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NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Agenda
Reliability Issues Steering Committee

April 9, 2018 | 3:00–4:00 p.m. Eastern

WebEx | Dial-in: 1-415-655-0002 | Access Code: 733 043 664

Introduction and Chair's Remarks

NERC Antitrust Compliance Guidelines and Public Announcement*

Agenda Items

1. **March 16, 2018 Meeting Minutes* – Approve**
2. **Resilience Framework* – Discuss**
   a. NERC Standing Committee Input*
   b. Relationship Between Reliability and Resilience*
3. **2019 Reliability Leadership Summit – Discuss**
4. **Future Meeting Dates**
   a. To Be Determined

*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.

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Draft Minutes
Reliability Issues Steering Committee

March 16, 2018 | 2:00–3:00 p.m. Eastern

Kristin Iwanechko took attendance and verified a quorum with the following Reliability Issues Steering Committee (RISC) members on the phone: Peter Brandien, Mark Ahlstrom, Lisa Carrington, Carol Chinn, Jeff Cook, Brian Evans-Mongeon, Andrew Gallo, Donald Holdsworth, Charles King, Mark McCulla, Patti Metro, Dave Osburn, Nelson Peeler, Woody Rickerson, Chris Root, Mark Rothleder, Brian Slocum, and Dave Zwergel. Additional stakeholder observers were in attendance as well. NERC staff attendees included Erika Chanzes, Mark Lauby, and Mike Walker.

Introduction and Chair's Remarks

Mr. Brandien welcomed RISC members and observers and reviewed the agenda.

NERC Antitrust Compliance Guidelines and Public Announcement

Ms. Iwanechko called attention to the NERC antitrust guidelines in the agenda package.

Agenda Items

1. **January 12, 2018, Meeting Minutes**

   The January 12, 2018, meeting minutes were approved on a motion by Mr. Osburn and seconded by Mr. Ahlstrom subject to removing Mr. Slocum from the attendees. New RISC members abstained.

2. **2018 RISC Roster**

   Ms. Iwanechko pointed attendees to the posted roster and noted a request to distribute contact information among RISC members. RISC members did not object. Ms. Iwanechko will circulate contact information to RISC members.

3. **Resilience Framework**

   a. RTO/ISO Submissions to FERC

   b. Initial NERC Standing Committee Input to RISC

   Mr. Brandien noted he presented an update on the RISC's efforts in developing the resilience framework to the NERC Board of Trustees in February. Next steps for the resilience framework included reviewing comments submitted by RTO/ISOs to FERC and requesting input from NERC standing committees to help inform the mapping of activities to the four attributes of resilience and identify any potential gaps.

   RISC members discussed the RTO/ISO comments, noting that they generally appear to be in-line with the definitions outlined in the resilience framework and proposed by FERC. Most commented

that the planning processes take into account both reliability and resilience. Mr. Brandien noted that while some comments included various recommendations to FERC, there did not appear to be any major differences or gaps in relation to the RISC's discussions.

- Mr. Zwergel highlighted an item in MISO's comments regarding interregional efforts that could advance resilience and some things (i.e., TLR) that could be replaced or advanced. This could be a joint effort between NERC and NAESB.
- Mr. Rickerson highlighted ERCOT's comments, noting that they focused on what they do with their resource owner (e.g., training).
- Mr. Rothleder highlighted California ISO's comments which referred back to NERC Reliability Standards and how their planning processes address the standards. He also described how diversity of resources supports resiliency. He suggested that it should be clearer how FERC's proposed definition differs from standards.
- Mr. Brandien highlighted New England ISO's focus on fuel security and market initiatives for better pricing. He noted some resilience concerns from the perspective that New England is in a constrained area with respect to retirements of conventional resources.
- Mr. Lauby noted that industry is not able to build a one hundred percent reliable system, so it builds a system that provides an Adequate Level of Reliability. A Bulk Power System that provides an Adequate Level of Reliability is a resilient one.
- RISC members discussed concerns with the recovery and response aspect of FERC's proposed definition. Mr. Lauby noted that the Adequate Level of Reliability calls for recovery to be in a coordinated and controlled manner. RISC members supported the discussion on referring to ALR and highlighting that it captures resilience.

Mr. Brandien noted that RISC requested standing committee input by March 28. Standing committee representatives stated that the request is included on their March agendas and will be collecting input to submit to RISC by the deadline.

Mr. Brandien reminded members that the Board's original ask at the November 2017 meeting was to develop a definition of resilience in the context of NERC's mission. This evolved into a framework to gather information before providing a recommendation to the Board. Mr. Brandien will look to better define the RISC's current thoughts on resilience based on recent discussions and what to present to the MRC in May. The goal is for RISC to provide a recommendation to the Board at its August 2018 meeting regarding a definition and how it fits into NERC's mission, as well as any thoughts on additional work within NERC's jurisdiction that should be addressed.

4. 2019 Reliability Leadership Summit

Mr. Brandien noted the summit is an input into the RISC's ERO Reliability Risk Priorities Report and held each year the report is updated. The next report is scheduled to be presented to the Board in August 2019 with the summit to be scheduled around March 2019. Mr. Brandien noted that past summits consisted of three to four panels focused on specific topics, but alternative approaches

are welcome. He asked RISC members to start brainstorming topics that RISC may want to explore during the next summit and identifying experts to invite to speak on the topics. Ms. Iwanechko will send to RISC members proposed dates for the 2019 summit to identify potential conflicts and the agendas from the past two summits as a starting point for discussions around topics for the next summit.

5. **Next Steps**

   Mr. Brandien will look to better define the RISC's current thoughts on resilience based on recent discussions and what to present to the MRC in May.

   Ms. Iwanechko will send to RISC members proposed dates for the 2019 summit to identify potential conflicts and the agendas from the past two summits as a starting point for discussions around topics for the next summit.

6. **Future Meeting Dates**

   a. April 9, 2018 | 3:00–4:00 p.m. Eastern – conference call

Agenda Item 2
RISC Conference Call
April 9, 2018

Resilience Framework

Action

Discuss feedback from the NERC standing committees on their respective activities addressing resilience. Review the attached slide deck discussing the relationship between reliability and resilience.

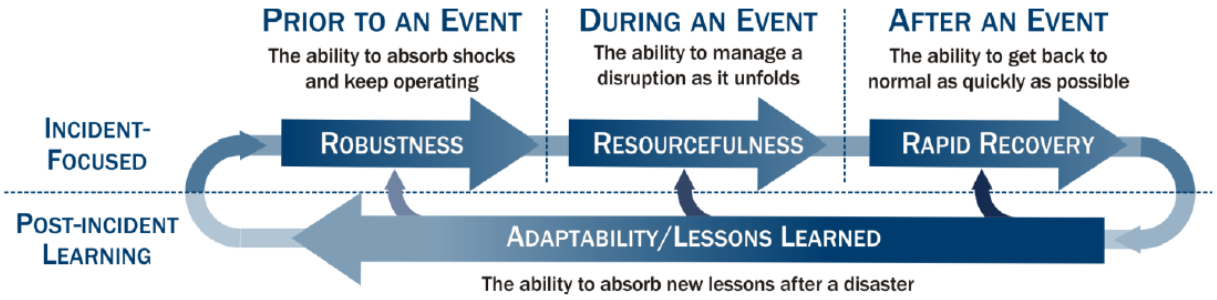
Background

As part of efforts by NERC to further understand BPS resilience, Peter Brandien, RISC Chair, presented the following framework proposed by the RISC during the Member Representatives Committee's (MRC's) February 7, 2018, meeting:

1. Develop a common understanding and definition of the key elements of BPS resilience;
2. Understand how these key elements of BPS resilience fit into the existing ERO framework; and
3. Evaluate whether there is a need to undertake additional steps within the ERO framework to address these key elements of BPS resilience beyond what is already in place and underway in connection with ongoing ERO Enterprise operations, including work being undertaken by each of the NERC standing committees.

The RISC suggested the NIAC's Framework for Establishing Critical Infrastructure Goals[1] is a credible source for further understanding and defining resilience. The NIAC framework includes four outcome-focused abilities:

1. Robustness – the ability to absorb shocks and continue operating;
2. Resourcefulness – the ability to skillfully manage a crisis as it unfolds;
3. Rapid Recovery – the ability to get services back as quickly as possible; and
4. Adaptability – the ability to incorporate lessons learned from past events to improve resilience.



The RISC highlighted ERO Enterprise activities within these four areas, as shown in the table below. The NERC Board of Trustees (Board) requested that the RISC move forward with the resilience framework, with the next step being to request input from the standing committees

[1] See Exhibit 2.1 of the National Infrastructure Advisory Councils' (NIAC's) Final Report and Recommendations, "A Framework for Establishing Critical Infrastructure Resilience Goals," (October 19, 2010).

on respective activities addressing resilience. Specifically, the RISC requested the following input on or before March 28, 2018, using the table below as a reference:

1. The committee's views on how BPS resilience is currently being addressed within the scope of the committee's responsibilities; and
2. Any additional activities the committee believes should be undertaken.

The RISC will then review and summarize this information, together with any additional views and recommendations it may have, for discussion at the May 2018 MRC meeting.

NIAC Resilience Constructs	Key Programs and Activities	Specific Efforts\Tools

Robustness—The ability to continue operations in the face of disaster. In some cases, it translates into designing structures or systems to be strong enough to take a foreseeable punch. In others, robustness requires devising substitute or redundant systems that can be brought to bear should something important break or stop working. Robustness also entails investing in and maintaining elements of critical infrastructure so that they can withstand low probability but high consequence events.	• Reliability and Emerging Risk Assessments
	• Risk, Event and Performance Monitoring
	• Technical Committee work, including special projects
	• Mandatory Reliability Standards
	• Reliability Guidelines Operator Certification and Training
	• E-ISAC information sharing programs
		• Alerts
		• State of Reliability Report
		  o GADS
		  o TADS
		  o DADS
		  o Protection system misoperations
		  o TEAMS
		  o FR Performance
		• Long-Term Reliability Assessment
		• Key Reliability Standards:
		  o TPL (Extreme)
		  o EOP
		  o Blackstart Restoration
		• GridEx
		• Security conferences and information sharing (e.g. GridSecCon)

Resourcefulness—The ability to skillfully manage a disaster as it unfolds. It includes identifying options, prioritizing what should be done both to control damage and to begin mitigating it, and communicating decisions to the people who will implement them. Resourcefulness depends primarily on people, not technology.	• Situational Awareness and Industry Coordination
	• Government Coordination
	• Cross-Sector Information Sharing
	• Mandatory Reliability Standards/Functional Model
		• BPSA information sharing tools and processes
		• E-ISAC information sharing tools and processes
		• Formation of a Crisis Action Team to support industry and governmental coordination
		• Standards requirements
		  o Reliability Coordinators
		  o Transmission Operators

Rapid recovery—The capacity to get things back to normal as quickly as possible after a disaster. Carefully drafted contingency plans, competent emergency operations, and the means to get the right people and resources to the right places are crucial.	• Situational Awareness, Industry Coordination • Government Coordination • Cross-Sector Information Sharing	• Support for Electric Sector Coordinating Council activities
Adaptability—The means to absorb new lessons that can be drawn from a catastrophe. It involves revising plans, modifying procedures, and introducing new tools and technologies needed to improve robustness, resourcefulness, and recovery capabilities before the next crisis.	• Reliability Assessment • Event Analysis • Event Forensics	• Technical Committee Recommendations • Reliability Guidelines • Lessons Learned • Event Analysis, Investigations • Audit Recommendations • Reliability Assessments • State of Reliability Report

NERC Compliance and Certification Committee Comments to RISC on Resilience Framework (March 2018)

- Resilience is not a new concept in the industry; the definitions of Adequate Level of Reliability as well as the definitions of Reliability, Adequacy, and Security closely map to NIAC's outcome-focused abilities of robustness, resourcefulness, rapid recovery, and adaptability.
- If there is a gap analysis to be performed related to resilience, we recommend that is focused on any missing elements in the definition of Adequate Level of Reliability.
- Most of the RISC recommendations are outside the purview of the CCC.
- To reassure policy makers that resilience is being addressed; NERC should consider creating a set of web pages that better communicate NERC's ongoing reliance and risk-mitigation efforts related to the Risk report produced by risk as well as the status of those items.
    - Useful resources to address specific risks. A possible model would be sites developed by FEMA and "Ready.gov" https://www.ready.gov/be-informed. Each risk page could be linked to useful resources (such as the Generating Unit Winter Weather Readiness – Current Industry Practices" guide on a page for extreme weather or cold weather).
- The CCC supports the use of the existing National Infrastructure Advisory Council's (NIAC's) *Framework for Establishing Critical Infrastructure Goals* as a framework for NERC is appropriate.
- NERC should continue to calculate and share key compliance information, specifically the CP-1 (risk) and CP-2 (impact) metrics.
    - This data should get increased visibility to better address risk and add to resilience.
    - Beyond just noting the requirements that have impacted reliability or had Serious risk when violated, we would recommend summarizing mitigation approaches to past violations of these key requirements. Publicizing these mitigation actions could reduce the likelihood of impactful violations – thereby increasing industry resiliency.
- ERO could include resiliency related issues in its Risk Elements as part of driving ERO compliance monitoring efforts. For example, the RISC seems to highlight the role of EOP/TPL Standards in supporting resiliency, and additional compliance monitoring focus in these areas may buttress steps registered entities are taking to be resilient.

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Critical Infrastructure Protection Committee

Response to NERC RISC Committee
CIPC Strategic Activities Supporting Resilience of the BPS
March 20, 2018

The Critical Infrastructure Protection Committee Strategic Plan 2018-2020 focuses on supporting and implementing the Strategic objectives of the ERO and RISC Committee. At the request of the RISC Committee the CIPC is providing input on the activities in its strategic plan that are in support of BPS Resilience. In accordance with the accepted Resilience Framework, the efforts of the CIPC are separated into four categories: Robustness, Resourcefulness, Rapid Recovery and Adaptability.

Robustness – *The ability to absorb shocks and continue operating*

- GridSecCon – Support and attendance expands capability to predict, detect and respond to disasters
- Emerging Technology – Partnerships with NERC, vendors, government and industry to understand the implication of emerging technology and its impact on resilience
- Fuel Handling SCADA systems - Evaluating security risk of Fuel Handling SCADA systems that supply generation facilities (especially natural gas)
- Reduction of asset criticality – This a joint effort with Planning Committee to improve resilience through the development of design standards.
- Supply Chain Security - Development of a Supply Chain Controls Matrix to support robustness of the BPS through the security of the individual components
- Security Practices - Development of Security practices for High Impact Control Centers

Resourcefulness – *the ability to skillfully manage crisis as it unfolds*

- Information Sharing – The development and maintenance of a strong partnership with E-ISAC ensures early detection of events.
- GridEx - Planning and Participation in GridEx improves our ability to manage crisis as it unfolds.
- VoIP Guidance - Development of VoIP implementation guidance to facilitate communications capability during a crisis.

Rapid Recovery - *Capacity to get back to normal as quickly as possible.*

- Cloud Services Assessment – This review covers the implications of Cloud Services for CIP Assets. The ability to use cloud services would speed recovery and aid in robustness

Adaptability – The ability to incorporate lessons learned from past events to improve resilience

- BES Security Metrics – Provides measurement of the current state of resiliency and facilitates timely improvements.
- CIPC Training Events – CIPC delivered training may include technology, process and security advancements which improve robustness, resourcefulness and recovery.
- Legacy System Testing - Lessons learned from testing developed in support of supply chain security yields gains in the area of robustness
- Annual BES Security Assessment – Provides insight that can be used to guide activities and improve resilience.
- CIPC collaboration Site – The development of the CIPC collaboration site on NERC.com aggregates CIPC efforts and information in an easy to use and accessible manner.

The CIPC also considered the question as to whether or not a separate definition of "Cyber Resilience" is necessary to support the resilience framework. Cyber resilience is similar to BPS resilience in the need to design robust systems, manage crisis, recover quickly and adapt. However, with cyber resilience there is an additional need for detection. Unlike natural events, cyber events may be difficult to detect at first. This concept of detection fits within the broader category of Resourcefulness as defined by the framework. Rather than adding an additional construct, the CIPC proposes a modification to the definition of Resourcefulness to include detection.

> *Resourcefulness – The ability to skillfully detect and manage a disaster as it unfolds. It includes identifying options, prioritizing what should be done both in to control damage and to begin mitigating it, an communicating decision to the people who will implement them. Resourcefulness depends primarily on people, not technology.*

It is the opinion of the CIPC that the included strategic activities and proposed definition modification provide the necessary support of the RISC Committee for 2018-2019 and that additional activities are not necessary.

March 2018 NERC Operating Committee (OC) - Resilience Framework Assignment

Categories

1. Robustness – the ability to absorb shocks and continue operating;
2. Resourcefulness – the ability to skillfully manage a crisis as it unfolds;
3. Rapid Recovery – the ability to get services back as quickly as possible; and
4. Adaptability – the ability to incorporate lessons learned from past events to improve resilience.

Resilience Framework Response			
No.	Category	Activity	Description
1	1,2,3,4	Ensure quality of training for System Operators to reliably manage normal and disturbance conditions	Personnel Subcommittee provides oversight on Continuing Education Program requirements for System Operators and performs audits of Continuing Education providers and training activities to ensure activities meet the requirements.
2	1,2,4	Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate Good Industry Practices to ensure reliability/resiliency.	Gas & Electric Operational Coordination Considerations
3	2,3	Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate Good Industry Practices to ensure reliability/resiliency.	Generating Unit Operation During Complete Loss of Communications
4	1,4	Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate Good Industry Practices to ensure reliability/resiliency.	Generating Unit Winter Weather Readiness (Conduct annual Webinar prior to cold weather)
5	2,3	Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate	Loss of Real Time Reliability Tools Capability

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		Good Industry Practices to ensure reliability/resiliency.	
6	1	Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate Good Industry Practices to ensure reliability/resiliency.	Operating Reserve Management
7	1,2	Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate Good Industry Practices to ensure reliability/resiliency.	Situational Awareness for the System Operator
8	1,2,3	Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate Good Industry Practices to ensure reliability/resiliency.	Work in Progress: Cyber Intrusion Guide for System Operators
9	1,2,3	Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate Good Industry Practices to ensure reliability/resiliency.	Guideline for Primary Frequency Control
10		Develop/Maintain/Communicate Reliability Guidelines and technical reference documents to disseminate Good Industry Practices to ensure reliability/resiliency.	Reliability and Security Guidelines: http://www.nerc.com/comm/Pages/Reliability-and-Security-Guidelines.aspx Reference Documents: http://www.nerc.com/comm/OC/Pages/Reference-Documents.aspx
11	1,4	Operating Committee (OC) Strategic Plan Goal #1: Investigate, review, and assess existing and emerging	Essential Reliability Services Working Group investigated and developed methods to assess the impacts of the changing resource mix. Ongoing assessment efforts, primarily by the

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		issues to identify gaps impacting the reliability of the BES.	Resources Subcommittee, to identify potential issues or emerging trends related to inertia, frequency response, ramping and load/resource balancing.
12	4	OC Strategic Plan Goal #1: Investigate, review, and assess existing and emerging issues to identify gaps impacting the reliability of the BES.	Inverter-based Resource Performance Task Force investigating Inverter based resource capabilities, performance characteristics and behavior under abnormal conditions. Addressing recommendations from prior disturbances. Developing recommendations for performance characteristics.
13	1	OC Strategic Plan Goal #1: Investigate, review, and assess existing and emerging issues to identify gaps impacting the reliability of the BES.	The OC engages with the Reliability Issues Steering Committee (RISC) to assist in the identification and prioritization of emergent issues. Also, engagement with RISC and other appropriate parties to identify and develop mitigation processes or solutions.
14	4	OC Strategic Plan Goal #2: Promote Events Analysis Processes and utilize the results to improve reliable operation of the BES	Events Analysis Subcommittee and NERC Staff review operational events for cause determination & the development of Lessons Learned for industry dissemination. Routine communication of new lessons learned to the industry (through documents, presentations & webinars) and routine presentations to the Operating Committee on recent events and lessons learned.
15	1,2,3,4	OC input/participation in the development of Special Assessments to provide operational feedback and good industry practice feedback	OC provided input to the NERC Special Assessment: Potential Bulk Power System Impacts Due to Severe Disruptions on the Natural Gas System

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March 2018 NERC Operating Committee (OC) - Resilience Framework Assignment

Additional activities the committee believes should be undertaken:

The RISC might want to consider recommending existing groups or committees address or enhance reliability in the following areas:

- Distributed Energy Resources Bulk Electric System operational impacts, i.e., impacts to Load Forecasting, System Restoration, State Estimation, RTCA results, etc.
- Fuel assurance to promote resiliency
- Quality of emergency preparedness, such as the characteristics of good "communications protocols" or "emergency plans"
- Interconnection-wide transmission loading relief procedures, such as TLR, to be more timely and precise in order to manage extreme events more effectively
- incorporate lessons learned from past events to improve resilience
- High Impact, Low Frequency (HILF) events
- Severe Impact Resilience events
- GridEX
- New technologies such as synchrophasors to improve operations and analysis

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NERC Standards Committee Comments to RISC on Resilience Framework (March 2018)

I. Background

In February 2018, the Reliability Issues Steering Committee (RISC) Chair presented to the MRC the following framework regarding Bulk Power System (BPS) resilience:

1. Develop a common understanding and definition of the key elements of BPS resilience;
2. Understand how these key elements of BPS resilience fit into the existing ERO framework; and
3. Evaluate whether there is a need to undertake additional steps within the ERO framework to address these key elements of BPS resilience beyond what is already in place and underway in connection with ongoing ERO Enterprise operations, including work being undertaken by each of the NERC standing committees.

The RISC suggested the following National Infrastructure Advisory Council (NIAC) Framework for Establishing Critical Infrastructure Goals as a credible source for understanding and defining resilience.

The RISC highlighted ERO Enterprise activities in those areas (as shown in Attachment A). The NERC Board of Trustees (Board) asked the RISC to move forward with the resilience framework and request input from the NERC standing committees. Specifically, the RISC seeks the following input (using the table below as a reference):

1. The committee's views on how it addresses BPS resilience within the scope of its responsibilities; and
2. Any additional activities the committee believes should be undertaken.

The RISC has requested feedback by March 28, 2018.

II. Response to RISC

A. Standards Committee Scope

According to its Charter, the Standards Committee (SC) works with NERC Standards Staff to manage and execute the Reliability Standards development process for the timely development and maintenance of Reliability Standards which, collectively, provide for the reliable operation of the BPS. In essence, the SC oversees the *process* of drafting, reviewing and revising Reliability

Standards. The SC does *not* review the *content* of Standards or approve Standards.[1] The SC approves a proposed Reliability Standard for posting for comment and ballot but provides no input on the Standard's *content*.

B. How the SC Addresses BPS Resilience Within the Scope of its Responsibilities

In light of the foregoing, the SC has very little *direct* impact on the NIAC Resilience Constructs in Attachment A. Nonetheless, consistent with its limited role, the SC addresses BPS resilience in the following ways:

1. Managing the Reliability Standards development processes to ensure effective and efficient production of results-based Standards; for example:
    a. Standard Authorization Request (SAR) Template which requires submitters to: (1) justify the project based on, among other things, whether the proposed Standard will address emerging risks; [Robustness] and (2) identify the Reliability Principle(s) promoted by the proposed Standard.[2] Additionally, any NERC Standing Committee [or anyone] can propose a SAR to address a reliability risk and, enhance BPS resilience.
    b. Reliability Standard Template which requires Standards to be based on the identified Reliability Principles (defined in Footnote 2).
    c. Periodic Review Template which asks the review team to identify any reliability gaps. [Adaptability]
    d. Results-Based Reliability Standard Development Guidance which, among other things:
        i. Instructs SDTs to use a defense-in-depth strategy for Reliability Standards development where each requirement in a Standard helps prevent system failures and those roles are complementary and reinforcing. [Robustness]
        ii. Instructs SDTs to achieve a portfolio of performance, risk, and competency-based requirements to support an effective defense-in-depth strategy, identifying a clear and measurable expected outcome, such as: a) a stated level of reliability performance, b) a reduction in a

[1] Standard Drafting Teams (SDTs) consisting of industry Subject Matter Experts (SMEs) draft new and revised Reliability Standards and members of the NERC Ballot Body vote on such Standards. *See* Standards Process Manual at Sections 4.3 and 4.7 to 4.15.

[2] The Reliability Principles and their associated resiliency constructs [in brackets] are: (1) interconnected systems should be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions; [Robustness] (2) systems' frequency and voltage should be controlled within defined limits through balancing real and reactive power supply and demand; [Robustness; Resourcefulness] (3) information needed for planning and operating interconnected systems should be made available to entities responsible for planning and operating the systems; [Robustness] (4) plans for emergency operation and system restoration should be developed, coordinated, maintained, and implemented; [Resourcefulness; Rapid Recovery] (5) facilities for communication, monitoring and control should be provided, used and maintained for the reliability of interconnected systems; [Resourcefulness; Rapid Recovery] (6) Personnel who plan and operate interconnected systems should be trained, qualified and have responsibility/authority to implement actions; [Resourcefulness] (7) reliability of interconnected systems should be assessed, monitored, and maintained on a wide-area basis; [Resourcefulness; Rapid Recovery] and (8) systems should be protected from physical or cyber attacks. [Robustness]

specified reliability risk, or c) a necessary competency. [Robustness; Resourcefulness; Rapid Recovery]

iii. Standards should be performance-based (define a particular reliability objective or outcome), risk-based (to reduce the risks of failure to acceptable tolerance levels) or competency-based (define a minimum set of capabilities to demonstrate the ability to perform a designated reliability function) [Robustness; Resourcefulness; Rapid Recovery]

iv. Standards should enable or support one or more Reliability Principle (defined in Footnote 2)

2. Performing periodic reviews of Standards to identify gaps or areas for improvement. [Adaptability]
3. Employing the criteria developed during the Independent Expert Review Project to independently review Standards and assess the content and quality of the Standards including identifying potential risks not adequately mitigated (*i.e.* gaps). [Adaptability]
4. Helping standards drafting teams follow the standards process, including the ANSI process which ensures an industry-wide consensus in support of Standards introduced to address any of the resilience constructs (to the extent a standard is deemed necessary).
5. Prioritizing the work of standards drafting teams and, when necessary, expediting the standards process to meet deadlines set by the Board or FERC.

C. Potential Additional BPS Resilience-Related Activities

Based on its limited scope, the SC could take the following actions:

- Review the Periodic Review Template to consider adding questions about resilience issues for a review team to identify as appropriate to the Standard reviewed;
- Review the SAR Template to determine appropriate resilience concerns identified when a new or modified Standard is proposed.
- Review the Standards Grading template to add a resilience category to the quality and content review used as an input to prioritize standards projects for the Reliability Standards Development Plan.
- Review and revise the Standard Drafting Team training materials to add the NIAC Resilience Constructs and support further explanations to ensure teams sufficiently address resilience concerns.

Attachment A

NIAC Resilience Constructs	Key Programs and Activities	Specific Efforts\Tools
Robustness—The ability to continue operations in the face of disaster. In some cases, it translates into designing structures or systems to be strong enough to take a foreseeable punch. In others, robustness requires devising substitute or redundant systems that can be brought to bear should something important break or stop working. Robustness also entails investing in and maintaining elements of critical infrastructure so that they can withstand low probability but high consequence events.	• Reliability and Emerging Risk Assessments • Risk, Event and Performance Monitoring • Technical Committee work, including special projects • Mandatory Reliability Standards • Reliability Guidelines Operator Certification and Training • E-ISAC information sharing programs	• Alerts • State of Reliability Report o GADS o TADS o DADS o Protection system misoperations o TEAMS o FR Performance • Long-Term Reliability Assessment • Key Reliability Standards: o TPL (Extreme) o EOP o Blackstart Restoration • GridEx • Security conferences and information sharing (e.g. GridSecCon)
Resourcefulness—The ability to skillfully manage a disaster as it unfolds. It includes identifying options, prioritizing what should be done both to control damage and to begin mitigating it, and communicating decisions to the people who will implement them. Resourcefulness depends primarily on people, not technology.	• Situational Awareness and Industry Coordination • Government Coordination • Cross-Sector Information Sharing • Mandatory Reliability Standards/Functional Model	• BPSA information sharing tools and processes • E-ISAC information sharing tools and processes • Formation of a Crisis Action Team to support industry and governmental coordination • Standards requirements o Reliability Coordinators o Transmission Operators
Rapid recovery—The capacity to get things back to normal as quickly as possible after a disaster. Carefully drafted contingency plans, competent emergency operations, and the means to get the right people and resources to the right places are crucial.	• Situational Awareness, Industry Coordination • Government Coordination • Cross-Sector Information Sharing	• Support for Electric Sector Coordinating Council activities
Adaptability—The means to absorb new lessons that can be drawn from a catastrophe. It involves revising plans, modifying procedures, and introducing new tools and technologies needed to improve robustness, resourcefulness, and recovery capabilities before the next crisis.	• Reliability Assessment • Event Analysis • Event Forensics	• Technical Committee Recommendations • Reliability Guidelines • Lessons Learned • Event Analysis, Investigations • Audit Recommendations • Reliability Assessments • State of Reliability Report

NERC

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Resilience Framework

RELIABILITY | ACCOUNTABILITY

NERC's Definition of Reliability

- NERC's view of "reliability" in the power industry consists of two fundamental and aspirational concepts:
  - ***Adequacy*** *is the ability of the electric system to supply the aggregate electric power and energy requirements of the electricity consumers* ***at all times****, taking into account scheduled and reasonably expected unscheduled outages of system components.*
  - ***Operating reliability*** *is the ability of the electric system to* ***withstand sudden disturbances*** *such as electric short circuits or unanticipated loss of system components.*

Adequate Level of Reliability (ALR)

- *Performance Objectives*
  - The BES does not experience instability, uncontrolled separation, cascading, or voltage collapse under normal operating conditions and when subject to predefined Disturbances.
  - BES frequency is maintained within defined parameters under normal operating conditions and when subject to predefined Disturbances.
  - BES voltage is maintained within defined parameters under normal operating conditions and when subject to predefined Disturbances.
  - Adverse Reliability Impacts on the BES following low probability Disturbances (e.g., multiple contingencies, unplanned and uncontrolled equipment outages, cyber security events, and malicious acts) are managed.
  - Restoration of the BES after major system Disturbances that result in blackouts and widespread outages of BES elements is performed in a coordinated and controlled manner.

A Reliable System is a Resilient System

- **The 2005 Federal Power Act requires** NERC to develop and enforce Reliability Standards that support Reliable Operations and provide for an adequate level of reliability.
  - Reliable Operation is *"operating the elements of the bulk-power system within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements."*
- **A System with an Adequate Level of Reliability is resilient**
  - Industry has designed a reliable Bulk Power System that is sufficiently robust, resourcefully operated, and rapidly recovers after an event.
  - Lessons learned are actively considered as part of operations, as well as structural and non-structural improvements.

Resilience is a Characteristic of a Reliable System

NERC Reliability Assessments and Performance Analysis

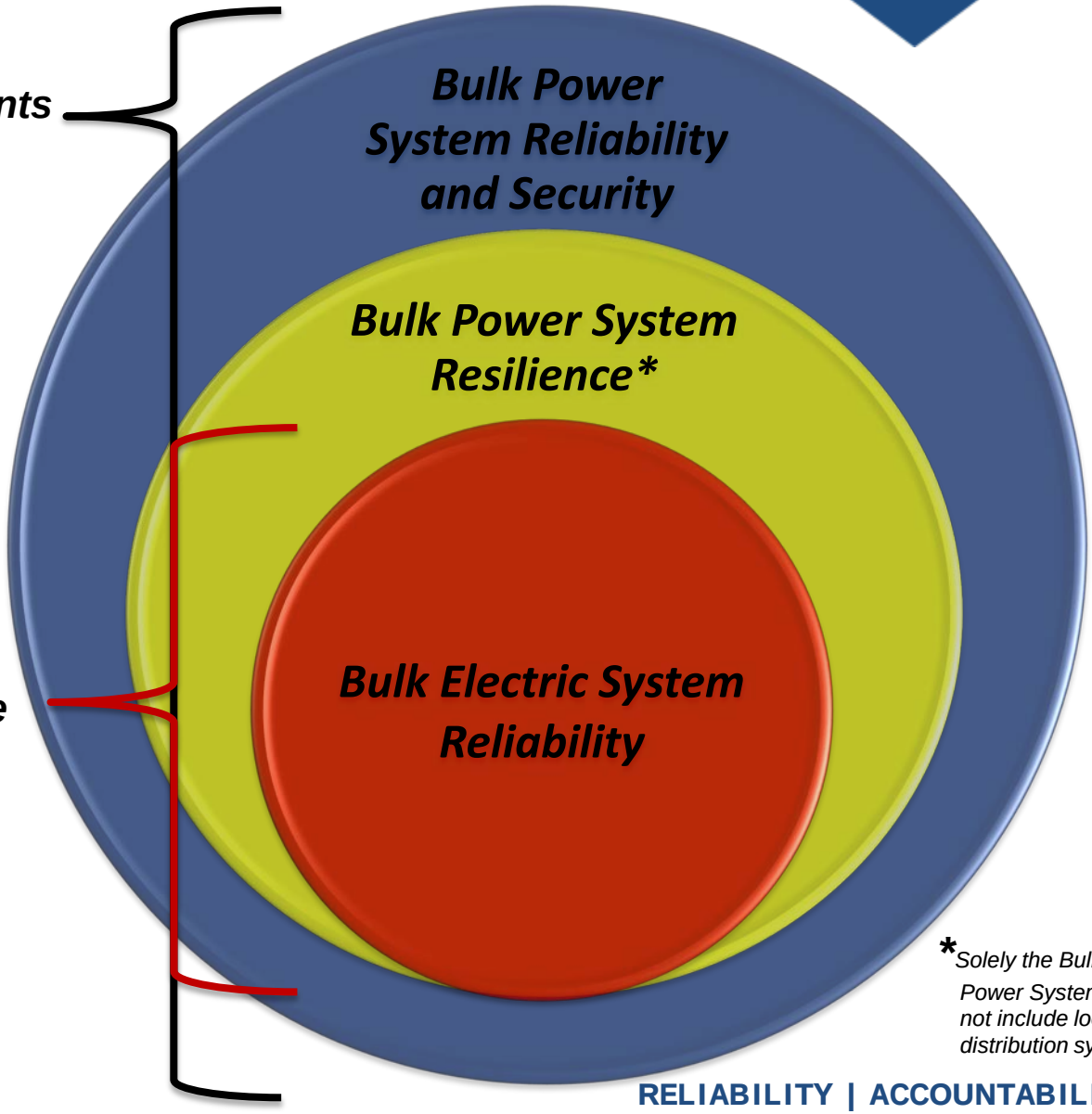
- *Reliability Assessments*
- *System Analysis*
- *Events Analysis*
- *Performance Analysis*
- *Situational Awareness*

Operator Training

E-ISAC

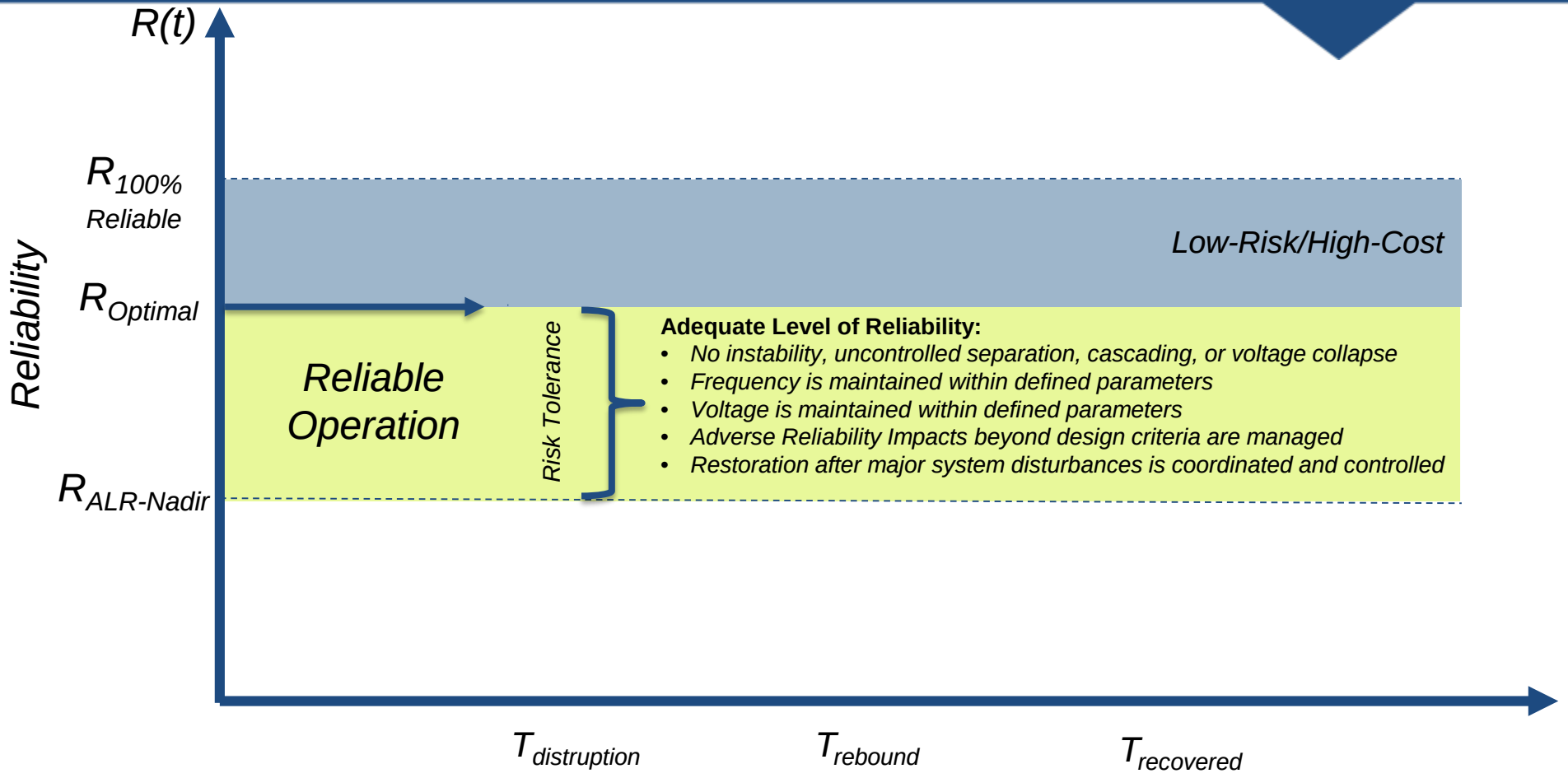
NERC Reliability Assurance

- *Standards*
- *Compliance*
- *Enforcement*
- *Registration*
- *Certification*

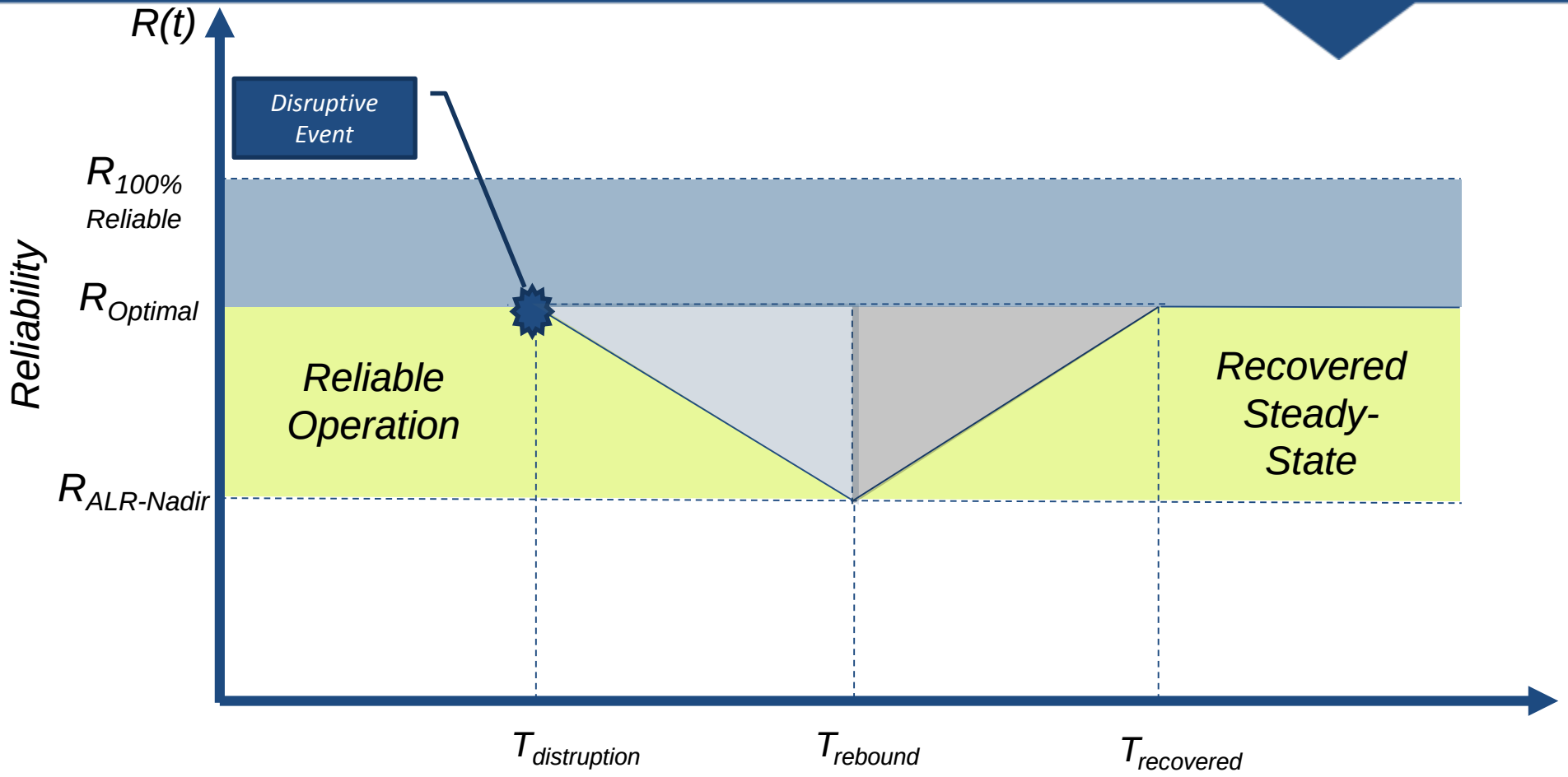


**Solely the Bulk Power System. Does not include local distribution systems.*

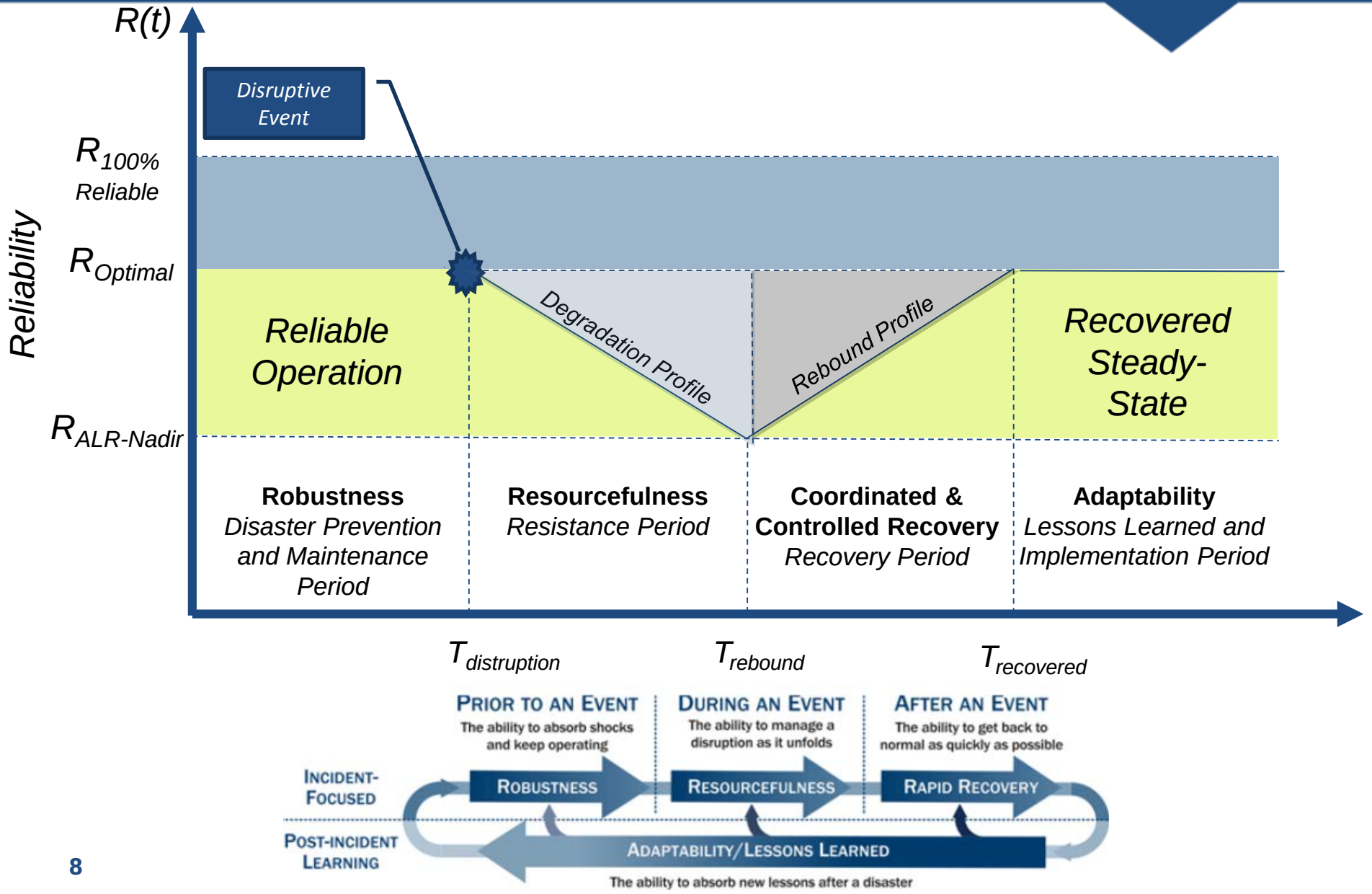
Adequate Level of Reliability



Disruption on BPS



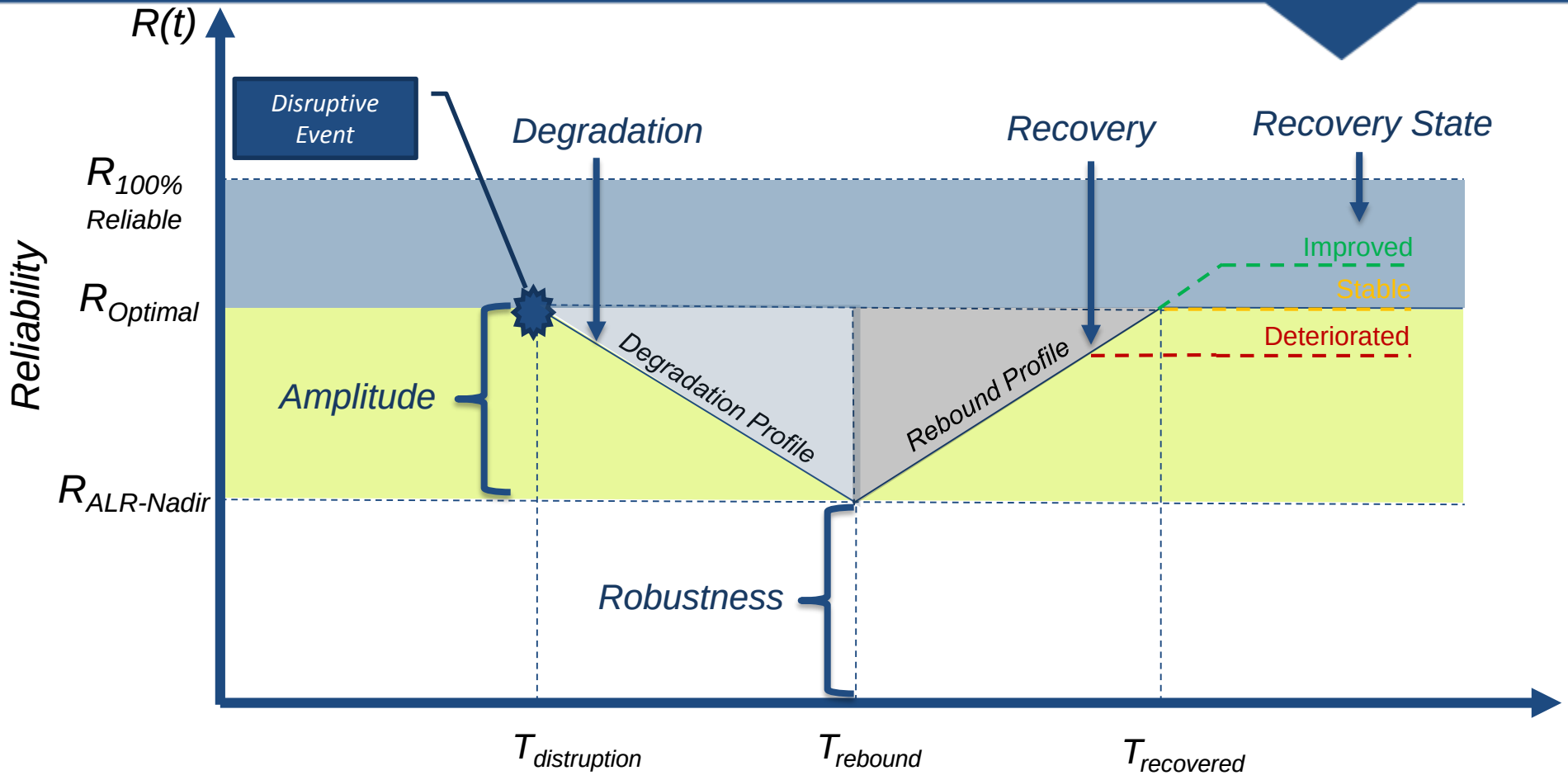
Resilience Framework



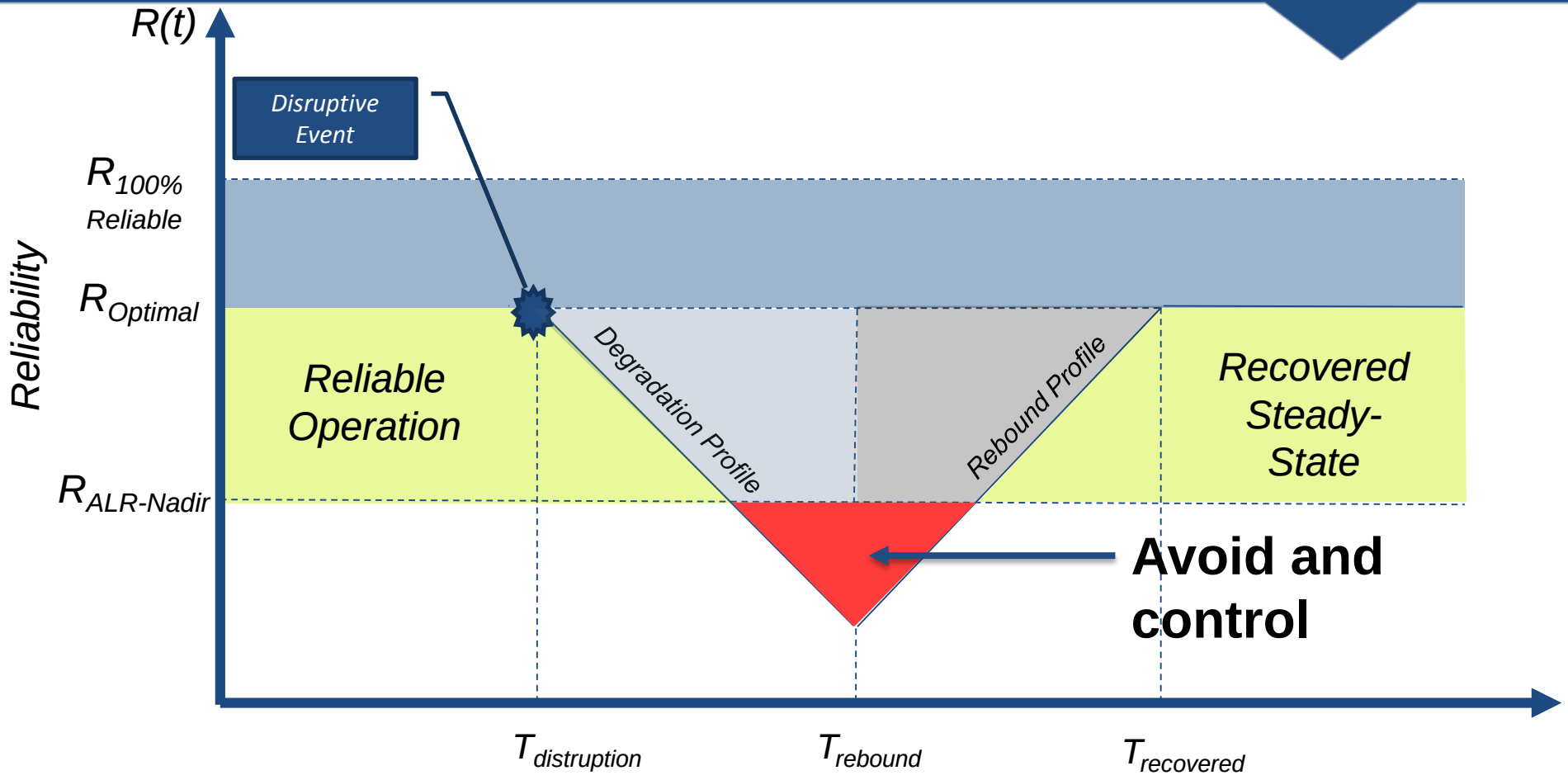
Resilience Indicators

- **Robustness:** the measured ability to withstand certain threats
- **Amplitude:** a measure of the impact on BPS performance
- **Degradation:** a measure of a change in system response with respect to an impact of varying amplitude
- **Recovery:** a measure of the rate at which the system returns (rebounds) to a normal or stable state after the disruptive event
- **Recovery state:** the state of BPS performance following the recovery period
  - Stable
  - Improved
  - Deteriorated

Resilience Indicators



Ensuring ALR



Questions and Answers