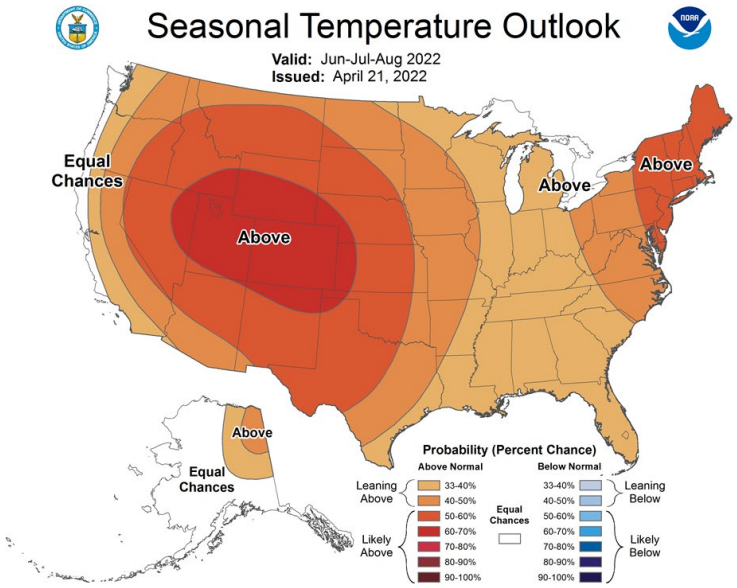
RELIABILITY | RESILIENCE | SECURITY

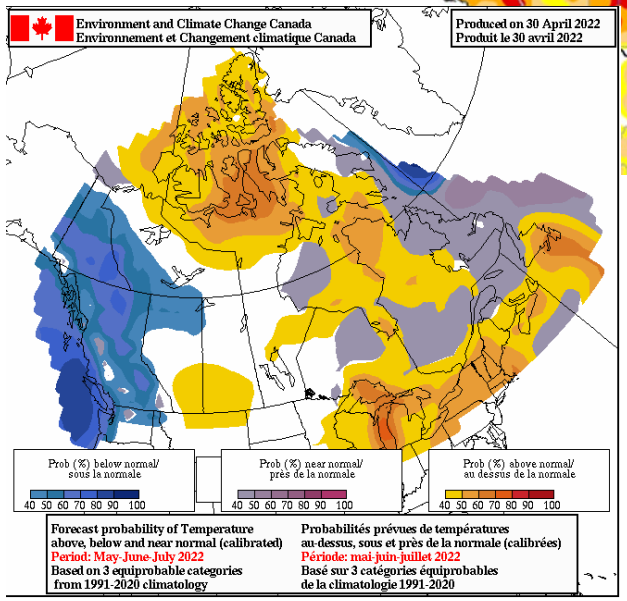



Challenging Weather: Heat and Drought

- Drought conditions create heightened reliability risks
- High temperatures are key driver of peak electricity demand



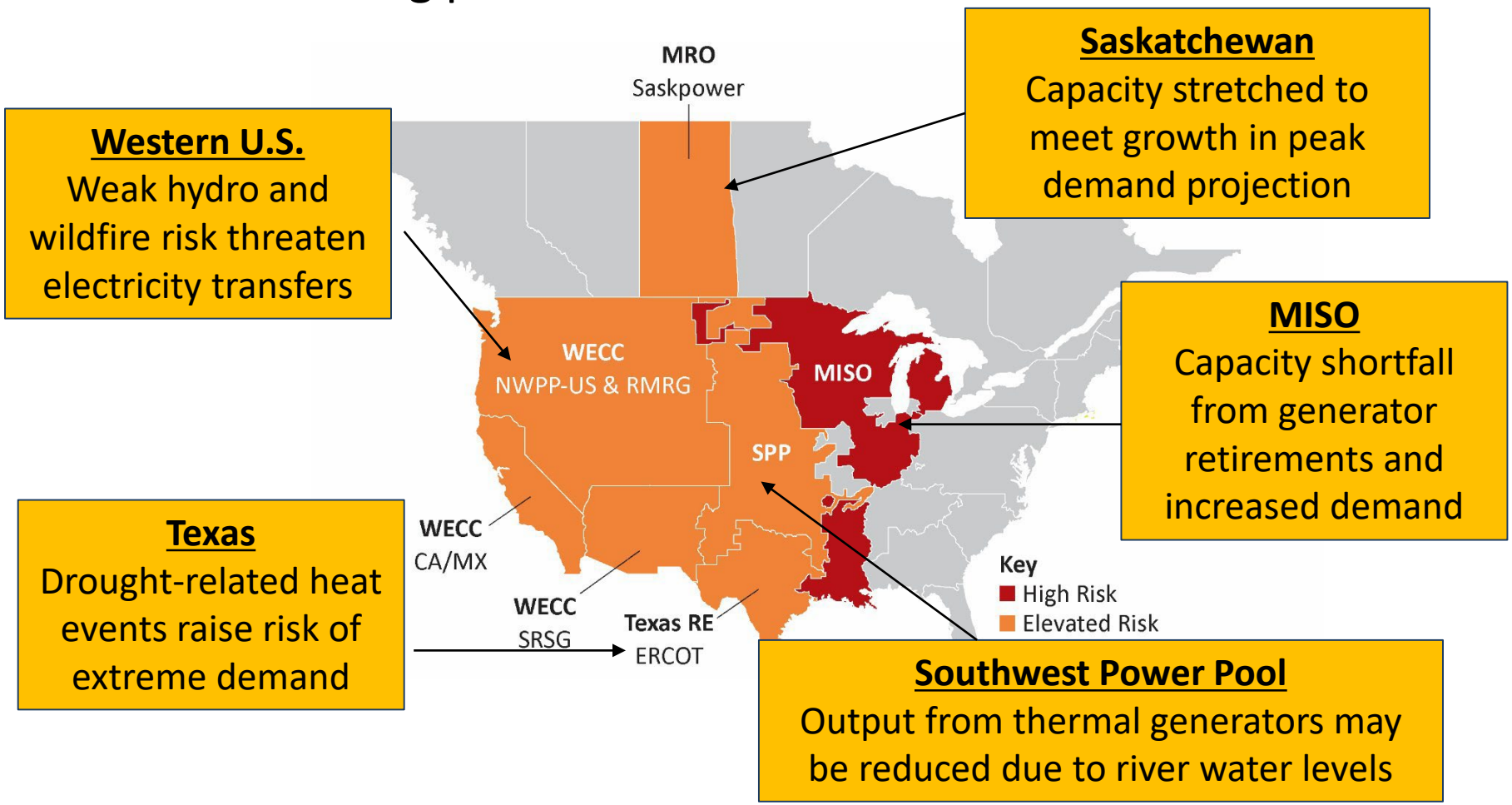




3-Month Temperature Outlook (U.S. National Weather Service, Environment and Climate Change Canada) and April North American Drought Monitor (NADM)

Preliminary Summer Risk Assessment

- Parts of North America are at **elevated** or **high** risk of energy shortfalls during peak summer conditions



Saskatchewan
Capacity stretched to meet growth in peak demand projection

Western U.S.
Weak hydro and wildfire risk threaten electricity transfers

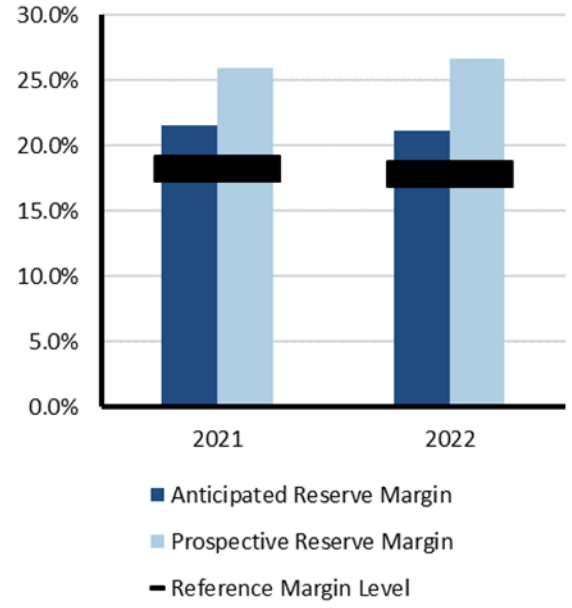
MISO
Capacity shortfall from generator retirements and increased demand

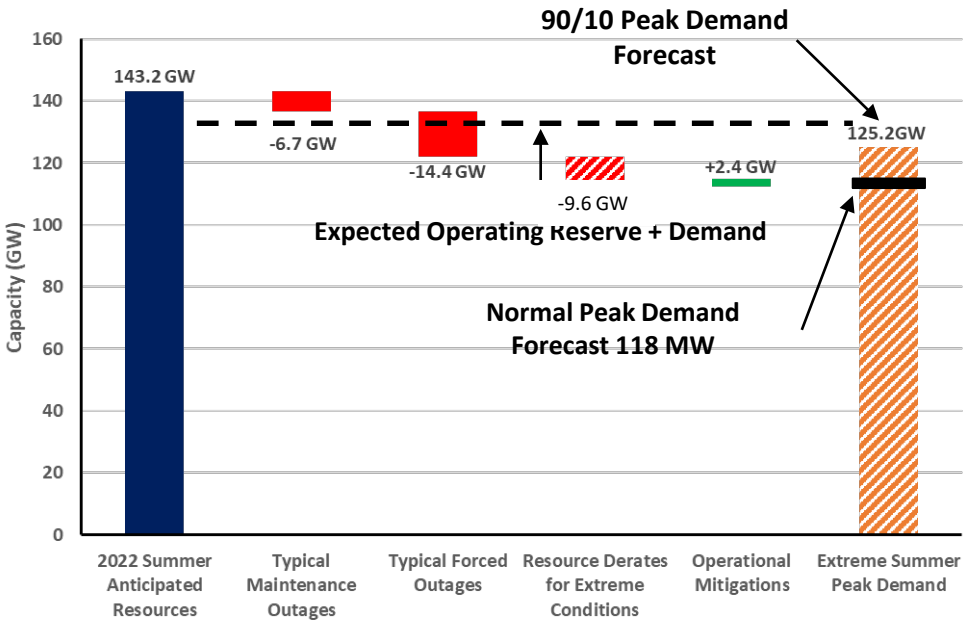
Texas
Drought-related heat events raise risk of extreme demand

Southwest Power Pool
Output from thermal generators may be reduced due to river water levels

MISO Assessment – High Risk

- Generation capacity declined 2.3% since 2021 resulting in lower reserve margin
- North and central areas at risk of reserve shortfall in extreme temperatures, high generation outages, or low wind

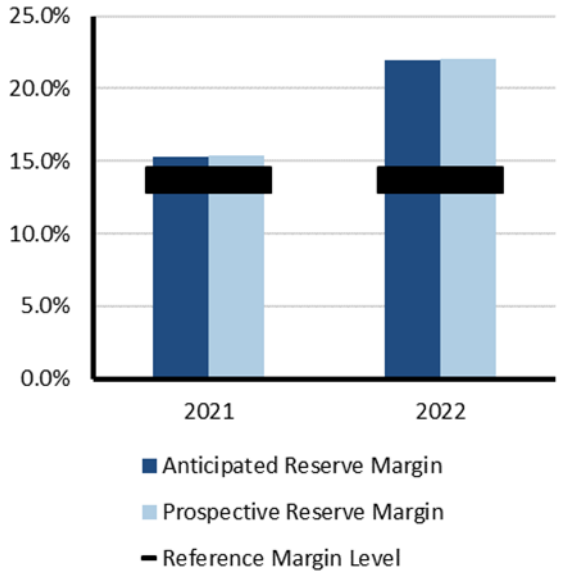


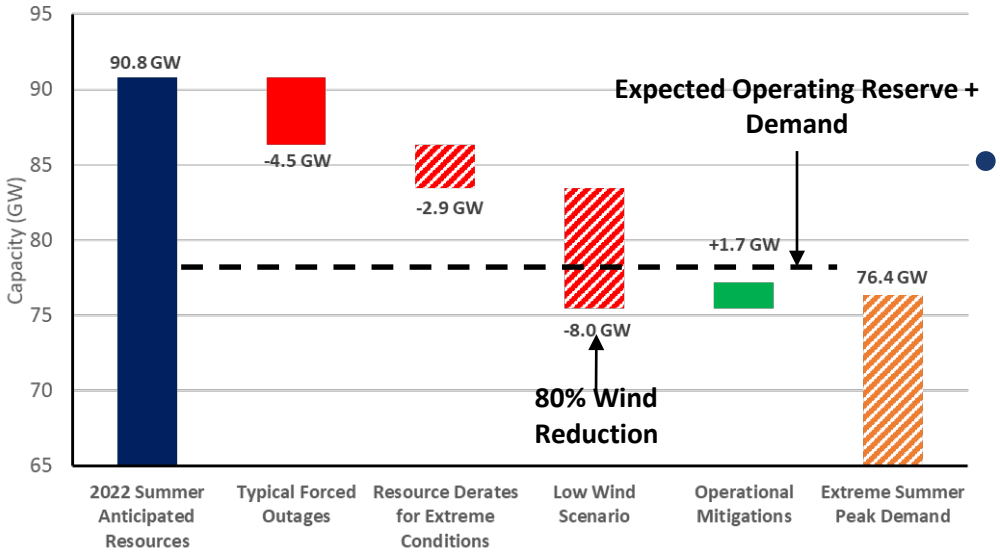


- Some risk of insufficient operating reserves at normal peak demand

Texas Assessment – Elevated Risk

- Extreme drought in Texas can cause wide-area heat events and extreme demand
- Extreme demand, low wind, and high thermal generation outages could lead to emergency procedures and load shedding

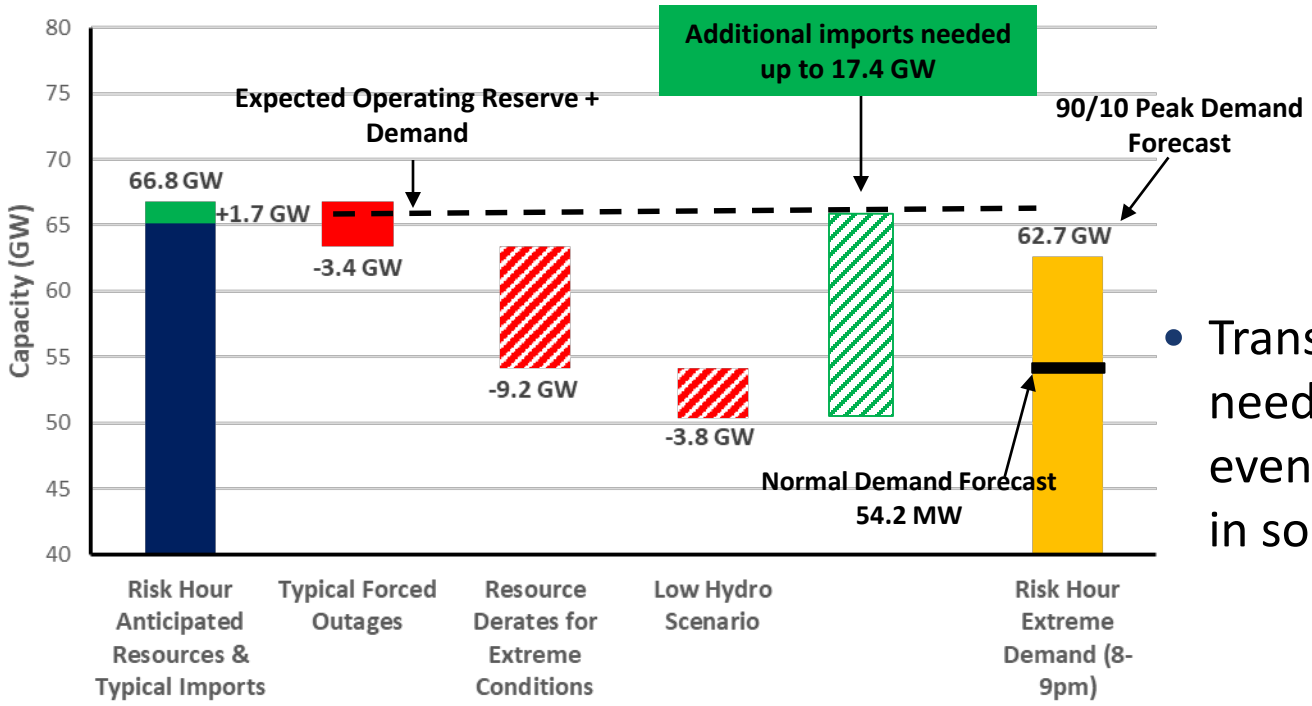


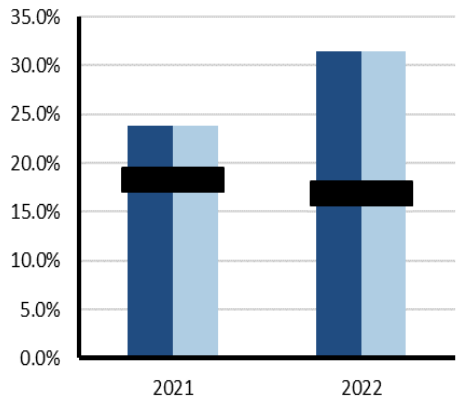


- Transmission projects needed to reliably integrate new resources being monitored for delays

California-Mexico and U.S. West Assessment – Elevated Risk

- Output from hydro generators affected by widespread drought and low snowpack
- Risk of insufficient supply of electricity for transfer to support system balancing during extreme conditions





CAMX Reserve Margins

- Transfers into CAMX are needed in afternoon and evening to offset decline in solar PV output

Other Reliability Issues

- Supply chain issues and commissioning challenges on new resource and transmission projects
- Electricity and other critical infrastructure sectors face added cyber security threats in current geopolitical situation
- Unexpected tripping of solar photovoltaic (PV) resources during grid disturbances continues to be a reliability concern
- Active late-summer wildfire season anticipated in Western U.S. and Canada

2021 SRA Status

- The SRA report was reviewed by the NERC Reliability and Security Technical Committee (RSTC) in April
- Risk analysis is based on inputs from probabilistic studies and deterministic risk scenarios
- NERC Staff is preparing the report for RSTC endorsement and NERC Senior Leadership approval

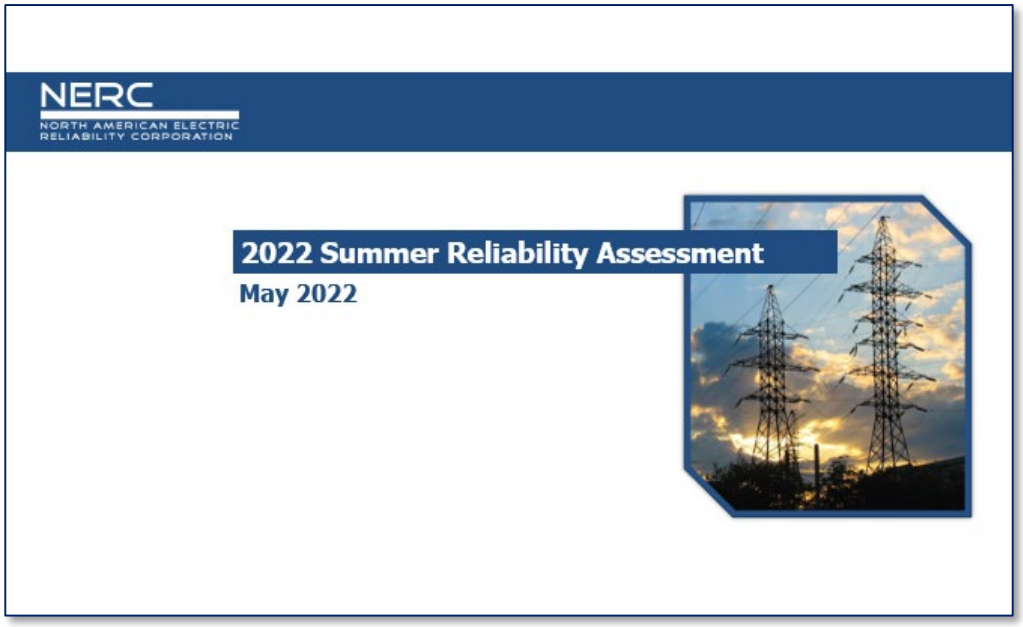
2021 SRA Schedule

Date	Milestone
Early May	Report sent to RSTC for Endorsement
May 10	Report sent to NERC Executive Leaders
May 12	Final Report sent to NERC Board of Trustees
May 17	Pre-publication Report sent to ERO Executive Committee and MRC
May 18	Report Release

Questions and Answers

About the Report

- NERC's Summer Reliability Assessment (SRA) examines potential regional resource deficiencies and operating reliability concerns
  - Describes industry preparations to manage seasonal risks
- Developed with the Reliability Assessment Subcommittee (RAS) and reviewed by the Reliability & Security Technical Committee



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2022 State of Reliability Report

RELIABILITY | RESILIENCE | SECURITY

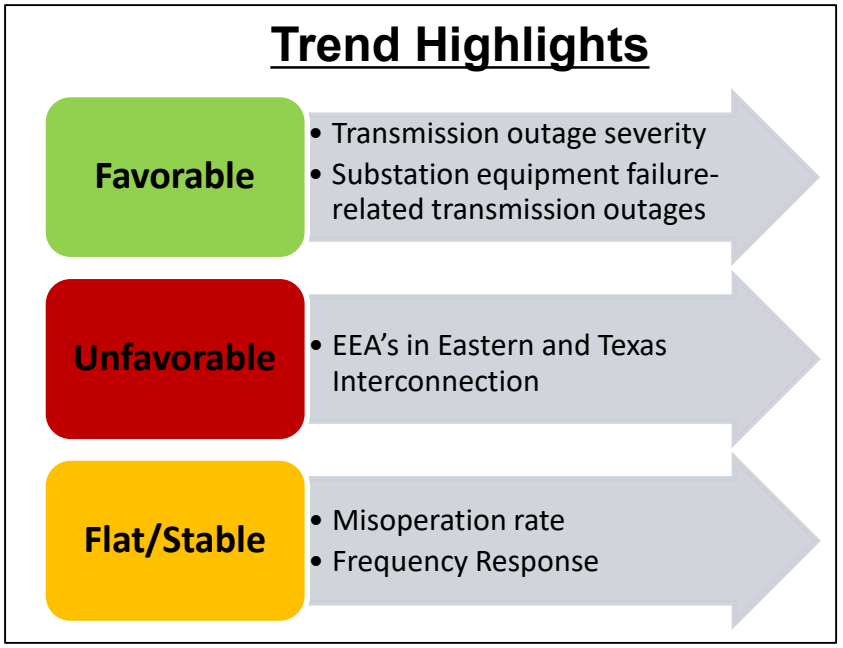



The State of Reliability: Objective

- Provide objective, credible, and concise information to policy makers, industry leaders, and the NERC Board of Trustees on issues affecting the reliability and resilience of the North American bulk power system (BPS)
  - Identify system performance trends and emerging reliability risks
  - Determine the relative health of the interconnected system
  - Measure the success of mitigation activities deployed
- Evaluates the 2021 Operating Year and Historical Trends

Preliminary Key Findings

- Extreme cold weather led to largest load-shedding event across South Central U.S. and Texas
  - Increased reliance on natural gas generation, generator freezing, higher than expected demand, uncertainty of renewable energy production
- Dramatic increase in the amount of unserved energy and operator-initiated load shed
  - Hurricane Ida, Northwest Heat Dome, Western Wildfires, December Tornadoes
- Cybersecurity threat landscape relentlessly evolves and presents new challenges to the electricity industry
- Multiple loss of solar events in Texas and California continue to impact the grid reliability



The North American BPS – By the Numbers

4,585,939 GWh
2021 Actual Energy

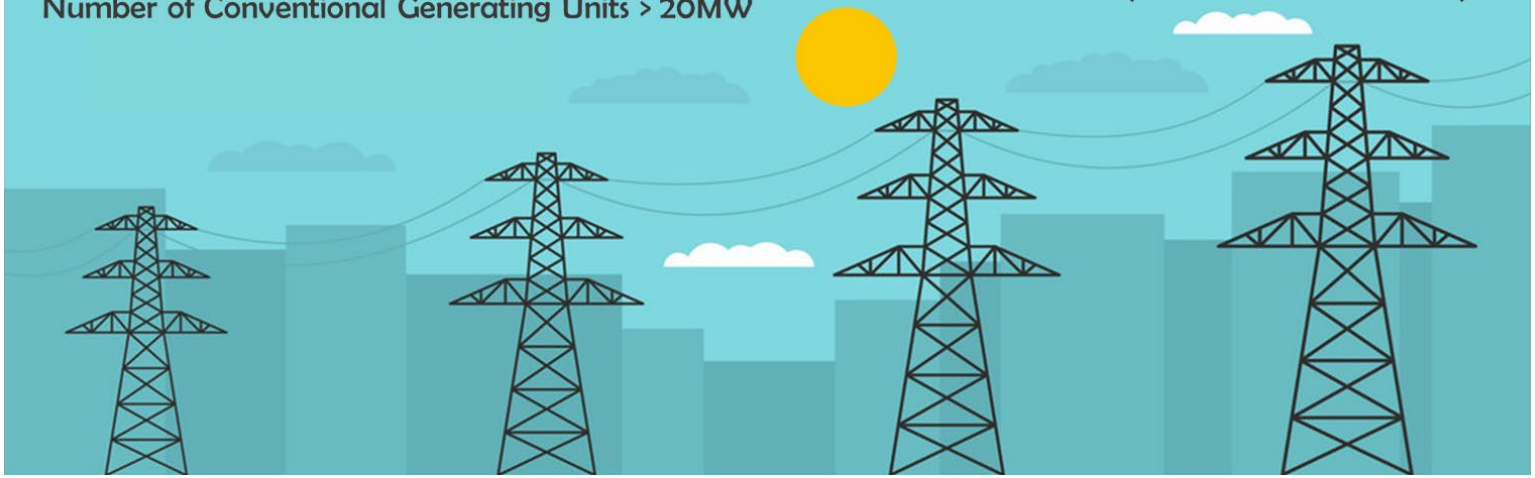
1,056.98 GW
2021 Summer Peak Capacity

511,099 mi
Total Transmission Circuit Miles > 100kV

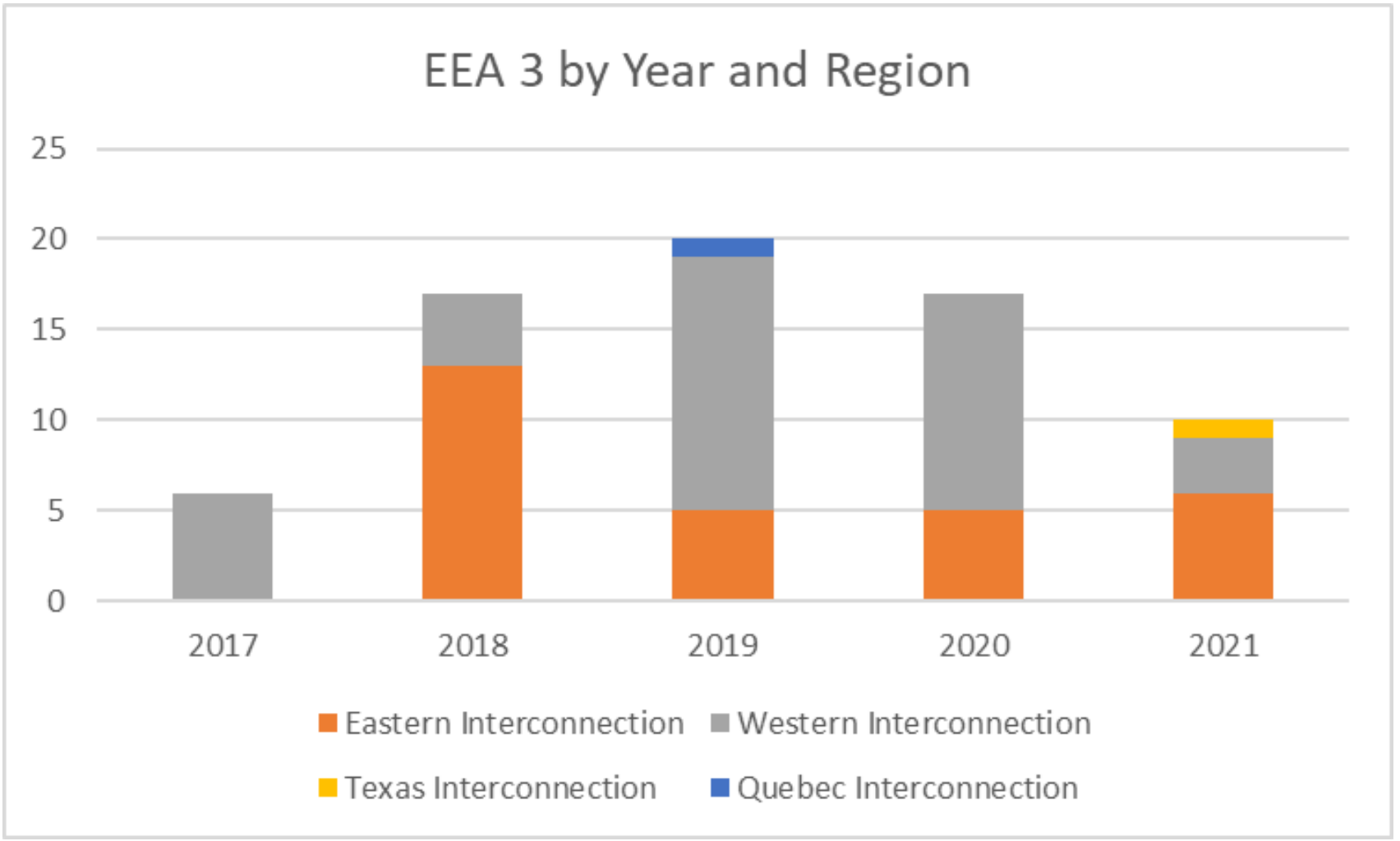
5,966
Number of Conventional Generating Units > 20MW

99.19%
Time with no operator-initiated firm load shedding associated with EEA-3 (1,015.5 GWh energy unserved or 0.022% of total energy served)

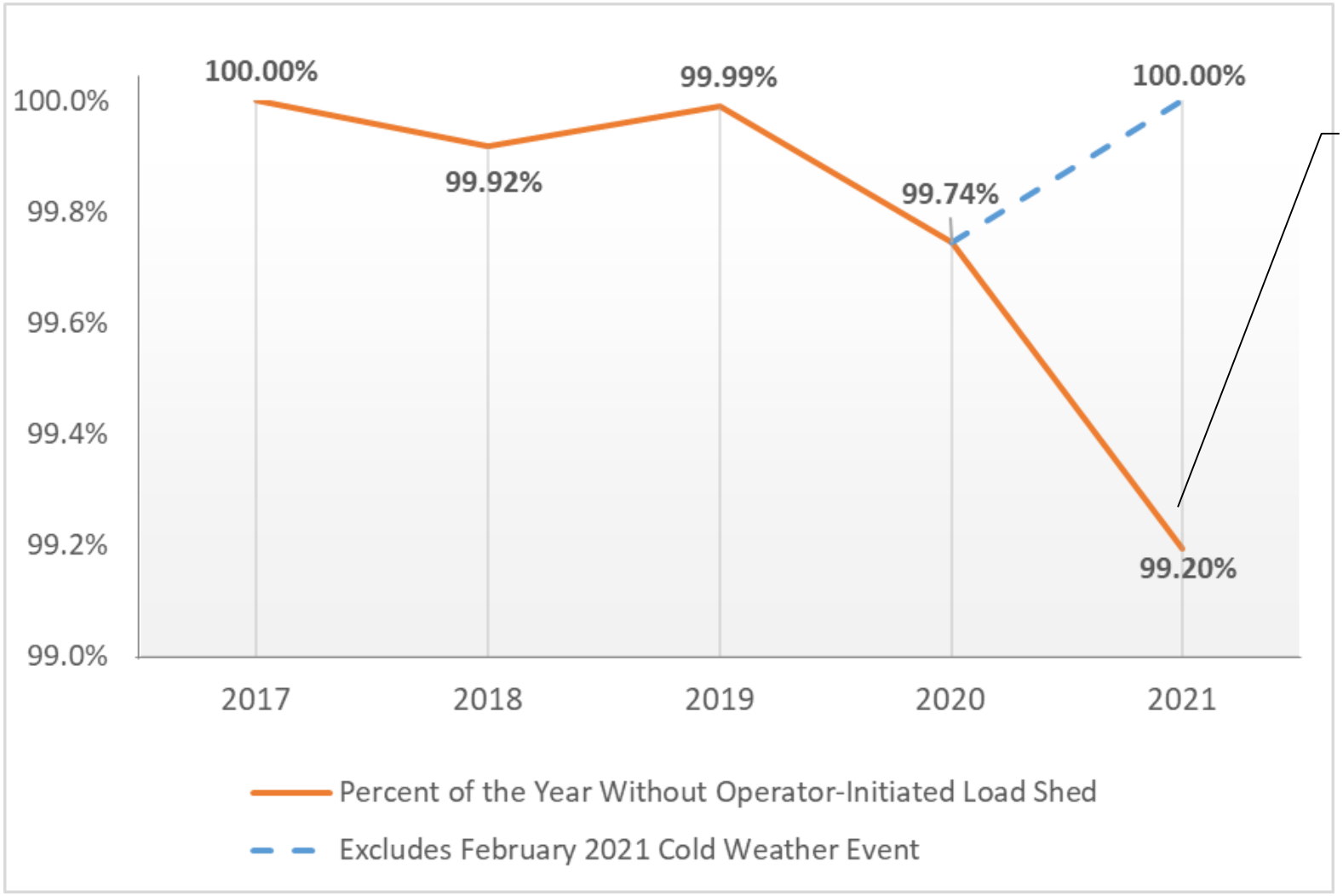
0
Category 3, 4, or 5 Events (non-weather related)



Number of EEA Level 3 Alerts by Interconnection



Hours Without Operator-Initiated Firm Load Shed (%/year)



2021

- 10 EEA-3 Alerts
- 1,015 GWh unserved
- Occurred February

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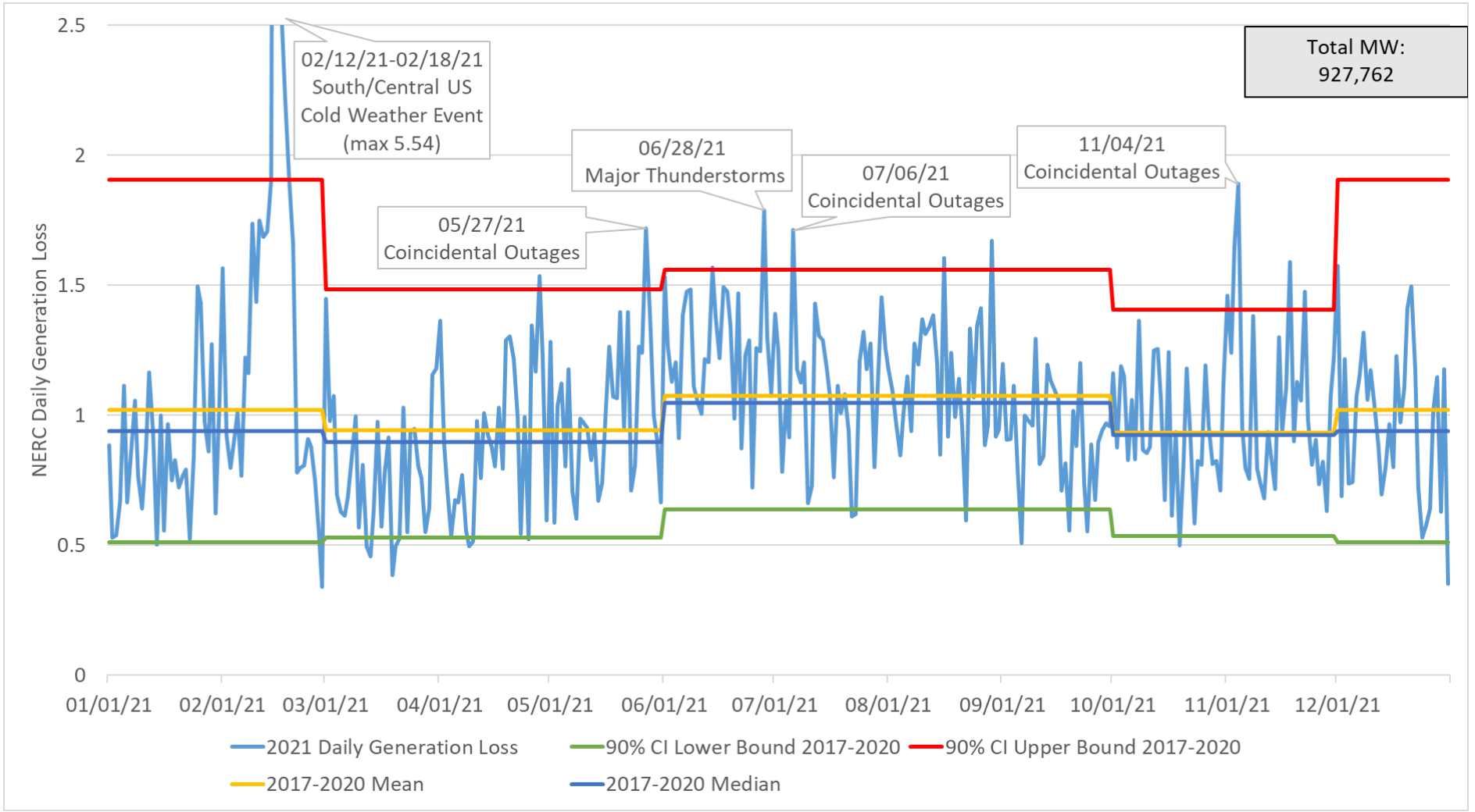
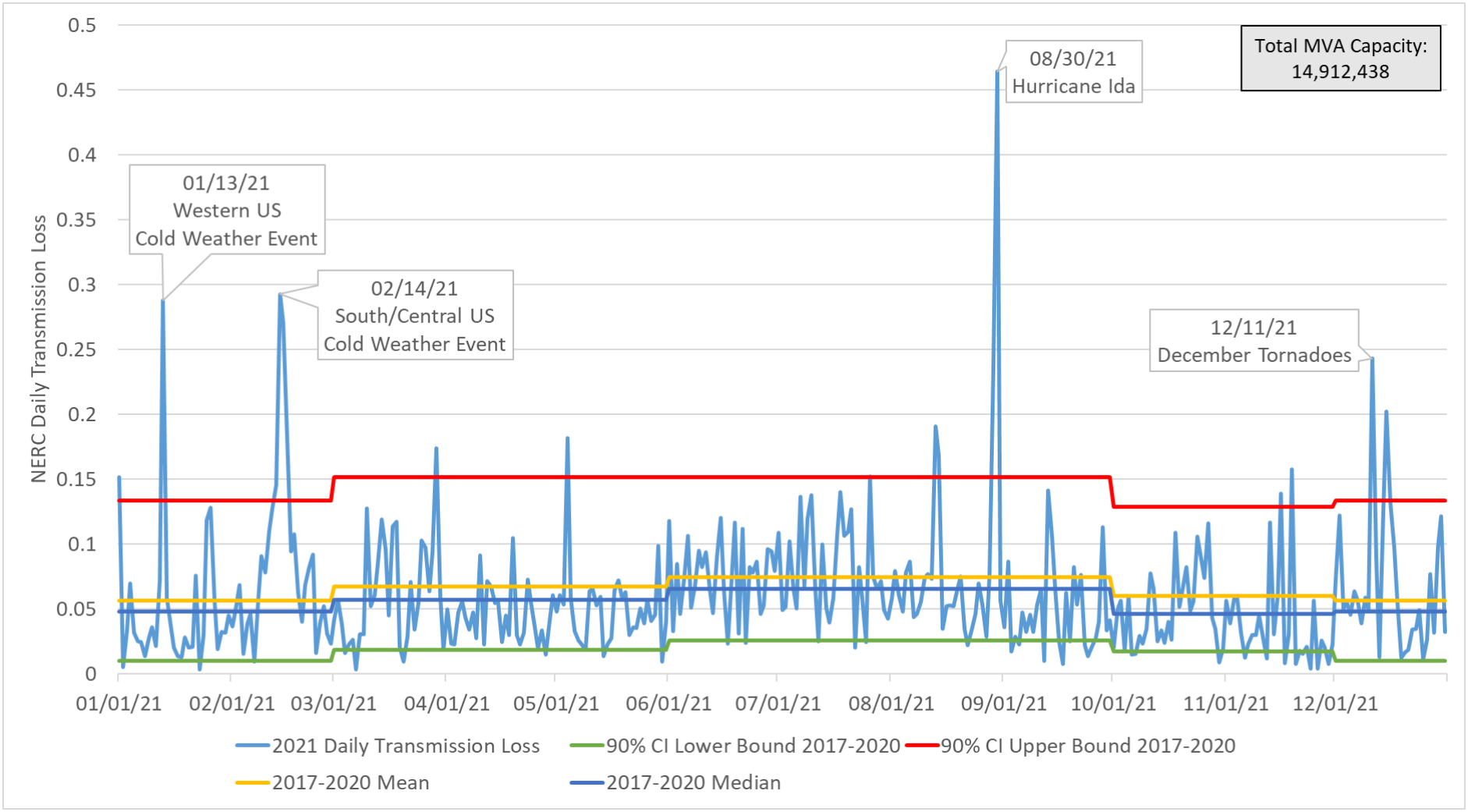
2021 Daily Generation Outages: Extreme Day Focus



Leading Cause of Outages on Extreme Days:
1) Fuel Systems, 2) Economics 3) Catastrophe

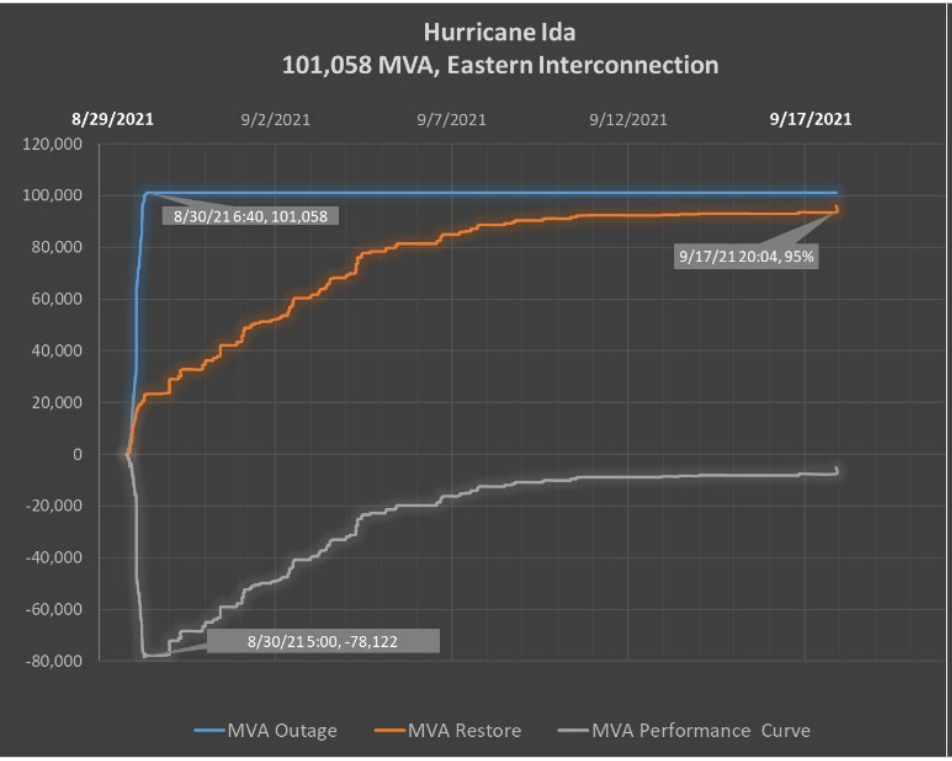
2021 Daily Transmission Outages: Extreme Day Focus



Leading Cause of Outages on Extreme Days:
1) Weather, 2) Failed Equipment 3) Wildfires (WECC)

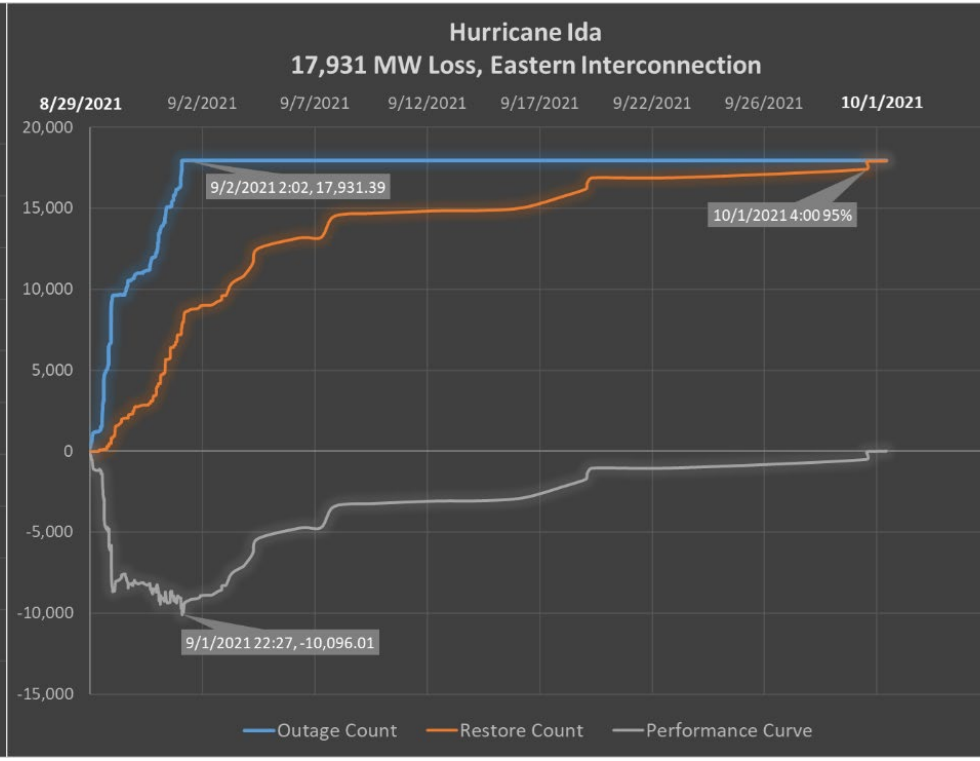
Resilience in Focus – Hurricane Ida Restoration Analysis

Transmission



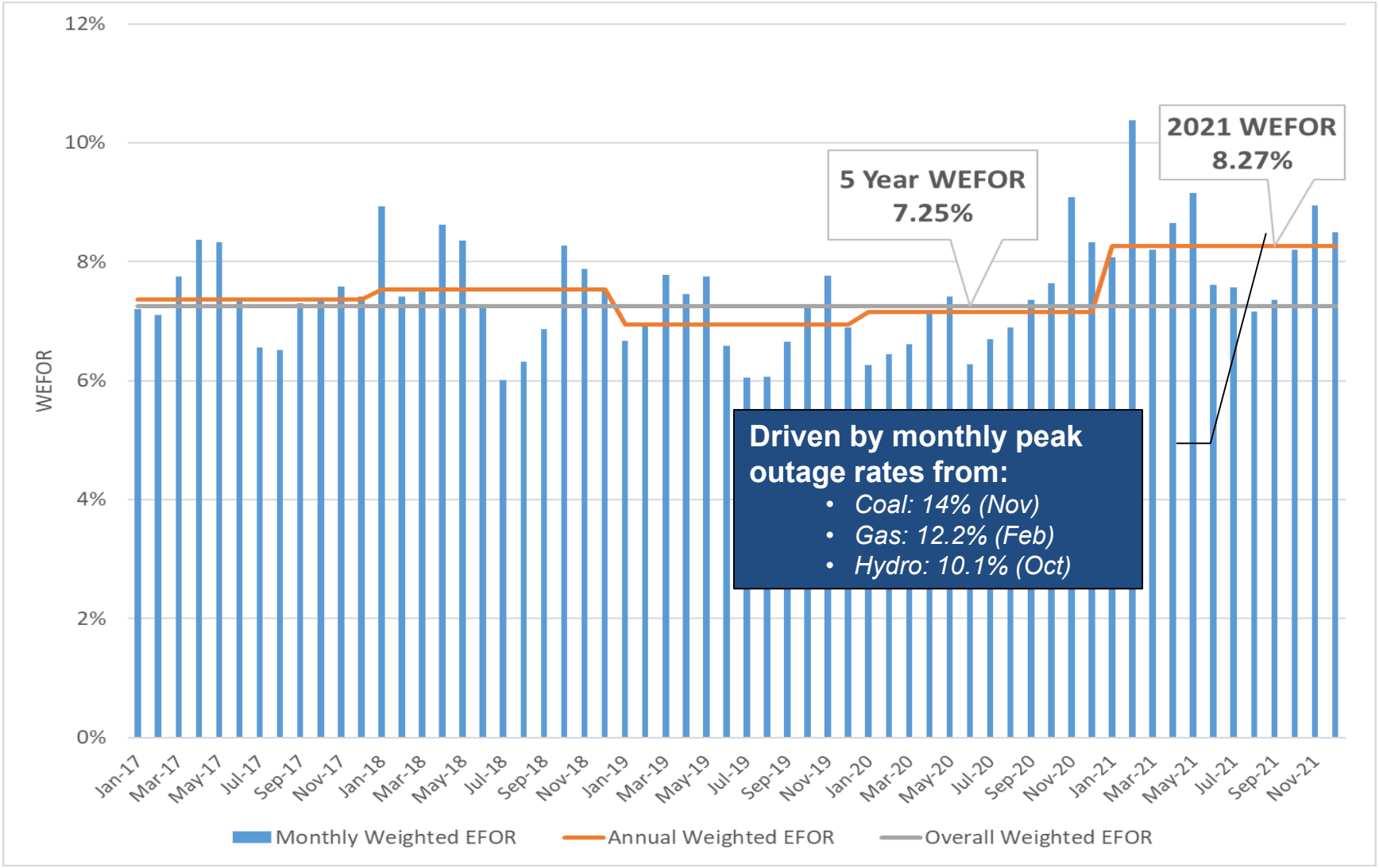
Peak Outage: 101,058 MVA
Time to first restoration: 47 minutes
95% restoration: 459 hours
Total restoration: 124 days

Generation



Peak Outage: 17,931 MW
Time to first restoration: 9.5 hours
95% restoration: 792 hours
Total restoration: 34 days

Generation Forced Outage Rate: Conventional Fleet



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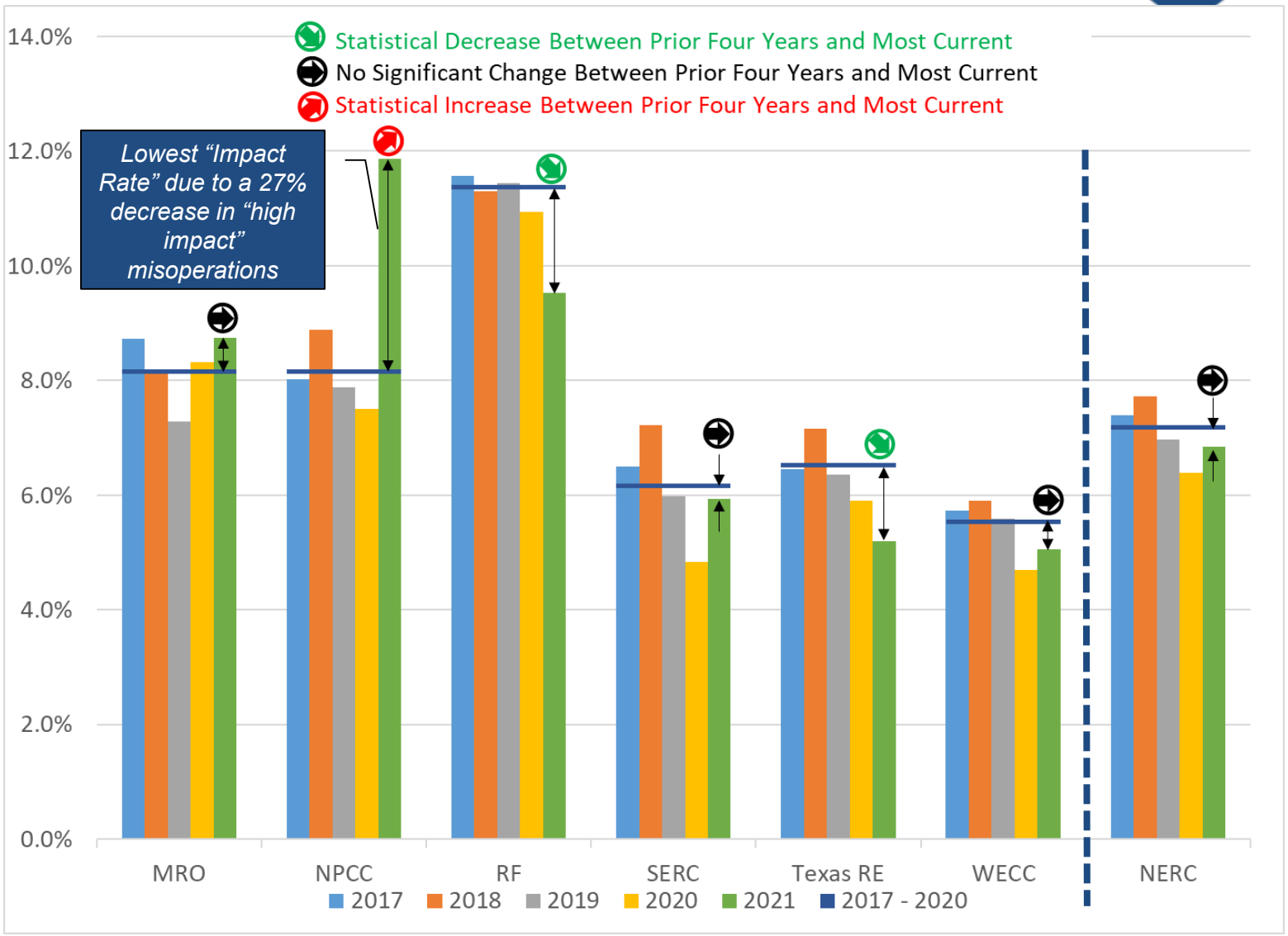
Protection System Misoperations



Cyber and Physical Security

Supply Chain

Geopolitical Threats

Ransomware

Domestic Extremists

Drones

COVID-19

2022 SOR Release Schedule

Date	Description
June 7	Presentation to RSTC, Beginning of Review Period
Mid-June	RSTC Endorsement
Early July	Board and MRC Review
Mid-July	Report release (Target)

Questions and Answers

2022 ERO Enterprise Reliability Indicators

Action
Review

Background
The 2022 ERO Enterprise Reliability Indicators identify key reliability indicators that provide insight into the performance of the bulk power system (BPS) as well as emerging trends that may indicate potential opportunities or challenges prospectively. The Reliability Issues Steering Committee (RISC) committee reviewed the 2020 ERO Enterprise Reliability Indicators as part of their 2020 Work Plan and recommended several modifications to the indicators for 2021. The current Reliability Indicators more accurately identify potential trends that may pose challenges to the BPS and include several more forward-looking indicators that can illuminate areas that may require further analysis. The RISC committee will review the Reliability Indicators again for further enhancements as part of their 2022 Work Plan.

Summary
NERC staff will provide an update on the status of the reliability indicators in respect to the work of the RISC.

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2022 First Quarter Reliability Indicators

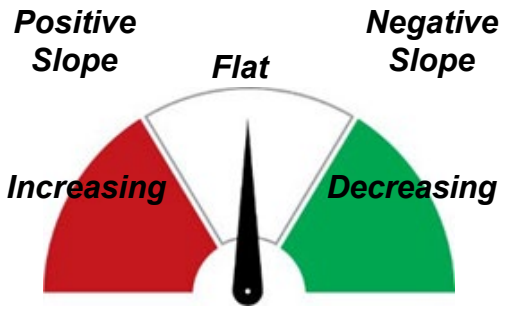
Soo Jin Kim, Director of PRISM
Reliability Issues Steering Committee Meeting
June 15, 2022

RELIABILITY | RESILIENCE | SECURITY




Indicator 1: Fewer, Less Severe Events

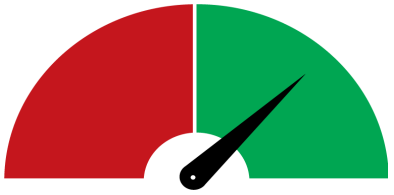
- **Why is it important?**
  - Provides a quantitative measure and trend of actual impacts on the BPS
- **How is it measured?**
  - Count: Number of Category 3 or above events
  - Trend: Statistical test is performed on the five-year cumulative daily event Severity Risk Index (eSRI) for (Category 1–3) events

Data (Annual Measurement) ○ Threshold: No Category 3 or above events: *Zero is green, else is red*	**2022 Status** 
Data (Compared to a 5-year rolling average) ○ Slope of eSRI line is flat to decreasing and does not show an increase above zero that is statistically significant (95% Confidence Interval). ○ "2022 Status" relates to the slope of the 5 year rolling average (Positive, Flat, or Negative), not just the 2022 performance.	

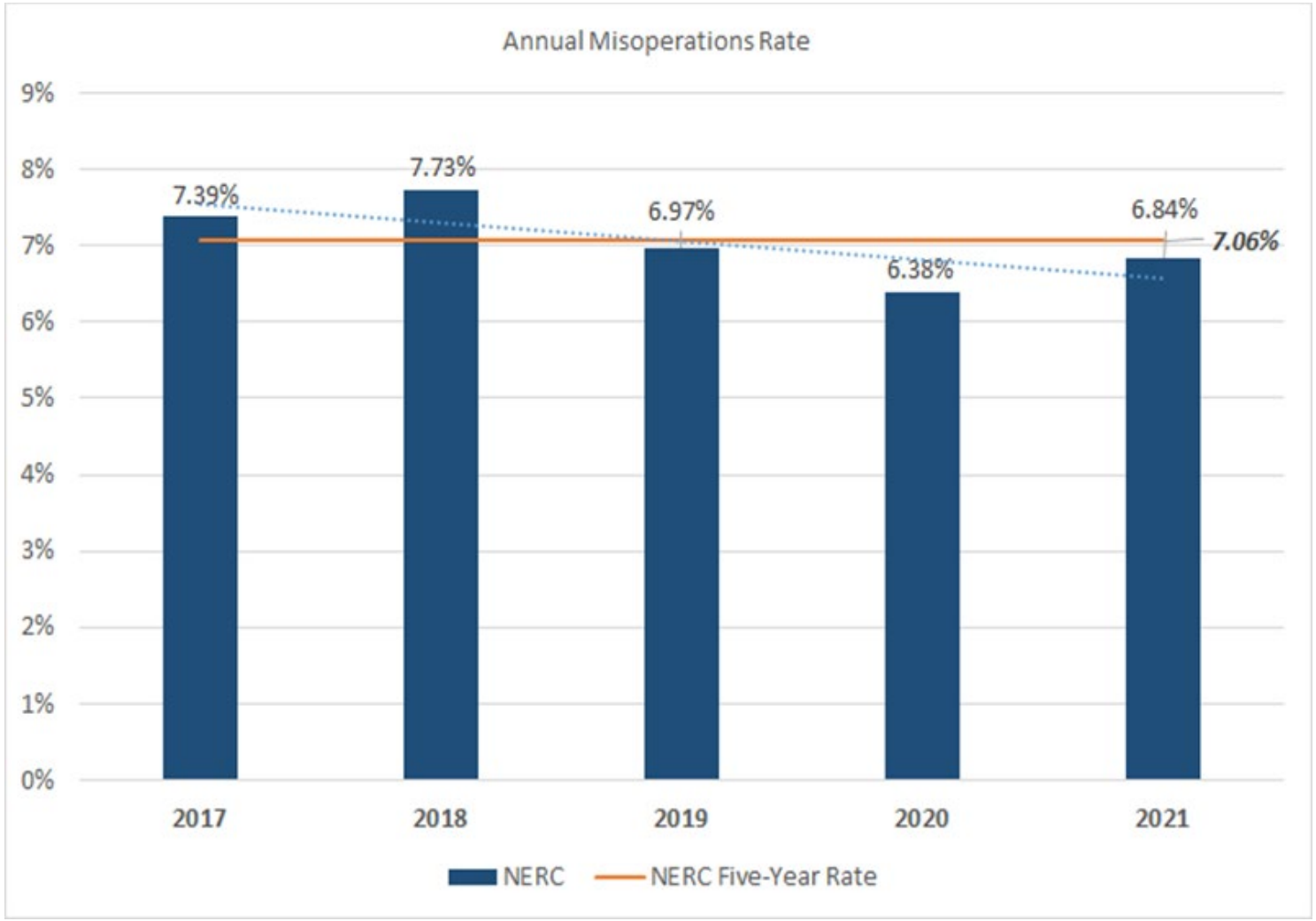
Indicator 2: Compliance Violations

- **Why is it important?**
  - Reduce risk to BPS reliability from Standard violations by registered entities
- **How is it measured?**
  - Moderate and serious risk noncompliance with a relevant history of similar past conduct: 7% of moderate and serious risk violations filed in Q1 2022 had relevant past conduct.
  - The number of violations discovered through self-reports: 87% of noncompliance submitted in Q1 2022 were self-reported.
  - Risk to the BPS based on the severity of Standard violations: 17% of the violations filed in Q1 2022 were assessed as serious risk.
    - *3% of past 5-year filings are assessed as serious risk.*

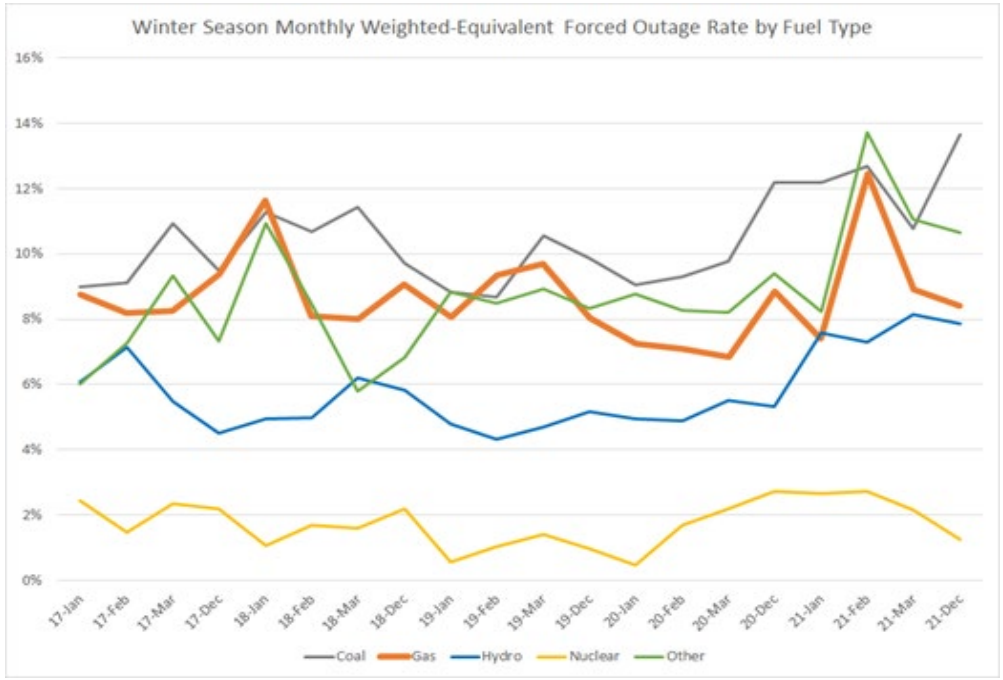
** For additional detail please refer to Q1 2022 CMEP report.*



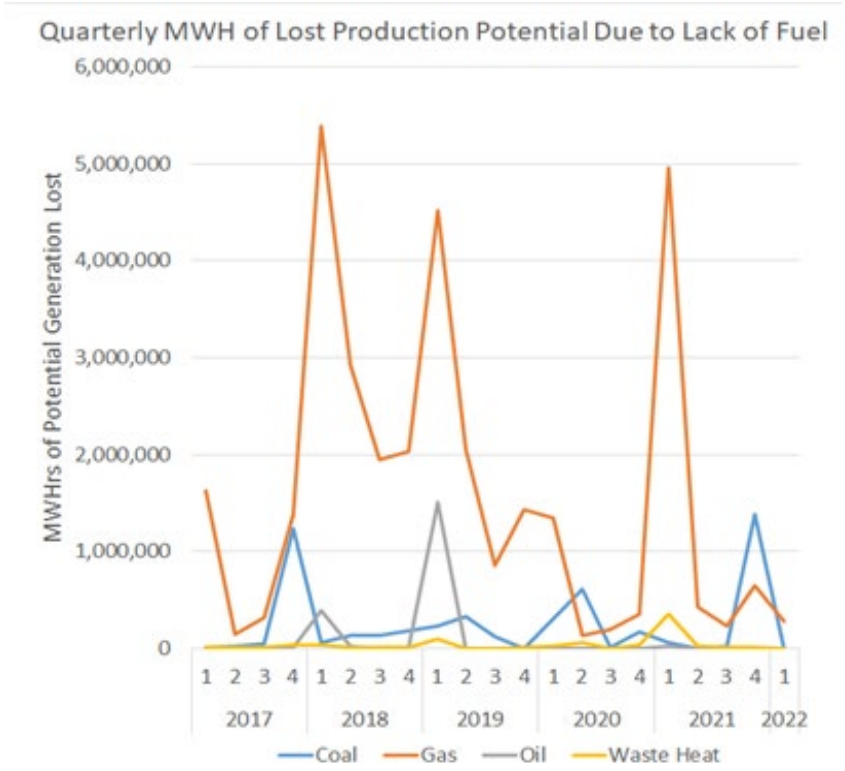
Indicator 3: Protection System Misoperations Rate



Indicator 4: Forced Outage Rate During Cold Weather Months and Potential Production MWH Loss Due to Lack of Fuel

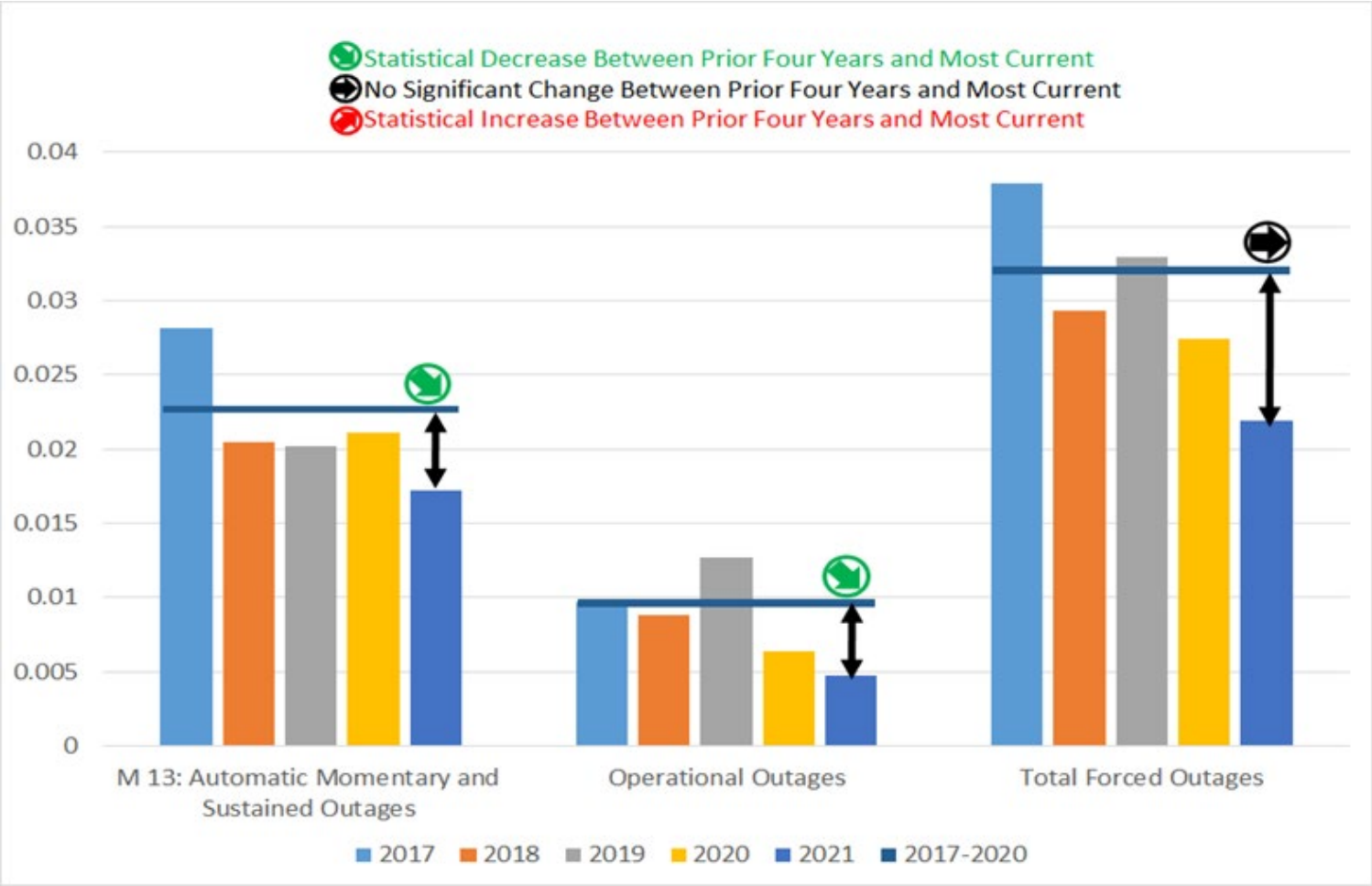


Winter Season Monthly Weighted EFOR by Fuel Type



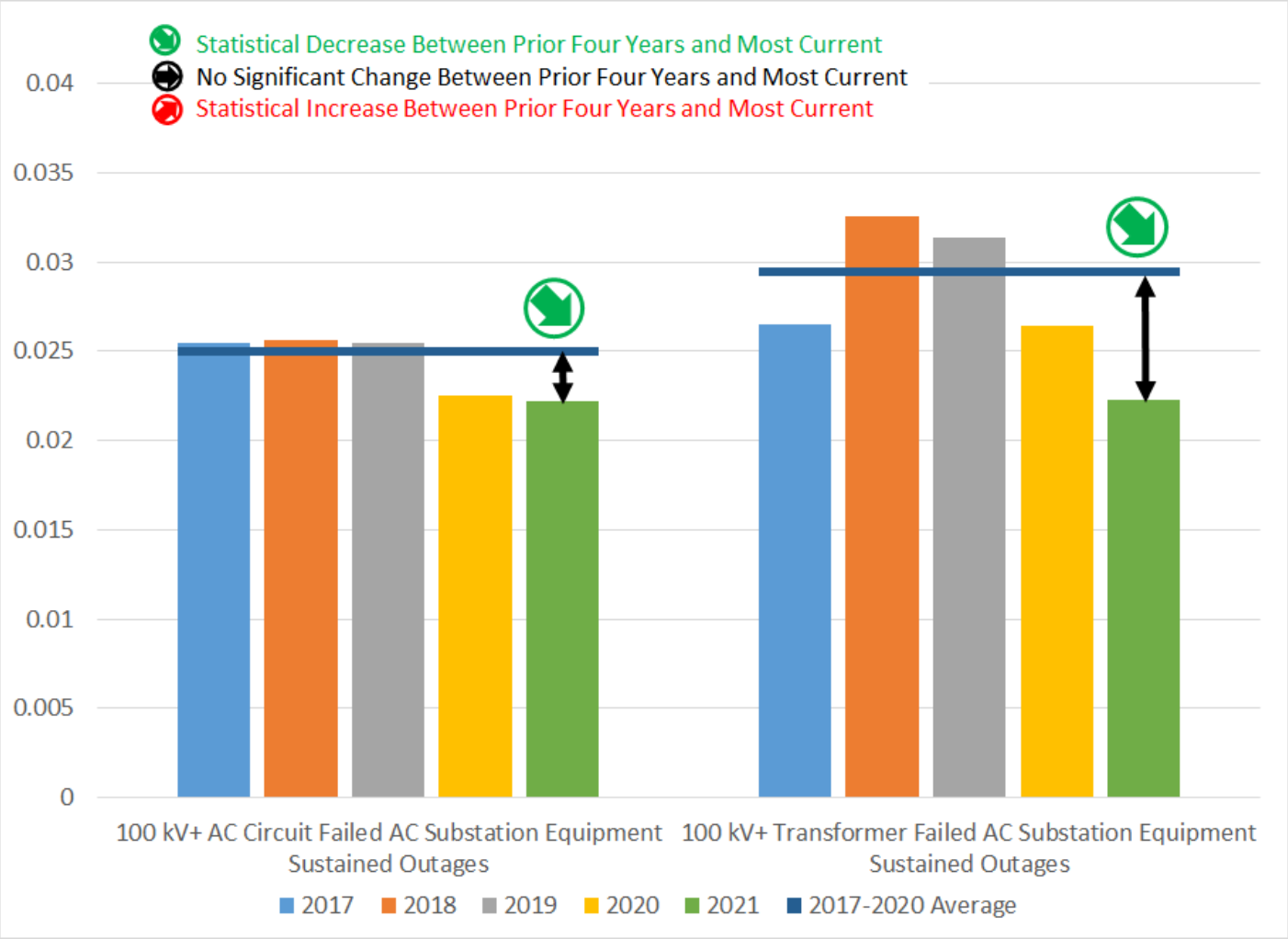
Percent of Potential Production Lost Due to Lack of Fuel

Indicator 5a: Operator or Other Human Performance Issues



Outages Caused by Human Error
AC Circuits

Indicator 5b: Substation Equipment Failures or Failed Circuit Equipment



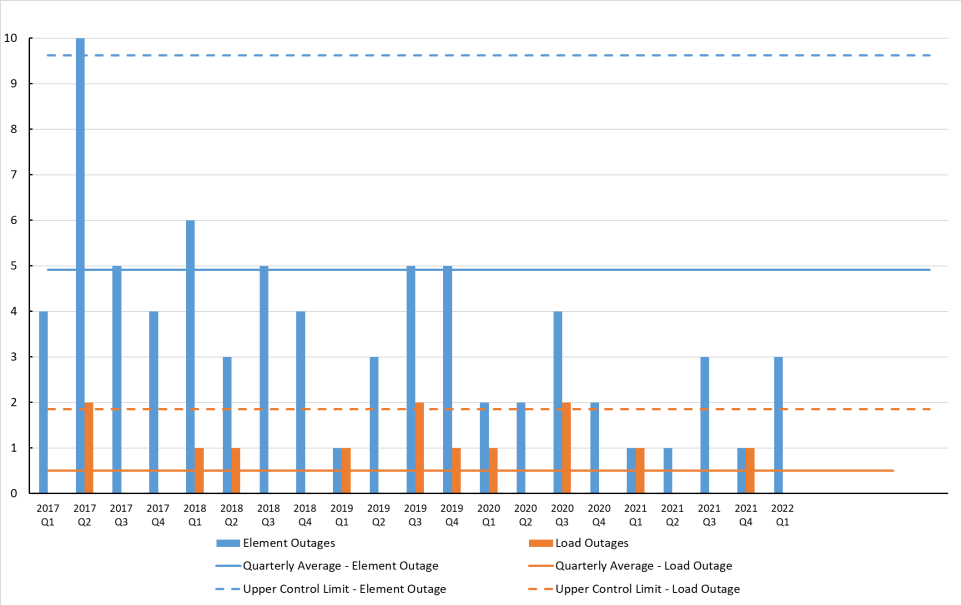
Failed AC Substation Equipment

Indicator 5c: Vegetation Encroachment

- **How is it measured?**
  - Number of vegetation encroachments: No Vegetation encroachment from inside of the right-of-way was reported to NERC during Q1 2022.

Security Indicator 6 : Impactful Cyber and Physical Security Incidents

- **How is it measured?**
  - Number of applicable DOE OE-417 Electric Emergency Incident and Disturbance Reports and NERC EOP-004 Event Reports



Data (Compared to 2016-2018 Quarterly Baseline)

- No disruption* of BES operations due to cyber security incidents
  Zero disruptions of BES operations due to cyber attacks in 2022 Q1
- Number of disruptions* of BES operations due to physical security incidents: *Below baseline Upper Control Limit is green, else is red*
  Three disruptions of BES operations (Zero with load loss) due to physical attacks in 2022 Q1

*A disruption means that a BES element was removed from service as a result of the cyber or physical incident

2022 Status

Cyber Security

Physical Security

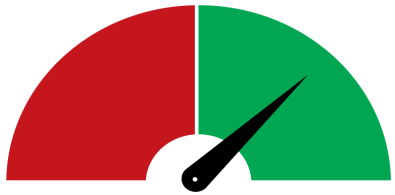
Indicator 7: Real Power Balancing Control Performance (BAAL)

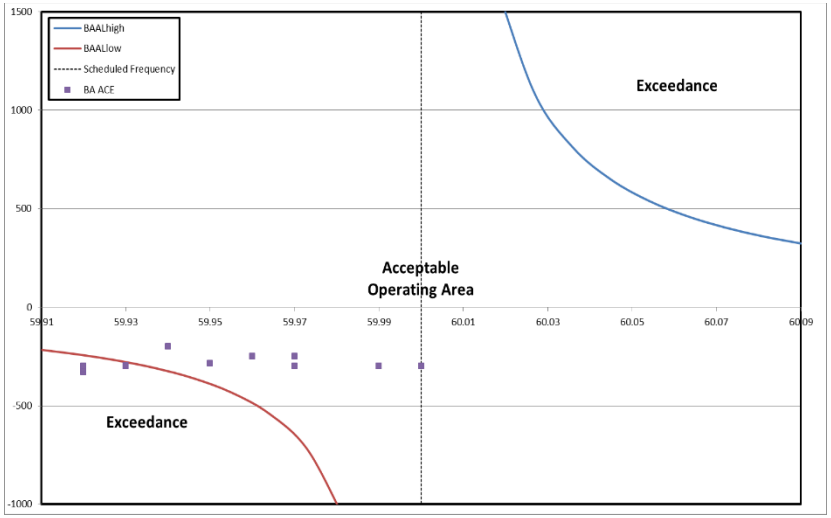
Why is it important?

Each Balancing Authority (BA) is required to operate such that its clock-minute average of reporting area control error (ACE) does not exceed its clock-minute BA ACE limit (BAAL) for more than 30 consecutive clock-minutes. The purpose of this metric is to measure risk to the BPS by monitoring the trend in the number of clock minutes in which BAs return their ACE to within their BAAL after an exceedance has occurred.

How is it measured?

Success (green) is achieved when the linear regression line of the most recent four years of quarterly BAAL exceedances greater than or equal to 15 clock minutes has a statistically significant negative slope or when the slope of the time trend is statistically neither increasing nor decreasing. This equates to either improvement or no decline in performance. Failure (red) occurs if slope of the time trend is increasing with statistical significance.





Indicator 8: Interconnection Frequency Response

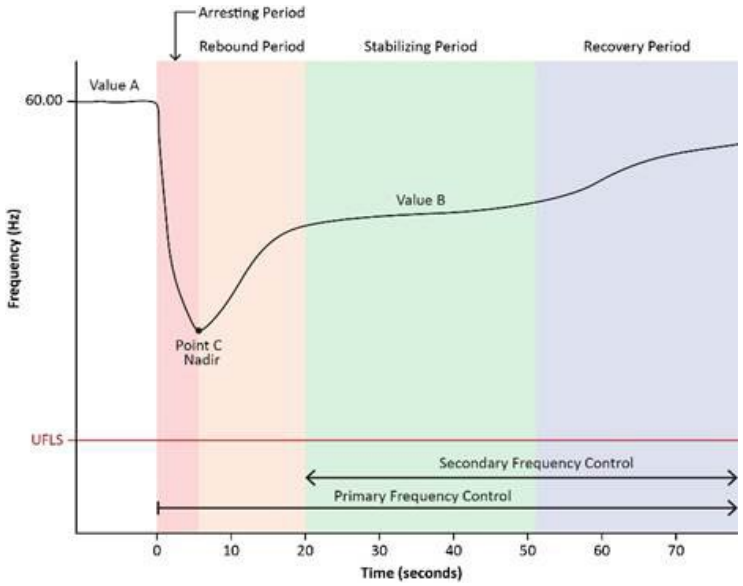
Why is it important?

Measures risk and impact to the BPS by evaluating the trend in the magnitude of the decline in Interconnection frequency experienced in each Interconnection during low frequency events selected for BAL-003-1 compliance. The Indicator will evaluate whether the risk of activating under frequency load shed devices is increasing or decreasing.

How is it measured?

EI, WI, QI, TI

Success (green) is achieved when the linear regression line of the most recent four years of quarterly mean values of Frequency A minus Frequency C has a statistically significant negative slope or when the slope of the time trend is statistically neither increasing nor decreasing. This equates to either improvement or no decline in performance where Interconnection risk has not changed or declined. Failure (red) occurs if the slope of the time trend is increasing with statistical significance or if under frequency load shedding is activated for any single BAL-003 frequency event in any Interconnection.



Indicator 8: Interconnection Frequency Response

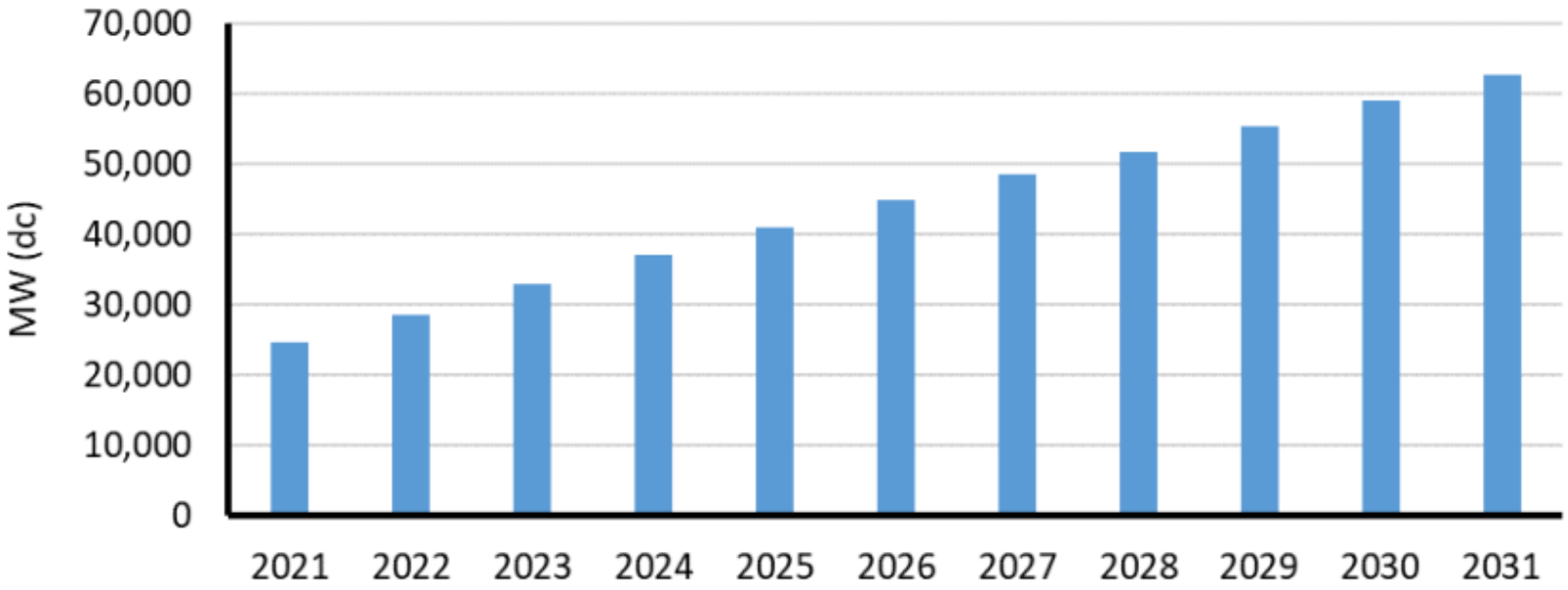
- **Why is it important?**
  - Measures risk and impact to the BPS by measuring the interconnection frequency response performance measure (IFRM) for each BAL-003-2 event as compared to the Interconnection Frequency Response Obligation (IFRO)
- **How is it measured?**
  - IFROs are calculated and recommended in the Frequency Response Annual Analysis Report for Reliability Standard BAL-003-2.1 implementation
  - IFRM performance is measured for each event by comparing the resource (or load) MW loss to the frequency deviation
  - Due to the timing in selection of events the metric is updated one quarter in arrears.

Data (Quarterly & Annual Measurement), NEW

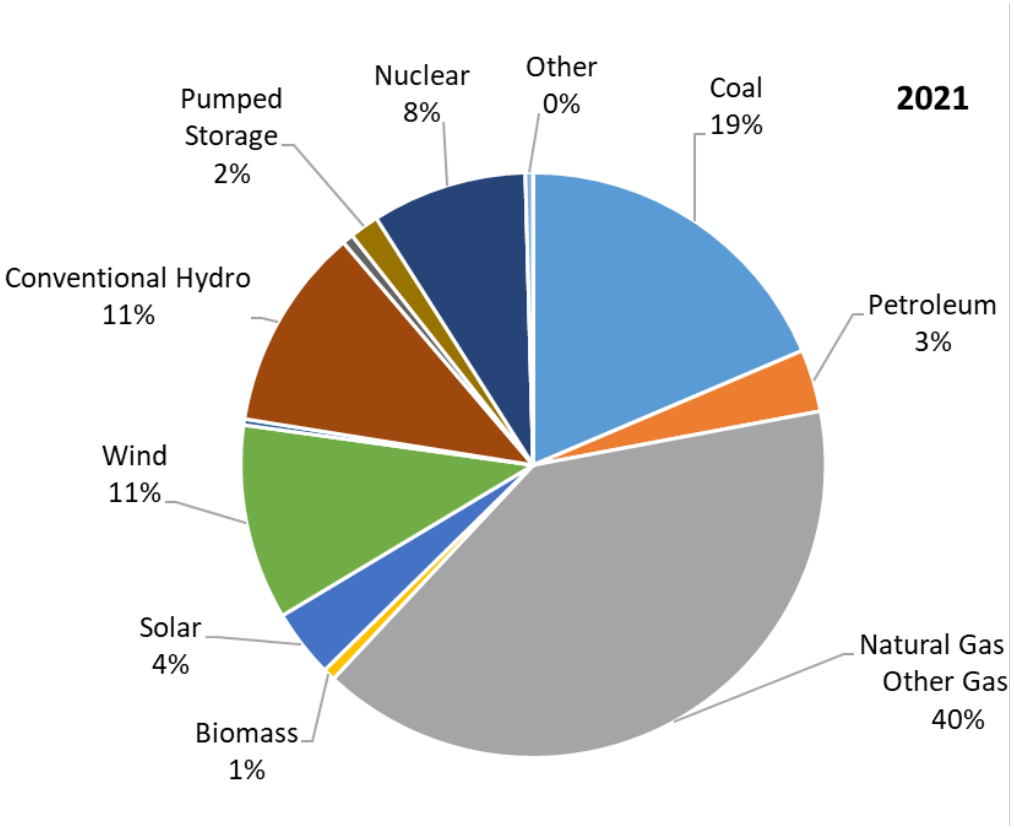
- IFRM for each BAL-003-2 event is compared to the IFRO for each quarter of the 2021 operating year
- Success is no Interconnection experiencing a BAL-003-2 frequency event where IFRM performance is below their respective IFRO: *Zero is green, else is red*
- **Metric Results through 1Q22:** No Interconnection experienced a BAL-003-2 event where their IFRM was below their IFRO

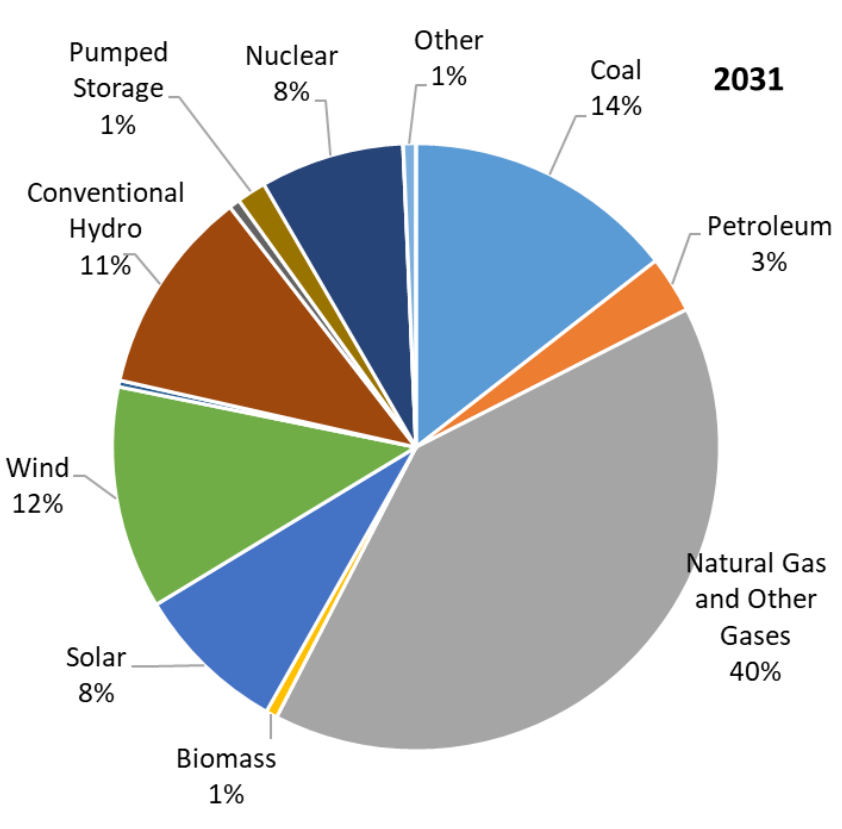
2022 Status

Indicator 9: DER Penetration



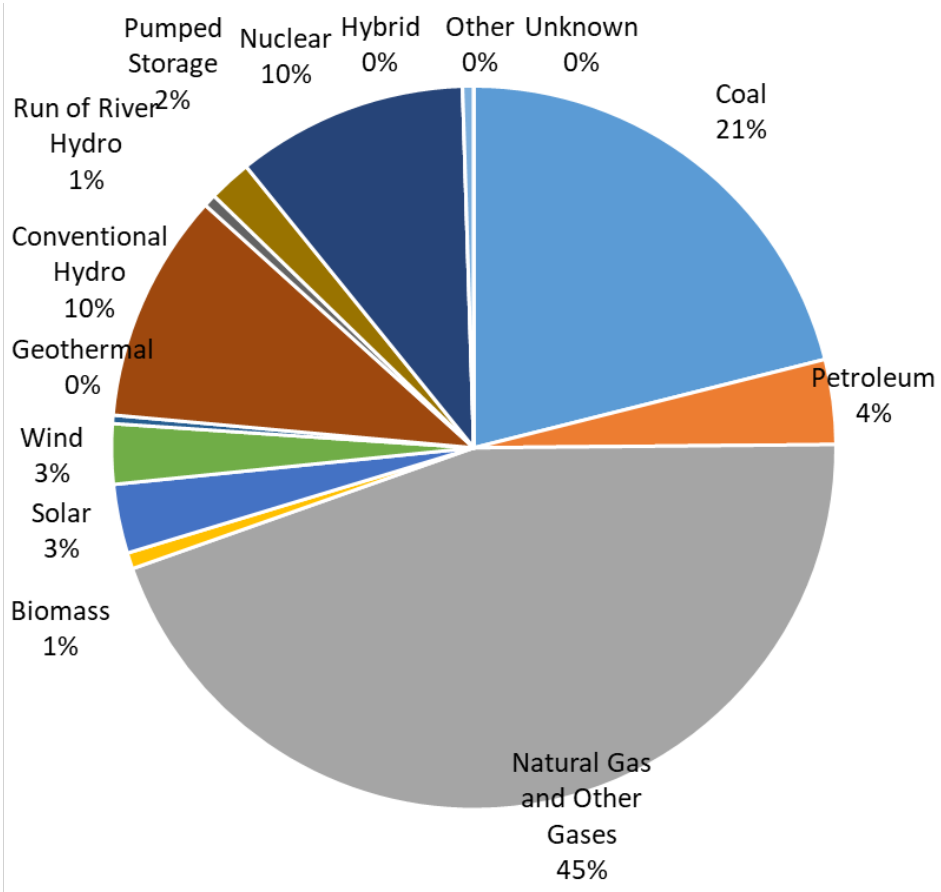
Indicator 10: Measure of the Changing Resource Mix

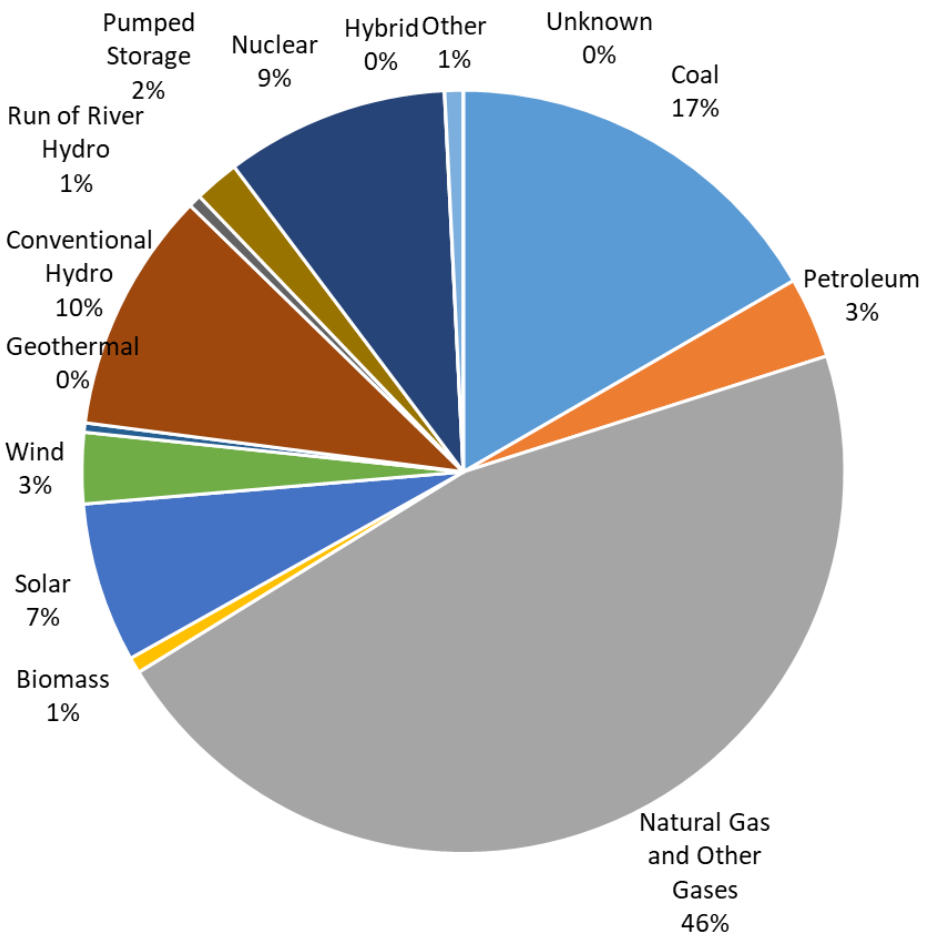




Installed Nameplate Capacity by Fuel Mix Trend

Indicator 10: Measure of the Changing Resource Mix





On-Peak Anticipated Capacity Trend by Fuel Mix

Questions and Answers

Agenda Item 1c
Reliability Issues Steering
Committee Meeting
June 15, 2022

Risk Prioritization

Action
Review

Summary
At its meeting on February 4, 2021, the NERC Board of Trustees accepted the ERO Enterprise Framework to Address Known and Emerging Reliability and Security Risks (risk framework). This framework was developed with input from industry members that serve on the NERC Reliability Issues Steering Committee (RISC) and Reliability and Security Technical Committee (RSTC). Industry stakeholders provided comment on the risk framework as part of the Policy Input letter for the NERC Board in October 2020. The purpose of the risk framework is to have a consistent ERO-wide approach to identifying, prioritizing, and addressing known and emerging reliability and security risks, utilizing the following six steps.

1. Risk identification and validation;
2. Risk prioritization;
3. Remediation mitigation identification and evaluation;
4. Mitigation deployment;
5. Measurement of success; and
6. Monitoring residual risk.

MRC policy input for the November 4, 2021 Board meeting showed continued support for the risk framework. The OLT is seeking volunteers from the RISC for this effort to help adopt this framework across the ERO Enterprise to include an OLT-endorsed risk prioritization process that was shared with the RISC at their 2021 Q4 meeting; additionally, in order to ensure we have adopted this framework for the 2023 ERO Risk Priorities report, we will need a few RISC members to help spearhead this effort in tandem with the OLT.

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Prioritization of Reliability, Resilience, and Security Risks

Richard Burt, MRO Senior VP and COO
Soo Jin Kim, Director of PRISM
Reliability Issues Steering Committee Meeting
June 15, 2022

RELIABILITY | RESILIENCE | SECURITY




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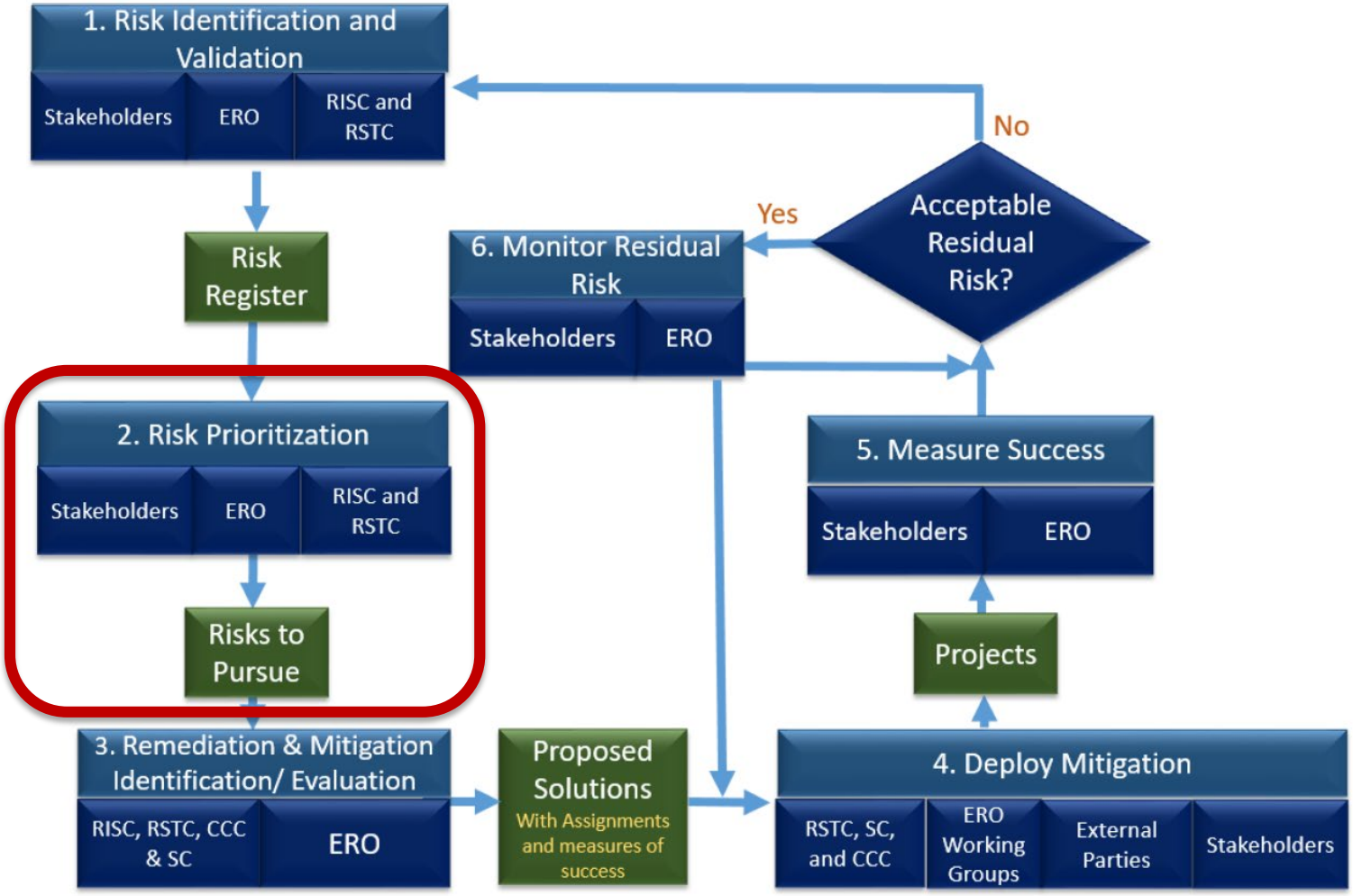
ERO Risk Framework



MRO

- **RAC develops MRO Reliability Risk Matrix**
  - SAC augments for security
  - CMEPAC augments for compliance
  - MRO shares matrix with NERC and other regions for feedback
- **MRO staff pilots use in Regional Risk Assessment (RRA)**

NERC / ERO

- **ERO Reliability Risk Framework is finalized**

MRO Risk Matrix

Reliability Risk Matrix						
Consequence/Impact (C)		Likelihood (L)				
		L1	L2	L3	L4	L5
		Very Unlikely	Unlikely	Possible	Likely	Almost Certain
C5	Severe	Medium	High	High	Extreme	Extreme
C4	Major	Medium	Medium	High	High	Extreme
C3	Moderate	Low	Medium	High	High	High
C2	Minor	Low	Low	Medium	Medium	High
C1	Negligible	Low	Low	Low	Medium	Medium

Consequence/Impact –How could a typical event due to this risk effect BPS Reliability?	
Severe (C5)	Impacts may have widespread effects to the BPS across North America.
Major (C4)	Impacts may have widespread effects to the RC area.
Moderate (C3)	Impacts may have widespread effects to portions of the RC area.
Minor (C2)	Impacts may have effects on the local entity.
Negligible (C1)	Impacts may have small or non-existent effects to the BPS.
Likelihood – What is the reasonable probability that consequences will occur?	
Almost Certain (L5)	Mandatory Controls – No NERC reliability standards in place for mitigation. Emerging Trends – Increasing trends have been identified. Event History – Documented events or widely publicized exploits have been recorded.
Likely (L4)	Mandatory Controls – No NERC reliability standards in place for mitigation. Emerging Trends – Some trends have been identified. Event History – Documented events or generally publicized exploits have been recorded.
Possible (L3)	Mandatory Controls – NERC reliability standards in place for limited mitigation. Emerging Trends – Some trends have been identified. Event History – No documented events, or moderately publicized exploits have been recorded.
Unlikely (L2)	Mandatory Controls – NERC reliability standards are in place for mitigation. Emerging Trends – Some trends have been identified. Event History – No documented events, or minimally publicized exploits have been recorded.
Very Unlikely (L1)	Mandatory Controls – NERC reliability standards are in place for mitigation. Emerging Trends – No known trends identified. Event History – No documented events or publicized exploits have been recorded.

2021 MRO RRA Risks

MRO Reliability Risk Matrix – Operations and Planning Risks + Physical and Cyber Security Risks

Consequence/ Impact (C) to the BPS		Likelihood of Occurring (L)				
		L1	L2	L3	L4	L5
		Very Unlikely	Unlikely	Possible	Likely	Almost Certain
C5	Severe					
C4	Major		3	6 8		
C3	Moderate		2 10	3, 4, 9 6, 4, 7	11	
C2	Minor			1 1, 2, 9	5, 7, 8, 10	
C1	Negligible				5	

	Physical and Cyber Security Risks
1	Adequate Security Staffing & Funding
2	CIP Standard Compliance Fatigue
3	Combined Cyber and Physical Attack
4	Communication Network (Backhaul)
5	Drones / Unmanned Aerial Systems (UAS)
6	Insider Threat
7	Sabotage
8	Supply Chain
9	Unsupported/Legacy Devices
10	Vulnerability Management

	Operations and Planning Risks
1	Overhead Transmission Line Ratings During Cold Weather
2	Voltage Stability and Reactive Management of the BPS
3	Reactive Capability of Inverter Based Resources
4	BPS Modelling Accuracy
5	Sunset of Telecommunication Circuits
6	Uncertainty of Planning Reserve Margins
7	Vegetation Management of 100-200 kV Circuits
8	Cold Weather Operation of SF6 Gas Insulated Circuit Breakers
9	Wind Plant Modelling and Ride-Through Capability During Faults
10	Misoperations Involving Directional Comparison Blocking Schemes
11	Misoperations Due to Errors Occurring During Commissioning

Status

MRO

- **RRA pilot is successful**
  - Results shared with ERO Enterprise
  - Both security and reliability risks on a single heat map

NERC / ERO

- **ERO Framework approved by NERC Board, NERC RISC, and NERC RSTC**

2022 MRO RRA Reliability Risks

- Updated Risk Matrix
- Industry Pilot

Operations and Planning Reliability Risk Rankings						
Consequence/Impact (C)		Likelihood (L)				
		L1	L2	L3	L4	L5
		Very Unlikely	Unlikely	Possible	Likely	Almost Certain
C5	Severe					
C4	Major			9	2 10	
C3	Moderate		3 4	1		
C2	Minor			8	5 6 7	
C1	Negligible					

	Operations and Planning Risks
1	BPS Modelling Accuracy *
2	Uncertainty of Winter Planning Reserve Margins *
3	Reactive Capability of IBRs and Reactive Resource Adequacy *
4	Inverter Based Resource Modelling and Ride Through Capabilities *
5	Misoperations Due to Errors Occurring During Commissioning *
6	Vegetation Management of 100-200 kV Circuits *
7	Cold Weather Operation of SF6 Gas Insulated Circuit Breakers *
8	Overhead Transmission Line Ratings During Cold Weather *
9	Lack of Energy Assurance Assessments - **New**
10	Generation Availability During Severe Cold Weather - **New**

2022 MRO RRA Reliability Risks

- Updated Risk Matrix
- Industry Pilot

Physical and Cyber Security Risk Rankings						
Consequence/Impact (C)		Likelihood (L)				
		L1	L2	L3	L4	L5
		Very Unlikely	Unlikely	Possible	Likely	Almost Certain
C5	Severe					
C4	Major				7	
C3	Moderate			4 5		
C2	Minor		1 6	2 3 8 9 11		
C1	Negligible			10		

	Physical and Cyber Security Risks
1	Accessing and Applying Threat Intelligence *
2	Adequate Security Staffing and Funding *
3	Focus on CIP Compliance *
4	Insider Threat *
5	Malware/Ransomware *
6	Security Awareness and Training *
7	Supply Chain Compromise *
8	Unsupported/Legacy Devices *
9	Asset Inventory and Management - **New**
10	Network Visibility and Monitoring - **New**
11	Perimeter Security and Controls - **New**

Next Steps

- Share Risk Matrix with NERC RISC and RSTC for consideration as ERO Risk Prioritization Tool
- Volunteers from RISC to help write the Process Document
- ERO Pilot (RISC, other Regional Risk Assessments)
- Address Remaining Framework Steps

Questions and Answers

Agenda Item 1d
Reliability Issues Steering
Committee Meeting
June 15, 2022

RISC Response to May 2022 Board of Trustees Policy Input

Action
Review

Summary
For the second quarter 2022, the Board of Trustees (Board) requested specific policy input on Strengthening Industry Action to Address Emerging Risks. NERC management will review the themes of the policy input received and recommended actions by the RISC in response to the input.

The policy input letter with its attachments and responses are posted with the Board's May 2022 meeting materials.

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Strengthening Industry Action to Address Emerging Risks Summary and Initial Responses

John Moura, Director, Reliability Assessment and Performance Analysis

Reliability Issues Steering Committee Meeting

June 15, 2022

RELIABILITY | RESILIENCE | SECURITY




Seeking Your Guidance and Input

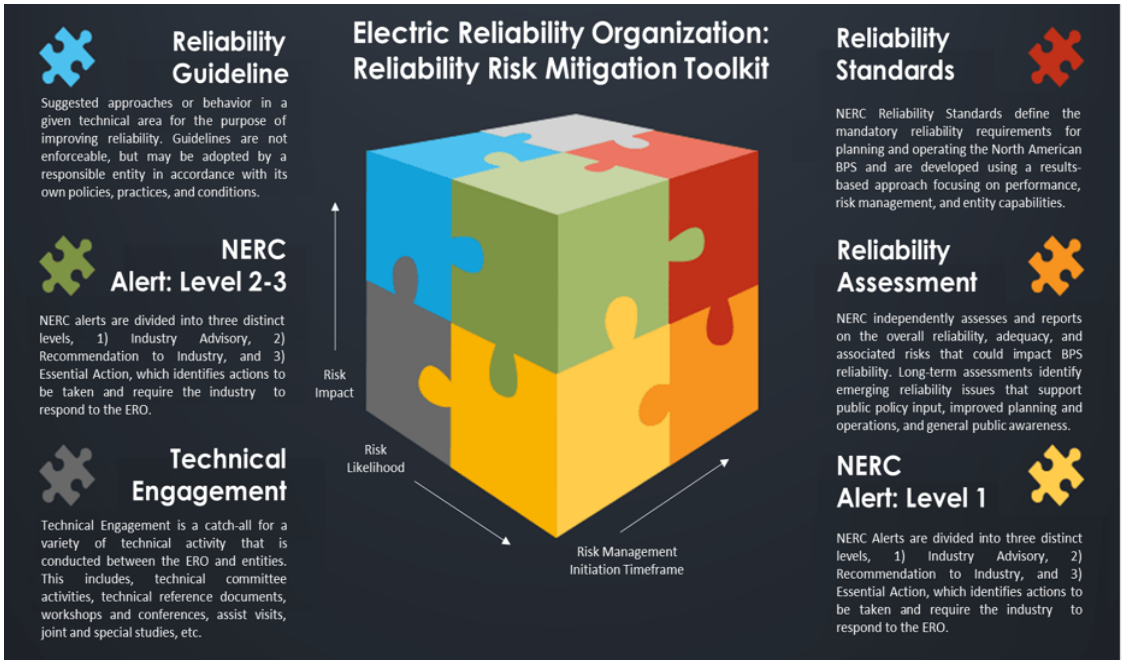
- Industry is facing risks to reliability that are quickly emerging and require accelerated response
- *Grid Transformation* – RISC HIGH PRIORITY
- After deploying a number of mitigations, the risk remains high
- Industry experts are highly engaged, open, and transparent about the challenges
- But with the amount of expected across generation queues and the rapid pace of interconnection the ERO remains concerned

Actions Taken By the ERO

(2) Reliability Guidelines Published

(2) Level 2 NERC Alerts

Formed Working Group (Now the IRP Subcommittee), Numerous Webinars and Outreach Events, Modeling Assessments, Coordination with IEEE standards development



Standards Gap Review, CMEP Practice Guides, SARs submitted to SC

(6) Event Disturbance Reports

Policy Input Request

- How can the ERO Enterprise and industry work together to address fast emerging risks to the reliable operation of the BPS with more effective and certain outcomes across North America?
- Specifically for the inverter-based resource challenges, what other actions should the ERO Enterprise take to ensure known reliability gaps with BPS-connected inverter-based resource performance are addressed?

Question 1 Themes

- Improve Reliability Guidelines, collaboration, and information sharing efforts
  - Ensure clarity of recommendations, applicability, and effectiveness in managing risk
  - Accessibility on NERC's website and other information sharing platforms
- Review and improve the Risk Mitigation Framework
  - Review implementation and identify any gaps
  - Build processes to support
- Close gaps with Reliability Standards
- Evaluate the Standards Development Process
- Enable and facilitate early implementation of essential actions identified with Standards under development

Question 2 Themes

- Develop processes for existing tools, such as a Level 3 NERC Alert
- Outreach to industry executives and states
- Support for on-going actions:
  - Continue outreach and lessons learned from disturbances
  - Recommend changes for FERC interconnection agreements
  - Support for adoption of IEEE-2800 and related Reliability Standards
  - Inverter Resource Performance Subcommittee and NERC staff-initiated SARs
  - PRC-024 Revisions
- Additional actions to consider:
  - Standards improvements to add specific modeling and performance requirements (e.g., Electromagnetic Transient Studies)
  - Lower threshold (e.g., <75MVA) to recognize risks from inverter-based resources

Next Steps

- Formulate action plan to address inverter performance risk
  - Engage RISC and RSTC to support efforts through reviewing the Risk Framework and develop/enhance processes accordingly

Questions and Answers

2023 RISC Reliability Leadership Summit

Action
Review

Summary
The 2023 RISC Reliability Leadership Summit (Summit) is tentatively scheduled for in-person on January 24-25, 2023 in Washington, DC. In an effort to ensure desired speakers and C-Level participants are secured, NERC management will commence the process of developing the agenda and determining the Summit panels. At the conclusion of the discussions on Risk Identification, NERC management will ask Committee members to submit recommendations on topics and any recommended speakers, as well as advise if they would be interested in moderating a panel.

A draft agenda for the Summit will be developed based on the responses received and discussed at the next meeting of the RISC on July 28, 2022.