

NPCC Fall 2019 Workshop

Welcome and Kickoff

Scott Nied
Assistant Vice-President, Compliance
Newport, RI
November 20, 2019

Welcome – Before We Begin

Go to www.slido.com and enter “#NPCC2019”

OR

Get the slido app on your
Phone and enter “#NPCC2019”



Rhode Island Facts

- How far are you from the oldest operating tavern in the U.S?
 - White Horse Tavern is ½ mile away. (since 1673)
- Rhode Island is really small
 - 4,000 could fit in the lower 48 states.
- There aren't a lot of people in RI, right?
 - True, but 2nd most densely pop state. 1,022/sq mile
- The 1st circus in the U.S. was held in Newport in 1774

November 20 Classroom Tracks

2:15 pm, 3:15 pm, 4:15 pm

	2:00 pm	3:00 pm	4:00 pm
Track 1	A	B	C
Track 2	B	C	A
Track 3	C	A	B

A: Compliance Classroom #1 (in Main Ballroom)

B: Compliance Classroom #2 (in the Weatherly Room)

C: Entity Risk Assessment Team (in the Freedom Room)

EXAMPLE: If you are assigned to Track 1, your room rotation is ABC in that order.

Thursday

- We are offering a box lunch
- NO we are not having a raffle for those who attend the end

Compliance Solutions!

- AMICO Security Products
- Cooper Compliance
- Proven Compliance Solutions
- SOS Intl
- Force5
- Utility Services
- FoxGuard Solutions, Inc.
- PPKeys Power Partners



NPCC Workshop Disclaimer

This information, developed by Northeast Power Coordinating Council, Inc. (“NPCC”) staff, provides nonbinding guidance to industry stakeholders regarding existing and/or emerging Reliability Standards. If anything herein conflicts with the applicable Reliability Standard, approved Implementation Guidance, or any other applicable rule, order, regulation, etc., the latter will govern. This information is specific to NPCC and should not be relied upon in any other Regional Entity or at NERC. Compliance with Reliability Standards ultimately depends on the facts and circumstances, quality of evidence, and the language of the Reliability Standard.

News Flash: ERO Push for Collaboration

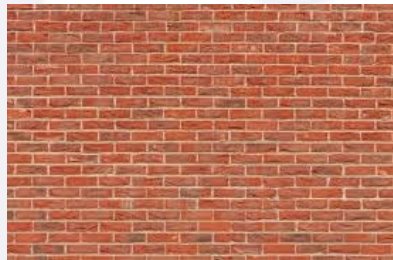
- Not only in CMEP arena
- RAPA, Planning, Operating
- Emerging issues...OC, PC, CIPC are going away
 - Reliability and Security Technical Committee
- NERC and FERC
- Battlefield



focus

Two Results

- Stakeholders viewpoint
- Stronger ERO



What NPCC has done in 2019...

- Self-report guidance – April
- Root Cause Analysis
- Evaluation of internal controls
- Implementing NERC COP process

Moving toward 2020

- 2020 ERO CMEP Implementation Plan
 - Streamlined
- 2020 Monitoring Schedule
- 2020 Self-certification with evidence
 - CIP-002, CIP-003, Sample evidence
- Assessment of controls as part of the monitoring engagement

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Align Technology Project

September Project Update

September 2019

RELIABILITY | ACCOUNTABILITY



- To ensure data security, refine compliance audit and investigation business processes, and address stakeholder concerns, Align release 1 has been delayed until 2020
- The project team will continue with its other scheduled activities:
 - Completing user acceptance testing
 - Identifying critical enhancements
 - Developing Training Material

How will Release 1 delay impact the Release 1 training schedule?

- The previously scheduled Release 1 training will be postponed due to the release delay
- Exact dates for Release 1 training are still being determined
- Release 1 training will likely be completed in Q1/Q2 2020
- The remainder of Q4 2019 will be used to refine training materials
- Project team will ensure that there will be ample time to register for training once schedule is published

How will Release 1 delay impact the Release 1 system features?

- The delay will not impact the system features scheduled for Release 1 of Align
- Release 1 will still include self-reporting, self-logs, mitigation, and enforcement activities.

- Align will deliver on the same business objectives originally communicated, which are to:
 - Provide a common portal for registered entities, enabling consistency of experience;
 - Offer real-time access to information, eliminating delays and manual communications;
 - Improve capability to support the risk-based compliance oversight framework;
 - Enhance quality assurance and oversight, enabling consistent application of the CMEP;
 - Improve analytics, including visibility into compliance and reliability risks;
 - Increase capability to implement audit best practices and processes (planning, fieldwork, reporting, and quality assurance);
 - Standardize the implementation of common business processes and workflows, enabling increased productivity; and
 - Reduce application costs across the ERO Enterprise.

How can I stay informed on Align?

- Align project team will provide regular updates on our progress toward Release 1
- We encourage you to review the Align newsletters, attend regional workshops featuring Align, and reach out to your [Align change agent](#)
- If you have any additional questions regarding Align, please feel free to reach out to the [Align project team](#)
- For more information on Align, please visit the [Align web page](#) and refer to our previous [Align FAQ document](#)

ERO Challenges

- Industry Expectations
- Invertor proliferation
- Human Perf – levels of awareness
- Cyber Threat Matrix
- 3 – D's



Why the ERO Exists

**WHY
ARE WE
HERE?**

We are here to assure a highly reliable and secure bulk power system for the benefit of society.

Electricity is a critical part of the fabric of modern society.

We exist to strengthen that fabric.



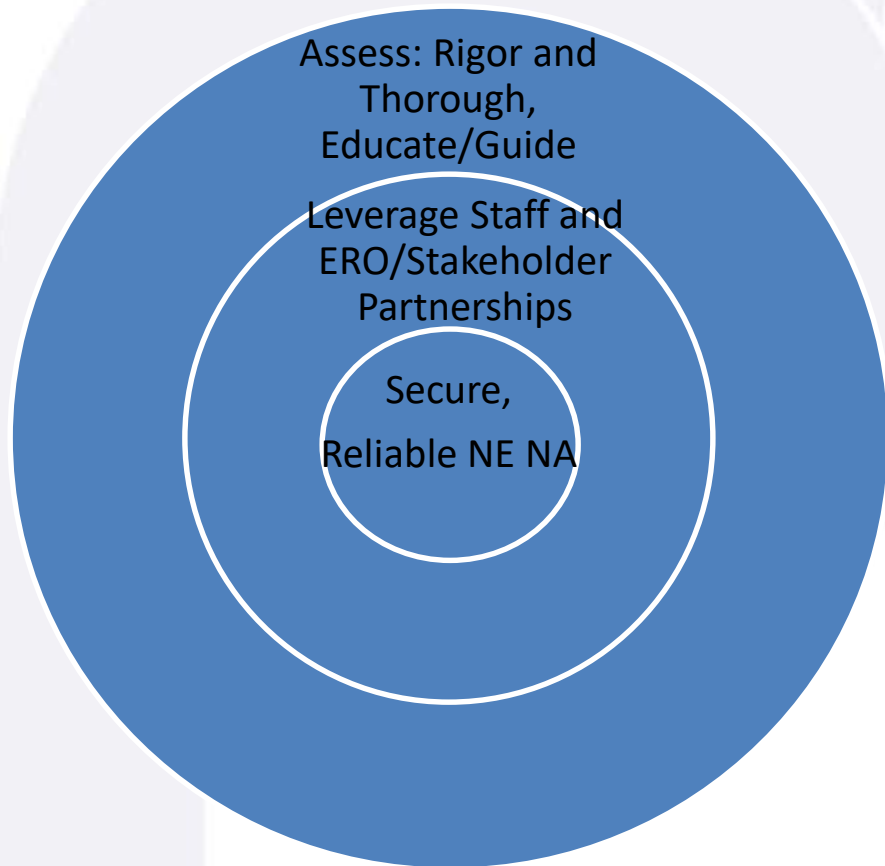
The ERO Golden Circle

Why, How, What



NPCC Version

Why, How, What



ERO Strategic Focus

1. Expand risk-based focus in all Standards, Compliance Monitoring, and Enforcement programs
2. Assess and catalyze steps to mitigate known and emerging risks to reliability and security
3. Build a strong, E-ISAC-based security capability
4. Strengthen engagement and collaboration across the reliability and security ecosystem in North America
5. Capture effectiveness, efficiency, and continuous improvement opportunities

- Questions during workshop? (Please be reasonable)
- Send comments/questions through slido
- We will vet them for the speaker

snied@npcc.org



Fall NPCC Compliance and Standards Workshop November 20-21, 2019 Newport, RI

Reliability Standards Outlook

Guy V. Zito
NPCC AVP - Standards



Discussion Items:

- Overview of Standards Development Projects
- Technical Rationale/GTB
- Standards Efficiency Review
- RISC Emerging Risks and Resilience/HEMP
- Process and Stakeholder tools
- Distributed Energy Resources (DER)
- NPCC's Regional Standard
- NPCC Criteria Services
- NPCC Regional Standards Committee

NERC Standards Development

- Overview-NERC Reliability Standards Development Plan (RSDP) 2020-2022, NERC Board of Trustees (BOT) Approved
 - High Priority
 - Project 2018-04 Modifications to PRC-024-2 (**GO, for Quebec- TO and PC-**)
 - Project 2016-02 Modifications to CIP Standards (**BA, DP, GOP, GO, RC, TOP, and TO**)
 - Project 2015-09 Establish and Communicate System Operating Limits - FAC-010, FAC-011, FAC-014 (**PC, RC, TOP, TP,) (GO, TO)**
 - Project 2019-01 Modifications to TPL-007-3 (**PC, TP, TO and GO**)
 - Project 2019-03 Cyber Security Supply Chain Risks (**RC, BA, TO, TOP, DP, GO, and GOP**)
 - Medium Priority
 - Project 2019-05 Modifications to PER-003-2 (**RC, BA, and TOP**)
 - Low Priority
 - Project 2019-04 Modifications to PRC-005-6 (**GO**)

NERC Standards Development

– Additional Considerations

- Reliability Issues Steering Committee (RISC)
- Industry Feedback Loops (e.g. Events Analysis, Compliance, RAPA)
- IEEE 1547 and VER Modeling
- Standards Efficiency Review
- Standards Grading
- DOE Report and NOPR to FERC (Resiliency concerns)
- High Impact Low Frequency events –EMP
- Further penetration of Distributed Energy Resources (DER)

NERC Standards Development

- Cost Effectiveness:
 - Analysis of the Risk being reduced
 - Costs that may be egregious considering reducing that risk
 - Standards Drafting Teams, Periodic Review Teams, and Standards Grading
 - **Drafting Teams asked to develop cost effective alternatives**
 - **Add question(s) to the Comment forms**
 - Application to all Standards projects

Technical Rationale for Reliability Standards

- Technical Rationale Transition Plan
 - Track 1 and 2 (CGP?)
- Remove from Reliability Standards (supporting documentation)
 - Guidelines and Technical Basis
 - Technical Rationale
 - Implementation Guidance
- FERC Approved parts of the Standard (mandatory and enforceable)
 - **Applicability**
 - **Requirements**
 - **Implementation Plan**
 - **Effective Date**
 - **VRFs and VSLs**
- May contain Compliance Guidance but not processed through the CGP
- Supporting Documents Section 11 of the SPM
- To be located with Standards to which they apply but as separate documents
- All standards going forward
- GTB Teams will begin the process of review of supporting documentation from the standards.

NERC Standards Efficiency Review (SER)

- What is it?
- What's been done to date?
 - SER Phase 1 approved by industry, BOT and filed with the FERC- approximately 84 requirements (INT, FAC, PRC, and MOD)
- Current Activities
 - SER Phase 2 on O&P
 - SER CIP
 - SER Concepts for increasing efficiency
 - Evidence Retention

Reliability Issues Steering Committee (RISC)

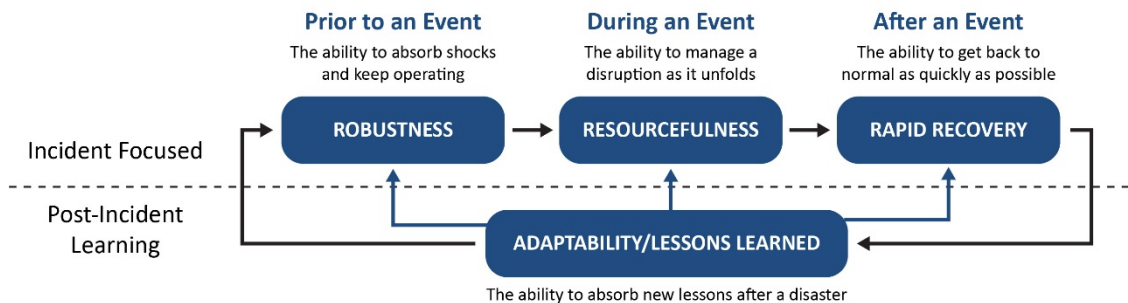
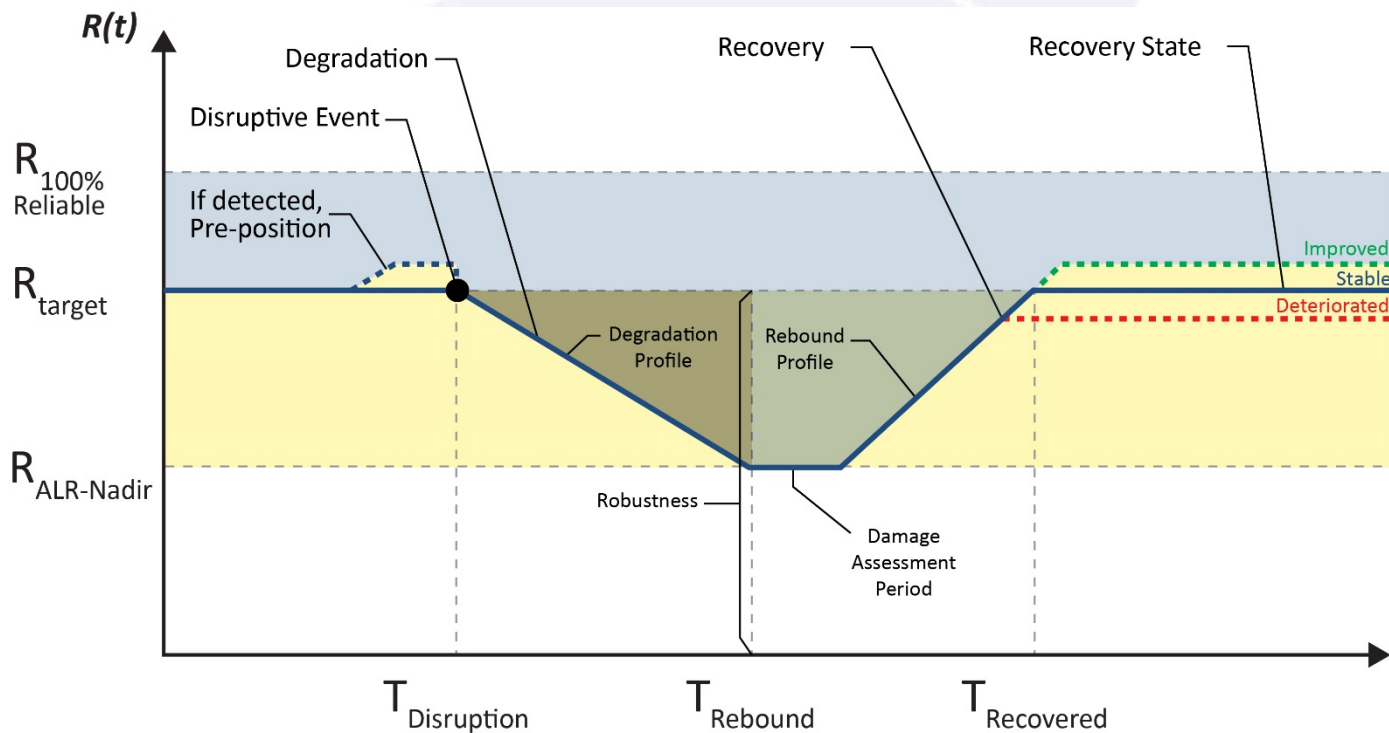
“ERO Reliability Risk Priorities,” – 2019 BOT Approved Report - Four High Level Risks Identified and a potential framework for Resilience

- Risk Profile #1: Grid Resource Transformation
 - BPS Planning
 - Resource Adequacy
 - Increased Complexity in Protection and Control Systems
 - Human Performance and Skilled Workforce
 - Changing Resource Mix
- Risk Profile #2: Extreme Natural Events
 - GMD and other
- Risk Profile #3: Security Vulnerabilities
 - Physical
 - Cyber
 - EMP
- Risk Profile #4: Critical Infrastructure Interdependencies
 - Communications, Water, Wastewater etc.

Resilience

- Four outcome-based abilities of resilience (framework) are as follows:
 - **Robustness** – the ability to absorb shocks and continue operating
 - **Resourcefulness** – the ability to **detect and manage a crisis as it unfolds**
 - **Rapid recovery** – the ability to get services back as quickly as possible **in a coordinated and controlled manner and taking into consideration the extent of the damage**
 - **Adaptability** – the ability to incorporate lessons learned from past events to improve resilience
- FERC Chairman-“Top priority of the Commission” address concerns- DOE Staff Report and NOPR”
- FERC terminated the DOE NOPR and developed a FERC NOPR
 - what resilience of the bulk power system means and requires;
 - understand how each RTO and ISO assesses resilience in its geographic footprint; and
 - use this information to evaluate whether additional Commission action regarding resilience is appropriate at this time.
- RISC Report on Resilience

Resilience



Electromagnetic Pulse (High Altitude “HEMP”)

- Electric Power Research Institute EPRI Study of E1
 - Study released Spring 2019
 - Study uses wave guides and direct injection
 - Study identified vulnerabilities such as digital relays
- FERC
 - Reviewing the study
 - Potential for a NOPR to address possible BES E1 risks
 - Potential for a similar approach as GMD, one for operational and one for planning (i.e. EOP-010 and TPL-007)
 - Critical facility list development identifying where potential weaknesses may exist
- NERC
 - [EMP Task Force Strategic Recommendations Report](#) approved by NERC BOT 2019

HEMP – High Impact Low Frequency Risk

- Executive Order, March 26, 2019

[Coordinating National Resilience to Electromagnetic Pulses](#)

- Update all U.S. Federal Plans to recognize EMP
- Identify critical infrastructure (public health and safety)
- Identify infrastructure most vulnerable to EMP
- Review existing standards, identify gaps
- Conduct a magnetotelluric survey (within 4 years)
- Analyze technology options and test them
- Report cost effective approaches to President

Stakeholder Tools

Compliance Guidance Policy-a Standards perspective:

- Process for developing approaches useful in providing guidance for implementing standards
- November 4-5, 2015 BOT approvals (NERC Comp. and Enf. Webpage)
- Two Types of Guidance:
 - CMEP Implementation Guidance:
 - Approaches on how entities could comply with standards
 - Led and developed by SME; vetted by pre-approved organizations, not NERC
 - Not necessarily the only approach to comply with a standard
 - Endorsed for Deference by the ERO
 - CMEP Practice Guide-Auditor Instructions
 - Initiated by ERO Policy
 - Initiated by ERO in response to a specific issue
- Section 11-"Process for Approving Supporting Documents" of the SPM under revision
- Upon ERO approval, provides compliance deference

Compliance Guidance Policy Pre-approved Orgs.

- American Public Power Association (APPA)
- Canadian Electricity Association (CEA)
- Edison Electric Institute (EEI)
- Electricity Consumers Resource Council (ELCON)
- Electric Power Supply Association (EPSA)
- ISO/RTO Council
- Large Public Power Council (LPPC)
- National Association of Regulatory Utility Commissioners (NARUC)
- National Rural Electric Cooperative Association (NRECA)
- North American Generator Forum (NAGF)
- North American Transmission Forum (NATF)
- Northwest Public Power Association (NWPPA)
- Transmission Access Policy Study Group (TAPS)
- Western Interconnection Compliance Forum (WICF)
- NERC Planning Committee (PC)
- NERC Operating Committee (OC)
- NERC Critical Infrastructure Protection Committee (CIPC)
- Regional Entity Stakeholder Committees

Stakeholder Tools

Request for Interpretation (RFI):

- Standard Processes Manual (SPM) Section 7 outlines the process for developing an interpretation. Eight criteria for rejecting a request.
- A valid interpretation provides additional clarity about one or more requirements, but does not expand on any requirement and does not explain how to comply with any requirement.
- Any entity that is directly and materially affected by the reliability of the North American Bulk Power Systems may request an interpretation.
- The NERC Standards and Legal staff shall make a recommendation to the Standards Committee whether to accept the Request for Interpretation (RFI).

Stakeholder Tools

Request for Interpretation (RFI) cont.:

- Reasons to reject RFIs Section 7 SPM
 - Requests approval of a particular compliance approach;
 - Identifies a gap or perceived weakness in the approved Reliability Standard;
 - Where an issue can be addressed by an active standard drafting team;
 - Where it requests clarification of any element of a Reliability Standard other than a Requirement;
 - Where a question has **already been addressed in the record**;
 - Where the Interpretation identifies an issue and proposes the development of a new or modified Reliability Standard, (such issues should be addressed via submission of a SAR);
 - Where an Interpretation seeks to expand the scope of a Reliability Standard; or
 - Where the meaning of a Reliability Standard is **plain on its face**.

Stakeholder Tools

Stakeholder tool developed by the Regional Standards Committee to document DER issues identified and pursue how they be addressed. Posted on NPCC Website.

- 1) Issue Identification (Stakeholder, RAPA, or Event Analysis)- Form
- 2) Evaluation (Preliminary screen, Scope, Type, Importance)- RSC and RCC
- 3) NERC or Regional solution, Recommendation (NPCC action taken?)
- 4) Creation of a Forum to discuss issues
- 5) Develop a draft DER Guidance paper

DER Activities

- NPCC DER Forum-
 - DER Impact Reporting Form
 - NPCC Guidance Document- Approaches to Preserve System Resilience and Reliability for a High DER Penetration Future
- NERC DER Position Paper and Regional Coordination
- NERC Activities- e.g. IRPTF, SPIDER

NPCC Regional Standards

- PRC-006-NPCC-1 Revision to:
 - Review for potential revisions made necessary by:
 - NERC PRC-006-1/PRC-006-2 Automatic Underfrequency Load Shedding
 - NERC PRC-024-1/PRC-024-2 Generator Frequency and Voltage Protective Relay Settings standards.
 - Review for Dispersed Generation (DG) issues
 - Developed to enable retirement of NPCC Directory 12
 - Three 45-day formal postings for comments
 - 30 day pre-Ballot Review and 10 + day ballot in fourth quarter 2018-approved by Stakeholders
 - Approved by NPCC Board of Directors
 - NERC BOT approval November 5, 2019
 - File with FERC and Provincial Governmental Authorities

NPCC Criteria Services

- Maintain and Revise Directories and Criteria
- A-10 “Classification of BPS Elements” Revision
- Cost Effectiveness and Resilience Pilot on two Directories
- Revise Directory Development and Revision Manual
- SPS to RAS Transition, Directory 7
- Criteria Enforcement Program
- Applicability (Member or Tariff)

NPCC Regional Standards Committee

- Interface with RISC- emerging issue identification
- Review and comments on NERC/ERO and Eastern Interconnection Regional Standards
- Develops Ballot Recommendations for NERC/ ERO Standards and Interpretations
- Participates in NERC Standards drafting and influence processes through various groups-formal and informal
- Oversees the Development and Maintenance of NPCC Regional Standards
- Oversees the Development and Maintenance of NPCC Regional Directories
- Regional Delegation Agreement-Standards Program Area
- Review all FERC Orders, Rulings, NOPRs and Petitions related to Standards
- Participates in Feedback loop mechanisms to improve standards
- Conducts DER Forum activities

“Intelligence is the ability to adapt to change.”- Stephen Hawking



Stephen Hawking (Jan 1942-March 2018)

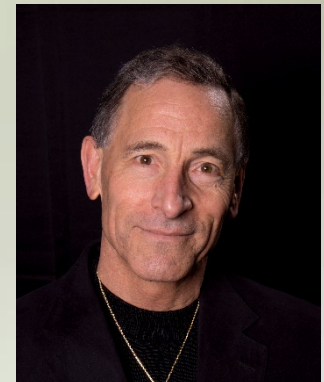
Questions or Comments ?

Standards Efficiency Review



Phase 2: Evidence Retention Project Update

*Dr. Michael Puscas, Ed.D.
Compliance Manager
ISO-NE*



NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Standards Efficiency Review Update

John Allen, Manager Reliability Compliance, City Utilities of Springfield
October 22, 2019

RELIABILITY | RESILIENCE | SECURITY



Introduction



- SER Phase 2 Project Purpose and Scope
- List 5 Evidence Retention Schemes and Associated Recommendations
- Emphasis on High Risk Standards and Requirements
- Next Steps



SER Project Scopes

Overall: Evaluate NERC Reliability Standards using a risk-based approach to identify potential efficiencies through retirement or modification of Reliability Standard Requirements. This project seeks to identify potential candidate requirements that are not essential for reliability, could be simplified or consolidated, and could thereby reduce regulatory obligations and/or compliance burden.

SER Project Scopes

CIP: Using a risk-based approach, evaluate NERC CIP Reliability Standards in order to identify potential efficiencies through retirement or modification of Reliability Standard Requirements.

SER Phase 2 Project Scope

- **Phase 2:** Evaluate NERC Reliability Standards (O&P and CIP), as informed by implementation experiences and compliance practices, to develop and recommend standards-based solutions intended to reduce inefficiencies and unnecessary regulatory burdens for the purpose of supporting continued safe, secure and reliable operations.



Phase 2 Industry Survey



- Gauged level of support (1-10) of each concept from 75 participants, equally weighted
 - **Concept 1: Evidence Retention (8.12)**
 - **Concept 5: Consolidate Information/Data Exchange Requirements (8.11)**
 - **Concept 3: Move Requirements to Guidance (7.85)**
 - **Concept 2: Prototype Standard (7.78)**
 - **Concept 6: Relocate Competency-based Requirements to the Certification Program/Controls Review process (6.85)**
 - **Concept 4: Consolidate & Simplify Training Requirements (6.19)**
- Reviewed industry survey responses, comments, and concerns
- Evaluated and prioritized concepts based on potential benefit, feasibility and effort of implementation

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Information / Data Consolidation

RELIABILITY | RESILIENCE | SECURITY



Recent Activities

- Analysis of ~140 Data/Information Requirements
- Common Themes
 - Horizon: Planning, operations, event driven
 - Purpose: Planning assessments, OPA, RTA, RTM
 - Timeframe: Real-time, on demand, annual
 - Mode: Digital, Email, Verbal
- Initial Observations
 - Consolidate
 - Trigger on unresolved non-performance
 - ROP Options (Section 1600, CMEP, etc.)

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Requirements to Guidance

RELIABILITY | RESILIENCE | SECURITY



Recent Activities

- Phase 2 Team on hold
- NERC developing guiding principles
- ERO risk mitigation framework
- Draft white-paper

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

CIP Standards Efficiency Review

RELIABILITY | RESILIENCE | SECURITY



Recent Activities

- Approach is very similar to SER Phase 1
- Industry input using SER Matrix ended August 26 (~30 responses)
- Working team formed
- Kickoff meeting in November
- Analysis of industry feedback
- Draft SAR

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Evidence Retention

RELIABILITY | RESILIENCE | SECURITY



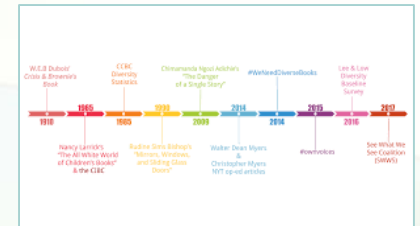
Evidence Retention Goals



- Build on 2014 Data Retention White Paper
- Achieve Objectives:
 - Identify 2014 applicable recommendations
 - Identify inconsistencies in current retention schemes
 - Identify a short list of simplified retention schemes
 - Identify solutions for each high risk requirement
 - Identify best path for implementation

Evidence Retention Timeline

- Informal industry survey ended September 23
- Consider feedback and finalize report – October / November
- Develop final recommendations – November / December
- Transition to implementation – TBD



Evidence Retention Problem

- The Evidence Retention team discovered over 50 different evidence retention schemes strewn throughout CIP and O&P Standards and requirements.
- Because of confusion everyone keeps everything for as long as possible



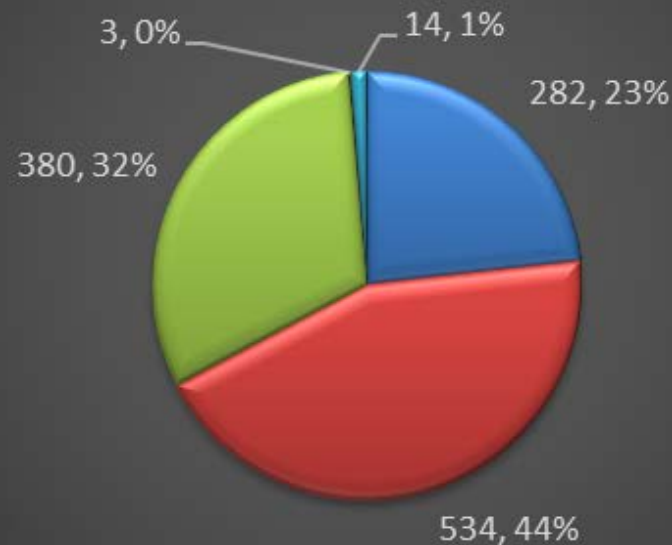
Example: Current Schemes

- It's All ONE Scheme: **12 Calendar Months**
 - 12 Calendar Months Following Completion of each CAP
 - One Calendar Year
 - Current Year
 - Last 12 Calendar Months
- Two Calendar Years vs. Current Calendar Year Plus One Previous Calendar Year



RISK: VRF Examination

VRF Percentage Levels for O&P and CIP Requirements



■ Lower VRF ■ Medium VRF ■ High VRF ■ No VRF Assigned ■ To Be Determined

Five Evidence Retention Schemes

Recommended Data/Evidence Retention Schemes	Rationale for the Data/Evidence Retention Scheme
1. Current plan, model, agreement, methodology, study, program or procedure with a revision history specifying changes and dates of review. If revised within the last year, the prior version should also be retained.	This satisfies the need for auditors to see the most recent documentation in a variety of areas. What is most important is the current document and that document should have a revision history showing that it is regularly reviewed and updated. In some instances, evidence retention may exceed a three year period.

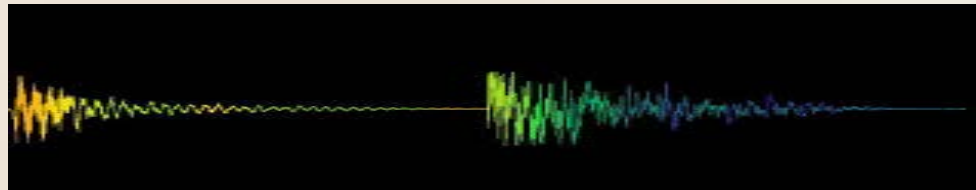
Five Evidence Retention Schemes

Recommended Data/Evidence Retention Schemes	Rationale for the Data/Evidence Retention Scheme
2. Most recent full testing records with evidence of previous testing intervals.	This satisfies the requirements to complete and document various tests and includes the requirement to have evidence of the previous full testing records. In some instances, evidence retention may exceed a three year period.



Five Evidence Retention Schemes

Recommended Data/Evidence Retention Schemes	Rationale for the Data/Evidence Retention Scheme
3. Rolling 3 Months data retention period for voice and audio recordings and 12 months for operating logs	Voice and audio recordings take up a lot of space on computer systems. Therefore, only 3 months of rolling history are necessary. Similarly, only 12 months of rolling history are necessary for operating logs



Five Evidence Retention Schemes

Recommended Data/Evidence Retention Schemes	Rationale for the Data/Evidence Retention Scheme
4. Rolling 12 Months data retention period.	This satisfies existing evidence retention scheme requirements to have at least 12 months of data. Given the type of data, it's not necessary to have 3 or more years of data.



Five Evidence Retention Schemes

Recommended Data/Evidence Retention Schemes	Rationale for the Data/Evidence Retention Scheme
5. Rolling 36 Months data retention period.	Many existing evidence retention schemes call for a three year (36 month) retention schedule. The 36 month data retention is retained with the addition of “rolling”.





Recommendations

- Pursue Rules of Procedure changes for evidence retention to minimize administrative burden. (NERC Staff)
- Retire Compliance Bulletin #2011-001 Data Retention Requirements, once ROP changes are in effect or publish CMEP guidance to supersede the bulletin. (NERC Staff and CCC)

Recommendations

- Concurrent with ROP changes, update Standard Drafting Teams (SDTs) references and notify active SDTs, with the minimum options for risk-based data retention schemes, as described above. In addition, the headings within Reliability Standard should be consistently named “Data and Evidence Retention Period”. (SC)





Recommendations

- If desired, concurrent with ROP changes, establish a project to revise evidence retention schemes for enforceable Reliability Standards with a Standard Drafting Team, Periodic Review team, or other mechanism. (SC and NERC Staff)

Recommendations

- Ensure changes to CMEP evidence retention processes are made in associated documents and communicated with ERO Enterprise staff, such as NERC Auditor's Manual, training materials, etc. (NERC Staff)
- Lastly...

Recommendations

- Ensure final recommendations of SER Evidence Retention are circulated with the CCC, SC, and NERC staff, and recommendations are incorporated into respective work plans in 2020. (CCC, SC, NERC Staff)



Evidence Retention Questions



Trend Analysis of ERO-wide Event Analysis Program (EAP) Events for Study Period 2015 thru 1st Quarter 2019

November 21, 2019

Key Objectives

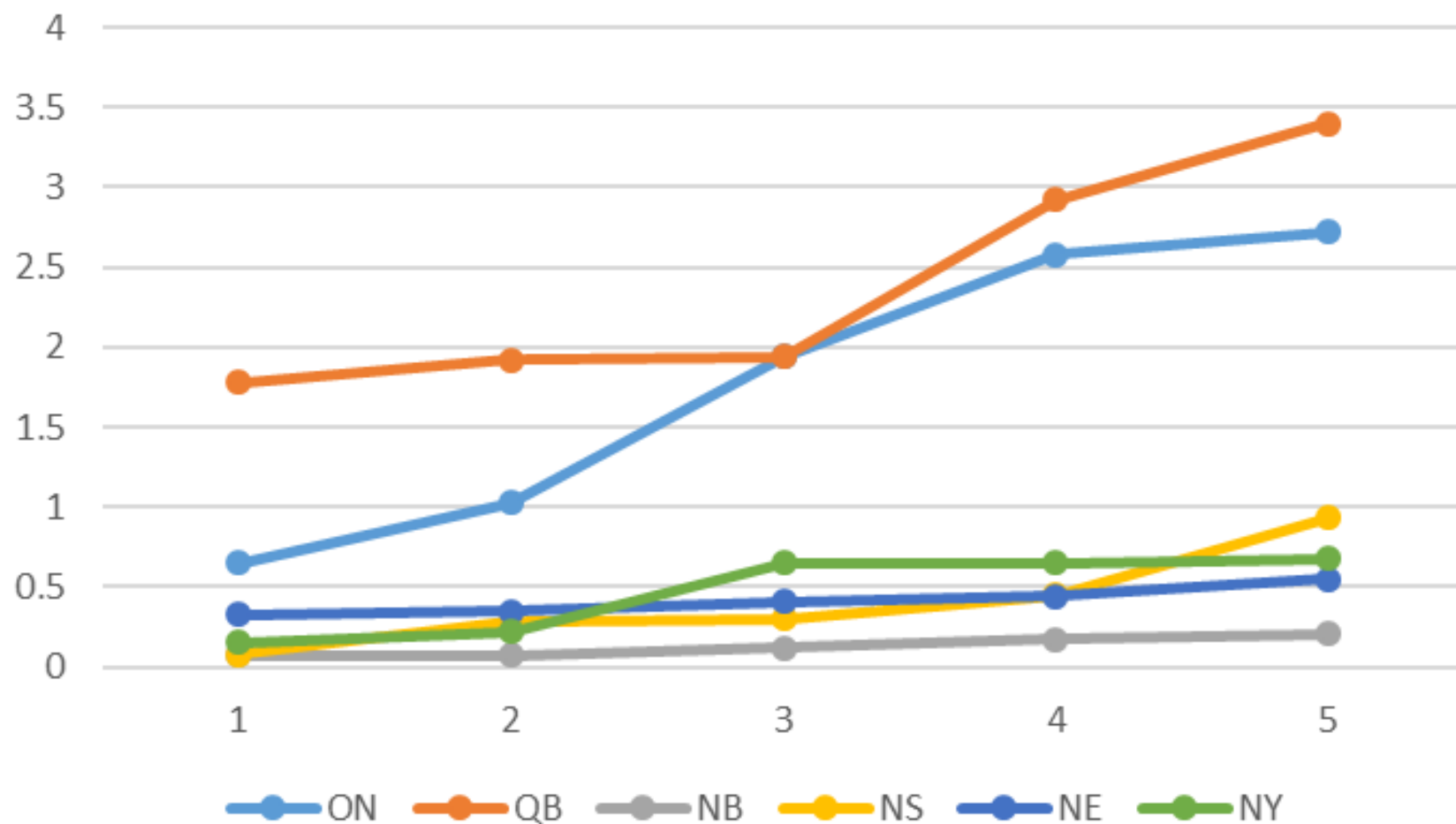
- Use of event Severity Risk index (eSRI) as a measure of Impact/ Resilience
- Development of pseudo-eSRI values for NPCC's Extreme Contingency (EC) tests
- Comparison of ERO-wide EAP events vs. NPCC's Actual Events and Extreme Contingency (EC) testing to identify past resilience performance
- Promoting Lessons Learned development.

EA Program Qualifying Events as of 10/14/19

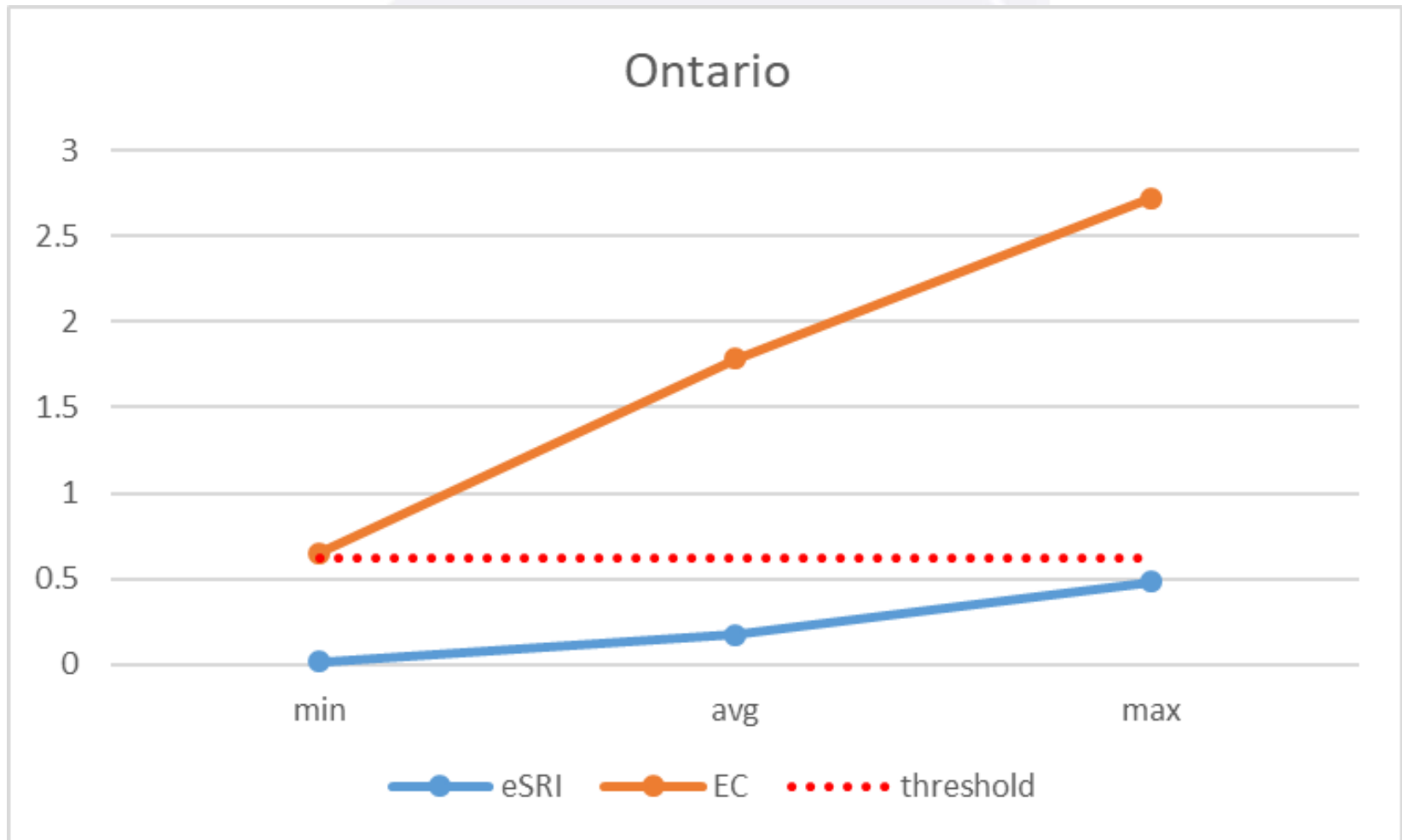
	NERC			NPCC	
	Total	2019		Total	2019
Category 1	1176	116		180	26
Category 2	173	2		27	2
Category 3	20	0		7	0
Category 4	3	0	SW Winter Weather (2011) SW Blackout (2011) Derecho (2012)	0	0
Category 5	4	0	Hurricane Sandy (2012) Polar Vortex (2014) Hurricane Harvey (2017) Hurricane Irma (2017)	1	0
Total	1376	118		215	28
Category 0	3387	217		520	22
Grand Total	4763	335		735	50

EsriCategory	min(eSRI)	max(eSRI)
1	0.000001	0.284889
2	0.28490	0.499999
3	0.50000	3.799999
4	3.80000	9.00000
5	9.000001	999.99999

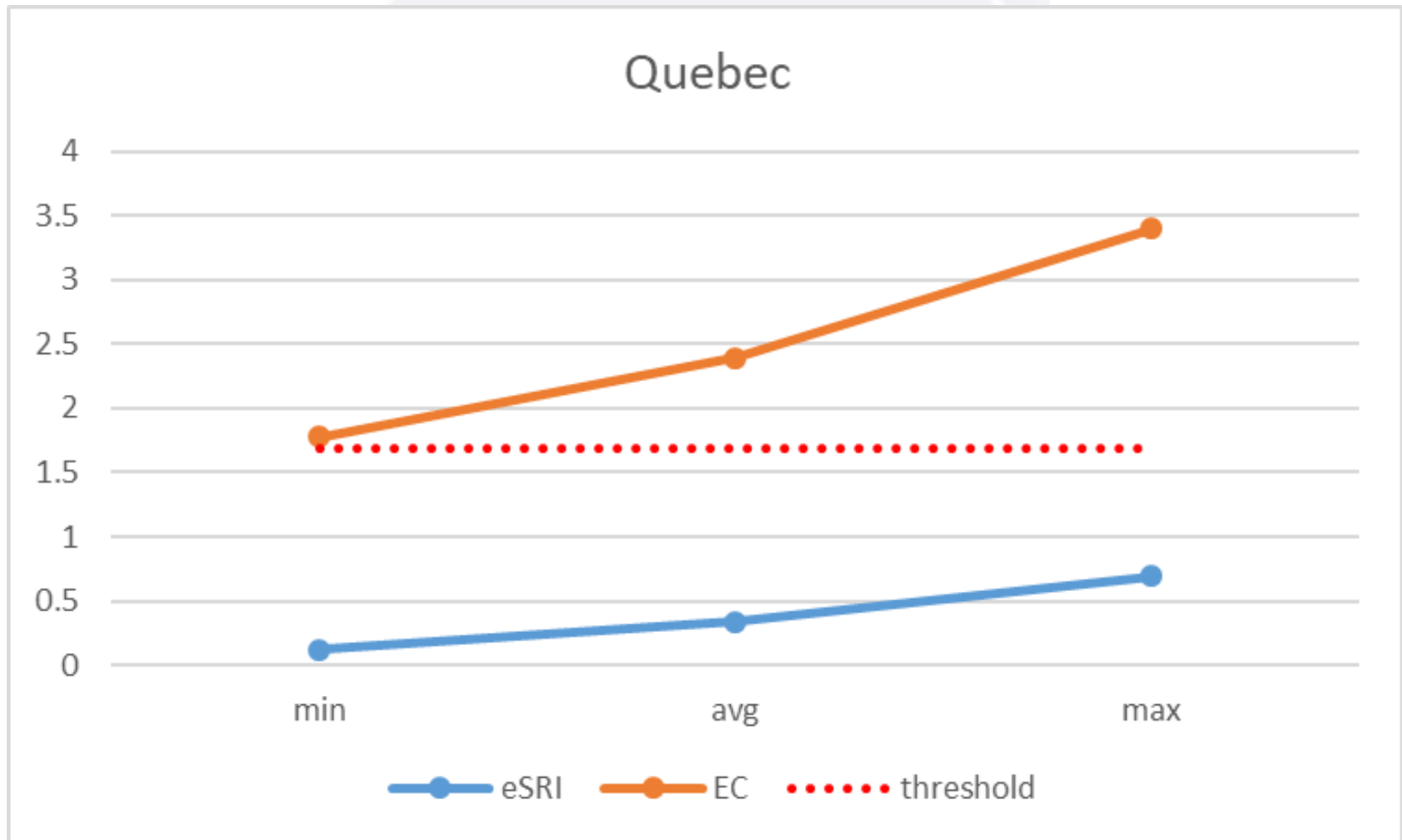
extreme contingency eSRIs by NPCC Area



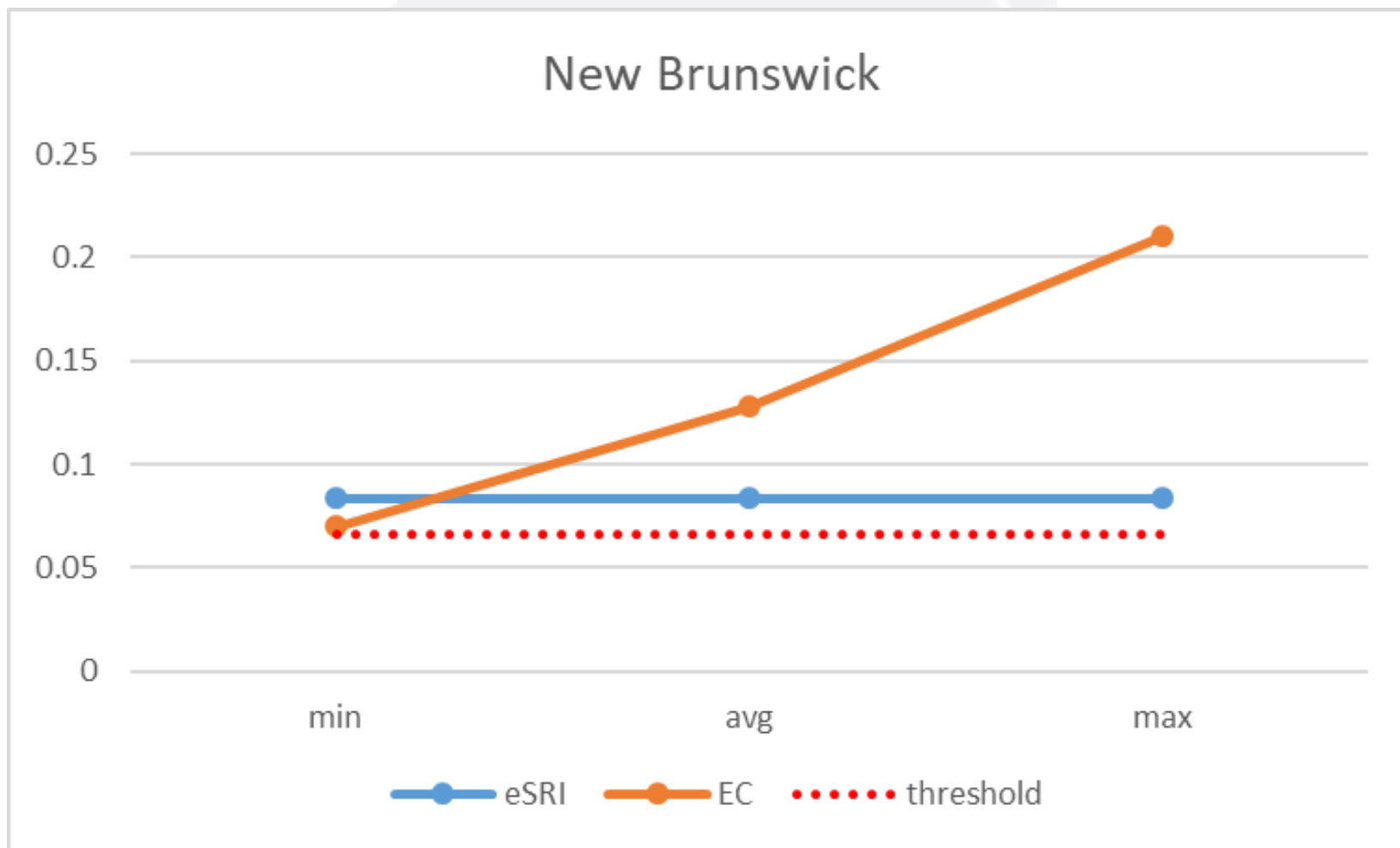
extreme contingencies vs actual events



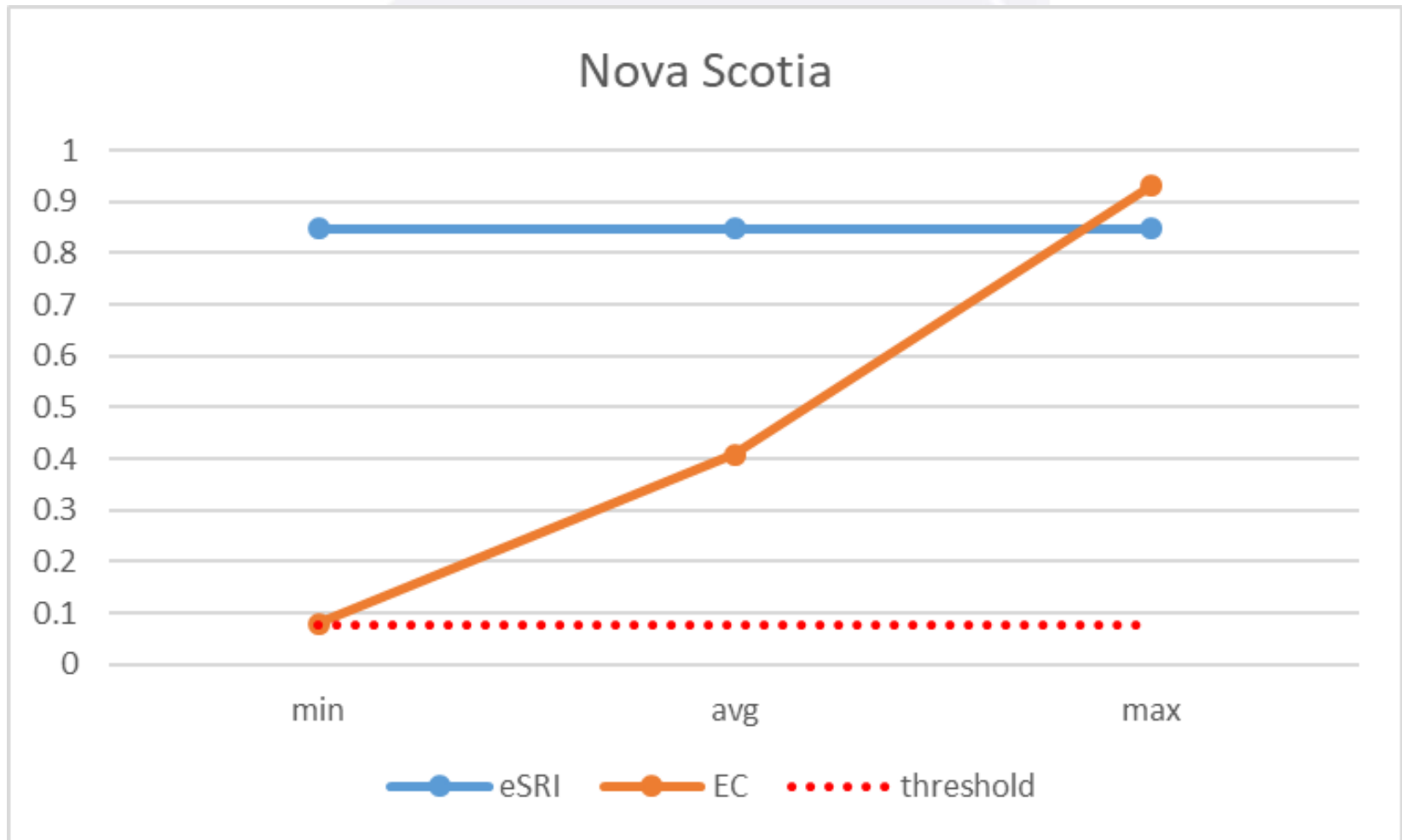
extreme contingencies vs actual events



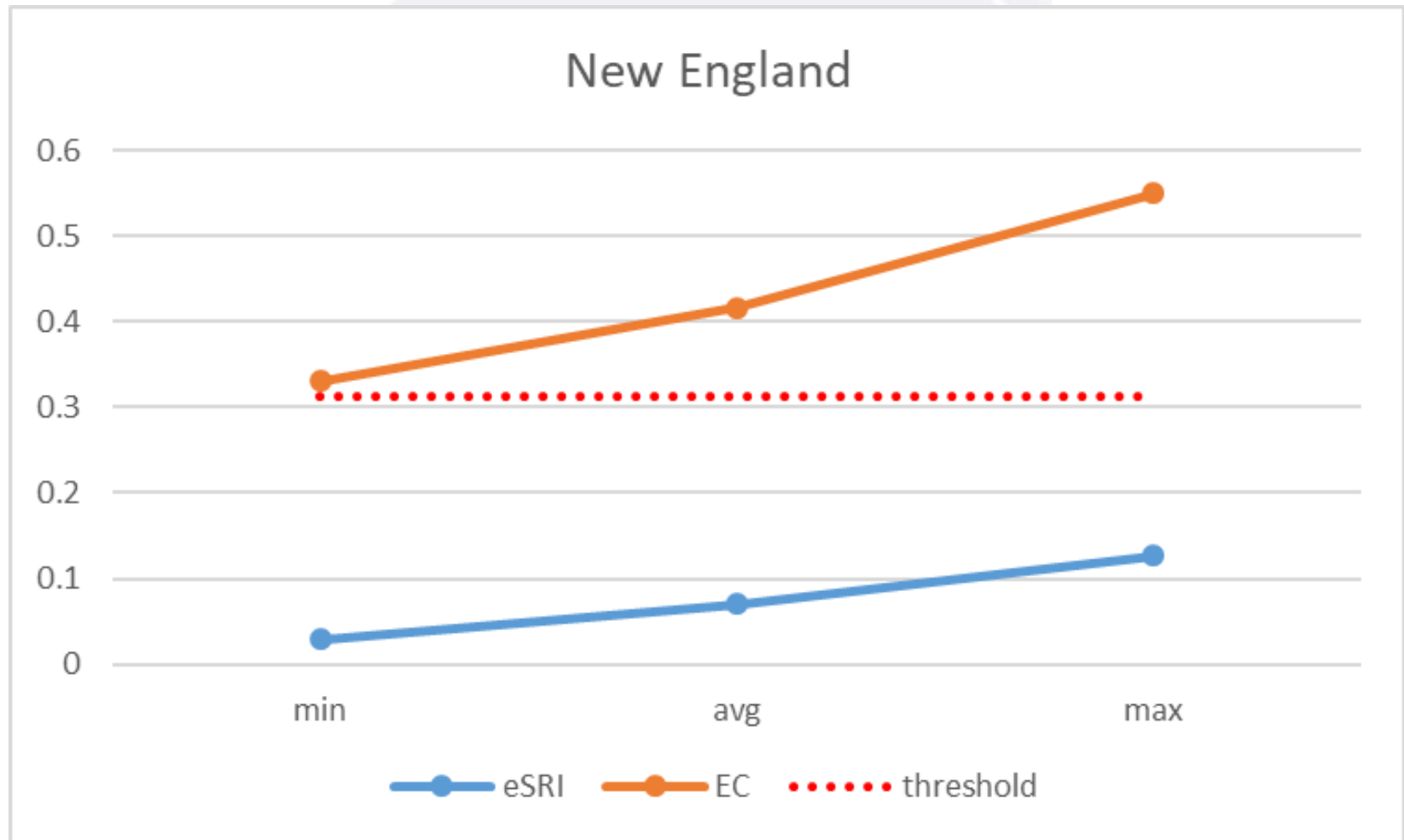
extreme contingencies vs actual events



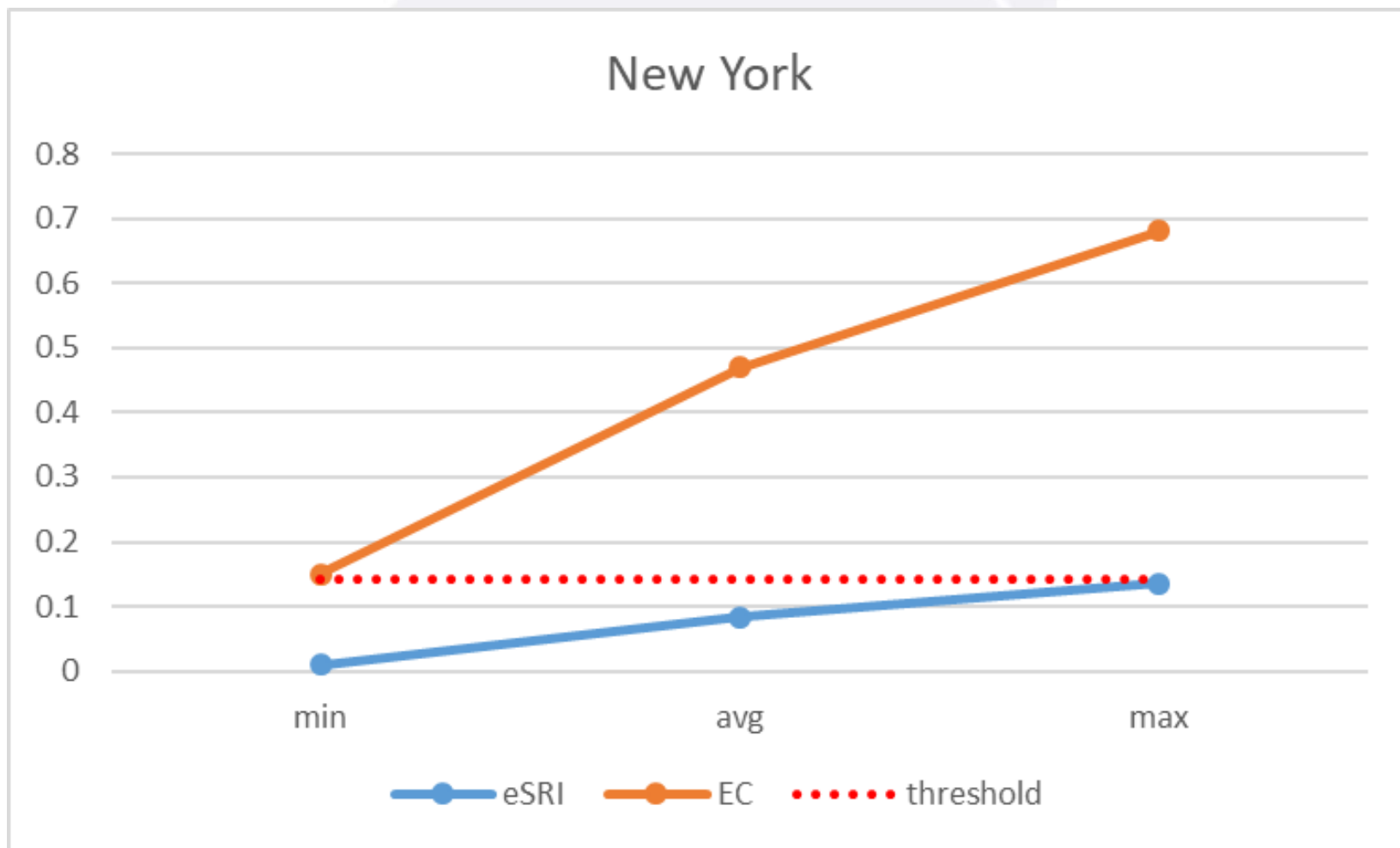
extreme contingencies vs actual events



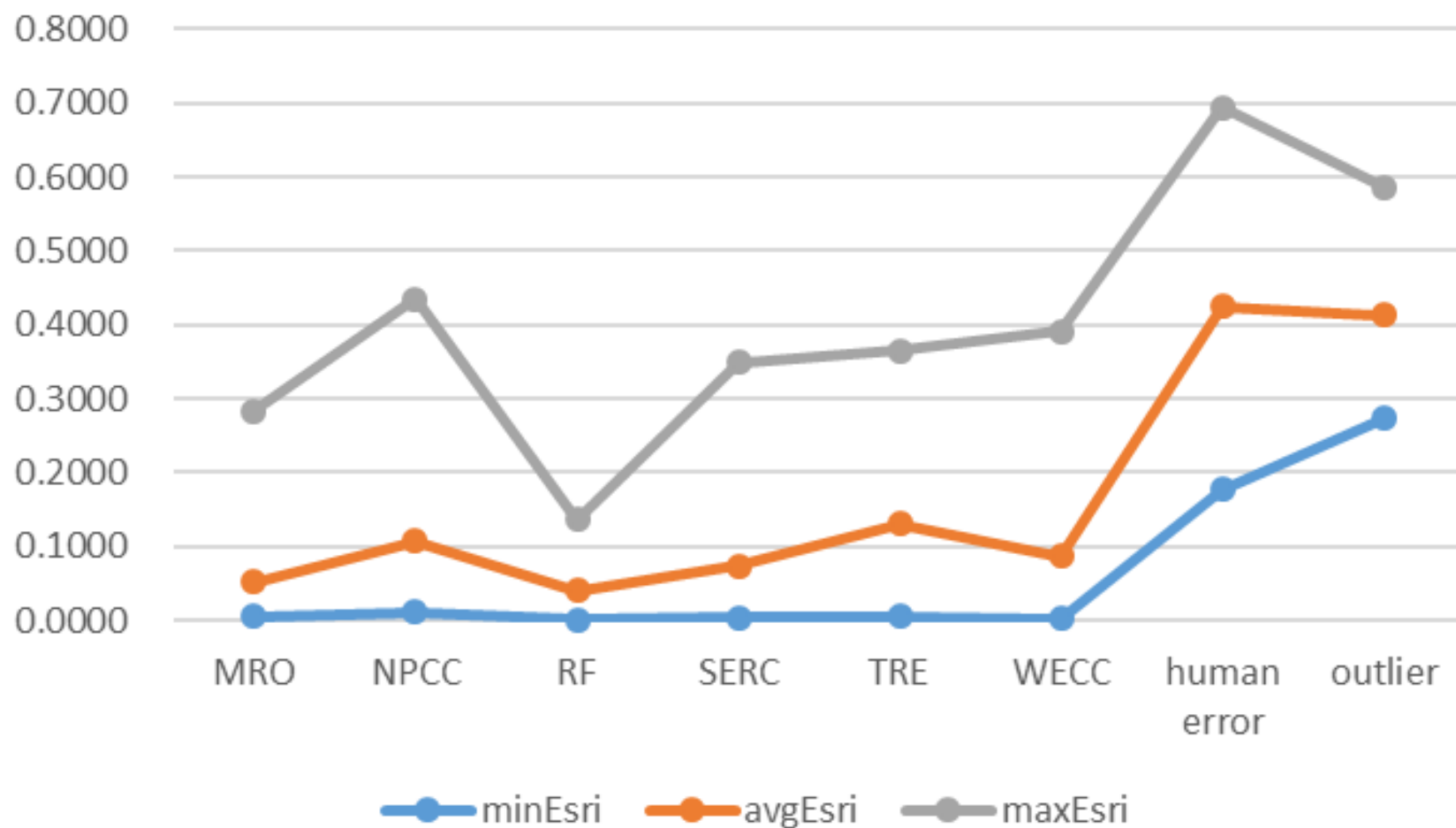
extreme contingencies vs actual events



extreme contingencies vs actual events



event, HE & outlier eSRIs by Region



NPCC NERC Published Lessons Learned

- By and Far the greatest by-product of the Event Analysis program is Lessons Learned (LL).
- The sharing of the knowledge gained by each of us during and after an event is only accomplished by the development and publishing of LLs (anonymously).
- If you are not developing your own or reading those already published, you are losing out on what this program is all about --- increasing RELIABILITY!

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
ERO Team*	0	0	0	0	0	0	0	0	0	2	2
MRO	0	2	2	0	3	1	2	0	3	0	13
NERC	23	1	0	0	1	0	0	1	0	0	26
NPCC	0	5	2	5	4	10	6	2	4	3	41
RF	0	3	1	3	4	1	1	1	5	2	21
SERC	0	1	0	2	4	2	2	0	0	0	11
TRE	0	5	8	1	2	1	1	2	0	0	20
WECC	0	5	5	3	1	1	1	3	3	3	25
Total	23	22	18	14	19	16	13	9	15	10	159

Events Analysis

The NERC has established an enhanced, industry wide Event Analysis program based on the recognition that many events which occur on the bulk power system beyond the reporting requirements in place today can have varying levels of significance to the electric system, providing otherwise unrealized lessons to be learned from these events and providing the opportunity for the trending of such events to identify possible reliability concerns. By integrating a "bottom-up" approach to a disturbance review within the framework of the NERC Event Analysis Program, consistency, comparability, flexibility and timeliness in the event analysis process will be promoted by NPCC, the registered entities and NERC in a collaborative initiative.

Upon the identification of an event, the goal of the Event Analysis Program is to:

- identify what transpired;
- establish the sequence of events;
- understand the essential root causes of the event;
- identify recommendations or corrective actions; develop, and disseminate to the industry, lessons to be learned so that the operational reliability of the bulk power system can be further enhanced.

The adoption by NERC of the Event Analysis Program in its Rules of Procedure brings clarity and certainty about what system events are relevant to analyze and to what level of detail, targeting potential vulnerabilities to the reliability of the bulk power system for detailed and in depth analysis.

Upcoming Meetings

Links

[ERO Event Analysis Process 7/2013](#)[Situational Awareness](#)[OE-417](#)[EOP-004](#)[ES-ISAC](#)

Do You recognize this website page?

You Should!

[Lessons Learned](#)
[Meetings](#)
[Announcements](#)

Events Analysis - Documents

[Lessons Learned Overview](#)

In an attempt to provide information gleaned from events that have occurred not only within the NPCC region, but continent-wide as well, the table below has been provided.

This table's objective is to act as an index of the regional insights/lessons learned (both posted on the NERC website and those still in the queue or regionally specific) indicating their area(s) of focus as they relate to the six areas (headers) listed below.

☐ Category	Title	Lessons Learned	NPCC Review	NERC LL
⊕ Category : EMS/SCADA (41)				
⊕ Category : Generation (5)				
⊕ Category : System Protection (23)				
⊕ Category : Transmission (5)				

How about this One? This provides links to some NERC LLS and the associated regional insights provided by our NPCC TFs on the LL.

Questions



FERC NPCC 2019 Workshop presentation is not available for distribution.

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

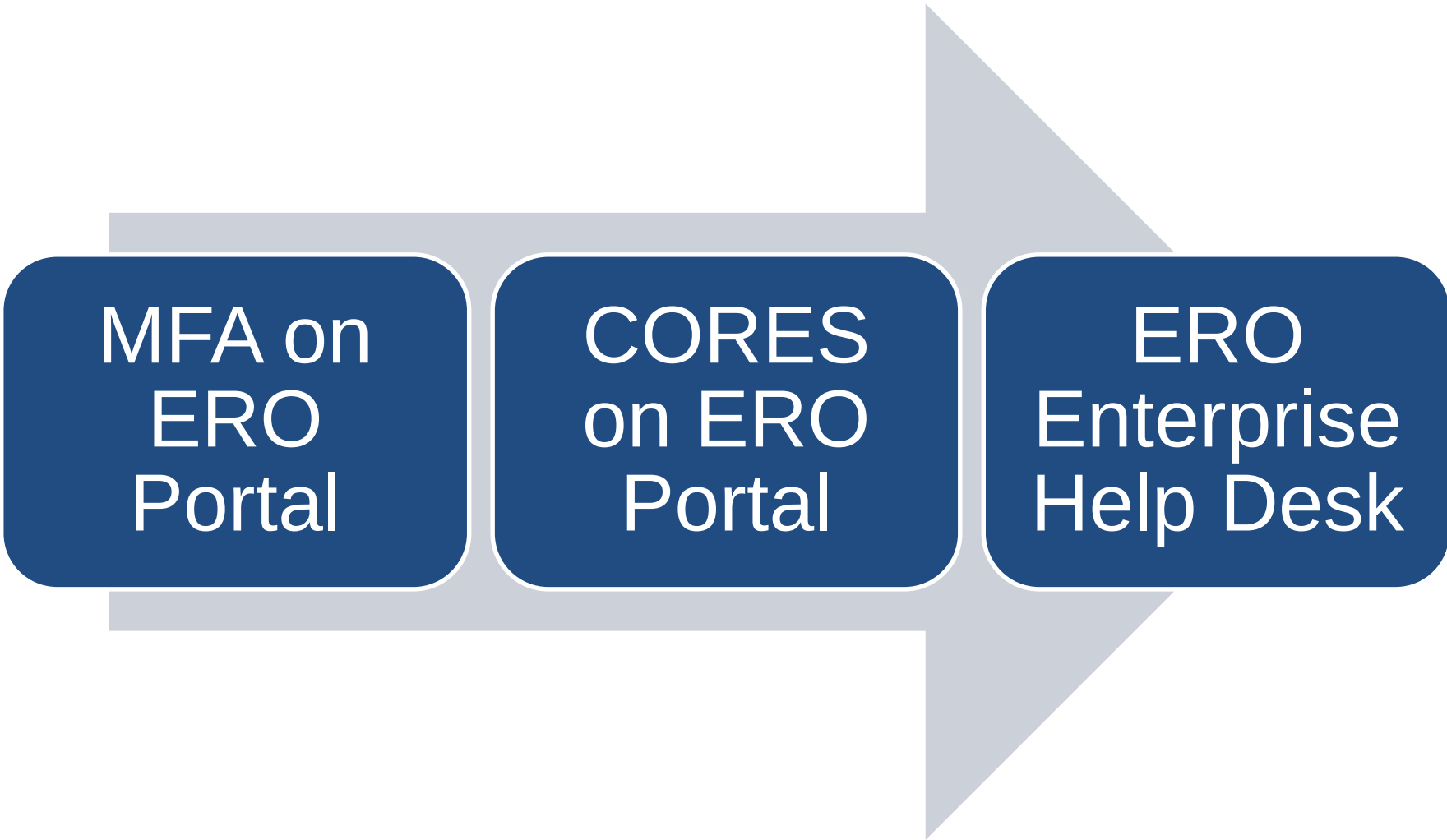
Centralized Organization Registration ERO System (CORES) Update

November 20, 2019

RELIABILITY | ACCOUNTABILITY



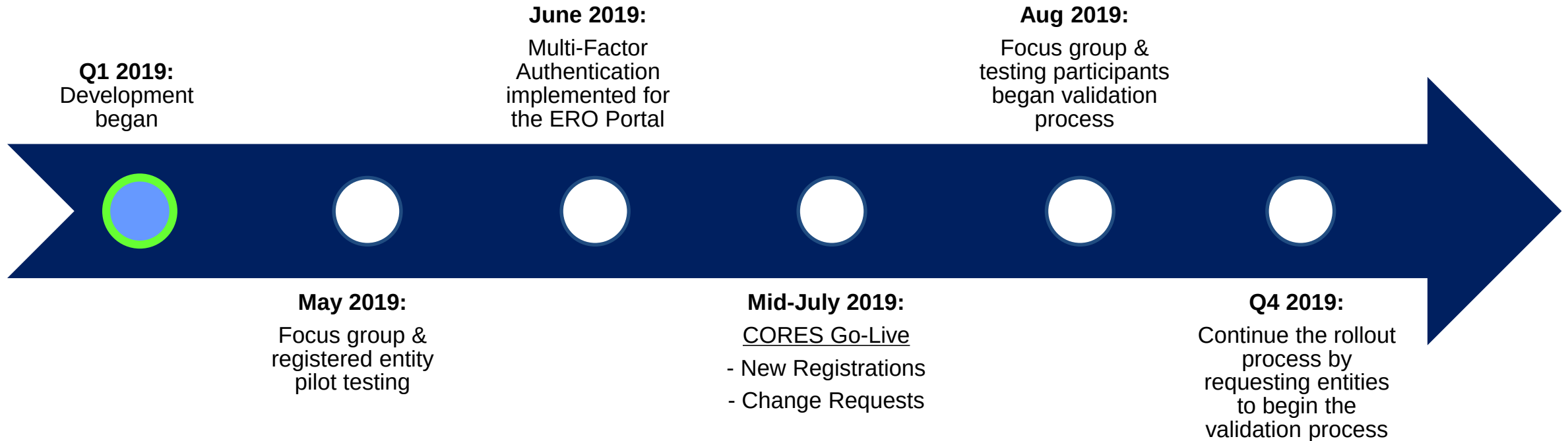
- The CORES platform enables entities to manage their registration information, contact information, and functional relationships from one application.
- The application is accessed through a common platform – the ERO Portal.
 - Link to access- <https://eroportal.nerc.net>
 - ERO Portal User Guide
(https://www.nerc.com/pa/comp/RegistrationReferenceDocsDL/User%20Guide_ERO%20Portal.pdf)
- The Centralized Organization Registration ERO System (CORES) was launched on July 15, 2019, to provide consistency and alignment across the ERO for registration activities.

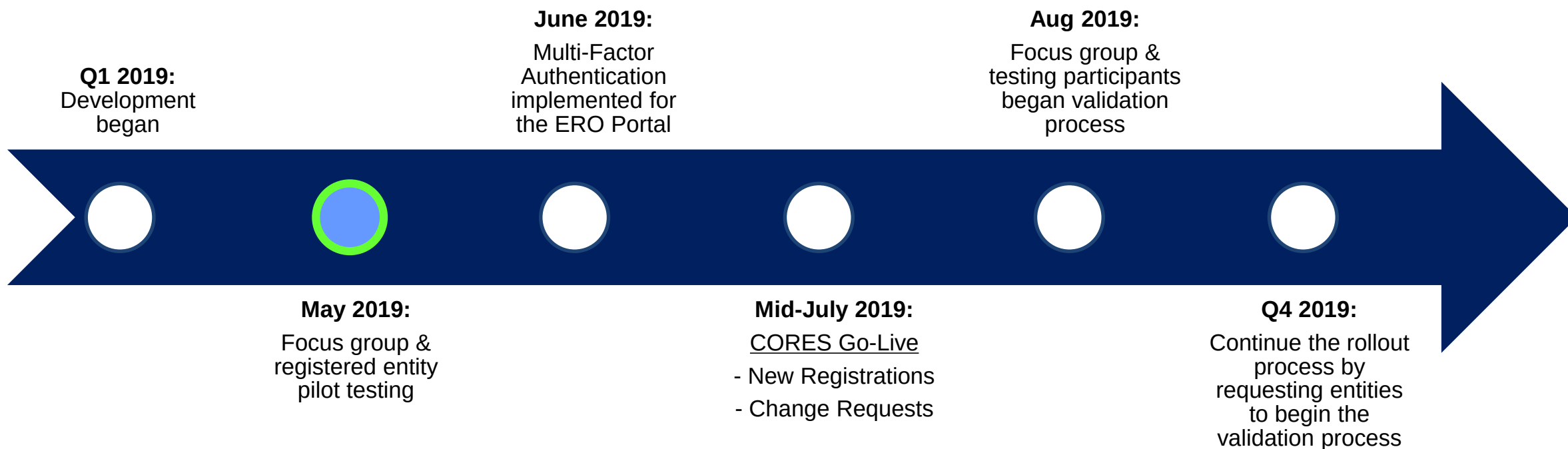


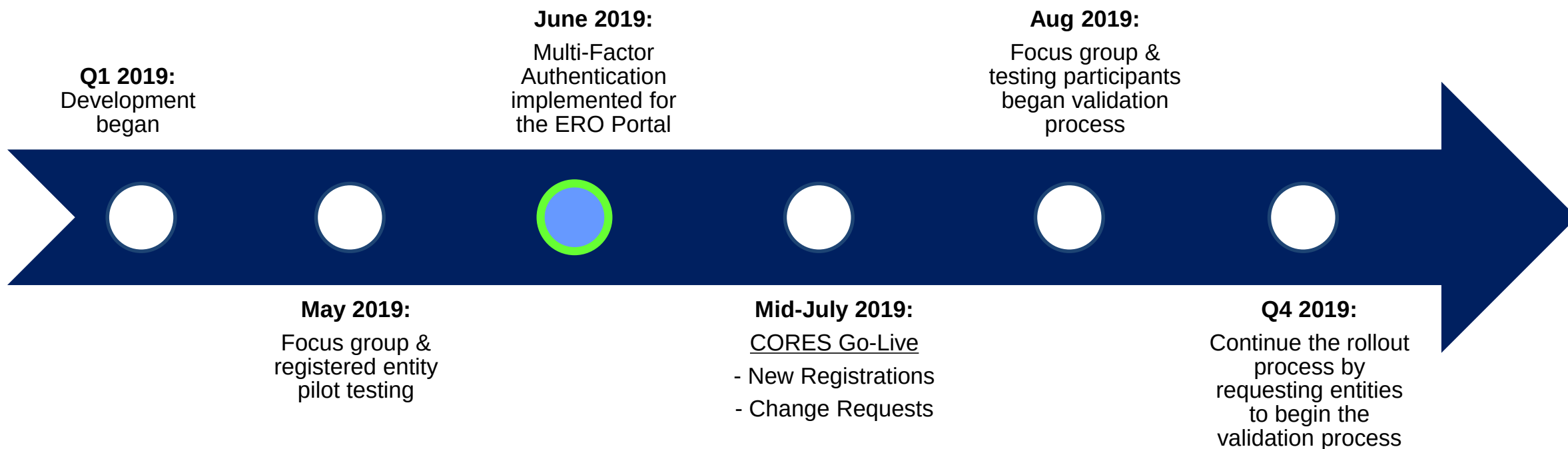
MFA on
ERO
Portal

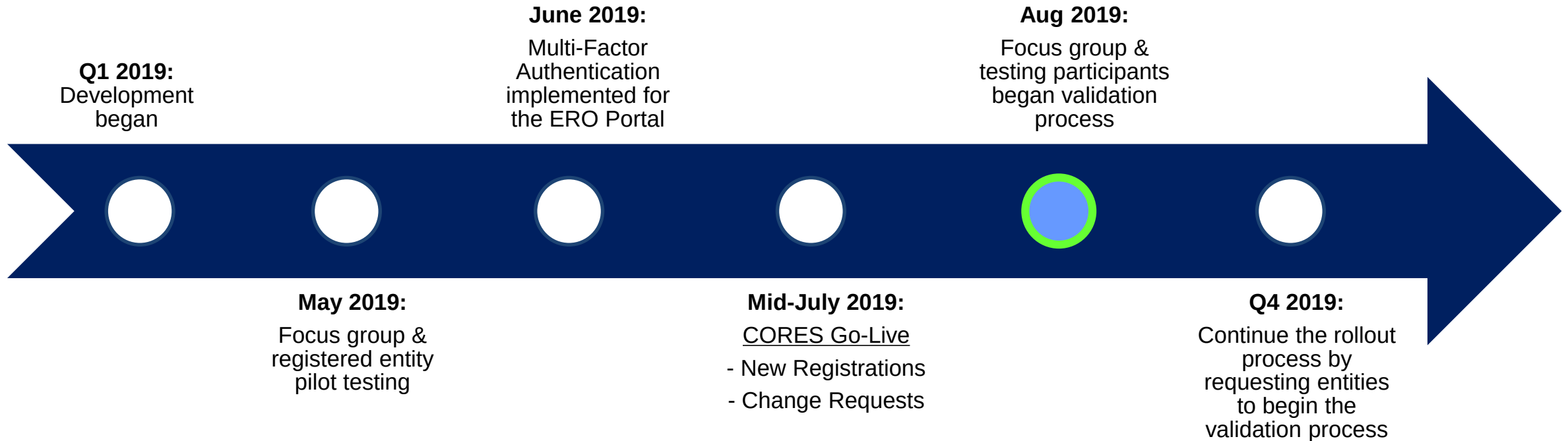
CORES
on ERO
Portal

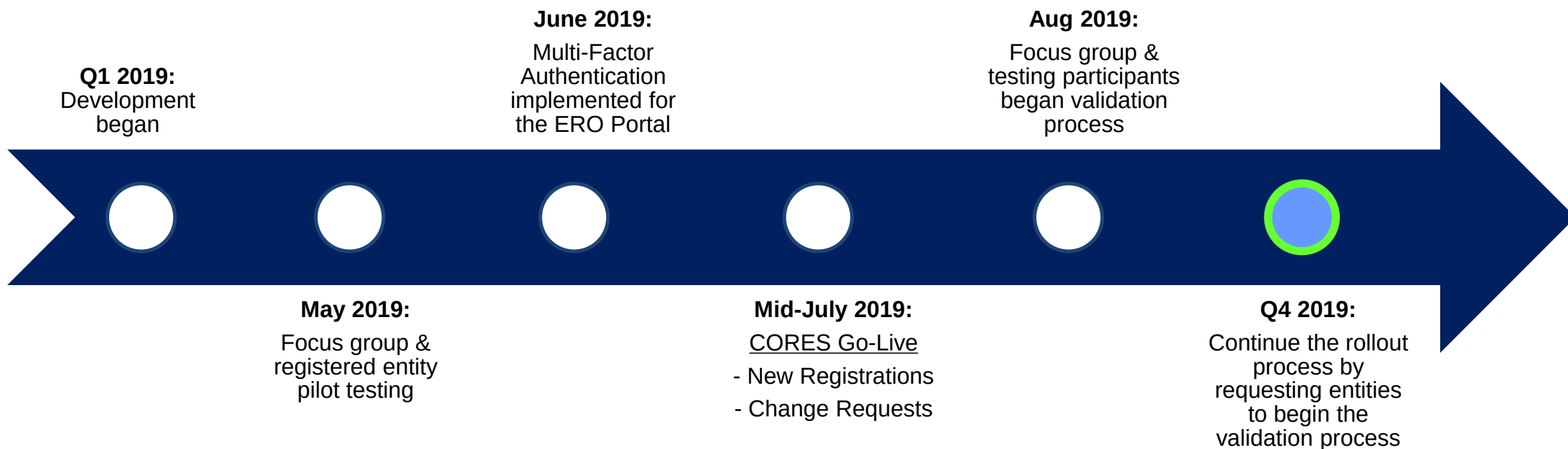
ERO
Enterprise
Help Desk



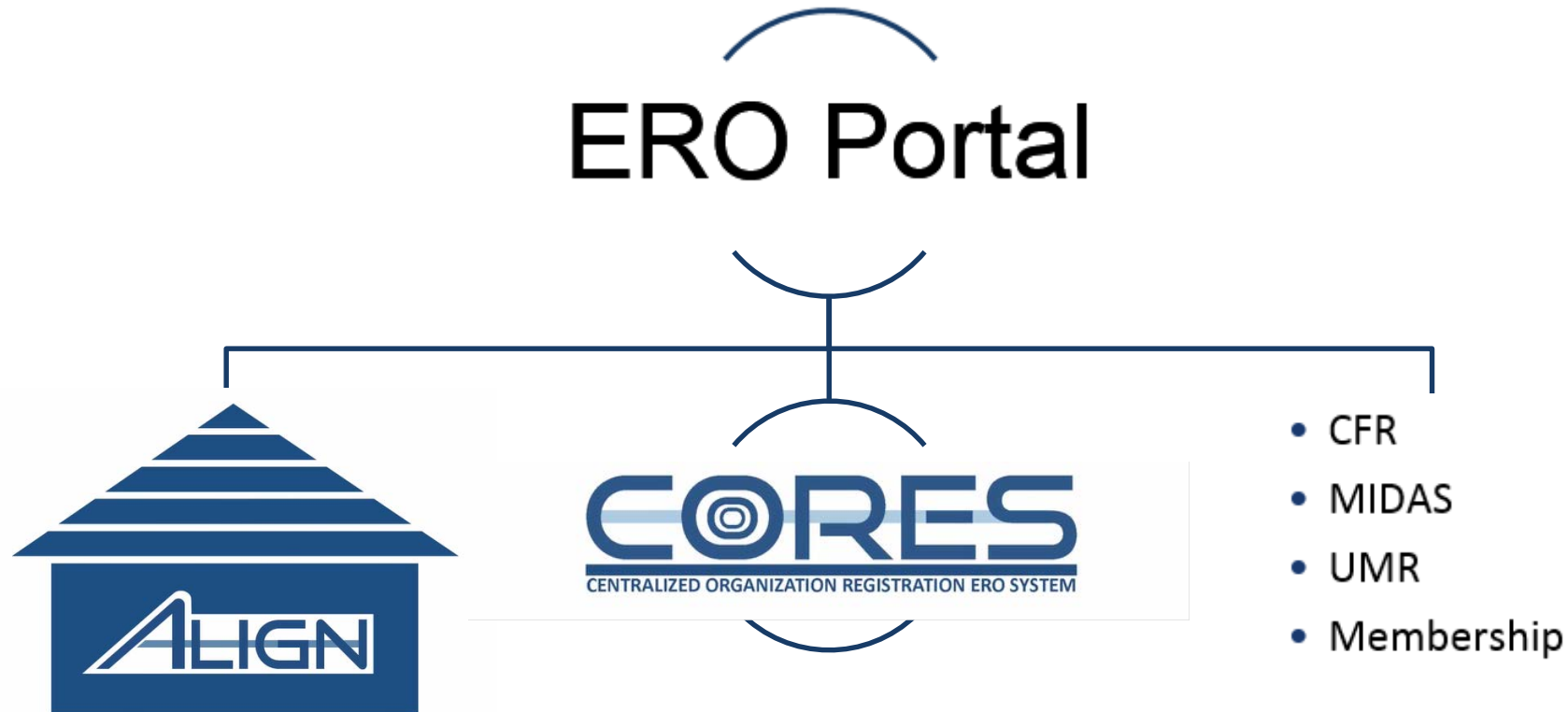








- CORES is a new system and the ERO wants users to have a positive user experience and to have the resources available to assist users with registration activities.
- There are three groups in the Managed Release –
 1. High priority entities that have registration requests that need to be processed immediately
 2. The initial pilot entities and focus group
 3. The remainder of the entities in all the regions
- The software will be released to the remainder of entities over the next several months on a regional basis
 - There were several enhancements that have been made or are close to being completed that we received from registered entity feedback.
 - The remainder of the entities will be provided access according to each Regional Entity's plan.



ERO Portal Access

- Align (Upcoming)
- Centralized Organization Registration ERO System (CORES)
- Coordinated Functional Registration (CFR)
- Misoperation Information and Data Analysis System (MIDAS)
- Email Lists / Extranet (UMR / Groups)
- Membership

Additional Logins

- System Operator Certification and Continuing Education (SOCCEd)
 - https://nerc-socced.useclarus.com/login?forward_url=/
- BESNet and SBS both use the same login
 - Bulk Electric System Exceptions (BESnet)
 - <https://identity.eroenterprise.com/account/signin>
 - Standards Balloting System (SBS)
 - <https://identity.eroenterprise.com/account/signin>
- GADS Wind
 - <https://gadswind.nerc.net/>
- NERC Alerts
 - <https://www.nercalerts.com>

- CORES is not currently planned to be used for
 - Compliance Monitoring and Enforcement Functions – see the Align project.
 - <https://www.nerc.com/ResourceCenter/Pages/CMEPTechnologyProject.aspx>
 - Certification or Certification Reviews
 - No system in place for certification or certification reviews at this time
 - BES Processing
 - BES processing will continue to utilize the BESnet application
 - <https://identity.eroenterprise.com/account/signin>

- The information collected in CORES will be based upon the Common Registration Form
 - Entity names
 - Contact information
 - Functional registration request information
 - Parent company and affiliate information

Entity Registration Form

This form should be submitted via e-mail to Registration@mro.net

Entity Information			
Entity Name/Company (Legal Name):			Date:
Corporate Address:			
City, State, Zip:		Country:	
Corporate Website:			
NERC Compliance Registry (NCR) ID:		New Facility test power sync date:	
Registration Request: New ☐ Deactivation ☐	BA ☐ GO ☐ GOP ☐ DP ☐ PA ☐ RC ☐ RP ☐ RSG ☐ TO ☐ TOP ☐ TP ☐ TSP ☐ DP UFLS only ☐		
DP Function:			
What is the peak Load (MW)?			
As a DP, does your entity own, control or operate:	1. a required Undervoltage Load Shedding (UVLS) program or	Yes ☐ No ☐	
	2. a required Special Protection System or Remedial Action Scheme or	Yes ☐ No ☐	
	3. a required transmission Protection System or an	Yes ☐ No ☐	
	4. Underfrequency Load Shedding (UFLS) program?	Yes ☐ No ☐	
Reason for request: (i.e. new registration, name change, removal of function, etc.)			
Has a BES Exception request been submitted?	Yes ☐ No ☐		
List parent company and NERC ID (if applicable):			
List affiliates and NERC ID (if applicable):			
Coordinated Functional Registration (CFR):	Yes ☐ No ☐	CFR Number:	
Joint Registration	Yes ☐ No ☐	Joint Registration Number:	

- The information collected in CORES will include
 - Joint Registration Organization (JRO) information
 - Multi-Regional Registered Entity (MRRE) information
 - Functional model relationships
 - Role information for specific contacts
 - *New information to be collected will be Outsourced Compliance Companies

Entity Registration Form

This form should be submitted via e-mail to Registration@mro.net

Entity Information			
Entity Name/Company (Legal Name):			Date:
Corporate Address:			
City, State, Zip:		Country:	
Corporate Website:			
NERC Compliance Registry (NCR) ID:		New Facility test power sync date:	
Registration Request: New ☐ Deactivation ☐	BA ☐ GO ☐ GOP ☐ DP ☐ PA ☐ RC ☐ RP ☐ RSG ☐ TO ☐ TOP ☐ TP ☐ TSP ☐ DP UFLS only ☐		
DP Function: What is the peak Load (MW)?			
As a DP, does your entity own, control or operate:	1. a required Undervoltage Load Shedding (UVLS) program or	Yes ☐ No ☐	
	2. a required Special Protection System or Remedial Action Scheme or	Yes ☐ No ☐	
	3. a required transmission Protection System or an	Yes ☐ No ☐	
	4. Underfrequency Load Shedding (UFLS) program?	Yes ☐ No ☐	
Reason for request: (i.e. new registration, name change, removal of function, etc.)			
Has a BES Exception request been submitted?	Yes ☐ No ☐		
List parent company and NERC ID (if applicable):			
List affiliates and NERC ID (if applicable):			
Coordinated Functional Registration (CFR):	Yes ☐ No ☐	CFR Number:	
Joint Registration			

- **November 20** - NPCC Workshop Update
- **November 21** - NPCC After the Workshop Early Release Training & Validation Reviews Session
- **December 10 at 10 AM** - NPCC Webex Training Session & Validation Reviews
- Entities access is restricted. In preparation for the events, the appropriate permissions will be assigned and the software will be released to registered entity contacts with roles.
- Each Region will be providing additional details at the Regional Entity workshops
- Multi-Regional Registered Entities will be accommodated and provided additional details specific to their registrations.

- The expectation is to complete these milestones no later than **April 1, 2020** in preparation for the Align system release.
- In the short term, contact information will not be updated in CORES.
 - Contact records, usernames, permissions will be handled through the helpdesk for access.
- CORES Milestones
 - Data validation from migration
 - Functional Registrations and dates
 - Entity relationships
 - Functional mapping
 - Coordinated Functional Registration
 - Joint Registration Organization

- CORES Video Library for Training Material
 - <https://vimeopro.com/nerclearning/cores-video-library/page/1>
- Project Page
 - <https://www.nerc.com/pa/comp/Pages/CORESTechnologyProject.aspx>
- Registration Pages for NERC and NPCC
 - <https://www.nerc.com/pa/comp/Pages/Registration.aspx>
 - <https://www.npcc.org/Compliance/Compliance%20Registration1/Forms/Public%20List.aspx>
- ERO Enterprise Help Desk
 - <https://support.nerc.net>
- Link to access and register for ERO Portal (CORES is accessed via the ERO Portal)
 - <https://eroportal.nerc.net/>



Questions and Answers

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

2019 Fall Compliance and Standards Workshop

Northeast Power Coordinating Council

John Moura

Director, Reliability Assessment and Performance Analysis

November 20, 2019

RELIABILITY | ACCOUNTABILITY



- State of Reliability
- Identifying priority reliability risks
- Measuring impact of mitigation efforts
- Long-Term Reliability Assessment

– RELIABILITY PERFORMANCE AND TRENDS?

– WHAT SHOULD THE ERO WORK ON?

– IS THE ERO HAVING AN IMPACT?

– WHAT ISSUES LIE AHEAD?

– LET'S GO!



Variable
Resources



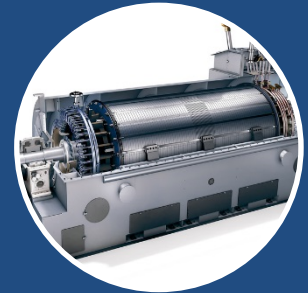
Generation
Retirements



Inverter
Controls and
Integration



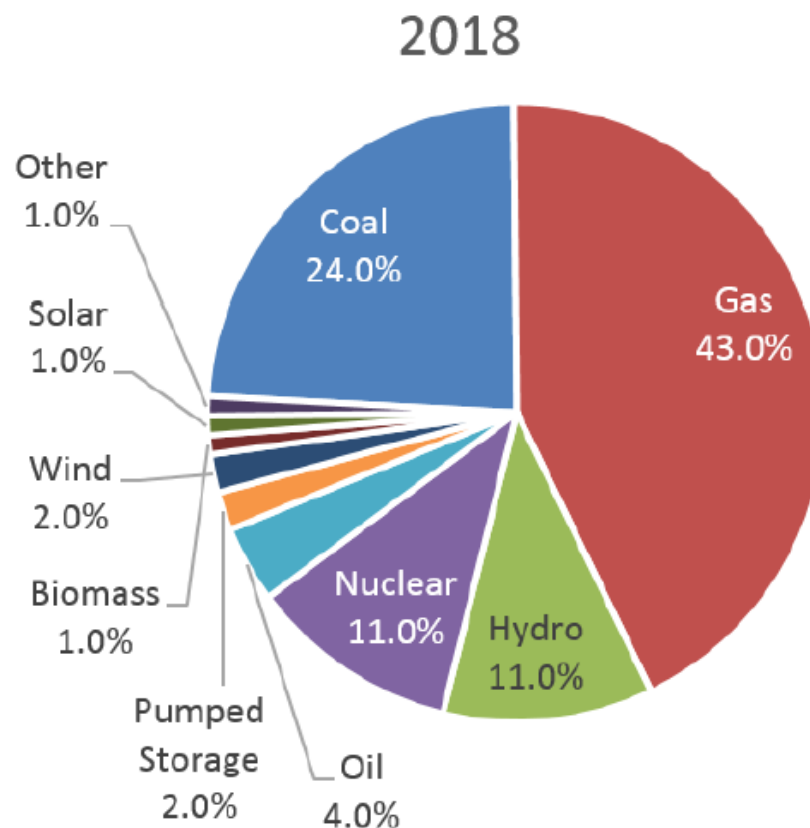
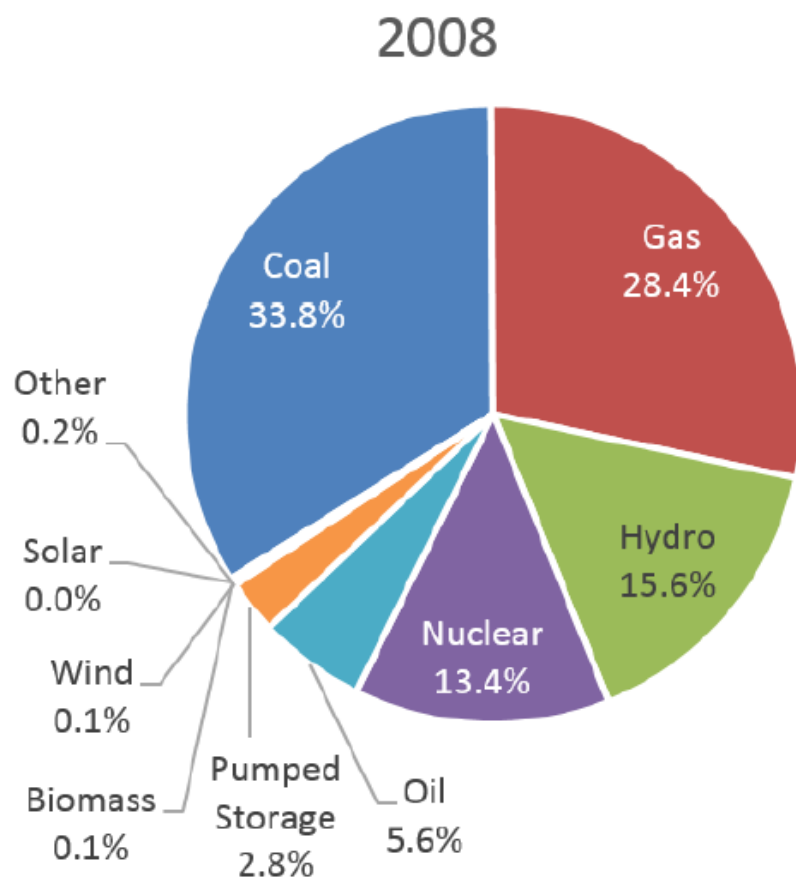
Distributed
Energy
Resources



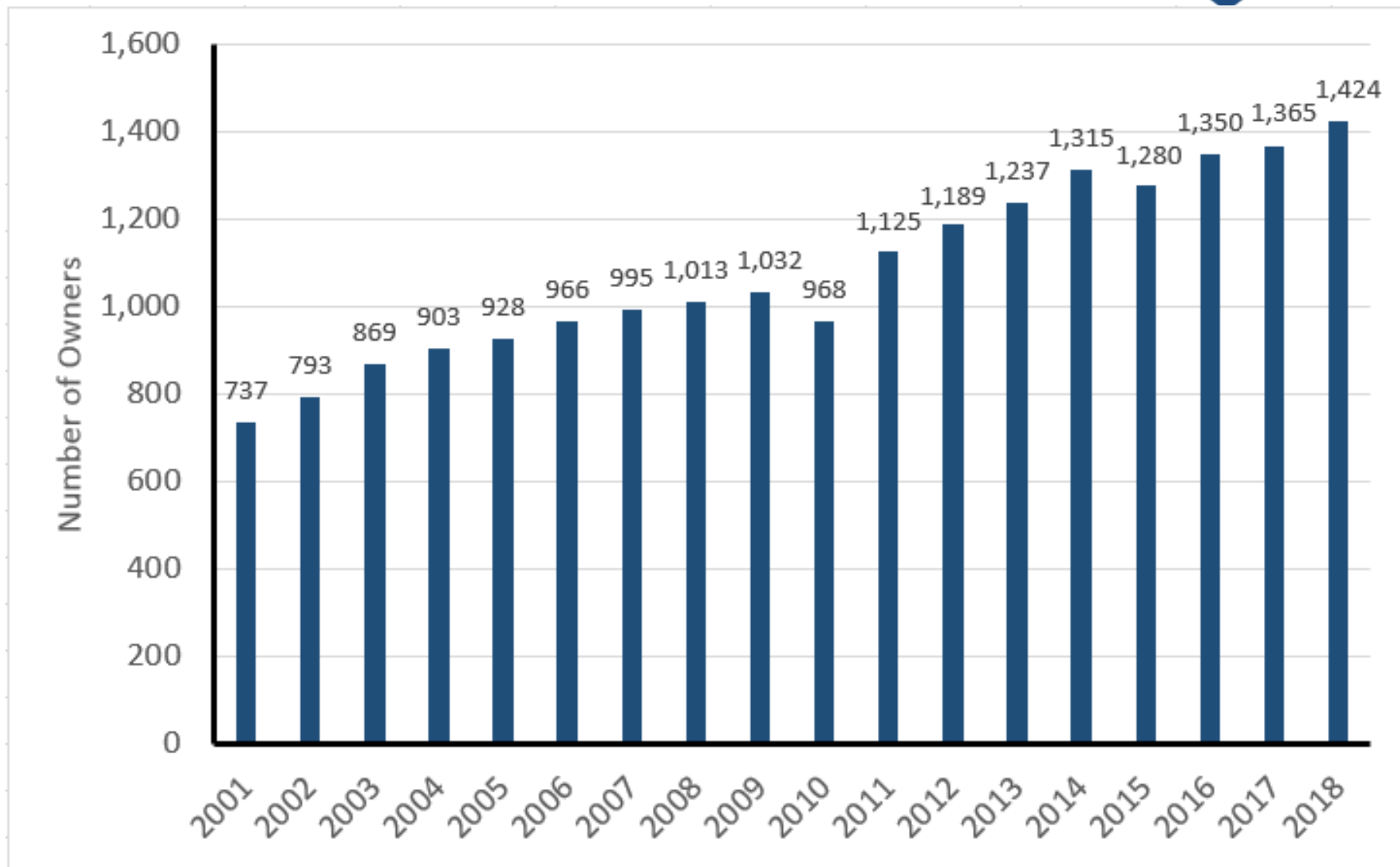
Lack of
Synchronized
Generation



NERC-Wide On-Peak Generation Capacity Mix: 2008 vs 2018



Number of Generator Owners (US ONLY)



- Provide objective information to policy makers, industry, and the general public on issues affecting BPS reliability and resilience
 - Identify system performance trends and emerging reliability risks
 - Report on the relative health of the interconnected system
 - Measure the success of mitigation activities deployed



- High Reliability in 2018, No Non-Weather Category 3, 4, or 5 events
 - Hurricane Michael and Florence Category 3
- Extreme weather events continue to be leading contributor to the largest generation and distribution outages
- Better than expected performance from Texas generation fleet helped meet 2018 summer peak demand; reliability risk in 2019 due to continued capacity deficit
- Continued downward misoperation rate trend
- Improving or stable frequency response performance in all interconnections
- Emerging reliability challenges identified as more inverter-based generation is added

4,353,740,908 MWh

2018 Actual Energy

1,028,629 MW

2018 Summer Peak Capacity

469,842 mi

Total Transmission Circuit Miles > 100kV

5,816

Number of Conventional Generating Units > 20MW

99.92%

Time with no operator-controlled
load shedding

0

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

The ERO Enterprise: NERC and 7 Regional Entities



TEXASRE



WECC



15 Reliability Coordinators

4 Interconnections

184 Transmission Operators

991 Generator Owners

73 Balancing Authorities

398 Distribution Providers

Bulk Power System Situation Awareness Inputs and Products in 2018

2,963

Intelligent Alarms

4,239

FNet Notifications

1,855

RCIS Messages

233

DOE OE-417 Reports

459

EOP-004-3 Reports

2

EOP-002-3 Reports



255

Daily Reports

5

Special Reports



0

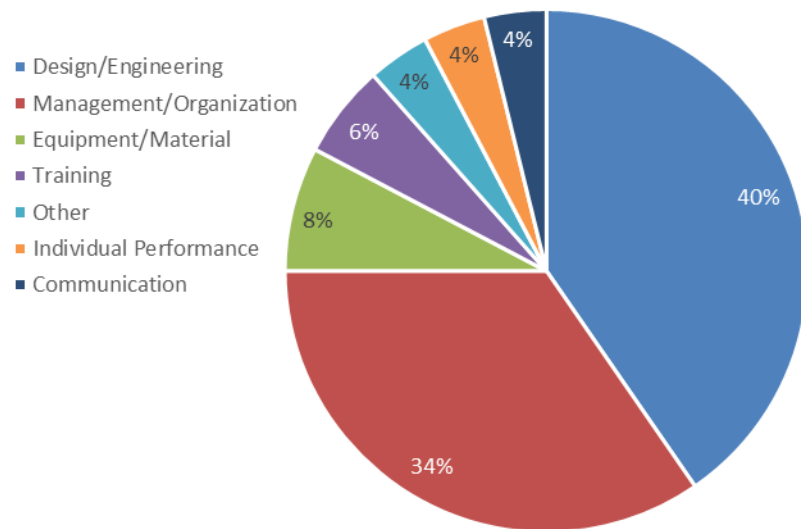
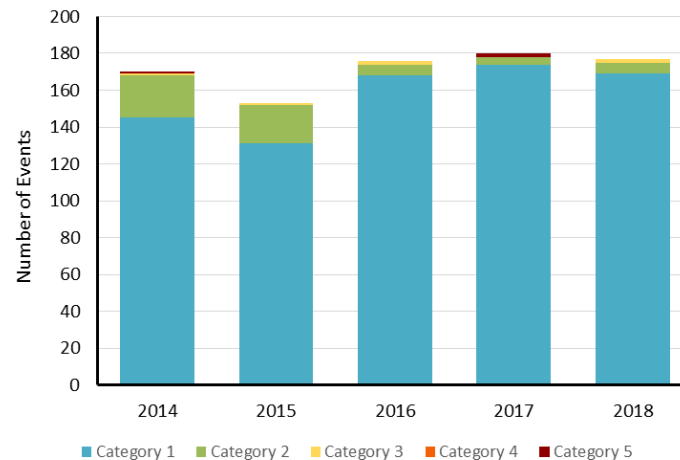
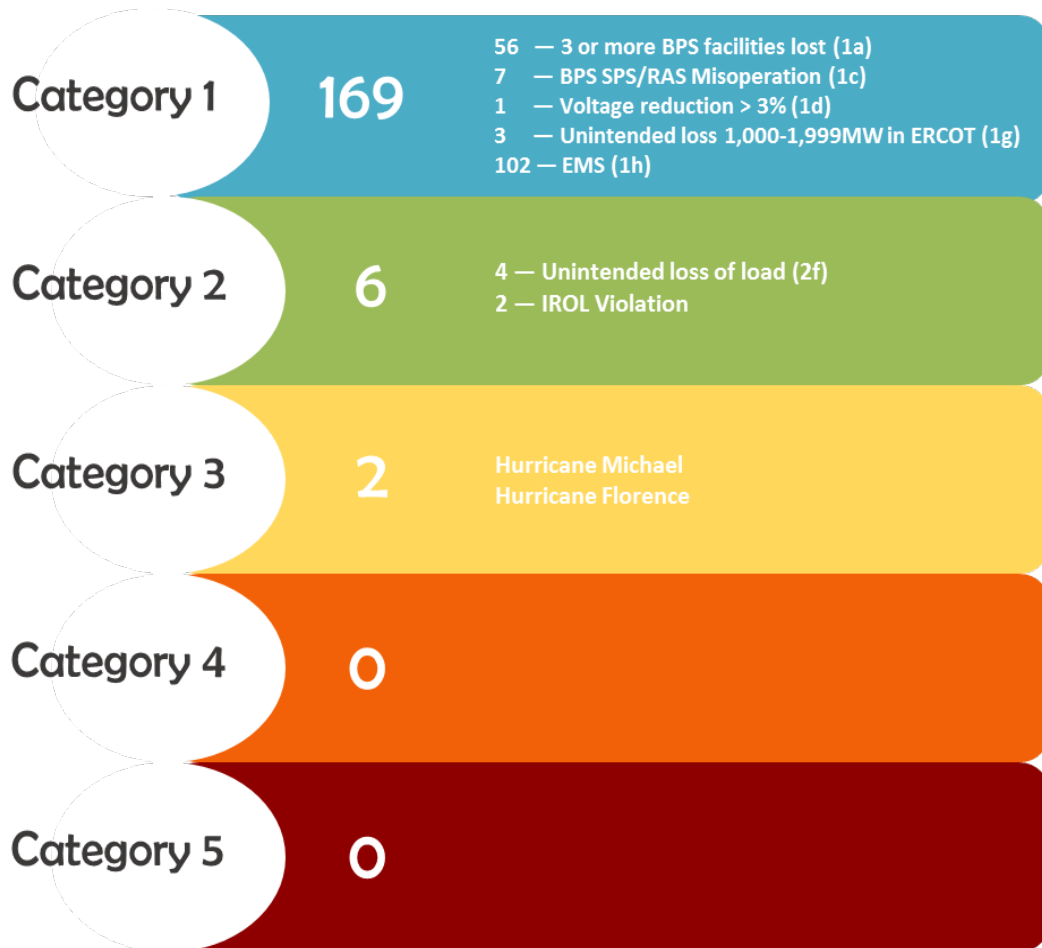
Level 1 Alert

1

Level 2 Alerts

NERC BPS Situational Awareness

Event Analysis (2018, Trends, Causes)



2014-2018 Event Analysis Trends



856 Event Reports

378 Identified Root Causes

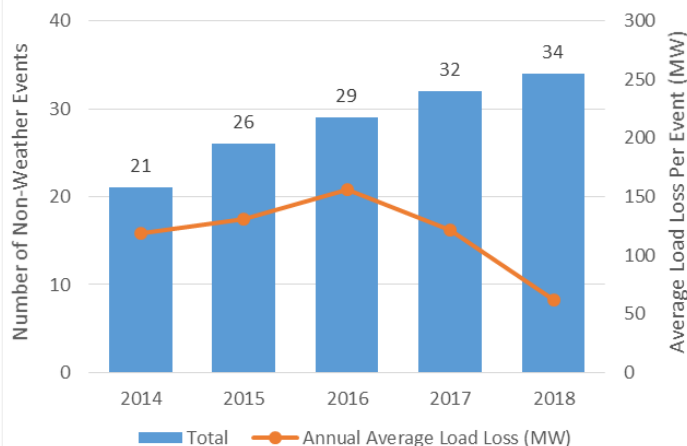


116 MW

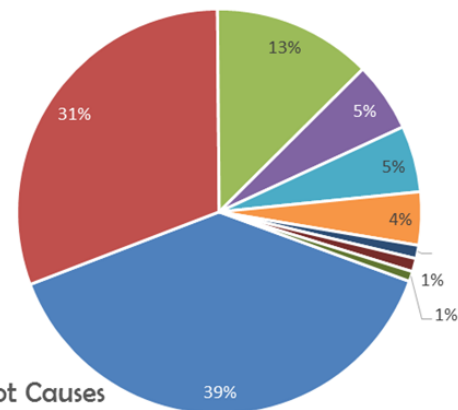
Overall (Five-Year) Average Load Loss of
Non-Weather Driven Events with Load Loss



Number of Non-Weather Events with
Load Loss and Annual Average Load Loss

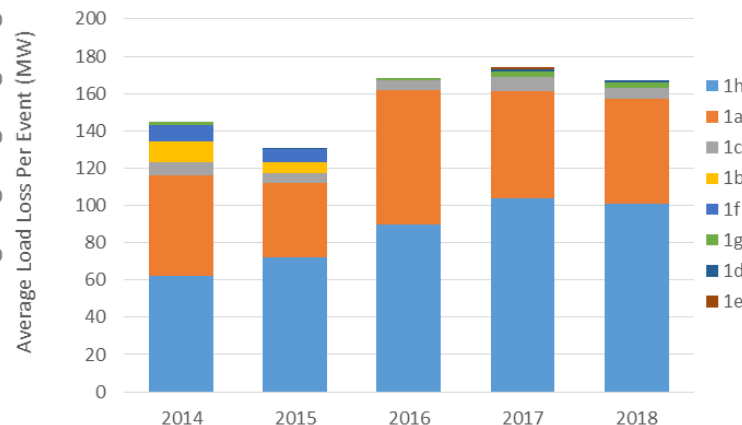


- Management/Organization
- Design/Engineering
- Equipment/Material
- Other
- Communication
- Individual Performance
- Training
- No Causes Found
- Overall Configuration

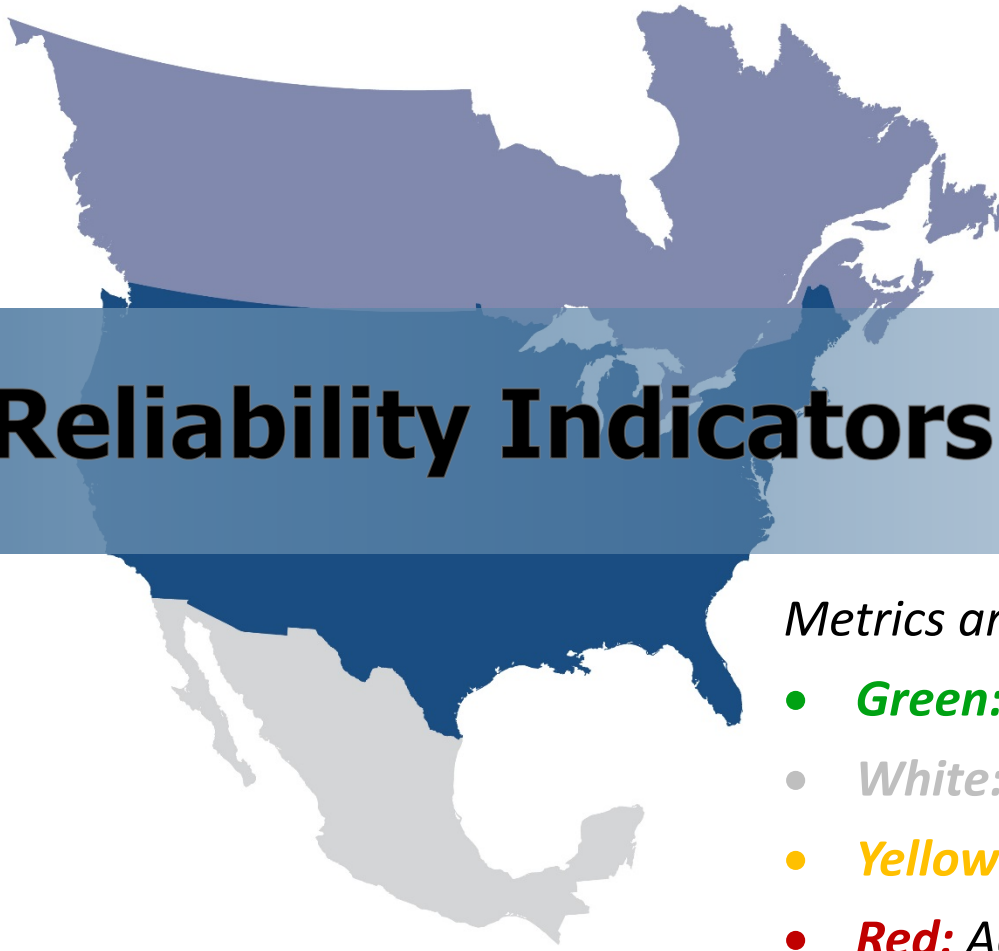


2014-2018 Identified Root Causes
(Processed to-date)

Total Category 1 Events by Year and
Subcategory



- **10 NERC Lessons Learned published to date in 2019**
 - 4 - Transmission Facilities
 - 2 - Generation Facilities
 - 4 - Communications
- **15 NERC Lessons Learned were published in 2018**
 - 1 - Generation Facilities
 - 6 - Communications
 - 7 - Transmission Facilities
 - 1 - Relaying and Protection Systems

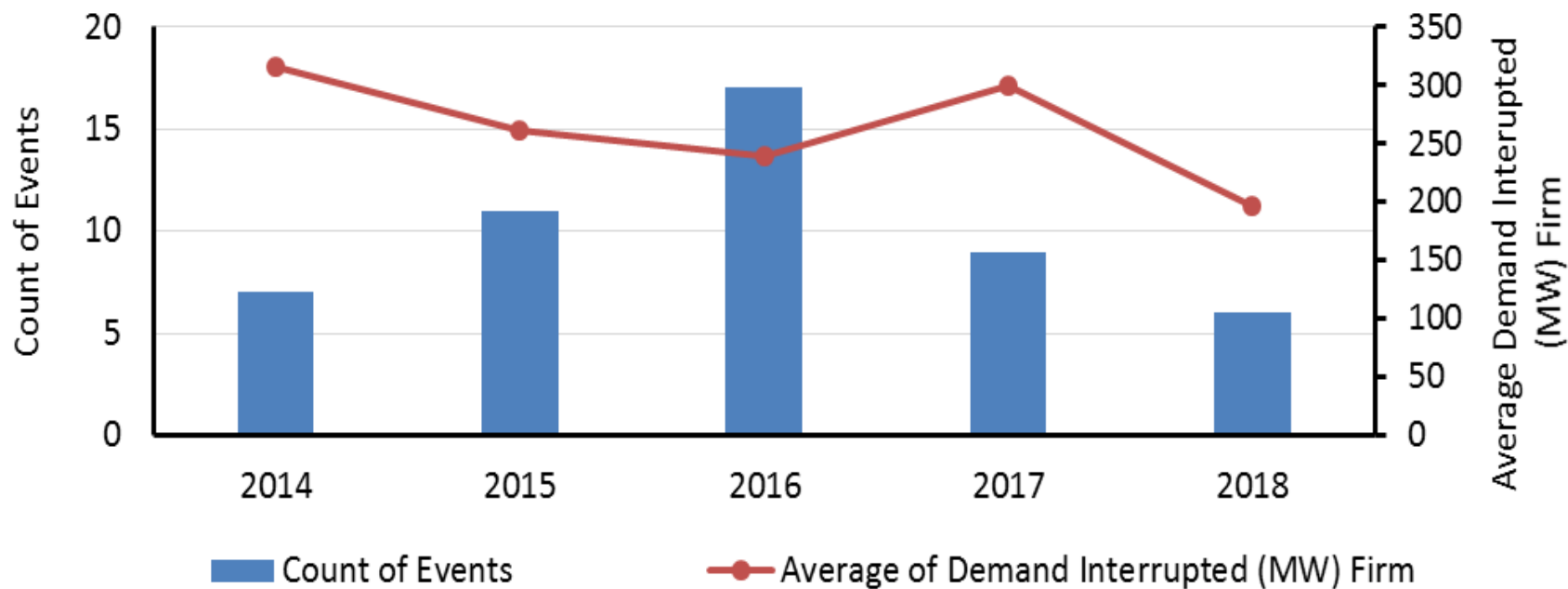


Reliability Indicators

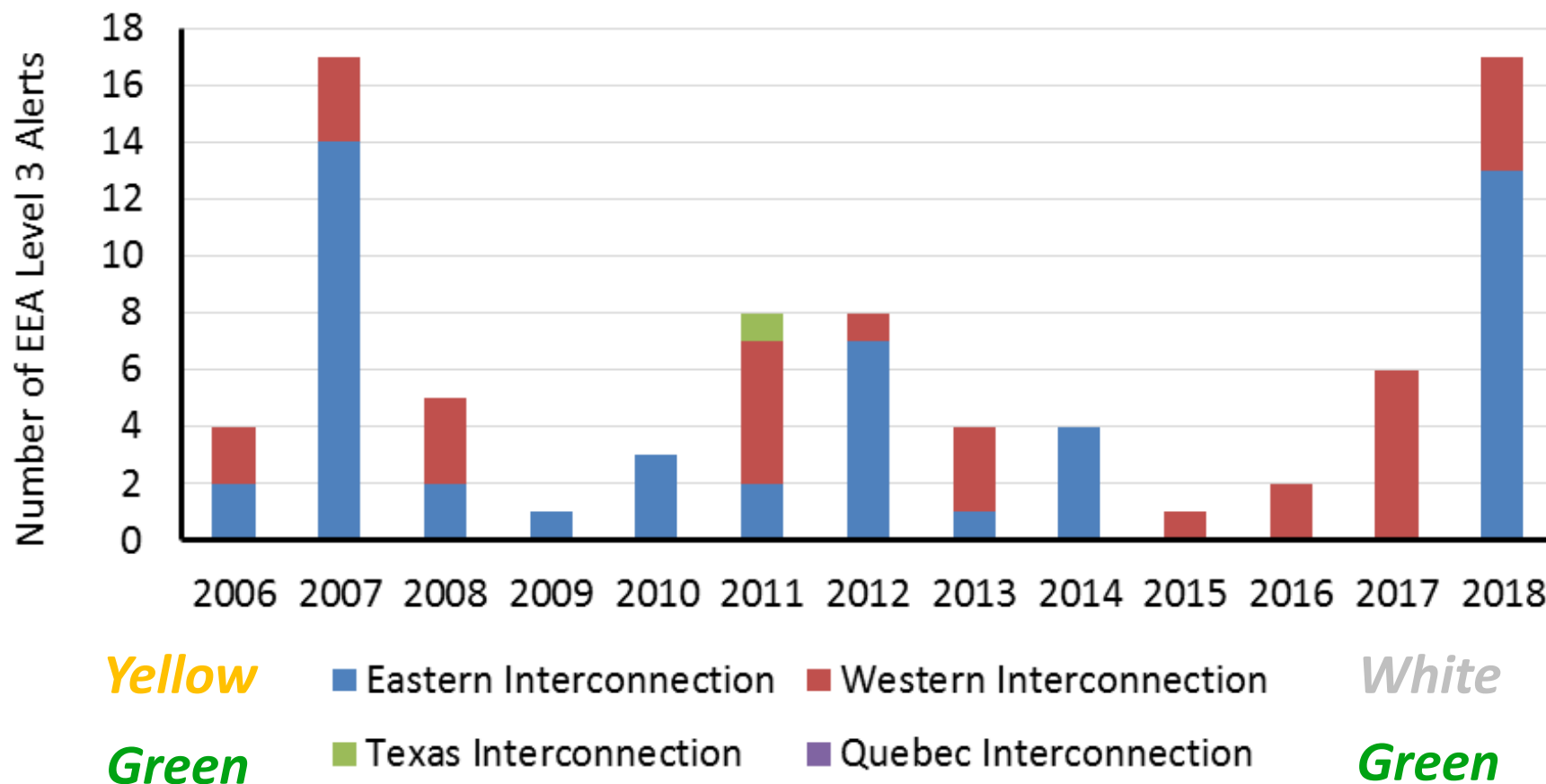
Metrics are rated on a four-point color scale:

- **Green:** Improving
- **White:** Stable or no change
- **Yellow:** Monitor
- **Red:** Actionable, may lead to key finding

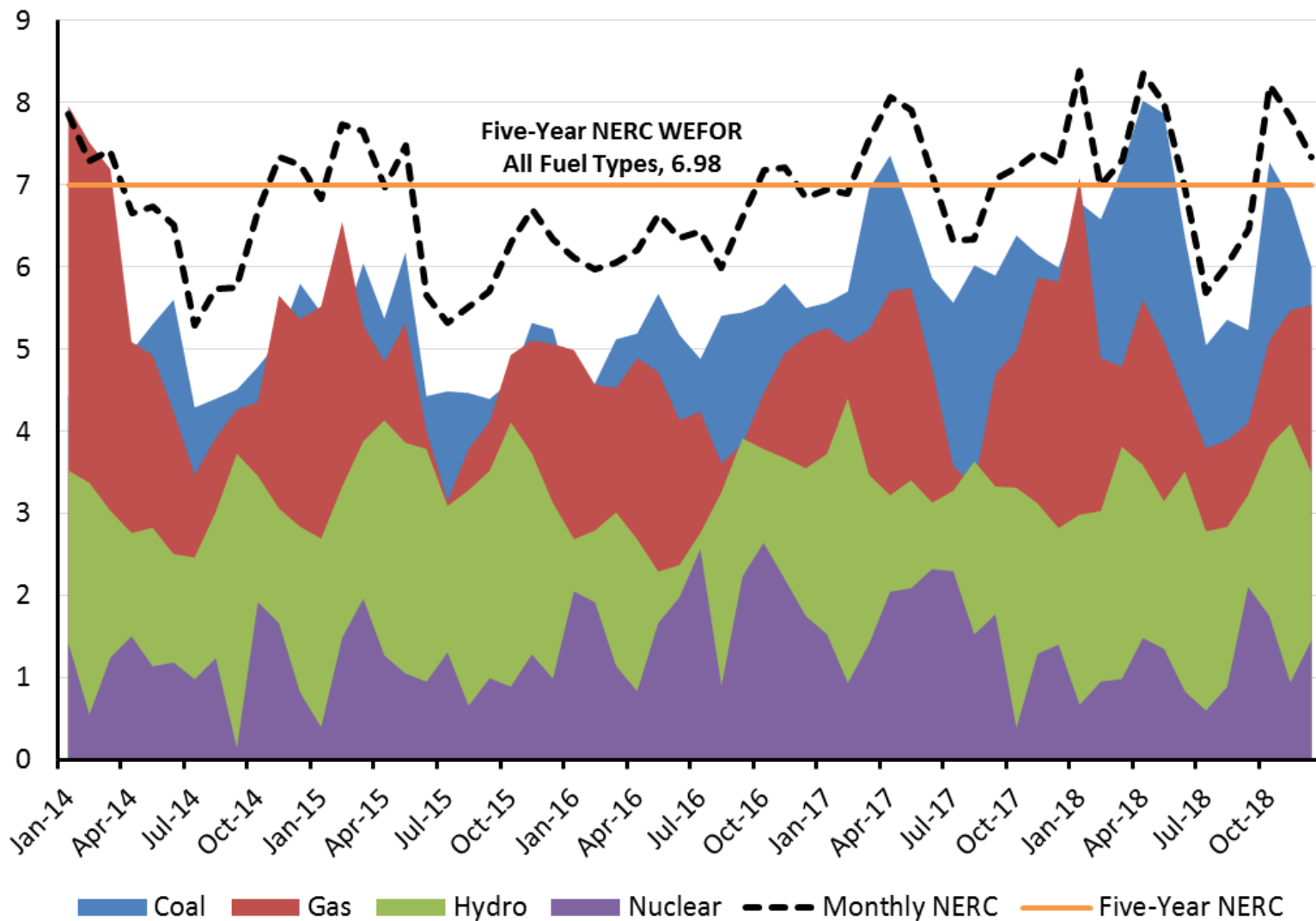
Reliability Indicator – Transmission Related Events Results in Loss of Load

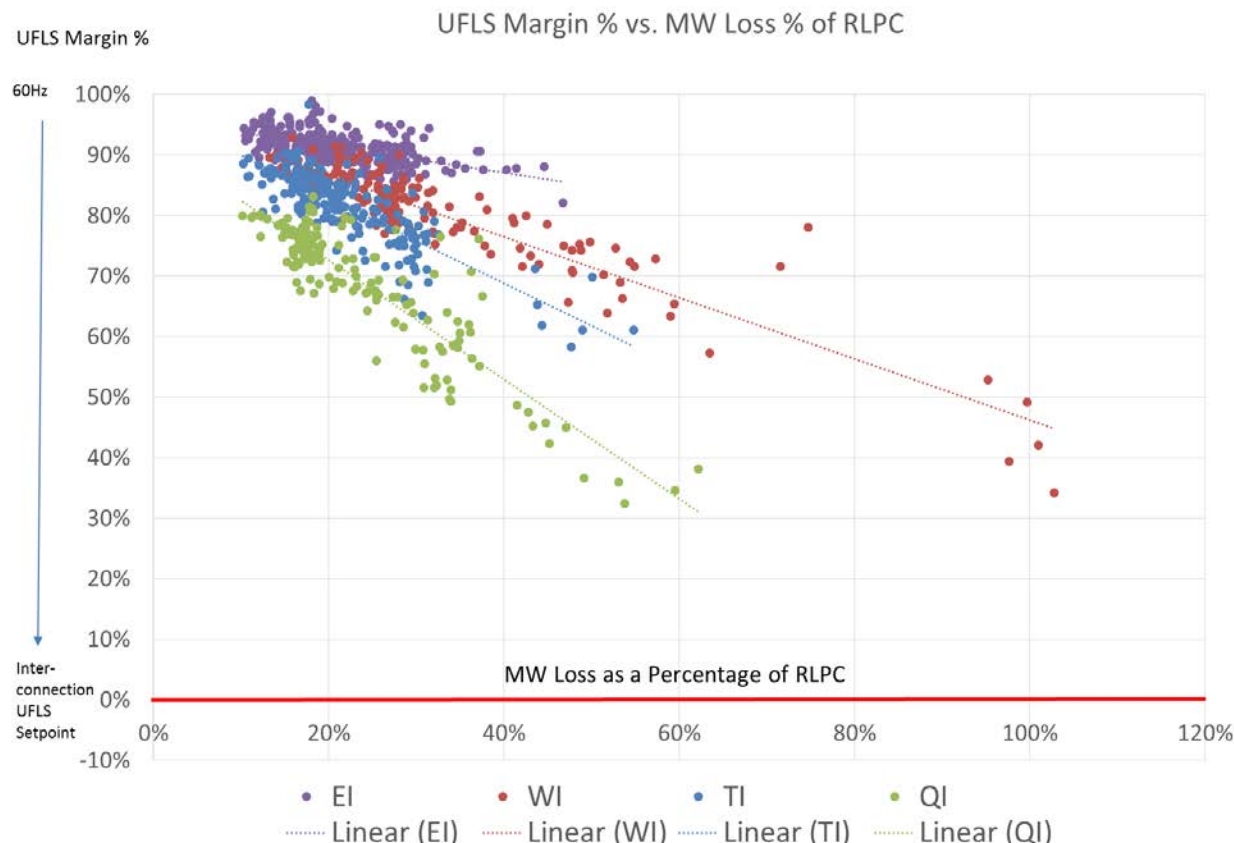


Reliability Indicator – Level 3 Energy Emergency Alerts



Reliability Indicator – Weighted Effective Forced Outage Rate, Conventional

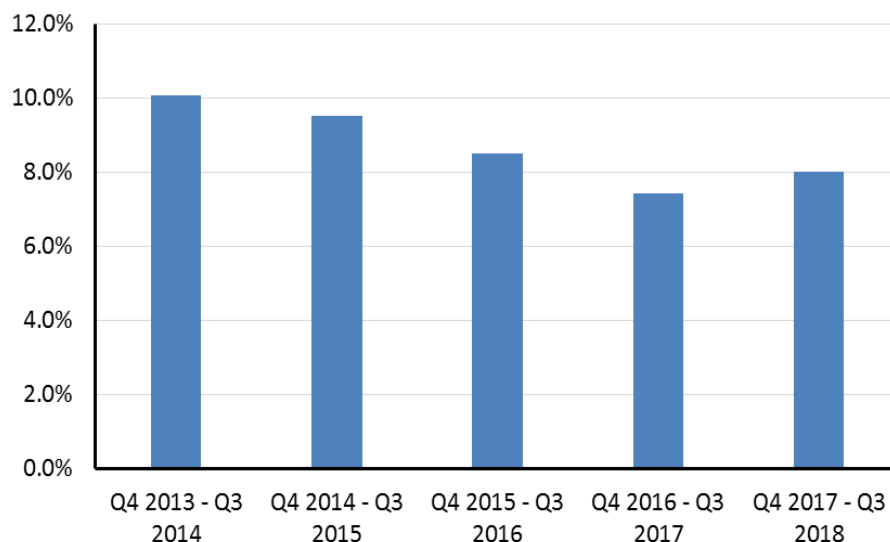




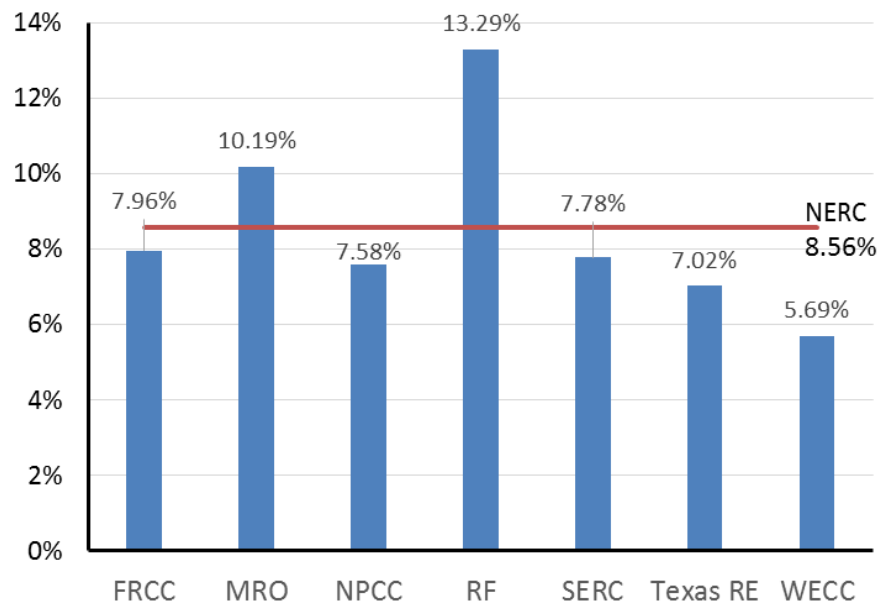
2018 Frequency Response Performance Statistics and Trend Assessment

Interconnection	2018 OY Arresting Period Performance			2018 OY Stabilizing Period Performance		
	Mean UFLS Margin (Hz)	Lowest UFLS Margin (Hz)	2014–18 OY Trend	Mean IFRM _{A-B} (MW/0.1 Hz)	Lowest IFRM _{A-B} (MW/0.1 Hz)	2014–18 OY Trend
Eastern	0.458	0.404	Improving	2,411	1,141	Stable
Texas	0.594	0.498	Improving	940	562	Improving
Quebec	1.075	0.678	Improving	862	364	Improving
Western	0.405	0.246	Stable	1,789	890	Improving

Reliability Indicator – Protection System Misoperation Rate



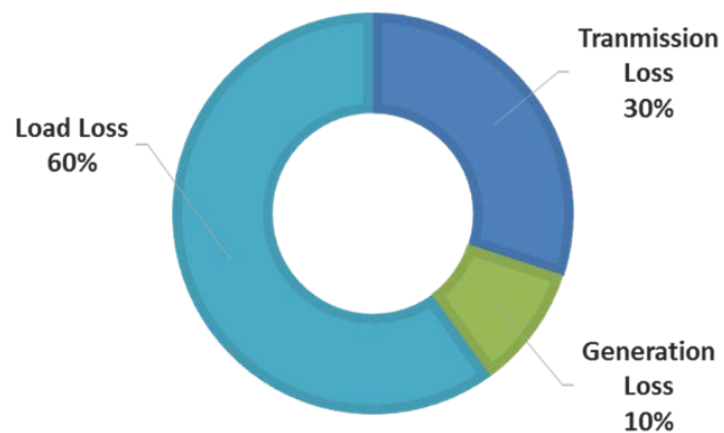
Annual Protection System Misoperation Rate



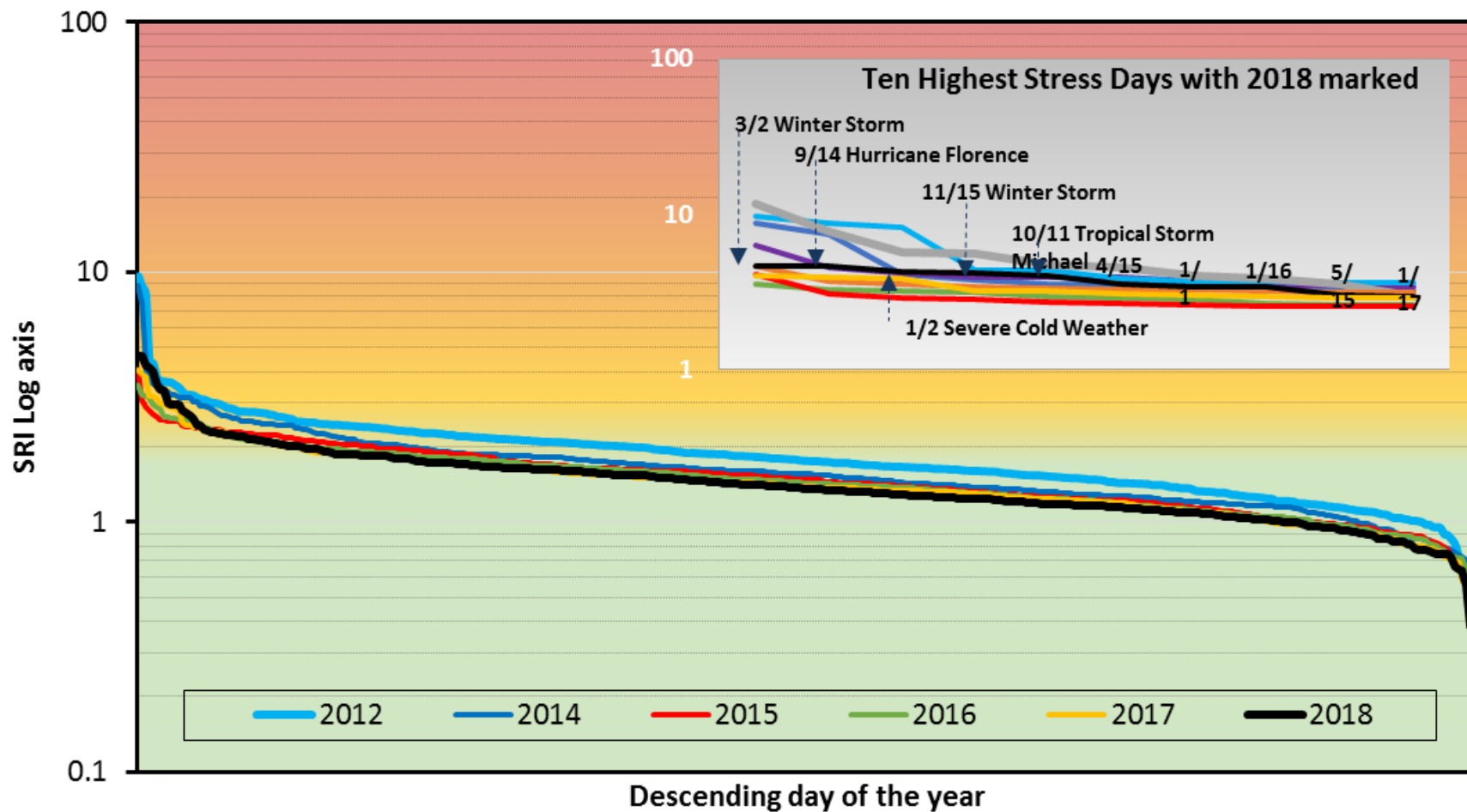
Five-Year Protection System Misoperation Rate by Region

Q4 2013 through Q3 2018

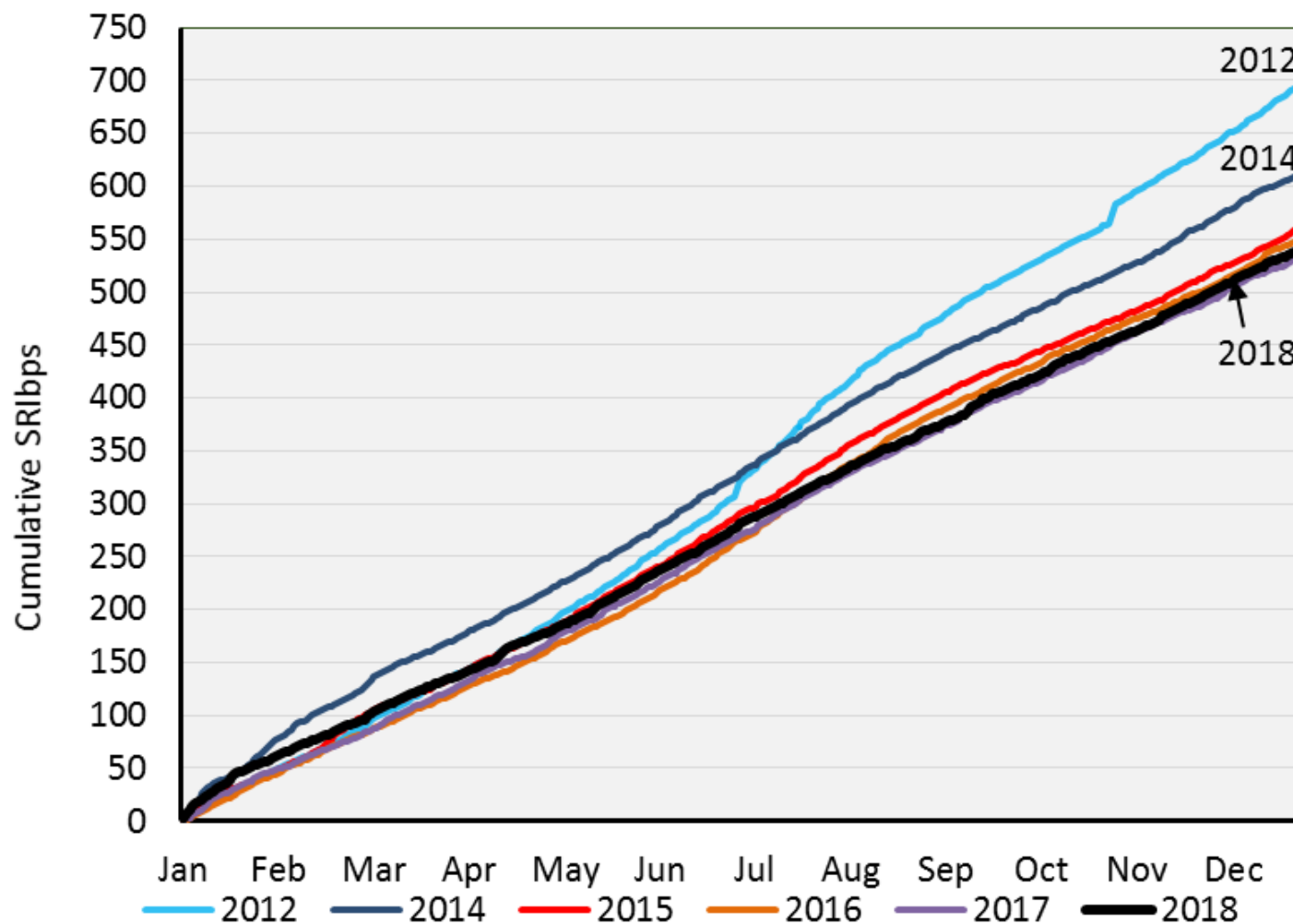
Severity Risk Index



Severity Risk Index (SRI) - Sorted



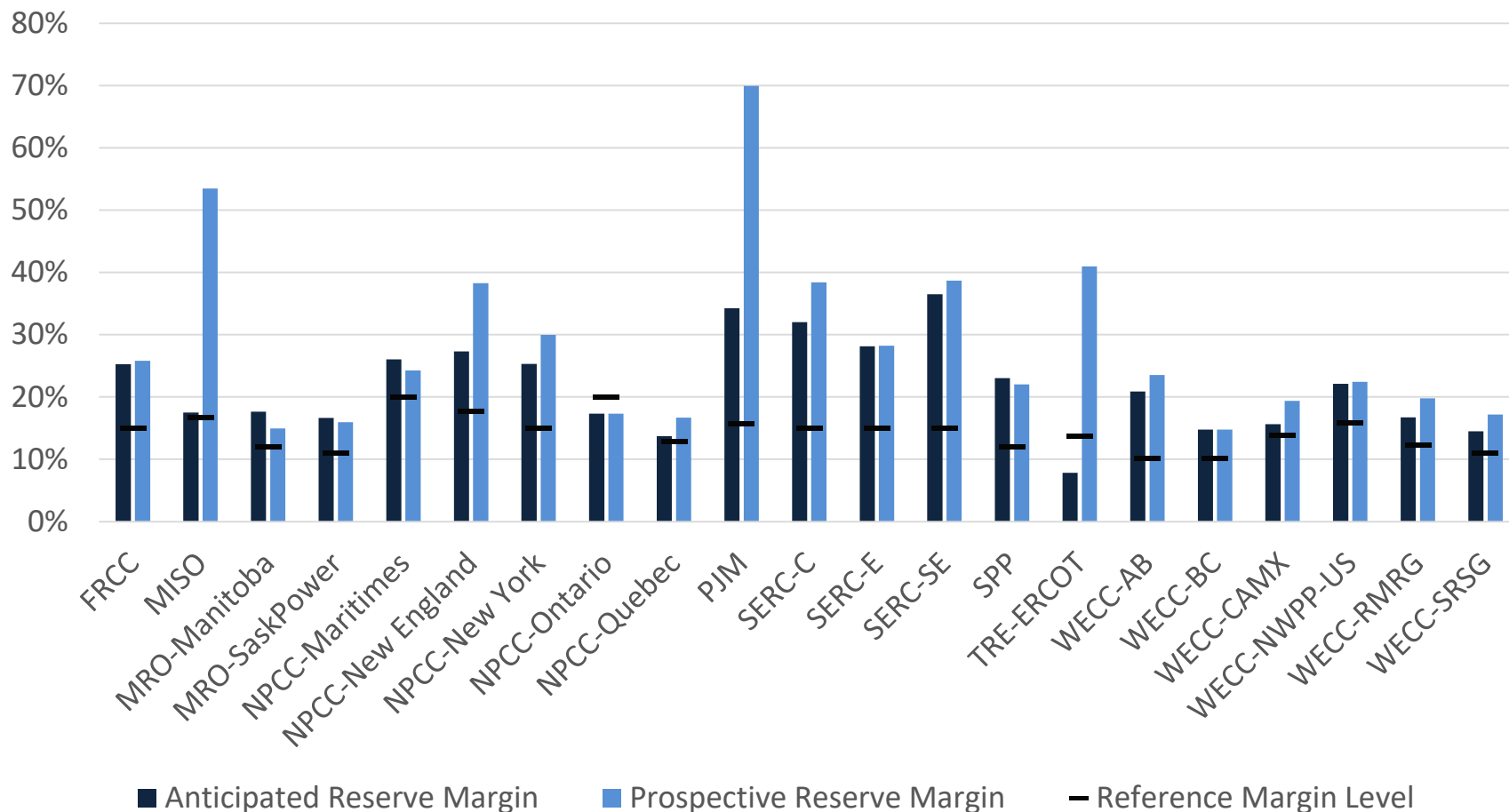
Severity Risk Index (SRI) – Cumulative



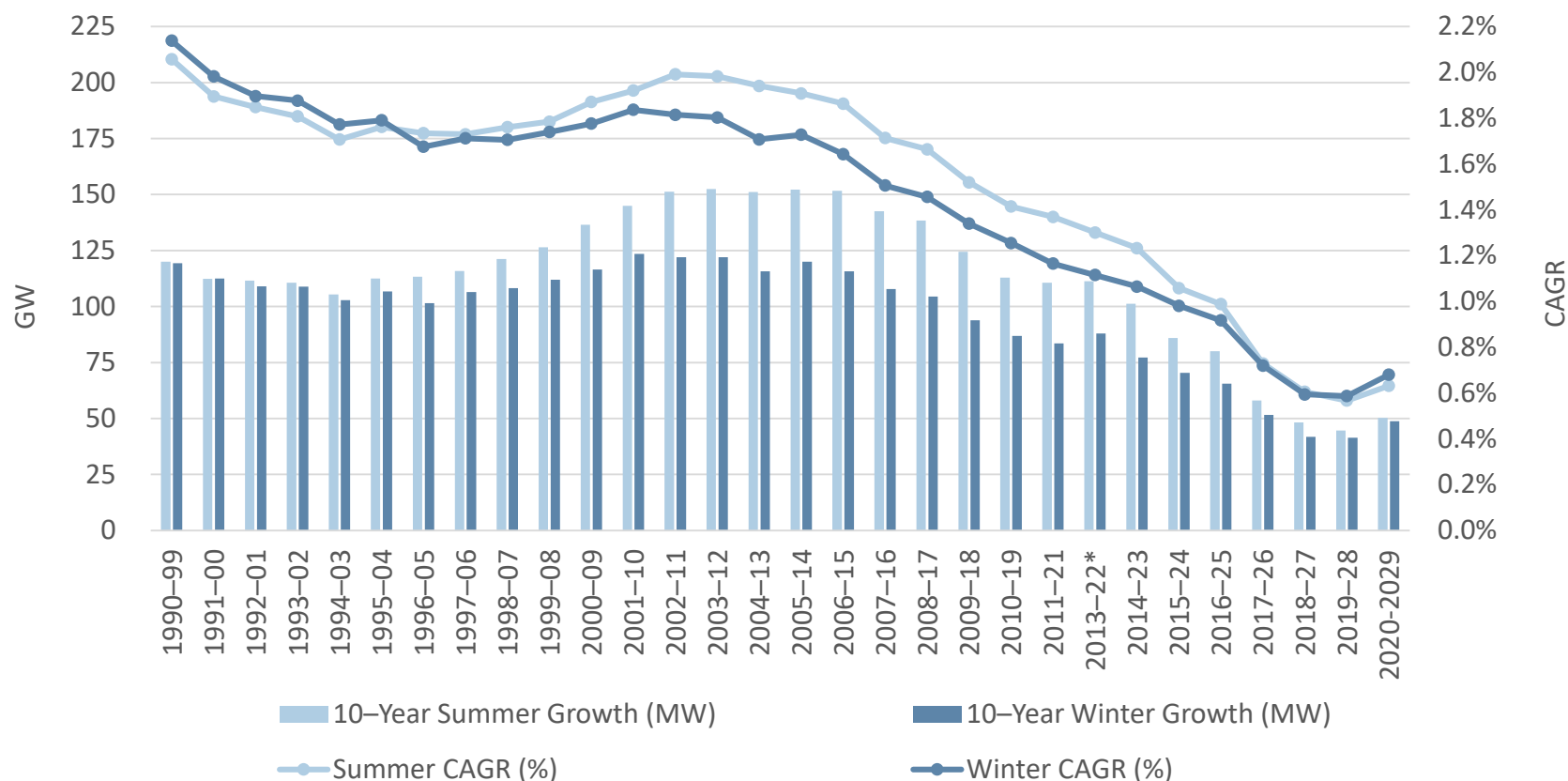


Long-Term Reliability Assessment

Projected 2024 Peak Planning Reserve Margins

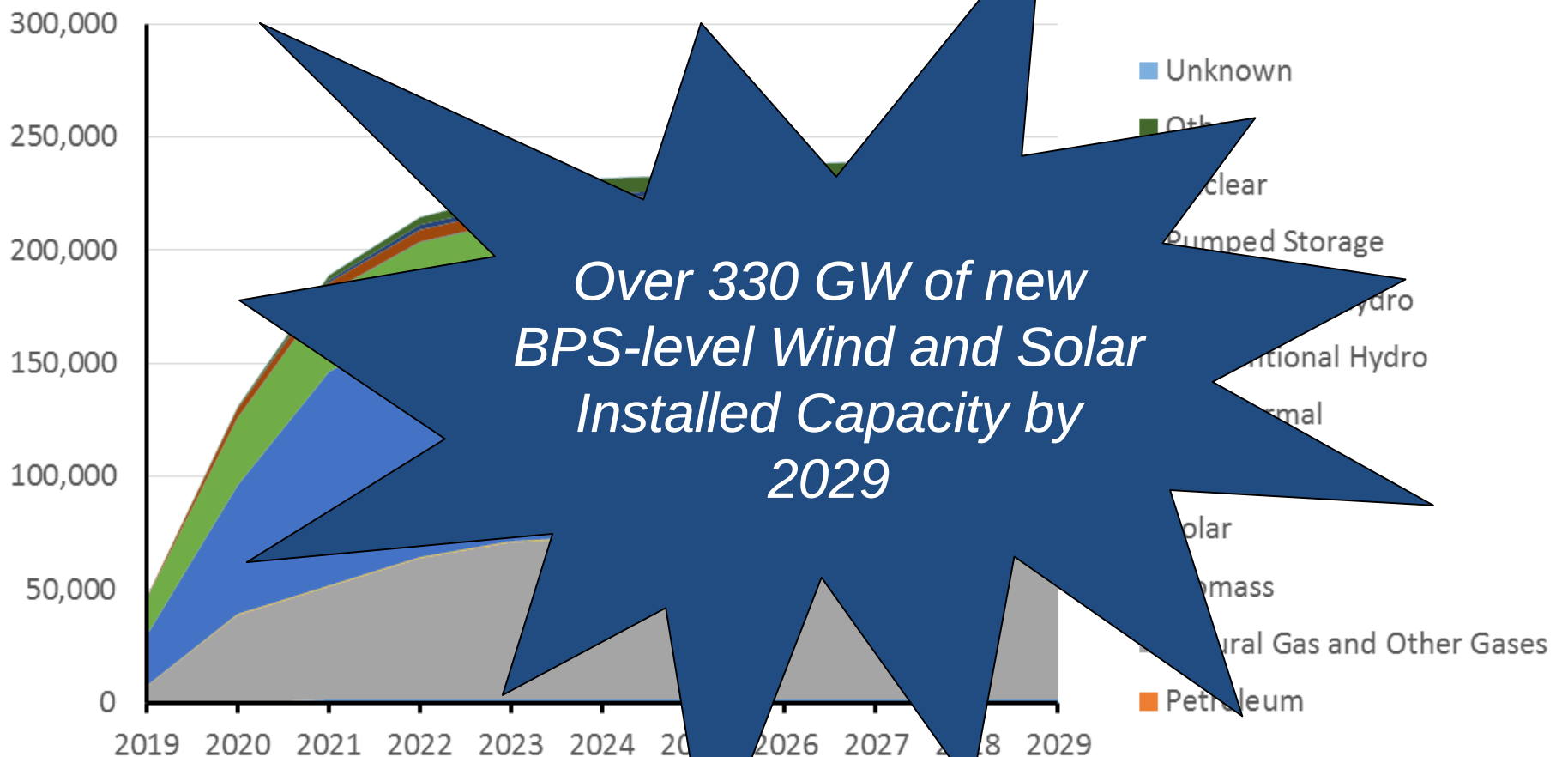


- 10-year compound annual growth rate (CAGR) of peak demand increased for the first time in 15 years for North America. Summer growth is 0.63% and winter growth is 0.68%.



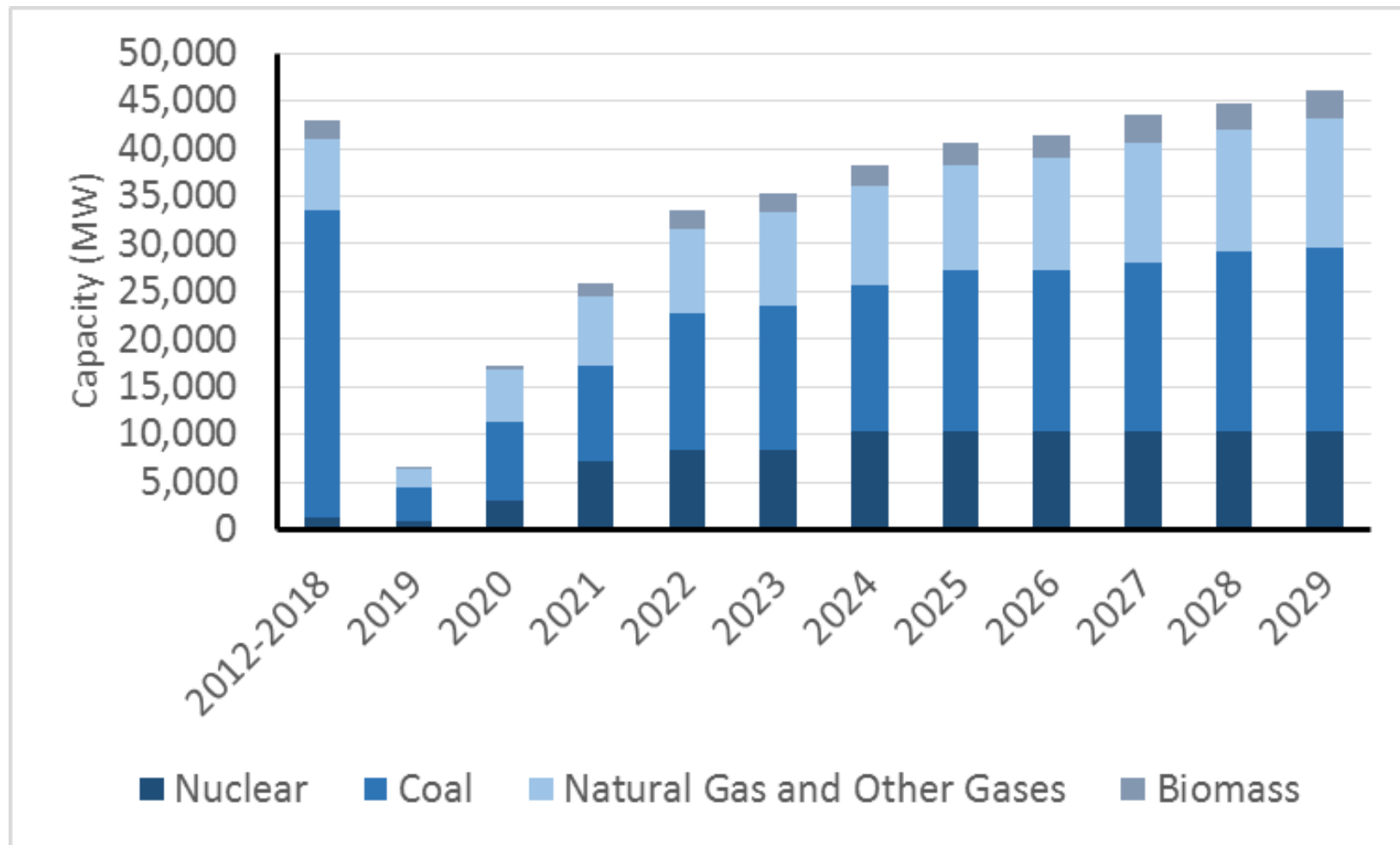
Key Finding: Changing Resource Mix

Tier 1 and 2 Planned Resources Projected Through 2029



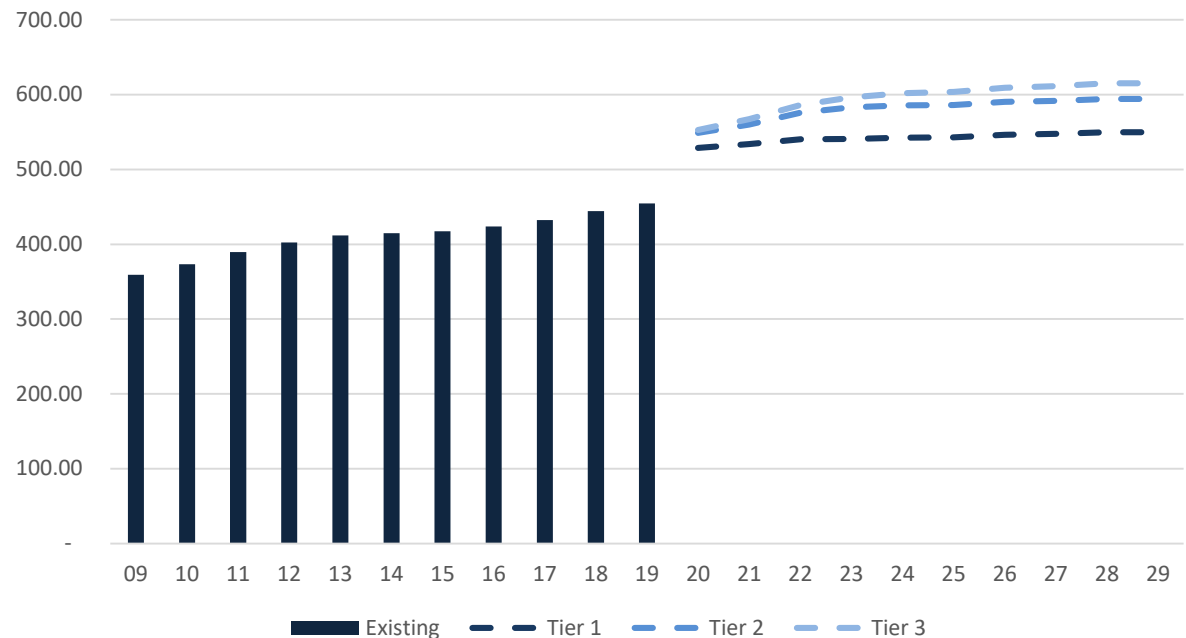
Key Finding: Resource Mix Changes

Committed retirements through 2029 are expected to surpass those retired in the last 7 years



- On-peak natural gas-fired capacity has increased to 455 GW, up from 359 GW in 2009.
- 100 GW of Tier 1 gas-fired capacity is planned during the next decade.

Assessment Area	2024(%)
FRCC	78.1%
WECC-CAMX	68.2%
Texas RE-ERCOT	63.3%
NPCC-New England	52.3%
WECC-SRSG	51.8%
WECC-AB	51.8%



What keeps me awake at night?

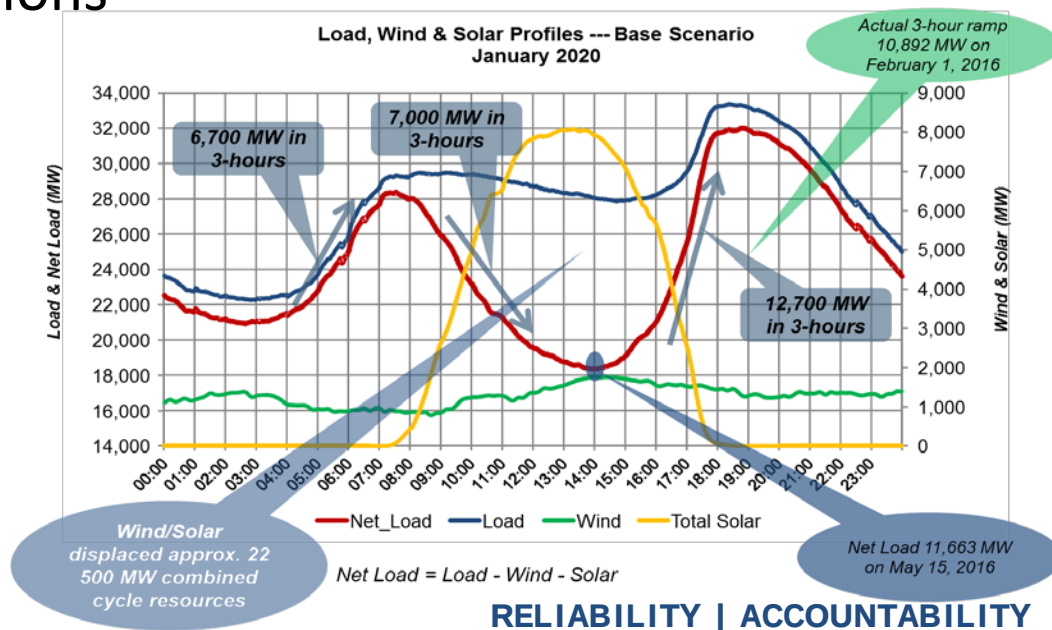


What keeps me awake at night?

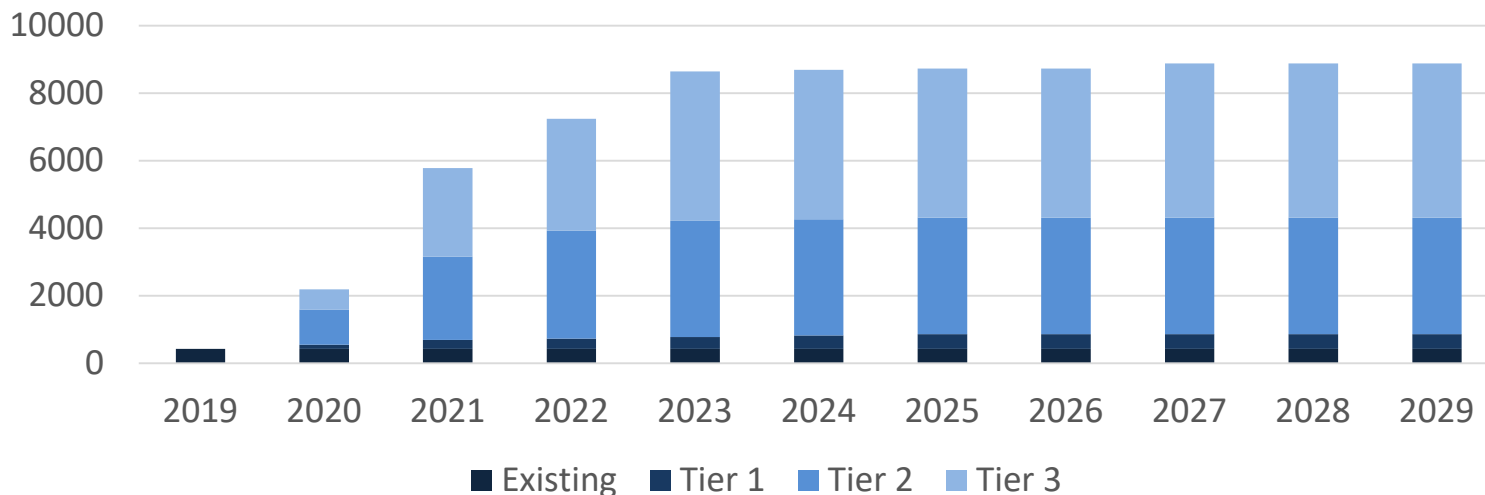
*Do they have
enough flexibility?*



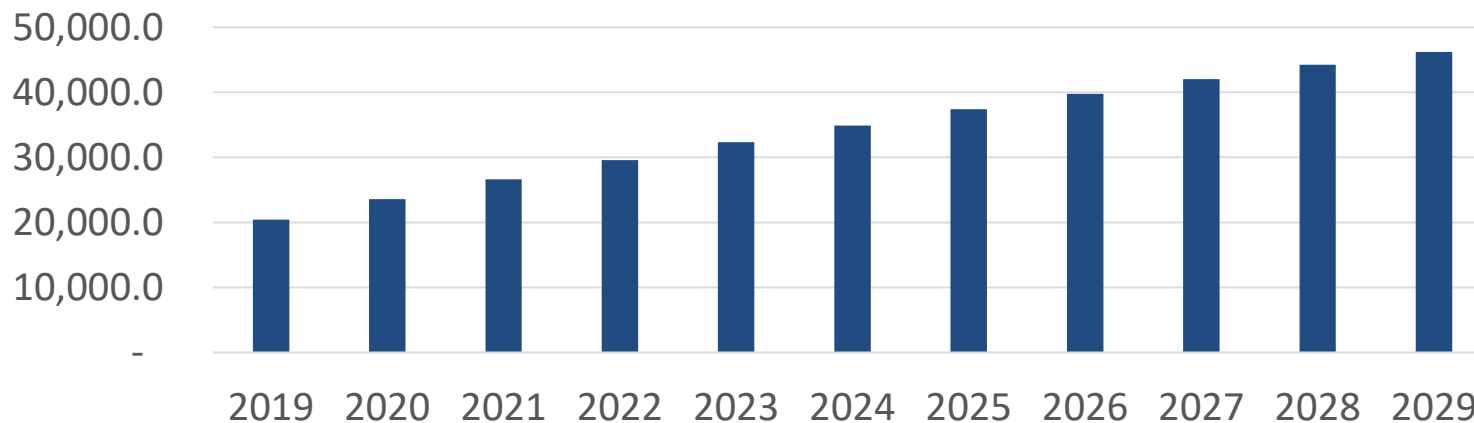
- **May 2017** – CAISO first Stage 1 Emergency in 10 years
- **October 2017** – EEA3 (demand response activated; no load shed)
- **March 2018** – Record breakers:
 - All-time demand served by transmission-connected solar was 49.95%
 - 3-Hour upward net-load ramp was 14,777 MW; 1-Hour 7,545 MW
- Larger ramps in shoulder seasons; however, supply scarcity more likely during summer conditions
- **June 2019** – Two EEA3
- **Projected 2021 Maximum 3-Hour Ramp = 17,048 MW**



Storage Projected to Increase over Five Years



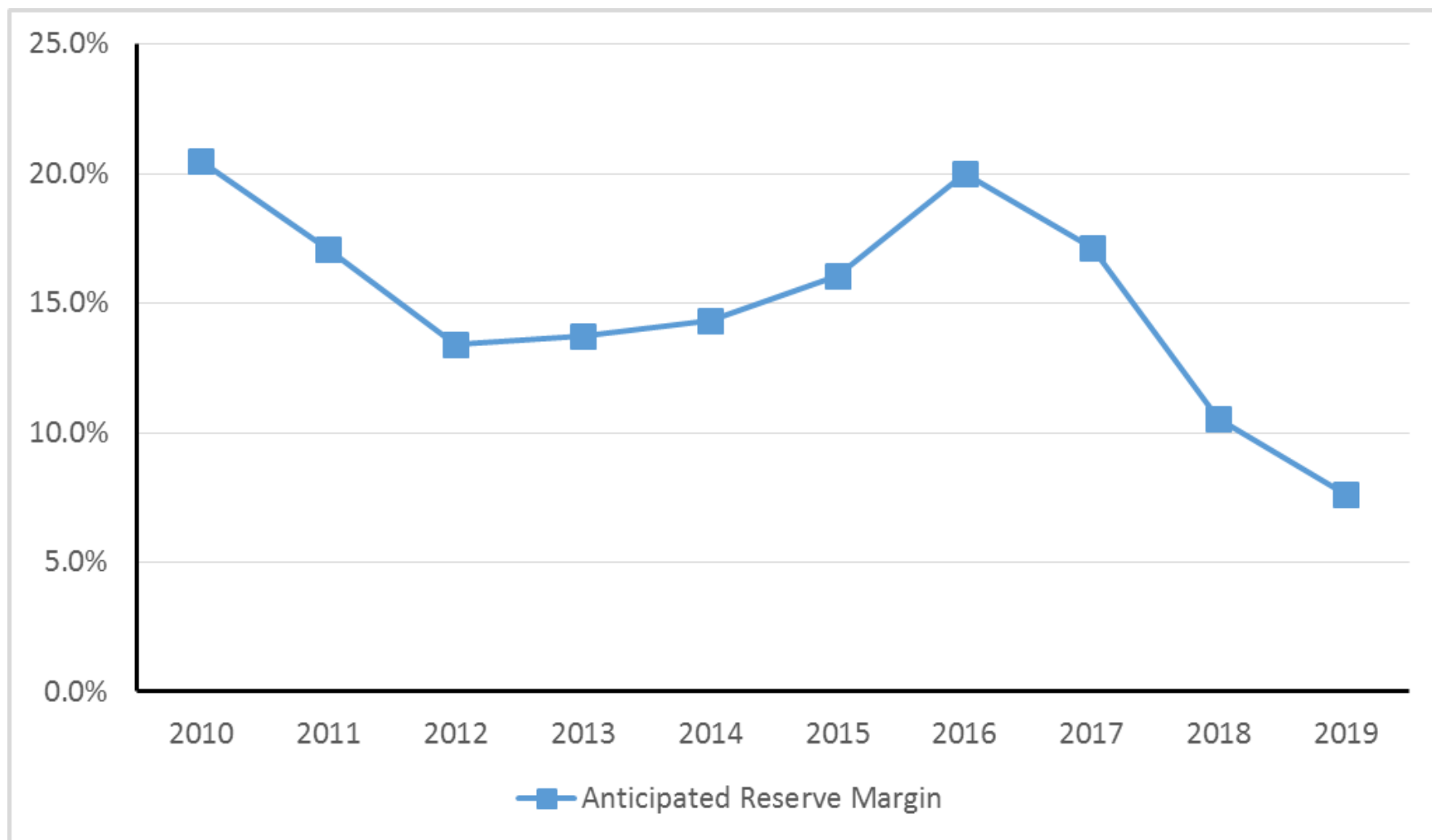
Ten Year Projected Total Installed DER/BTM Solar PV



What keeps me awake at night?

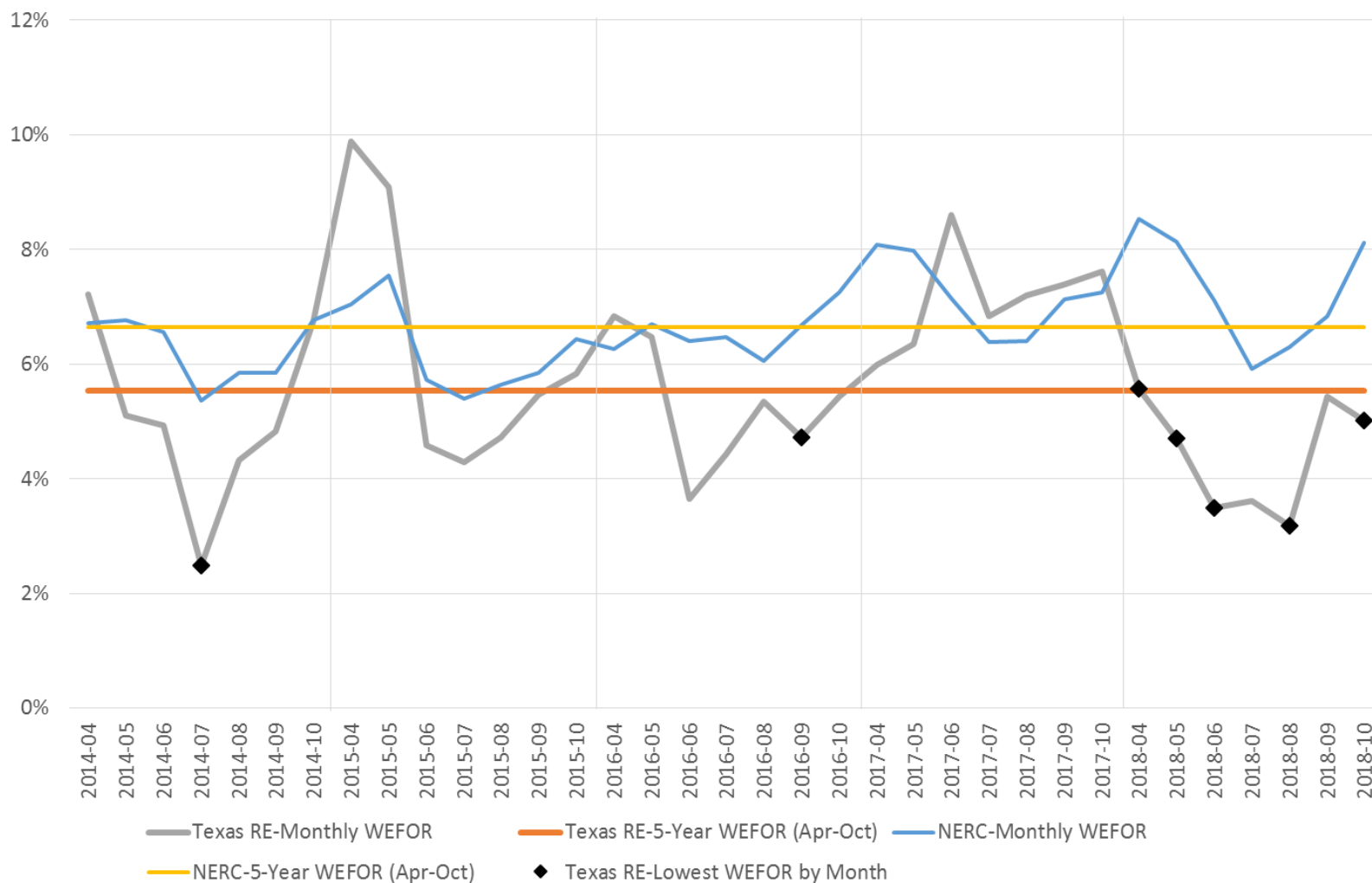


Texas-RE-ERCOT Reserve Margins

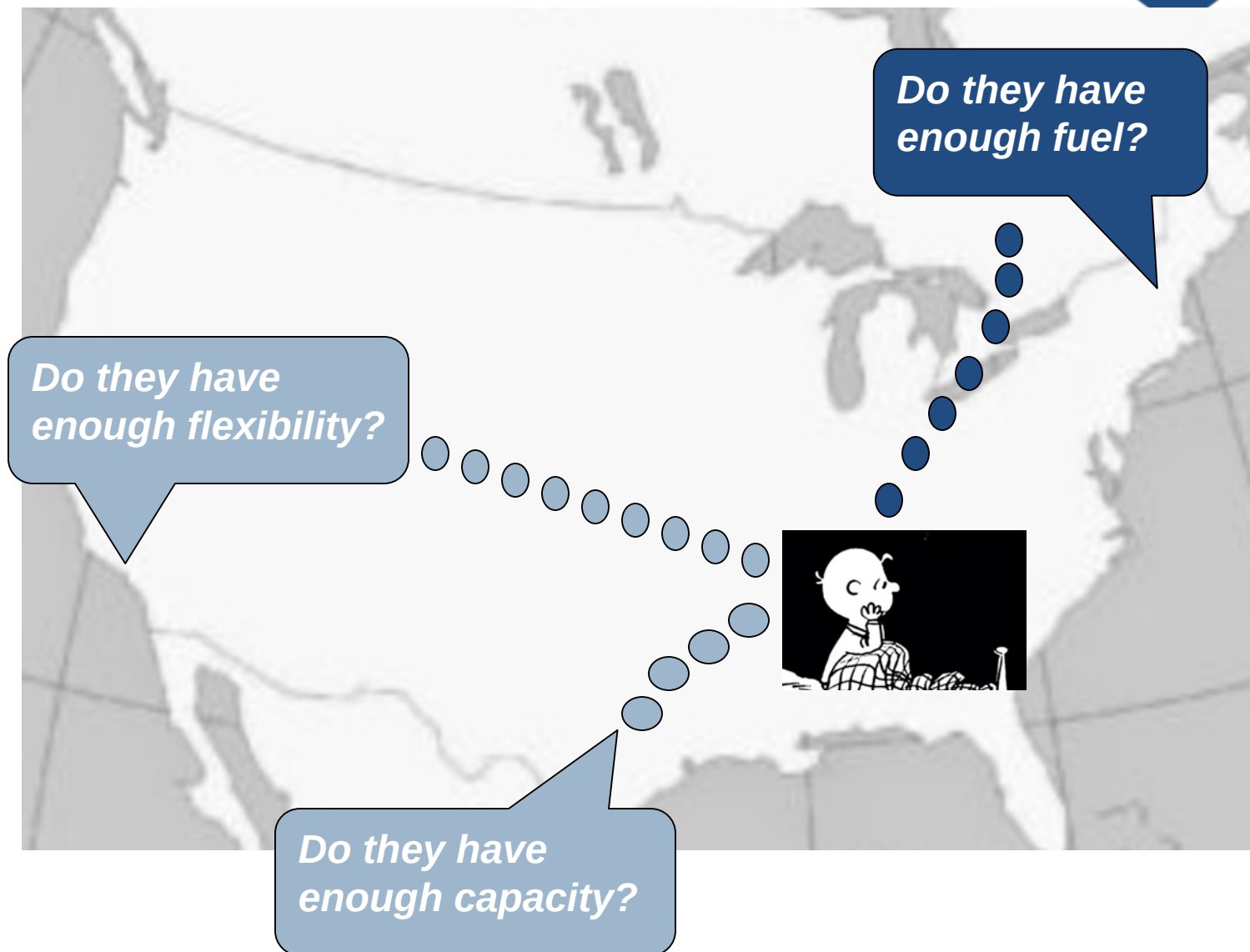


Monthly EFOR – All Conventional Fuel Types (GADS)

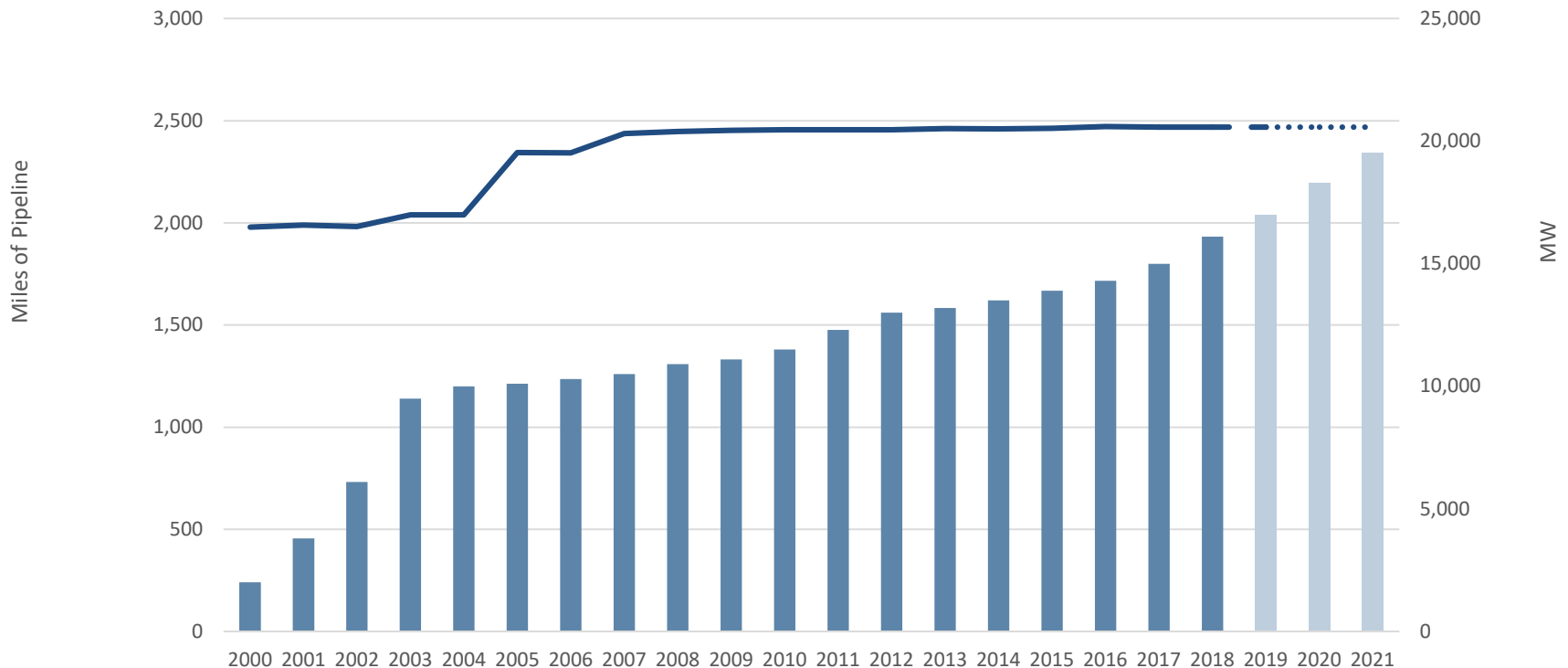
Weighted Equivalent Forced Outage Rate
Comparison of NERC and Texas RE Units
April 2014 - October 2018



What keeps me awake at night?

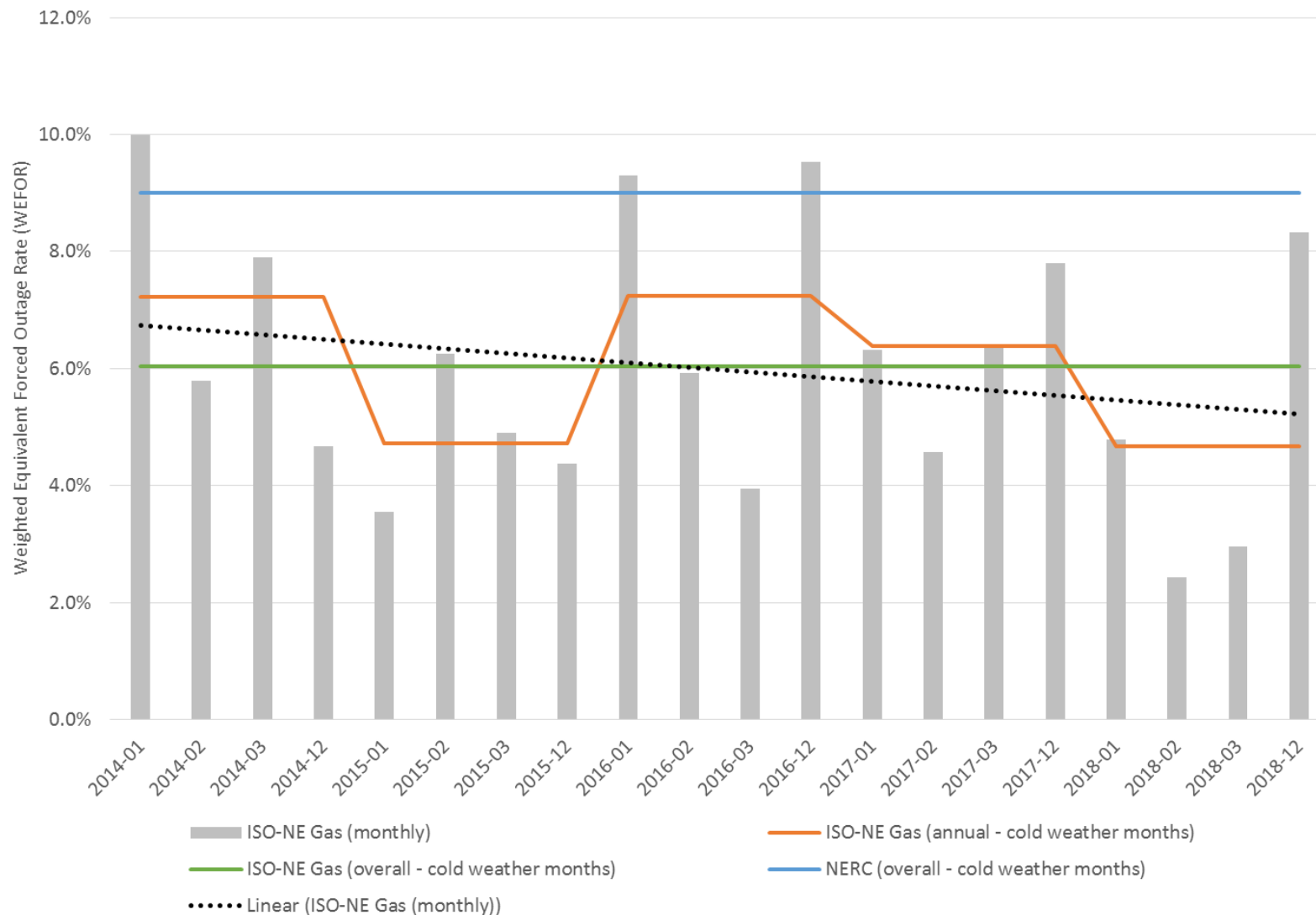


Gas-Fired Generation Outpaces Natural Gas Pipeline Expansion



Source: Velocity Suite, FERC Form 2 Page 514
State Breakout of Miles of Transmission Lines

ISO-NE Gas WEFOR for Cold Weather Months 2014 - 2018



What keeps me awake at night?

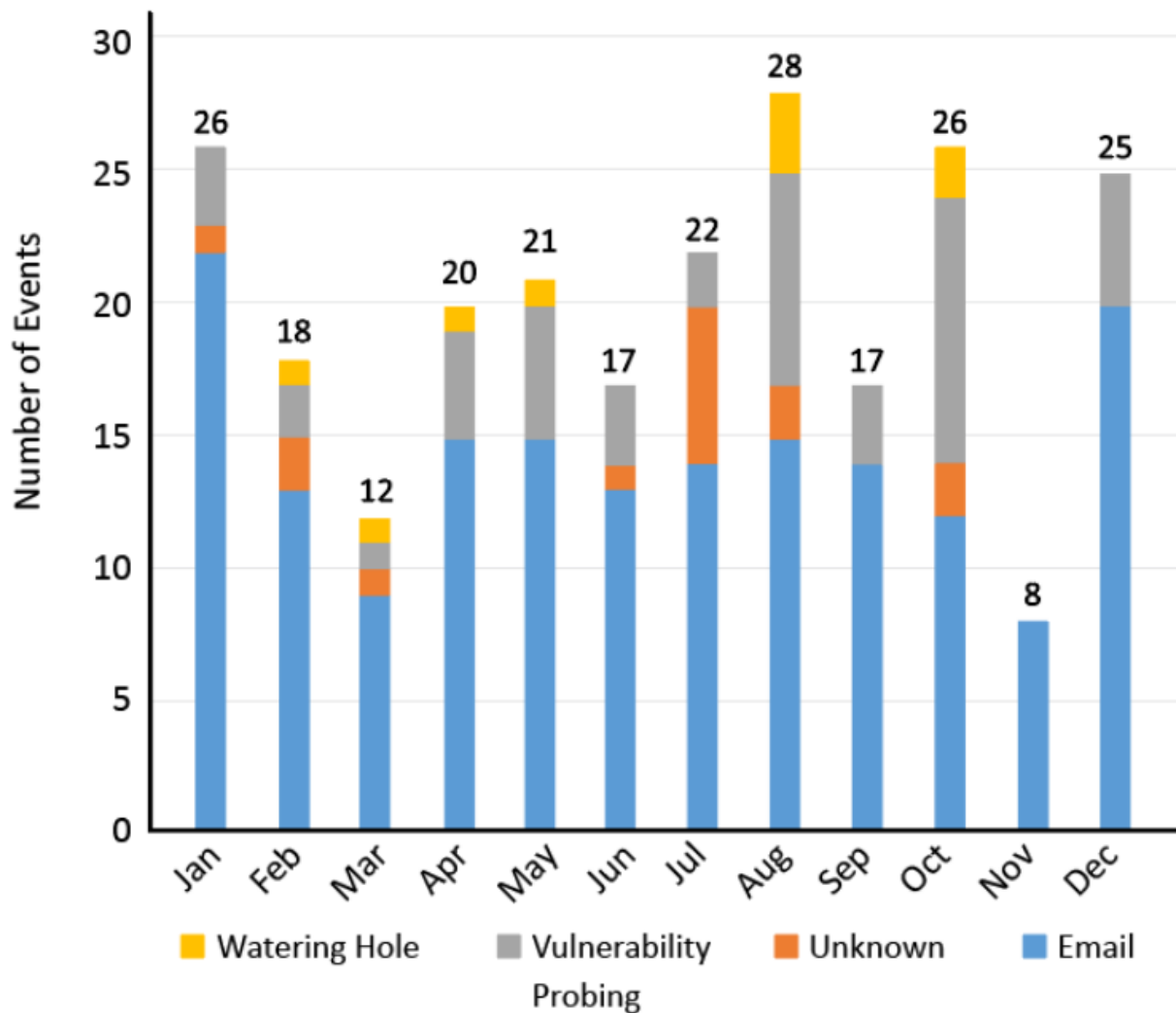


*Do they have
enough flexibility?*

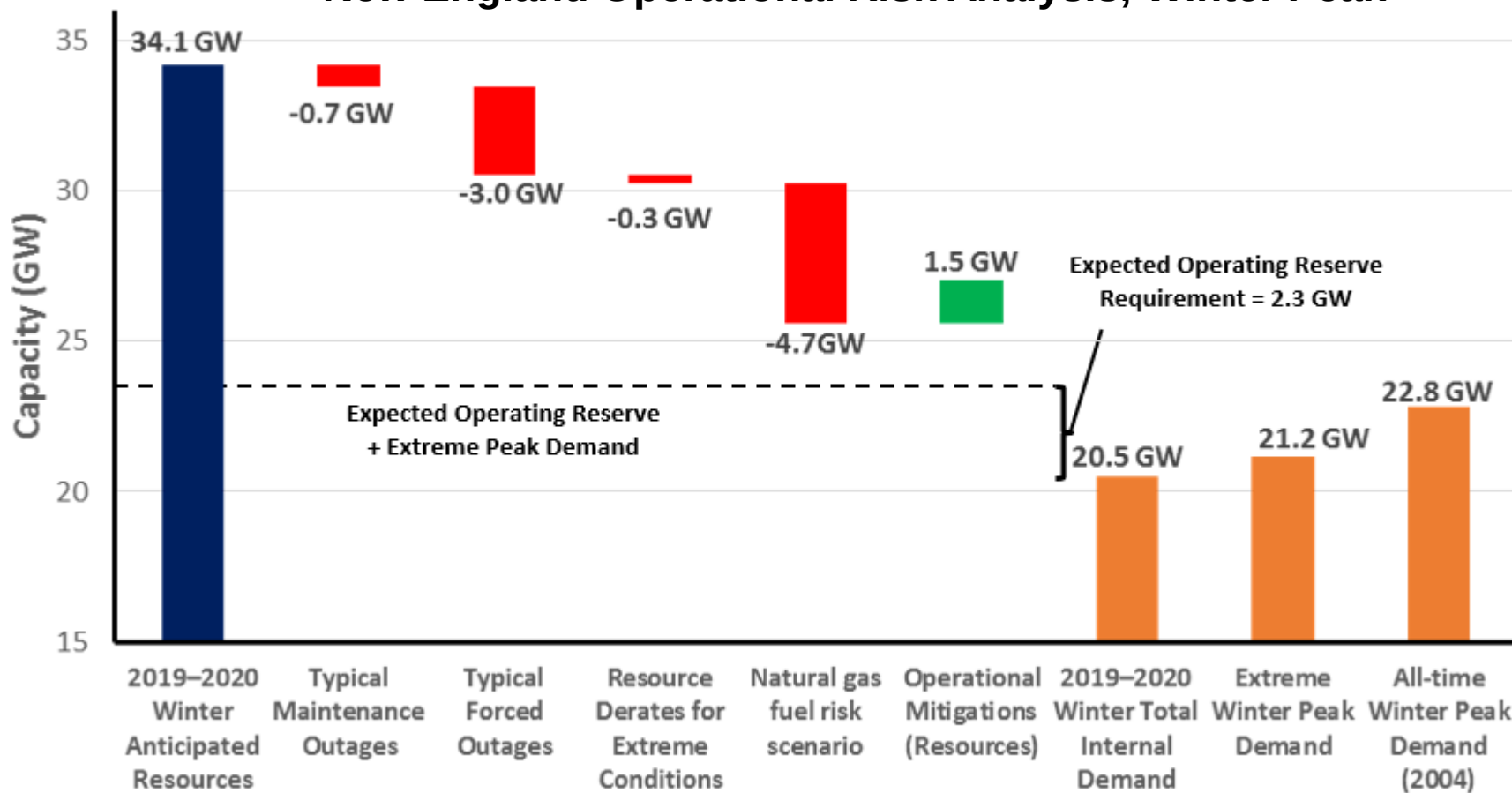
*Do they have
enough fuel?*

*Do they have
enough capacity?*





New England Operational Risk Analysis, Winter Peak





Questions and Answers