NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

ERO Enterprise Effectiveness Survey Update

Kristin Iwanechko, Associate Director, Regional and Stakeholder Relations

Member Representatives Committee Meeting

November 5, 2019

RELIABILITY | ACCOUNTABILITY

Background

- Survey issued July 2018
- Report of results and action plans finalized in May 2019
- Identified areas for focus grouped into four categories
  - ERO Enterprise Principles
  - Reliability Standards Development
  - Compliance Monitoring and Enforcement
  - E-ISAC

ERO Enterprise Principles

- Increase communications with industry on ongoing activities ensuring efficiencies and minimizing duplication (e.g., Align, availability data systems, stakeholder engagement efforts)
- Leverage NERC and Regional Entity staff expertise and deploy centers of excellence around certain practice areas
- Build mutual trust through activities outlined in Compliance Monitoring and Enforcement action plans
- Continue small entity outreach (assist visits, workshops, one-on-one meetings)
- Work with trade organizations to develop more targeted outreach programs

Reliability Standards Development

- Address risk to reliability in a cost-effective manner
  - Continue soliciting input through periodic reviews (PR), the standards grading metric, and public comment periods during standard drafting
  - Engage the Standards Committee to evaluate ways to incorporate comprehensive compliance and enforcement cost-impact measures into the PR template or team analysis
  - Continue Standards Efficiency Review
- Requirements are clearly stated
  - Continue PRs and standards grading metric
- Practical to implement
  - Continue outreach and training webinars
  - Continue PRs

Compliance Monitoring and Enforcement

Compliance Monitoring

- Efficiency in data gathering, workflow, and analysis tools
  - Align tool roll-out
  - CIP Evidence Request tool version 3 release
- Implementation of risk-based compliance monitoring
  - Continued evolution and alignment of Compliance Oversight Plan summaries and the CMEP Implementation Plan
- Outreach and education
  - Outreach on Implementation Guidance process through a webinar and upcoming workshops
  - Continue small group advisory sessions on Supply Chain standards
  - Continue outreach and awareness on the program alignment process

Compliance Monitoring and Enforcement (continued)

Compliance Enforcement

- Further streamline minimal risk noncompliance
  - Evaluate the following program elements for potential modification:
    - Self-logging
    - Necessary information to support a minimal risk determination
    - Compliance Exceptions
  - Align tool release (streamline submitting mitigation activities)
  - Established a guideline for sampling of verification of mitigation completion

E-ISAC

- Provide more actionable information, recognizing different degrees of required details or assistance
- Continue external messaging regarding relationships and controls around information sharing to improve trust
- Continue to implement functionality improvements to the portal
- Conduct separate, E-ISAC member-only surveys in the off-years of the ERO Enterprise Effectiveness Survey

Next Survey

- Evaluating approach to survey for effectiveness and efficiency
  - Work with Compliance and Certification Committee and Member Executive Committee
- Simplified approach to be presented to MRC in February 2020

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Questions and Answers

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Reliability and Security Technical Committee

Jennifer Sterling, MRC Vice Chair

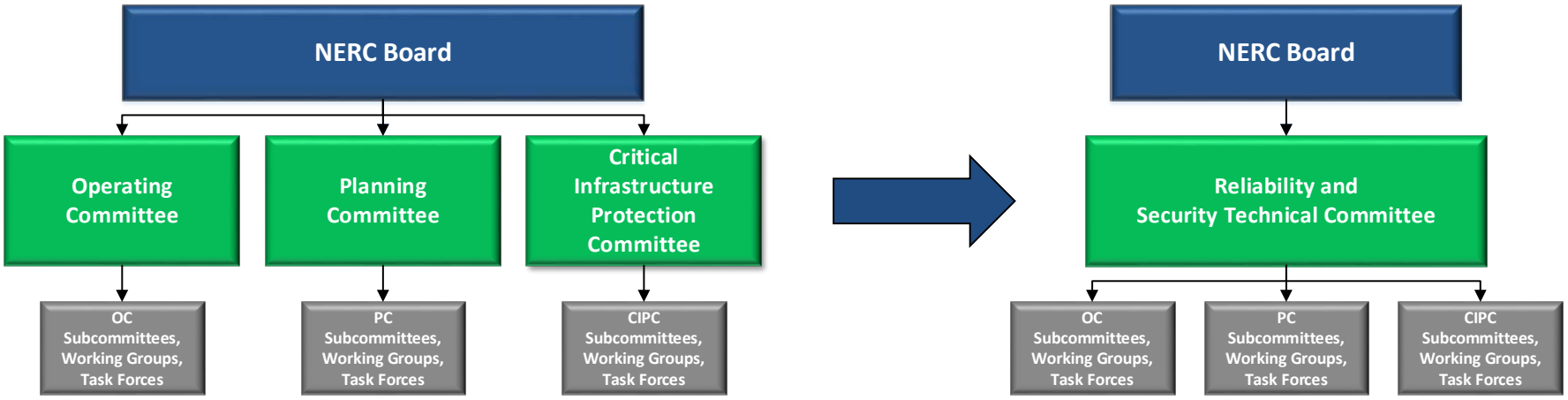
MRC Meeting

November 5, 2019

RELIABILITY | RESILIENCE | SECURITY

Potential Committee Structures – Option 2

- Replace OC, PC, and CIPC with the Reliability and Security Technical Committee (RSTC)
- Retain existing subcommittees, working groups, and task forces
- Will evaluate work products of subcommittees, working groups, and task forces and eliminate or combine those without recurring responsibilities



Revisions to Proposal

- The SET Nominating Committee will recommend initial chair and vice chair for appointment by the Board (November meeting). Both are for two-year terms
- The SET changed the Participation Model to two members per sector. Sectors will elect or appoint their representatives. For the annual election, any unfilled seats will become At Large until the term expires
- NERC will then hold Sector elections if needed followed by At Large Nominating process with Nominating Subcomittee as shown in proposal document (above)
- Board to approve slate of RSTC members February 2020

Revisions to Proposal

- Initial terms for Sector and At Large members will be approximately half of the members for two-year terms and half for a three-year term
- After initial terms, all terms are two-year staggered terms with approximately half of Sector and At Large terms expiring annually
- The Executive Committee will be elected by the RSTC membership at the first RSTC meeting
- The SET clarified the goal of having representatives based in each RE's area and each Interconnection
- The on-going RSTC Nominating Subcommittee will be appointed from the RSTC membership

Participation Model - Revised

- Proposed Sector-based and At-Large representation

Name	Voting Members
Sectors 1-10, and 12	22
At Large	10
Chair and Vice Chair	2
Total	**34**

- Additional Non-Voting Members

Non-Voting Member	Number of Members
NERC Secretary	1
U.S. Federal Government	2
Canadian Federal Government	1
Provincial Government	1
Total	**5**

Transition Plan Highlights

- Past meeting agenda/notes packages posted on SET web page
  - *https://www.nerc.com/comm/Pages/Stakeholder-Engagement-Team.aspx*
- November 5, 2019 – Board considers Proposal, Charter, and Transition Plan; if approved, appoints chair and vice chair
- November 6, 2019 – Open Sector nomination period
- December 6, 2019 – Sector nomination period ends. NERC Staff will conduct Sector elections, if necessary, by December 20, 2019
- December 9, 2019–January 3, 2020 – Open At Large nomination period. NERC Staff/SET analyzes Sector reps for gaps to be filled by At Large members
- January 6-15, 2020 – Nominating Subcomittee to develop slate of At Large nominees for presentation to the Board

Transition Plan Highlights

- February 6, 2020 – Board appoints RSTC members (Sector and At Large). Terms will expire in June of alternating years following the initial terms with the initial term being two or three years, and thereafter two year terms
- February 7–May 29, 2020 – RSTC develops transition plan and work plans for RSTC and subcommittees
- March 3-4, 2020 – Hold OC, PC, and CIPC meetings as scheduled. The RSTC will meet March 4, 2020 for the inaugural RSTC meeting
- June 2020 – OC, PC, and CIPC will meet for final work plan approvals and to complete any other approvals. The RSTC will hold initial regular meeting with subcommittee reports and other agenda items

Future Work

- Board appointed Chair and Vice Chair will review October, 2019 Policy Input for potential implementation plan enhancements
- Chair and Vice Chair will begin coordination with OC, PC and CIPC leadership on transition plan details
- More detailed Work Plan development will begin

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ERO Enterprise Long-Term Strategy Update

Jim Robb, President and CEO

Member Representatives Committee Meeting

November 5, 2019

RELIABILITY | RESILIENCE | SECURITY

Why We Exist

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.

MIDWEST RELIABILITY ORGANIZATION
NERC NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION
NPCC, Inc.
RELIABILITY FIRST
SERC Reliability Corporation
TEXAS RE
WECC Electric Reliability and Security for the West

The ERO Enterprise Golden Circle

Strategic Focus Areas

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

Stakeholder Comments

- Major comment themes:
  - Distinguish between near-term and longer-term tasks
  - Leverage capabilities already available from other agencies and partners
  - Create stronger linkages to the Reliability Issues Steering Committee (RISC) report
  - Clarify how the technical committee restructure supports collaboration
  - Address cost benefit analysis in the standards development process
  - Clarify what activities would require investigating a funding mechanism
  - Clarify the ERO Enterprise's role with respect to bulk power system resilience

Next Steps

- Revise long-term strategy based on comments received and additional inputs from ERO Enterprise leadership
- Socialize long-term strategy with Regional Entity boards for input and support
- Present to NERC Board of Trustees for approval during its December 14, 2019, conference call

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Questions and Answers

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Supply Chain Risk Assessment

Howard Gugel, Vice President of Engineering and Standards

Member Representatives Committee Meeting

November 5, 2019

RELIABILITY | RESILIENCE | SECURITY

Board Resolution

- Support effective and efficient implementation (e.g. CIP V5 transition)
- **Supply chain risk study**
- Communicate supply chain risks to industry
- Forum and Association white papers
- Plan to evaluate effectiveness of supply chain standards

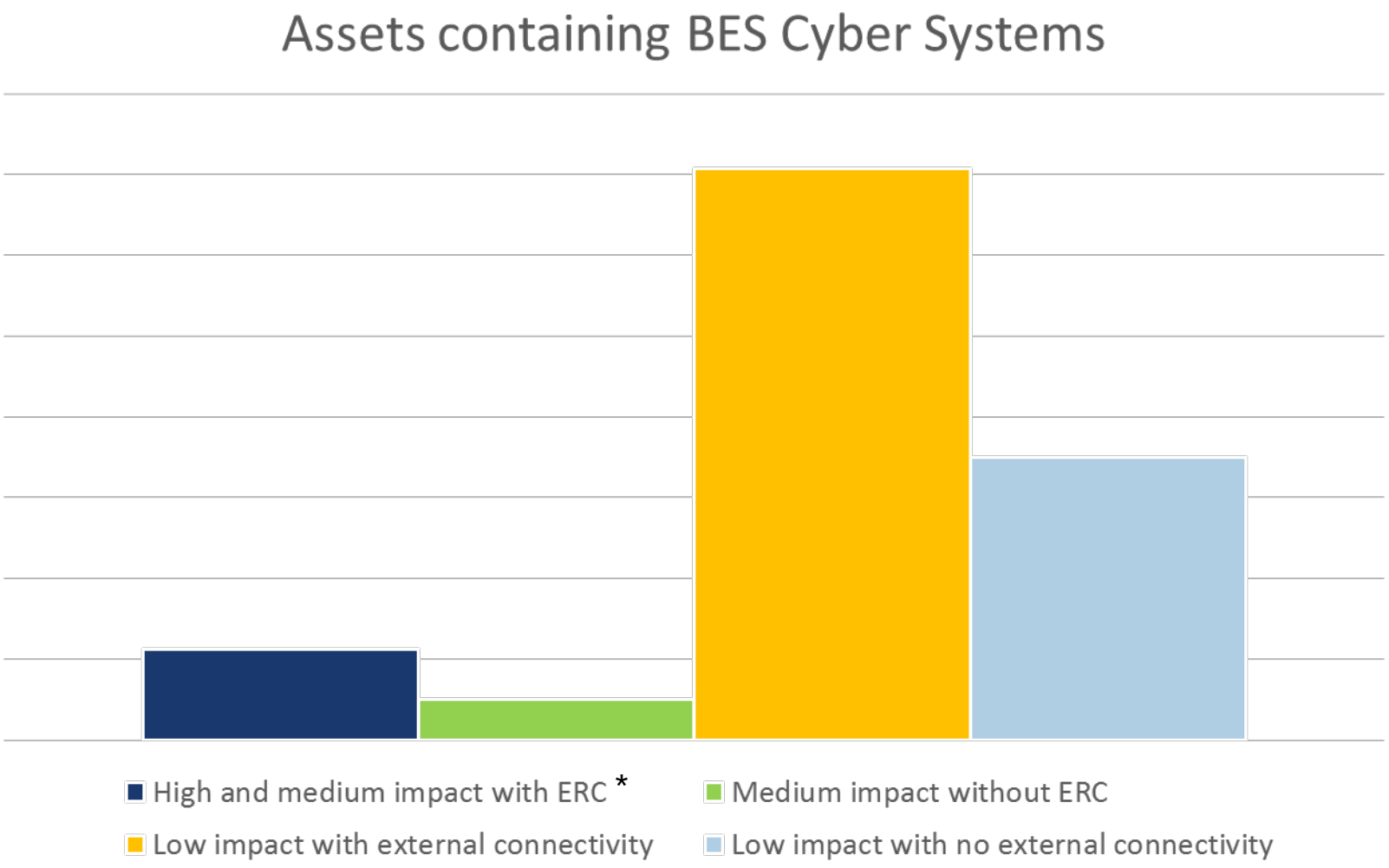
Recommendations from Study

- Include in Supply Chain Standards
  - Electronic access controls for medium and high impact Bulk Electric System (BES) Cyber Systems
  - Physical access controls for medium and high impact BES Cyber Systems
- Do not include in Supply Chain Standards
  - Electronic access monitoring and logging
  - Physical access monitoring and logging
  - Protected Cyber Assets
- **Collect more data on low impact BES Cyber Systems**
- Develop guidelines with CIPC Supply Chain Working Group
  - Application to lows
  - Evaluation of Protected Cyber Assets

Data Request Issued

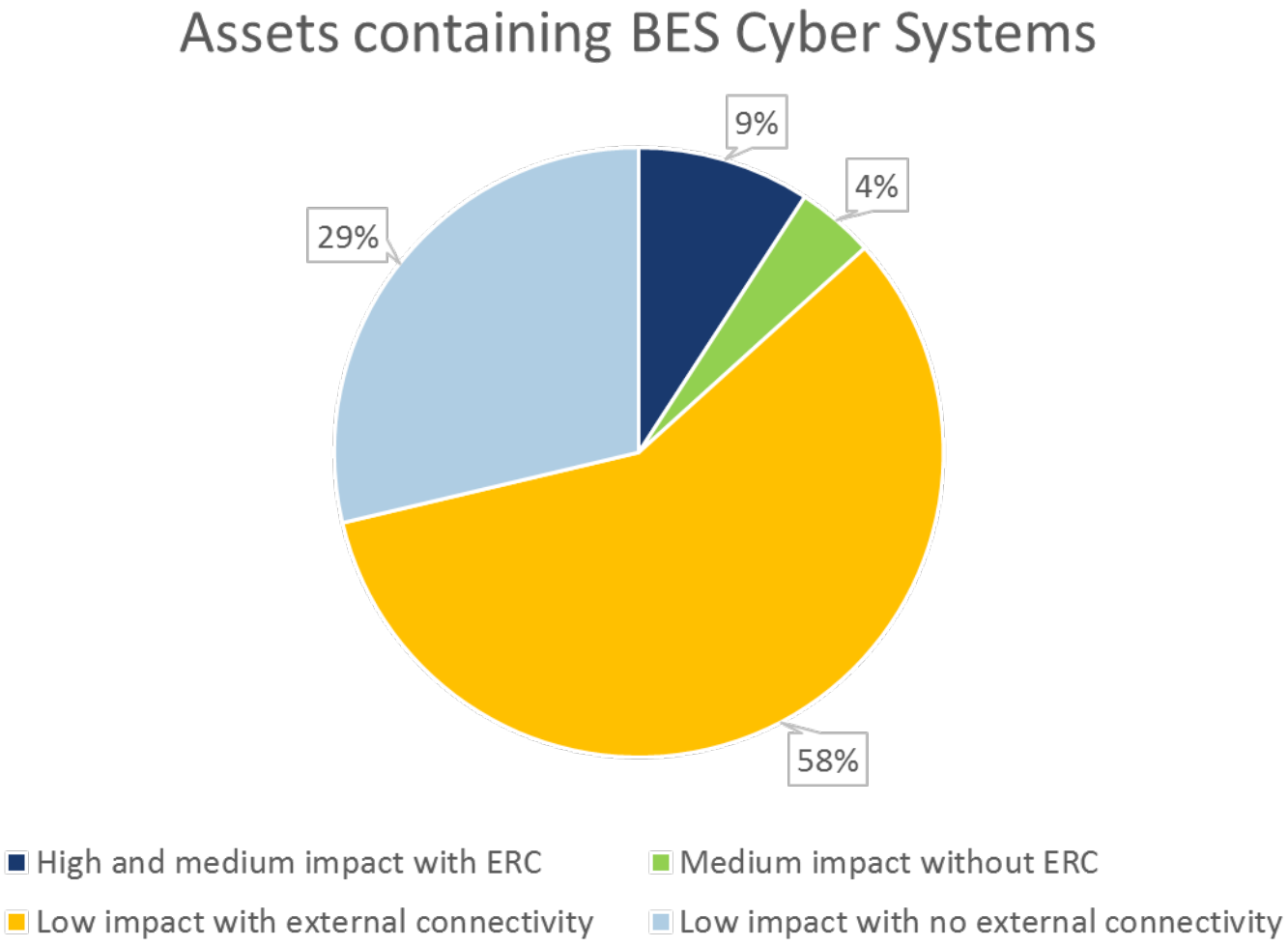
- Issued on August 19
- Responses due October 3
- Applicable to entities in CIP-002-5.1a
- Focused on low impact BES

BES Cyber Assets

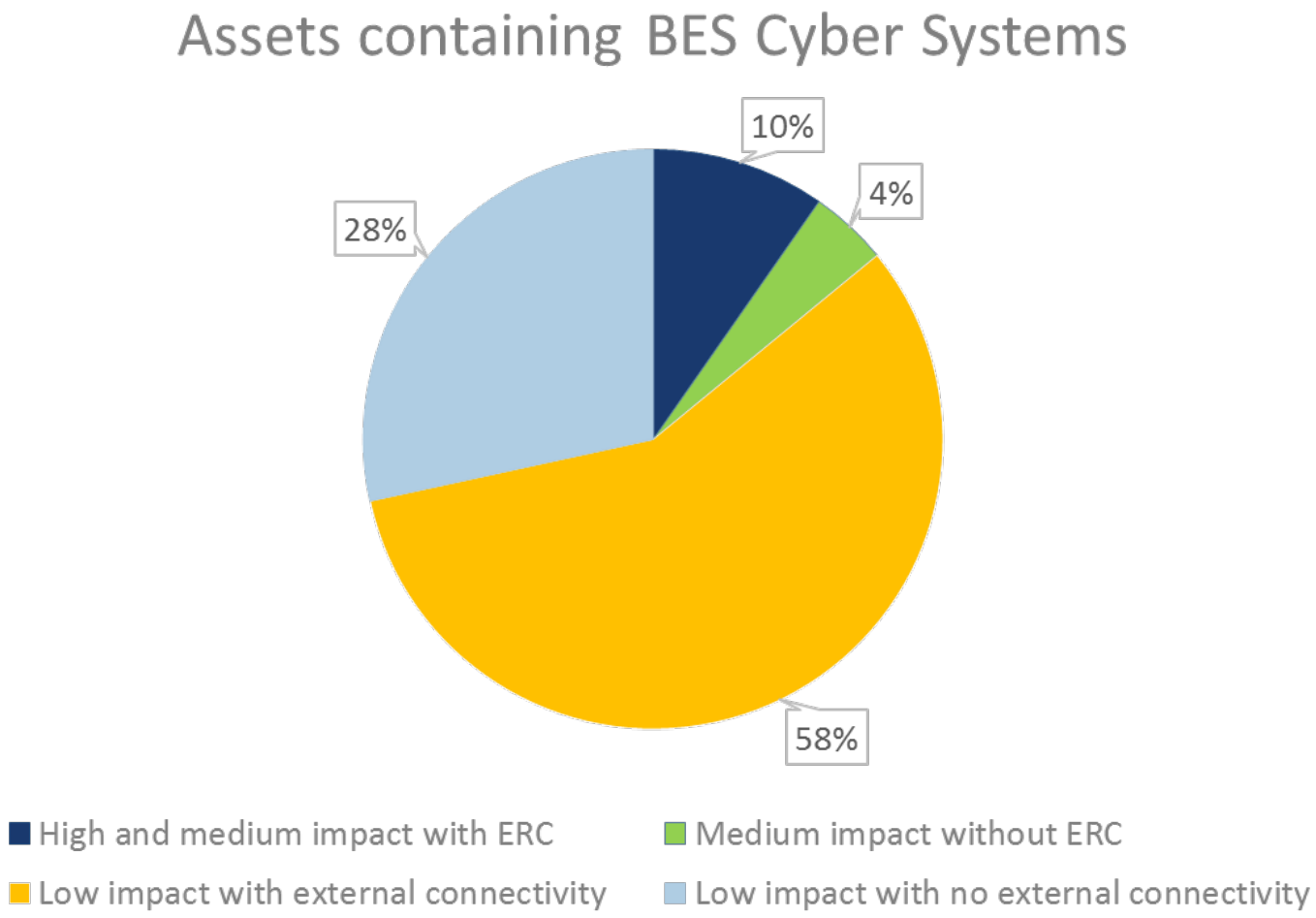


* ERC = External Routable Connectivity

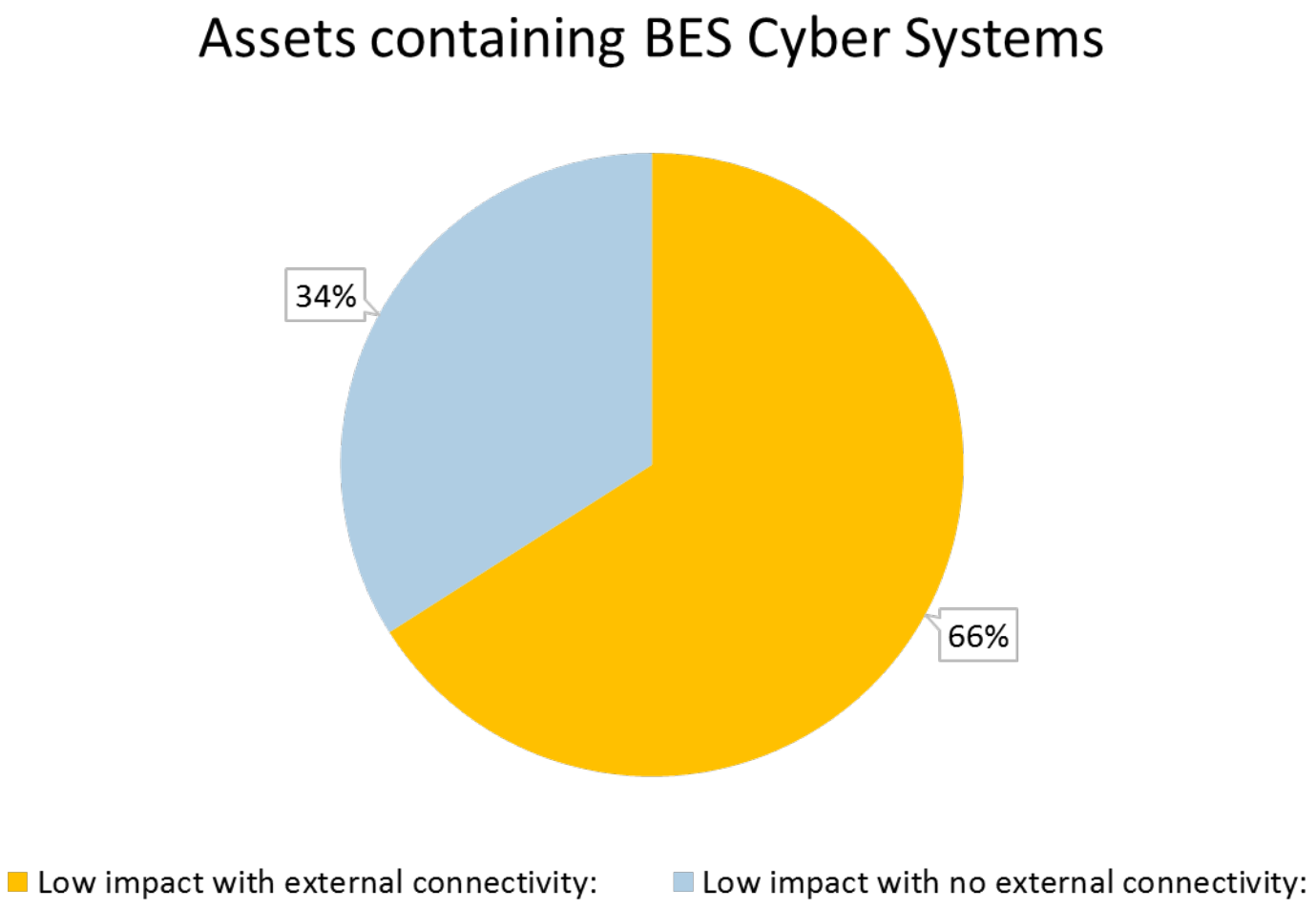
BES Cyber Assets



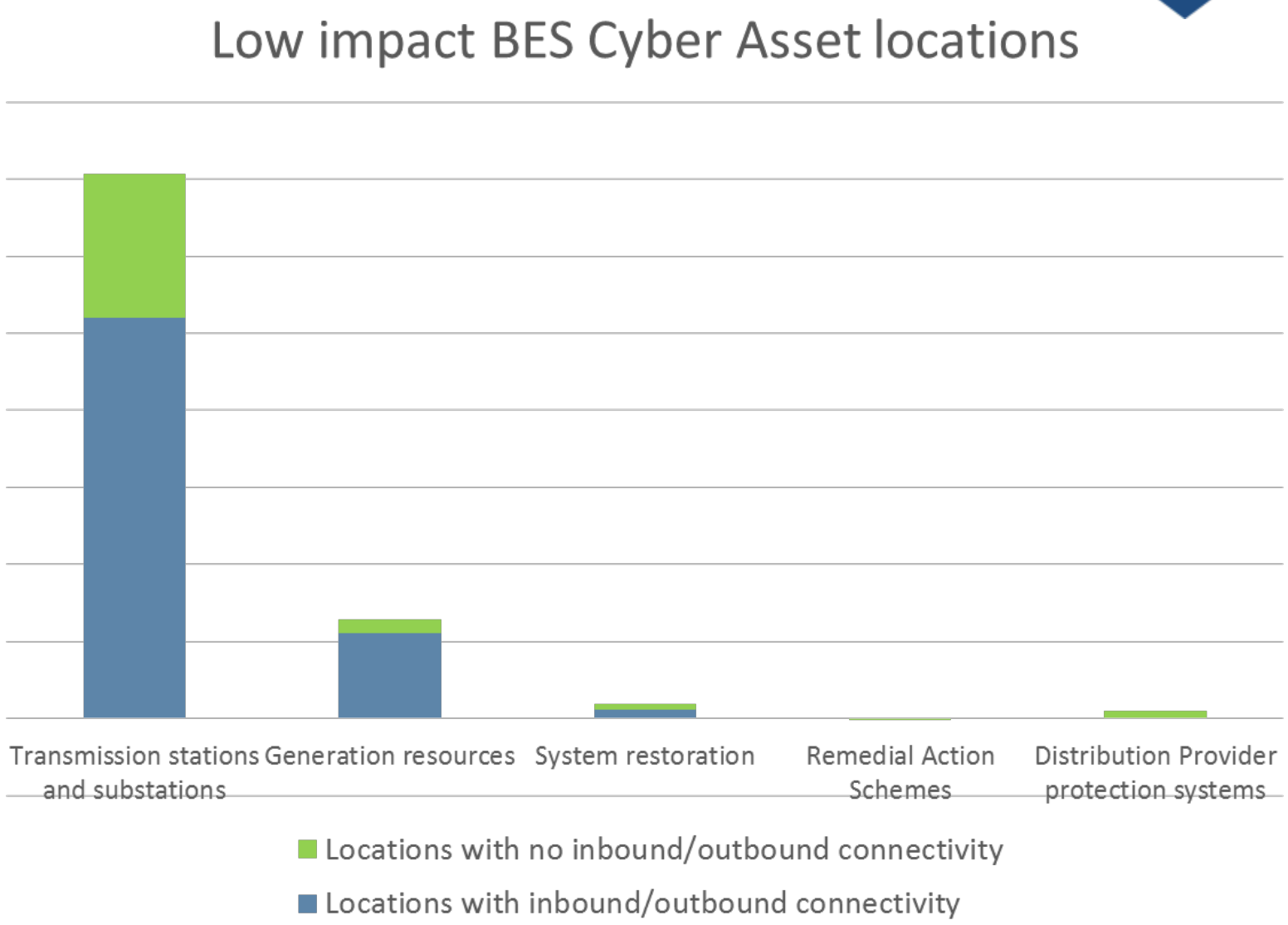
BES Cyber Assets with Medium and High



BES Cyber Assets with Lows Only



BES Cyber Assets with Medium and High



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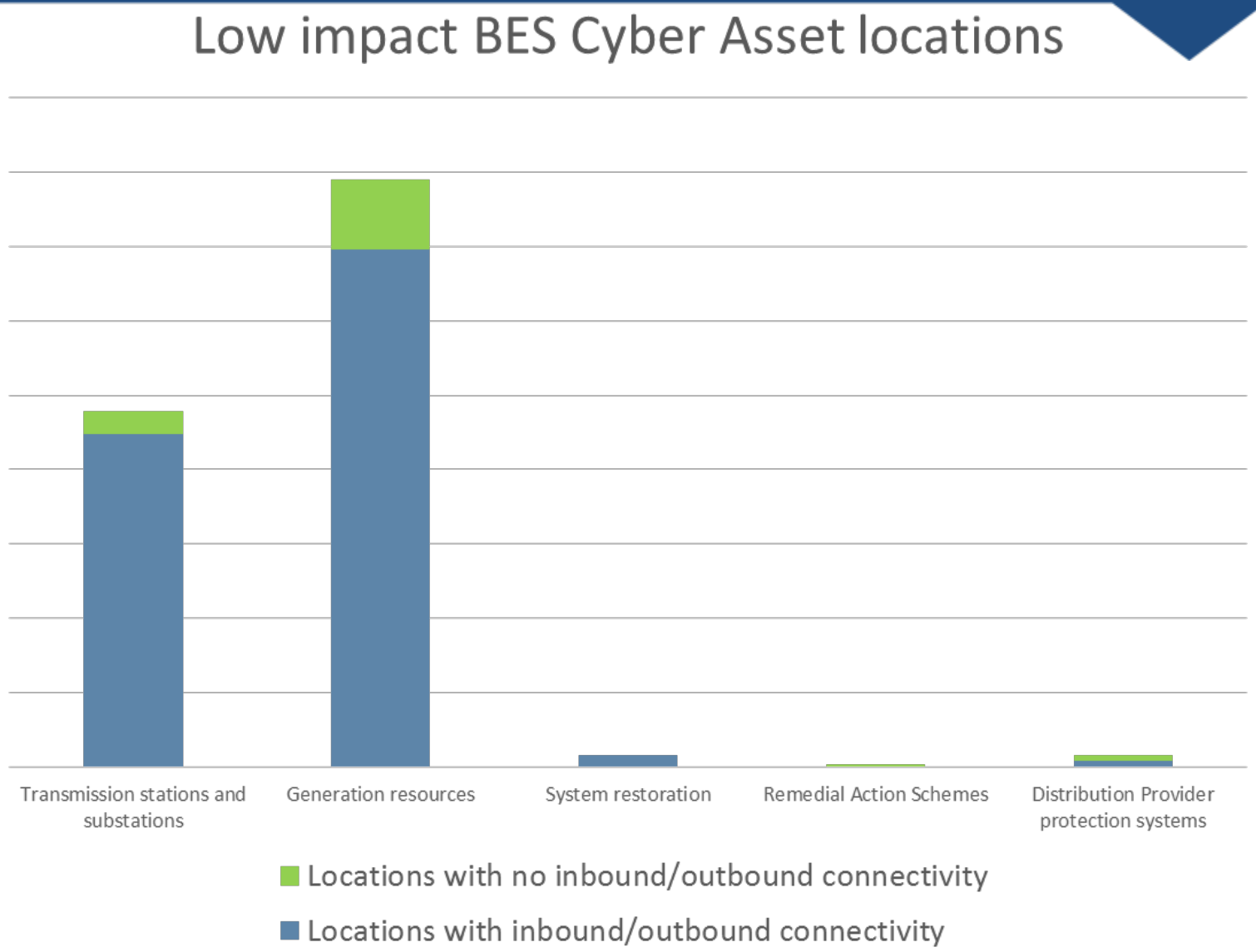

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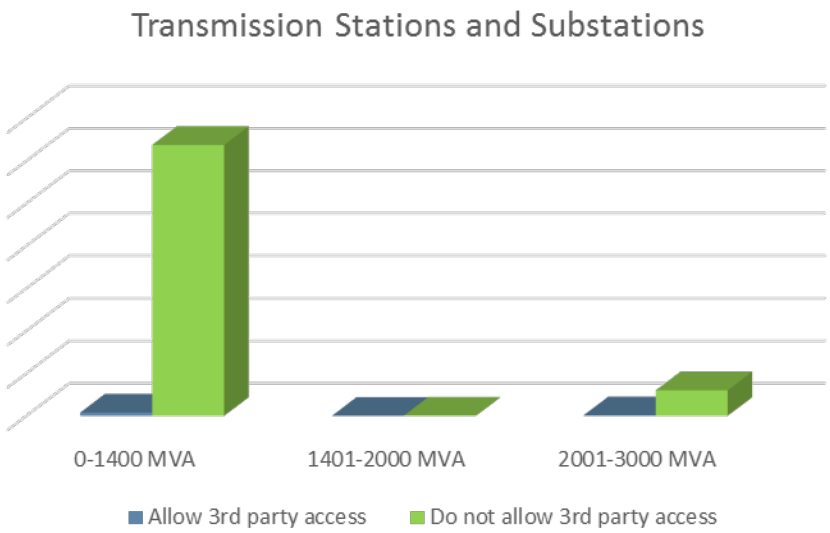

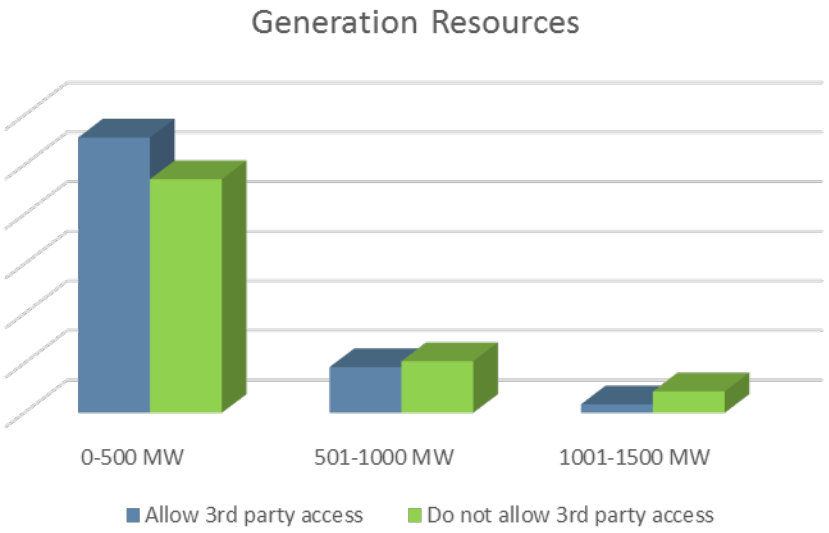

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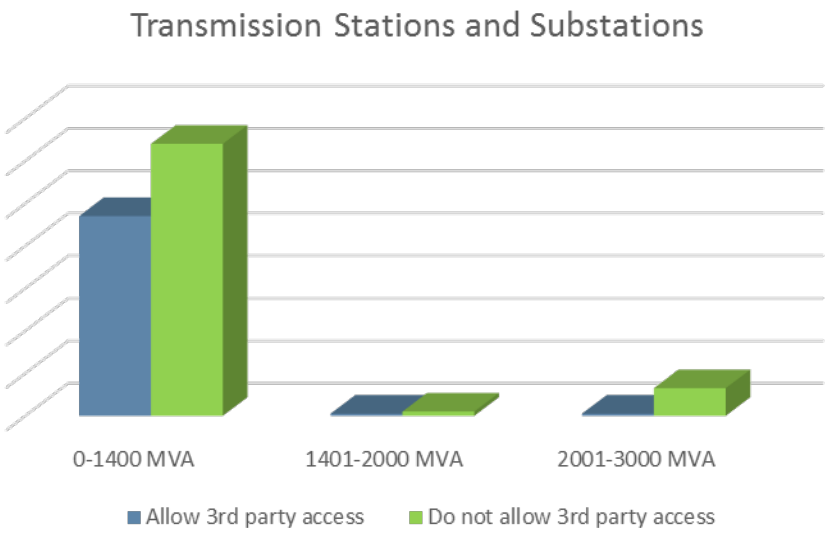
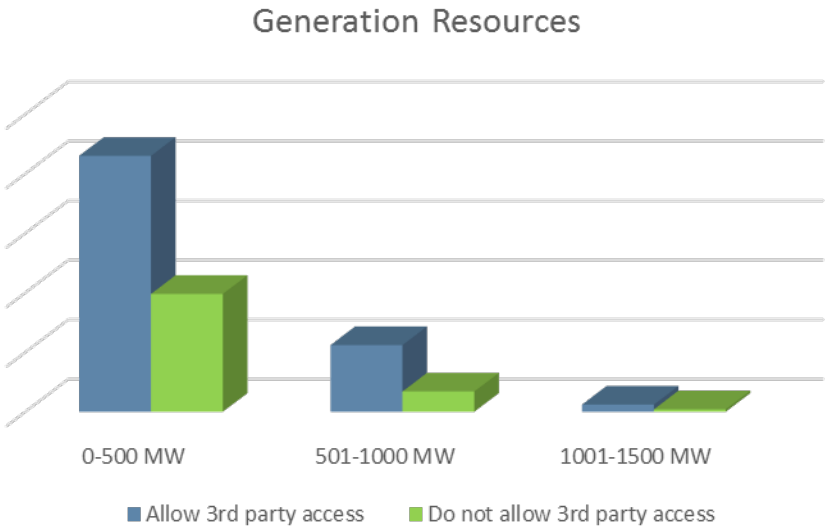




Observations

- Most low impact assets reside in organizations with higher impact assets
- Most low impact assets are lower risk
- Significant percentage of generation resources allow third party access
- Significant percentage of “low only” transmission stations and substations allow third party access

Questions and Answers

ERCOT Summer 2019 Update

DeAnn Walker
Chairman
Public Utility Commission of Texas

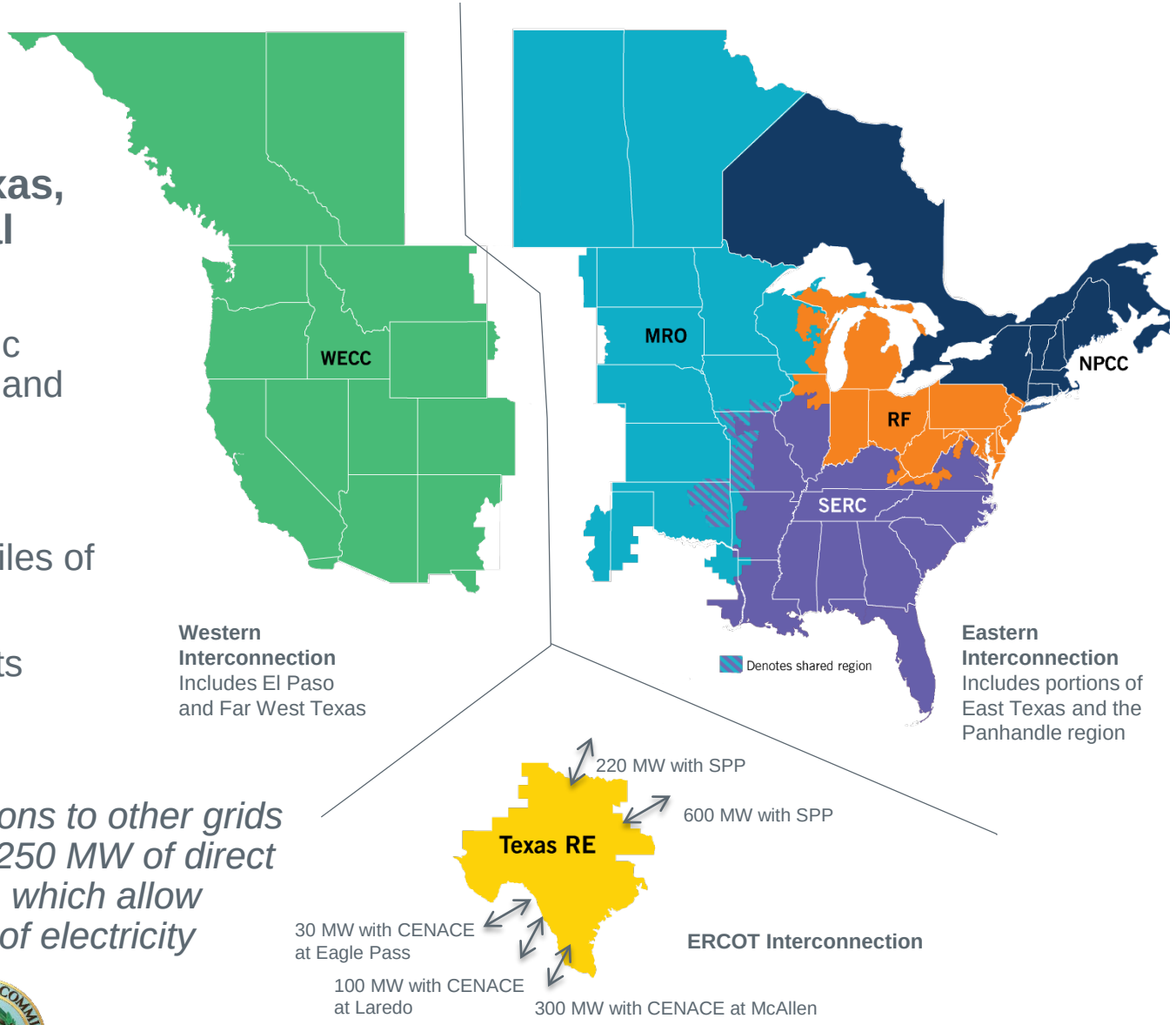
Bill Magness
President & CEO
ERCOT

November 5, 2019

The ERCOT Interconnection

The interconnected electrical system serving most of Texas, with limited external connections

- 90% of Texas electric load; 75% of Texas land
- 74,666 MW peak, August 12, 2019
- More than 46,500 miles of transmission lines
- 650+ generation units (excluding PUNs)



ERCOT connections to other grids are limited to ~1,250 MW of direct current (DC) ties, which allow control over flow of electricity

Unique Aspects of the ERCOT Interconnection

- ERCOT is a fully intrastate system and market subject to federal policy for reliability (through NERC) and state policy for market design and resource adequacy.

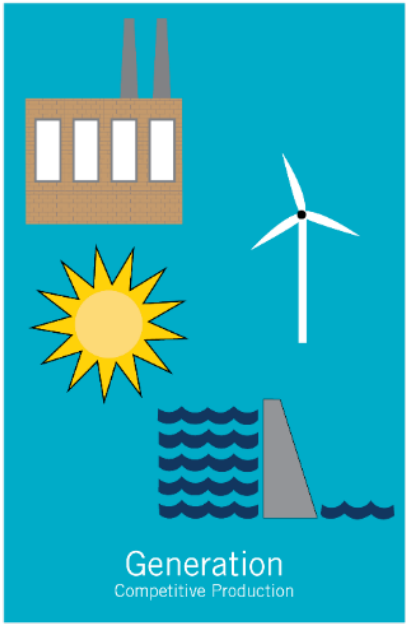
- Unlike other interconnections and ISO/RTOs: a single regulator, with policy set by the Texas Legislature; implemented and enforced by the Public Utility Commission of Texas (PUCT).

- In addition to ERCOT in the Texas RE region, the PUCT has state jurisdiction over utilities in the MRO, SERC, and WECC NERC regions and assessment areas. The PUCT works with REs and ISO-RTOs to coordinate issues of common interest among the regions in Texas.

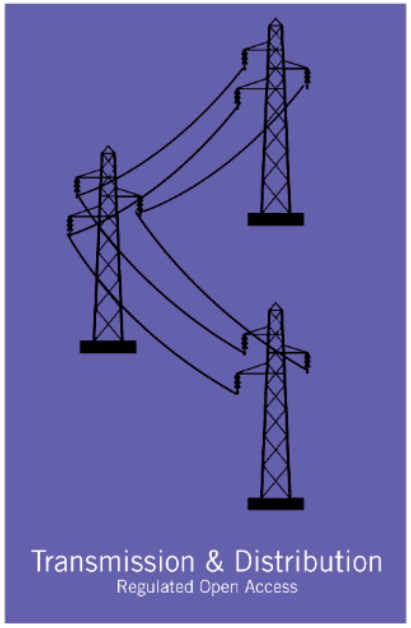
- Jurisdictional issues have been heavily litigated and are now subject to a set of settled rules. For a colorful history, see: Richard D. Cudahy, "The Second Battle of the Alamo: The Midnight Connection," *Natural Resources & Environment (American Bar Association)* (Summer 1995).

Market Structure in ERCOT

The ERCOT market operates based on a structure established by 1999 Texas legislation:



- Generating units are owned by merchant competitors companies (except for municipal and cooperative units
- Compete in ERCOT market to serve load
  - An open market overseen by PUCT.



- Transmission and distribution lines and related facilities are owned and operated by regulated utilities.
  - Utilities are full regulated by PUCT.
- Transmission costs recovered on “postage stamp” basis

- Retailers compete to serve consumers’ electric load in ~75% of state (except 25% in municipal and cooperative utility areas)
- Active retail competition
  - 92% have switched
  - ~15% switches in a year
- Nearly 100% smart meters

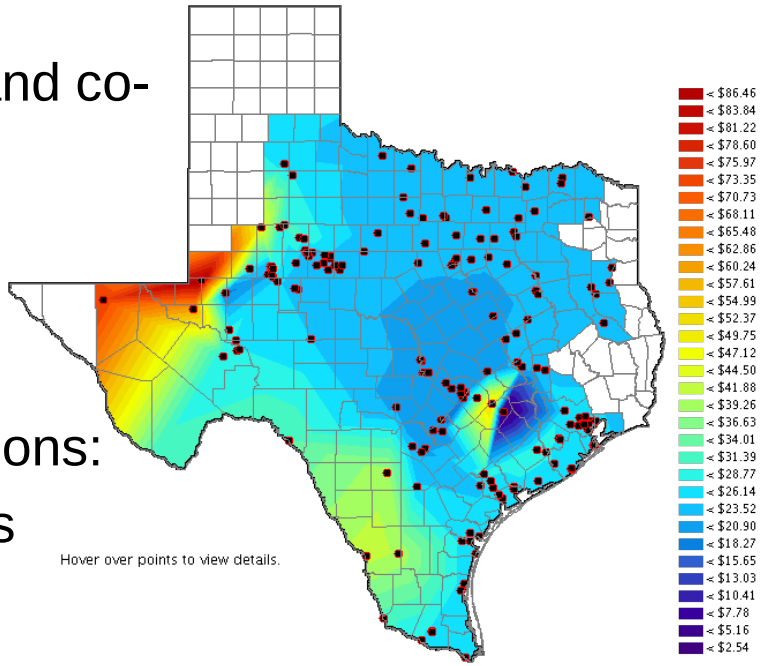
Resource Adequacy in the ERCOT Market

- There is no mandatory reserve margin that must be maintained.
  - Reserve margins may fluctuate significantly based on market entry and exit
  - PUCT and ERCOT are studying methods of measuring reserve margins that take into account market dynamics

- Economic price signals are essential to maintaining reliability.
  - ERCOT's energy-only market includes a $9,000 MWh offer cap, along with an Operating Reserve Demand Curve (ORDC) triggered by scarcity conditions
  - The economic consequences of scarcity pricing provide extremely strong incentives for generator performance
  - Price-responsive demand is key to the optimal functioning of the market

Market Design: Energy-Only Nodal Market

- All generators submit offers for generation output. ERCOT commits generation units only if necessary for reliability
- Voluntary Day-Ahead Market (DAM); Ancillary Services procured in DAM and co-optimized with energy
- Real-Time Market clears every five minutes, using generation with the lowest offers to serve the load
- Reliability tools for emergency conditions:
  - Supply and demand-side reserves
  - Reliability-Must-Run contracts for retirements that threaten system reliability



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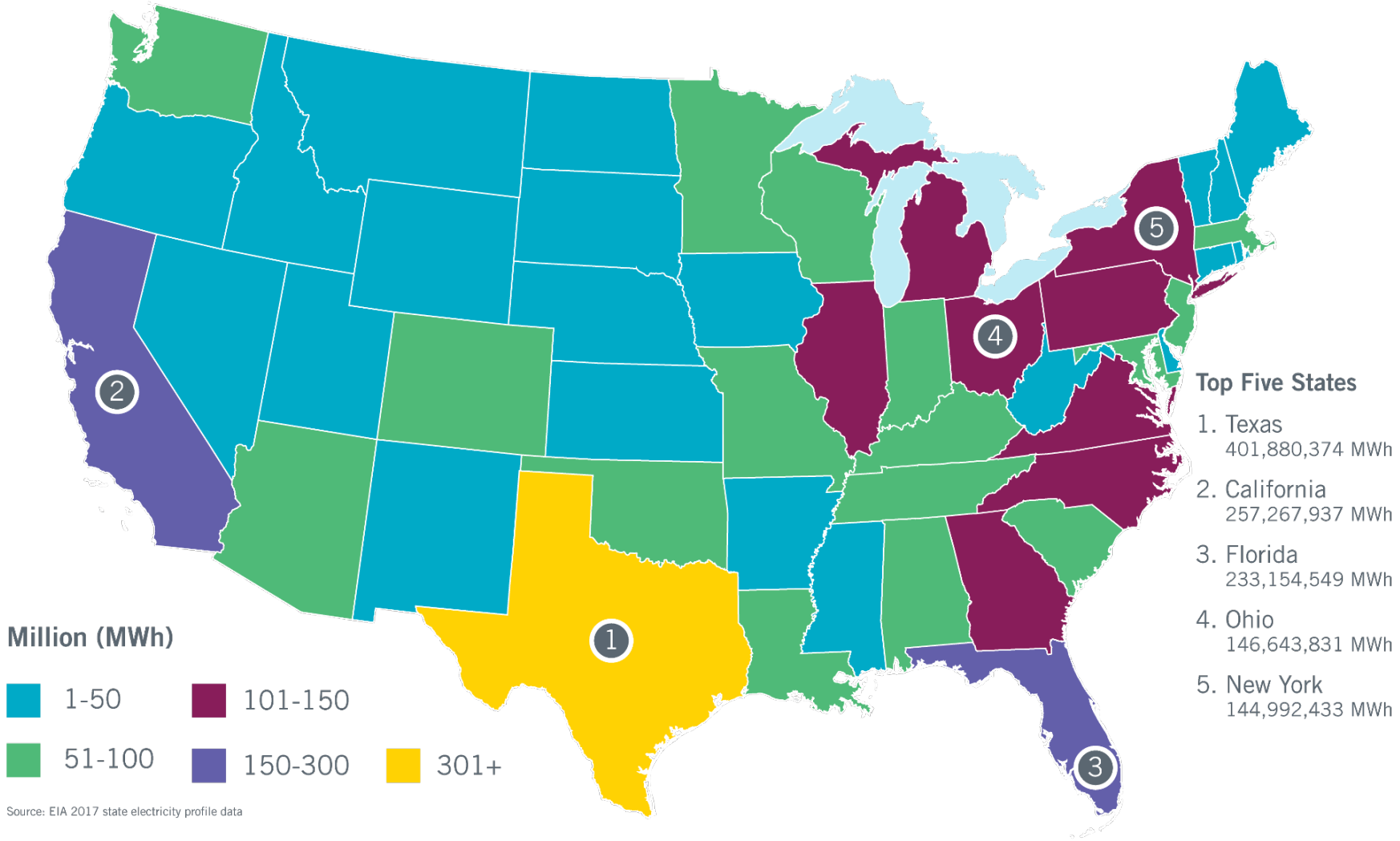
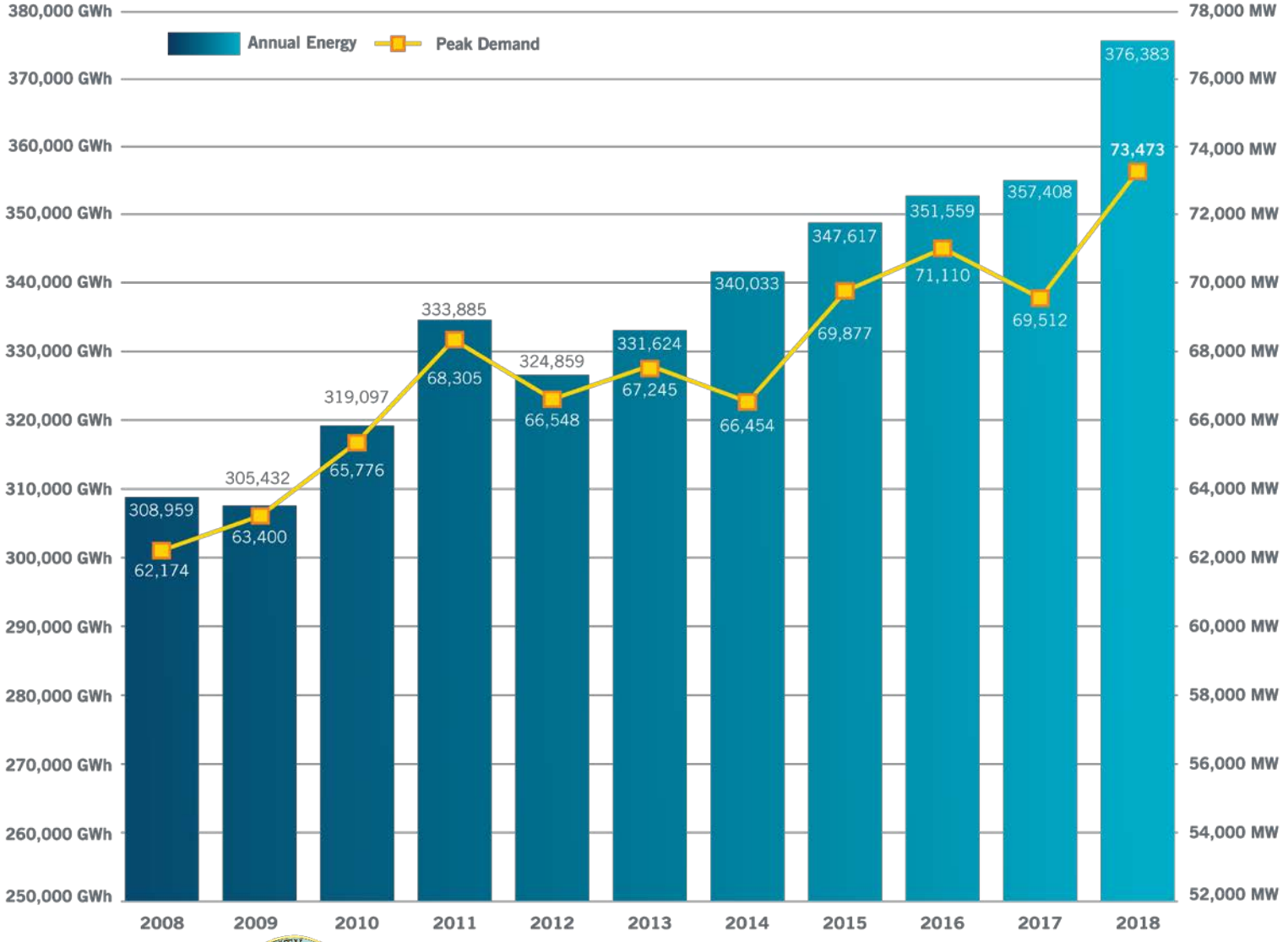
Texas Consumes More Electricity Than Any State



Source: EIA 2017 state electricity profile data

Consistent Load Growth in ERCOT (2008-2018)



Current Demand Records

Peak Demand Record: 74,666 megawatts (MW)*

- Monday, August 12, 2019, 4-5 p.m.

Weekend Peak Demand Record: 71,915 MW*

- Sunday, August 11, 2019, 5-6 p.m.

Winter Peak Demand Record: 65,915 MW

- Wednesday, Jan. 17, 2018, 7-8 a.m.

**New records are preliminary, subject to change in final settlement*

Monthly Peak Demand Records

January: 65,915 MW (Jan. 17, 2018)

February: 57,265 MW (Feb. 10, 2011)

March: 60,756 MW (March 5, 2019)

April: 53,486 MW (April 28,2017)

May: 67,265 MW (May 29, 2018)

June: 69,123 MW (June 27, 2018)

July: 73,473 MW (July 19, 2018)

August: 74,666 MW (Aug. 12, 2019)*

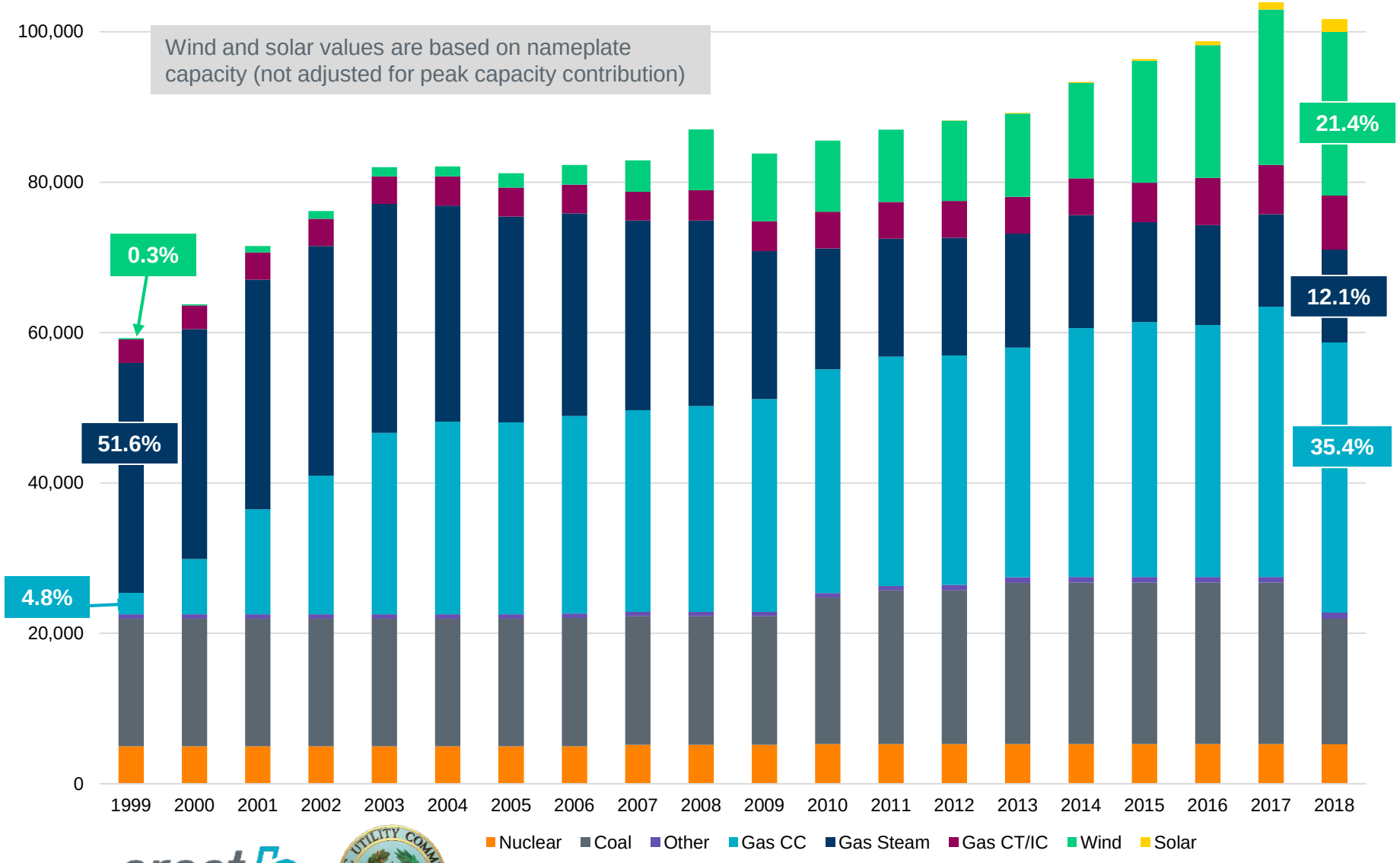
September: 68,817 MW (Sept. 6, 2019)*

October: 65,066 MW (Oct. 2, 2019)

November: 56,317 MW (Nov. 14, 2018)

December: 57,932 MW (Dec. 19, 2016)

ERCOT Installed Capacity (1999-2018)



The Summer 2019 Seasonal Assessment of Resource Adequacy (SARA) Values vs. Actuals at Peak Demand

	2019 Actual Peak Demand (8/12/19)	Final 2019 Summer SARA*	Difference
Total Resources, MW	80,098	78,930	1,168
Thermal and Hydro	64,401	65,526	(1,125)
Private Use Networks, Net to Grid	3,203	3,437	(234)
Switchable Generation Resources	2,837	2,726	111
Wind Capacity Contribution	7,447	4,898	2,549
Solar Capacity Contribution	1,394	1,405	(11)
Non-Synchronous Ties	816	938	(122)
Peak Demand, MW	74,666	74,853	(187)
Reserve Capacity, MW	5,432	4,077	1,355
Total Outages, MW	3,972 **	4,226	(254)
Capacity Available for Operating Reserves, MW	1,460	(149)	1,609

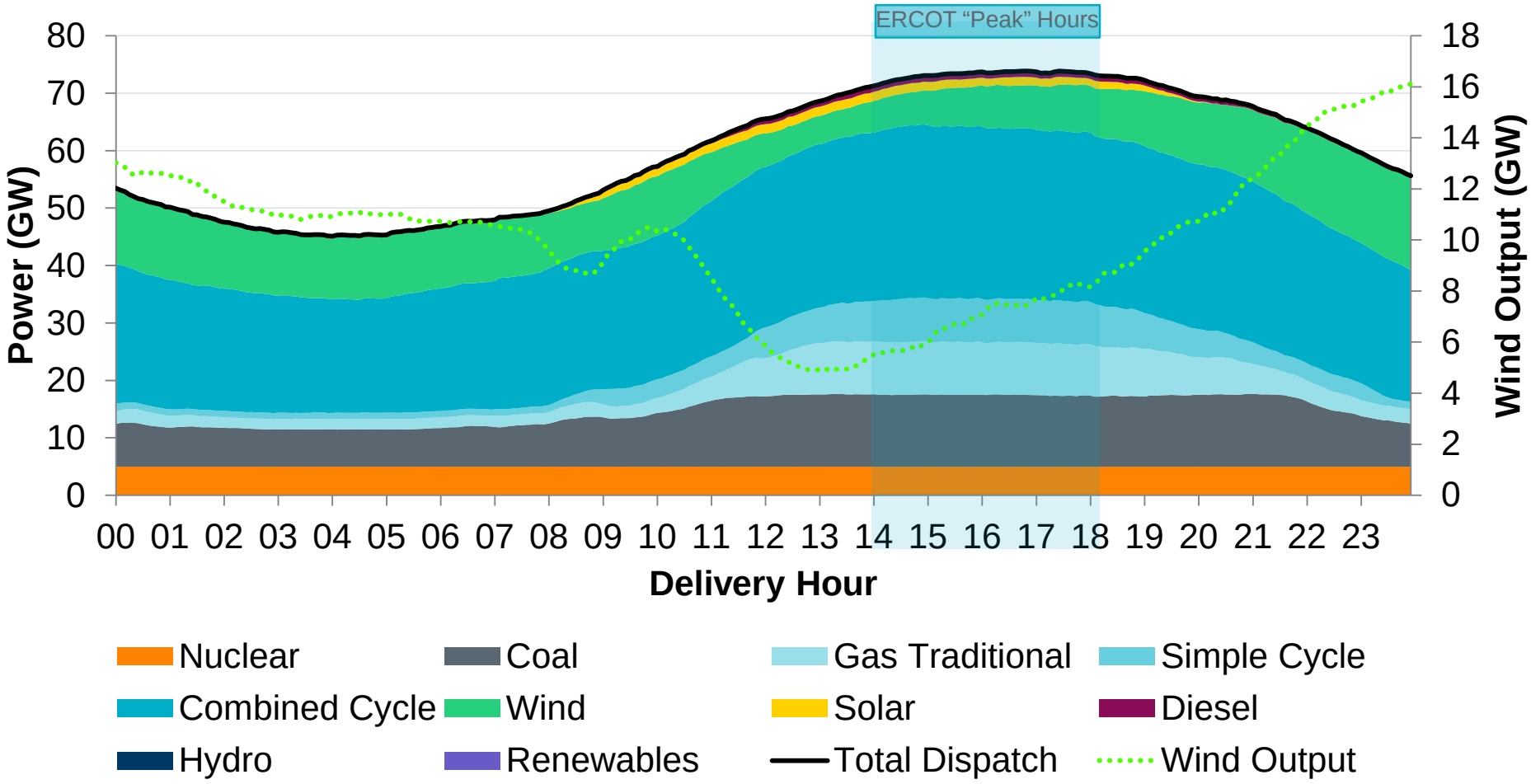
Largest absolute difference

Source: Final 2019 Summer SARA

*The totals for the Final 2019 Summer SARA column combine multiple rows into a single row in some cases. (E.g., already in-service Thermal and Hydro Resources with planned Thermal and Hydro Resources).

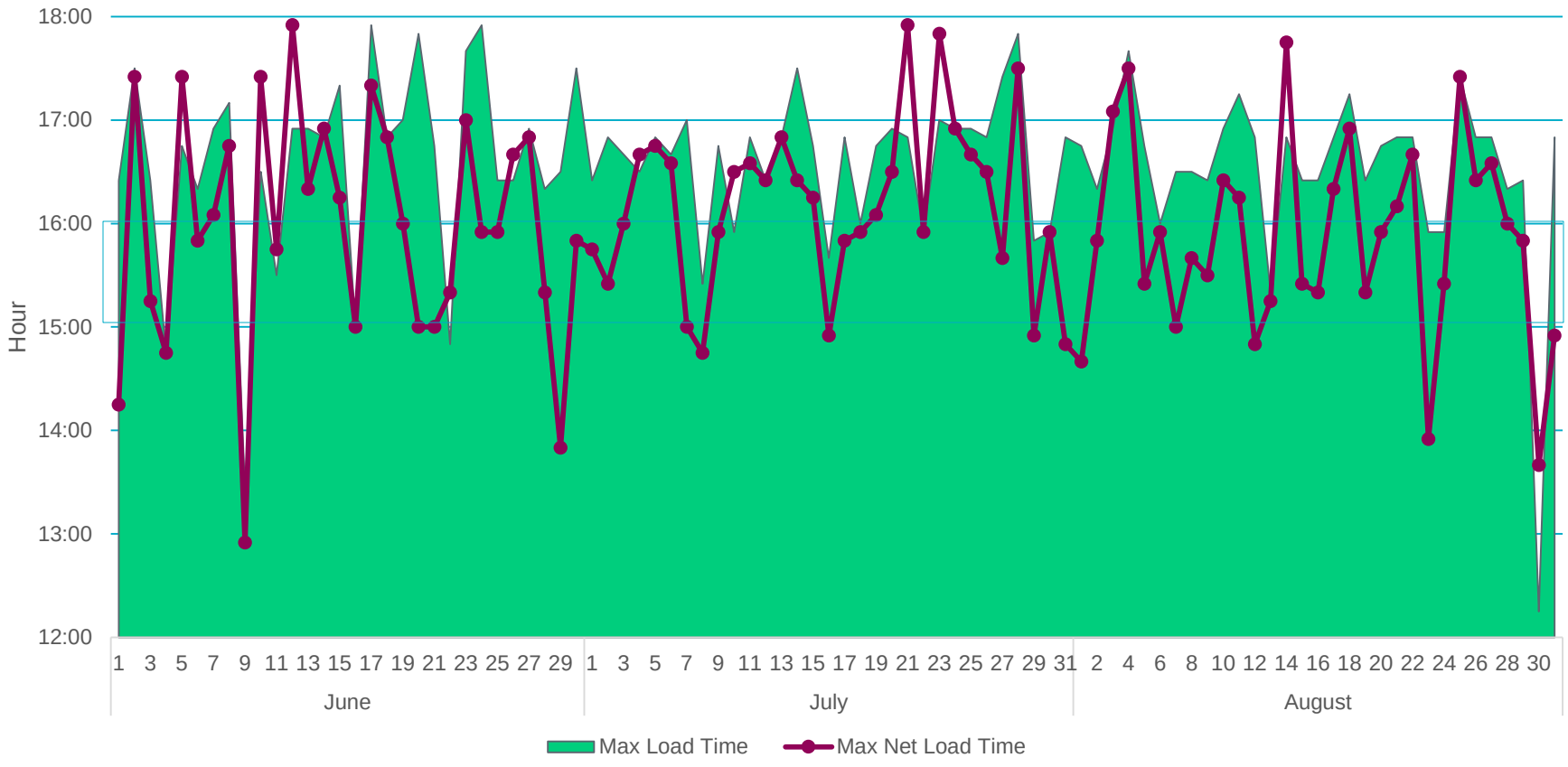
**The outage information in this table was extracted on Sept. 16, 2019.

Closer Look at Peak Demand Day of Aug. 12



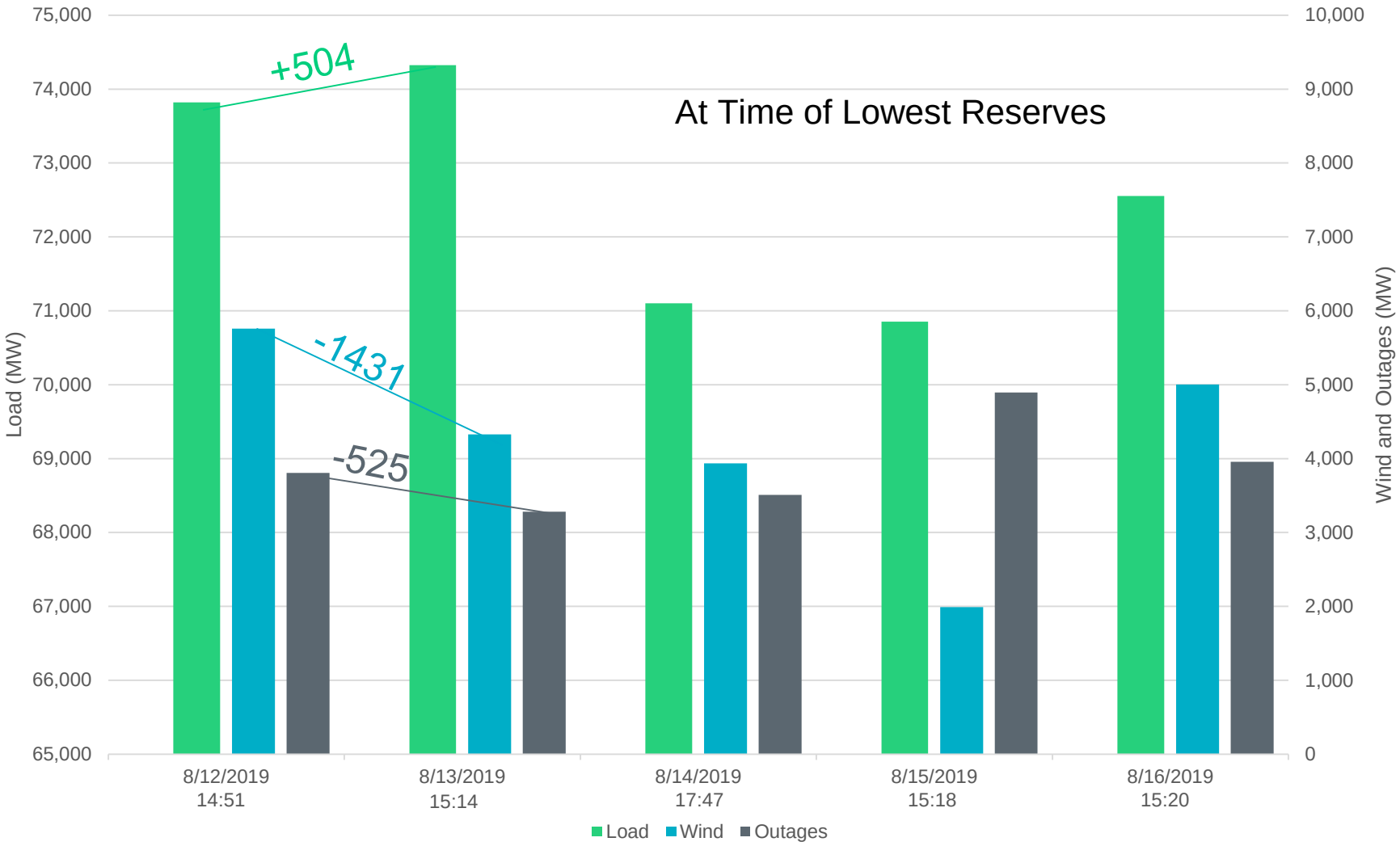
Timing of Peak Load and Peak Net Load (Load - IRR)

- During summer 2019, the peak net load frequently occurred prior to peak load.
- Net peak load occurred prior to 4 p.m. nearly 2/3 of the days in August.



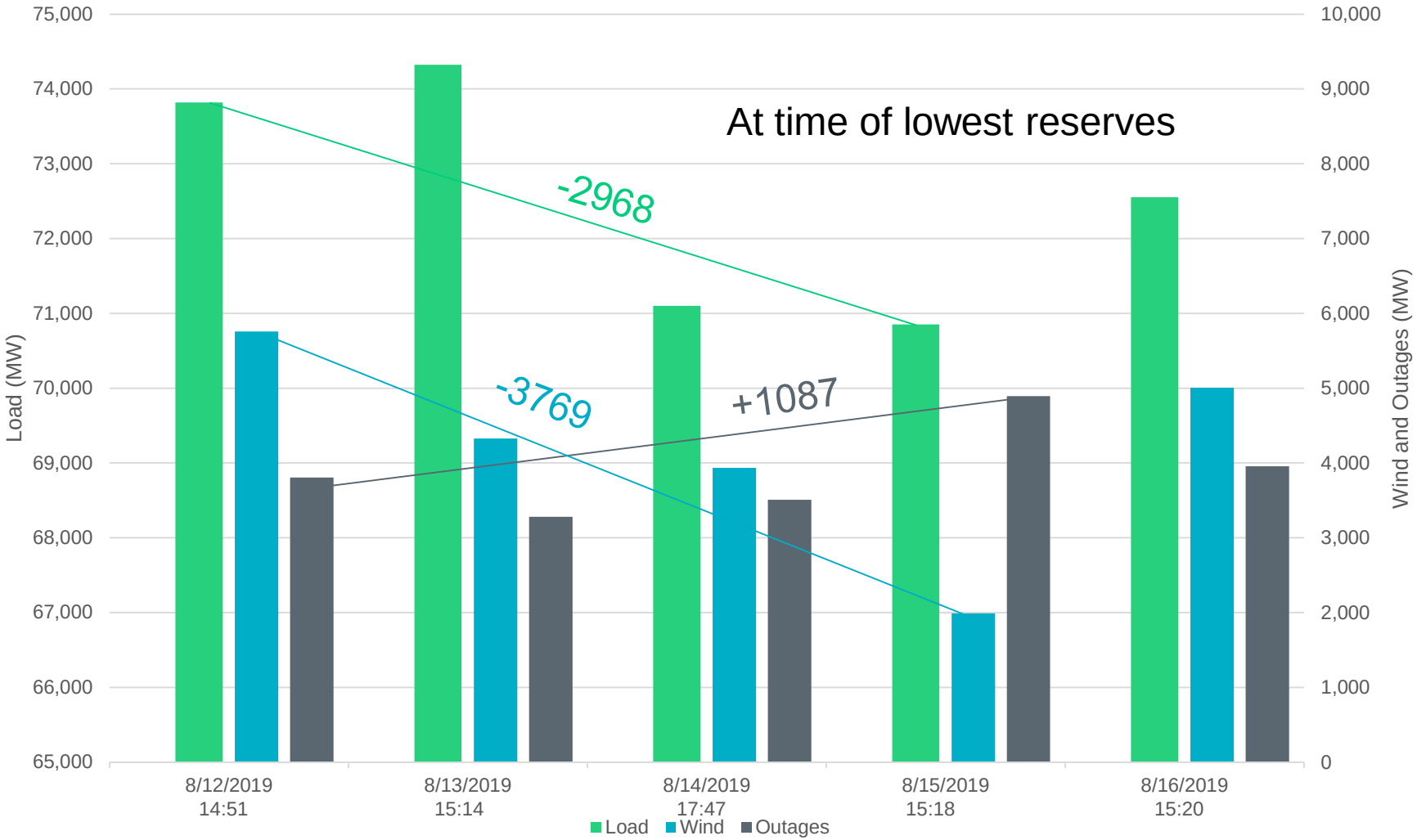
Time is rounded to nearest 5-minute interval

Load, Wind, and Outage Differences – 8/12-8/13



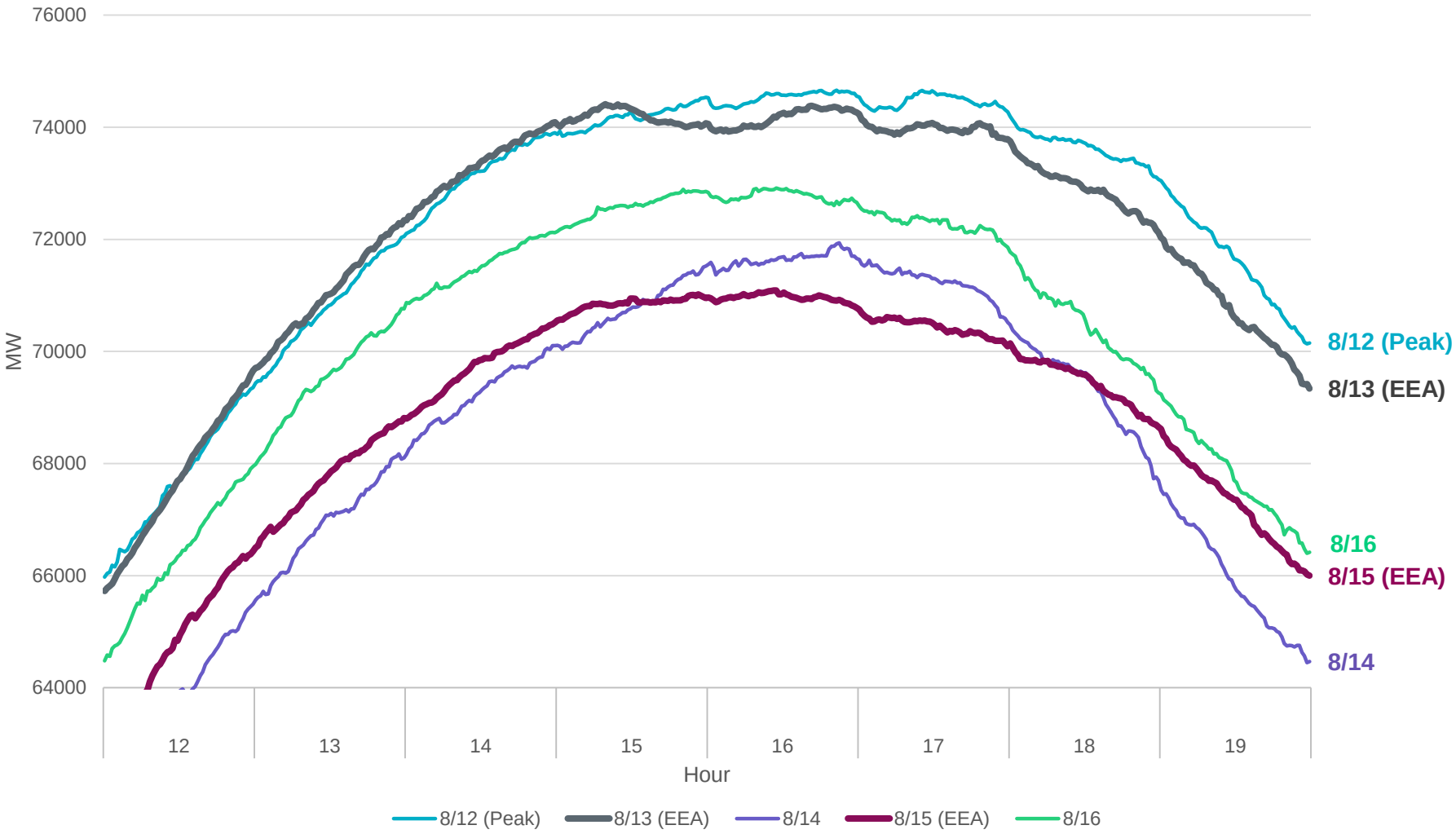
Outages Shown are non-IRR Outages

Load, Wind, and Outage Differences – 8/12-8/15



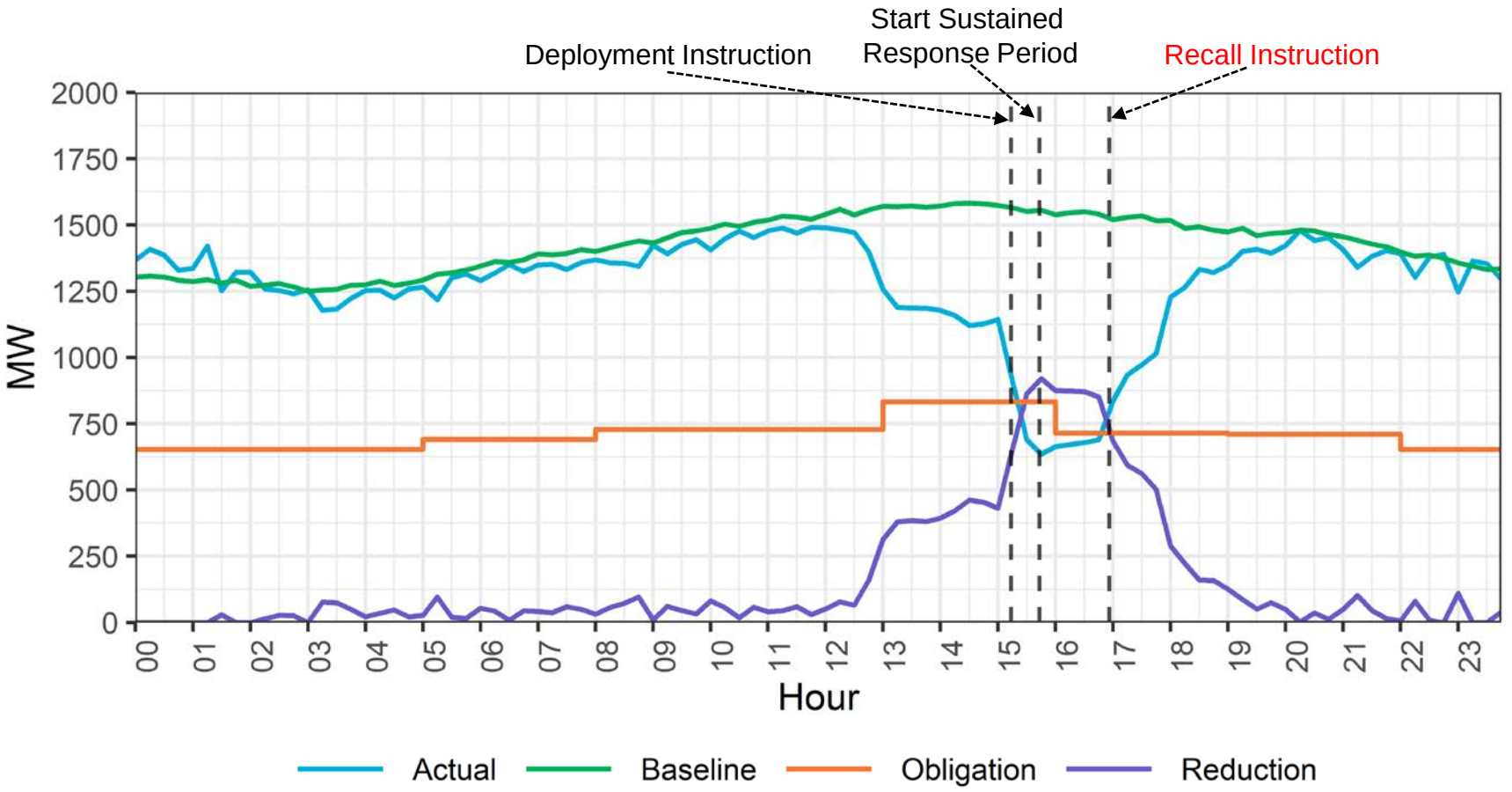
Outages shown are non-IRR outages

Load Patterns – 13:00-20:00 on 8/12-8/16

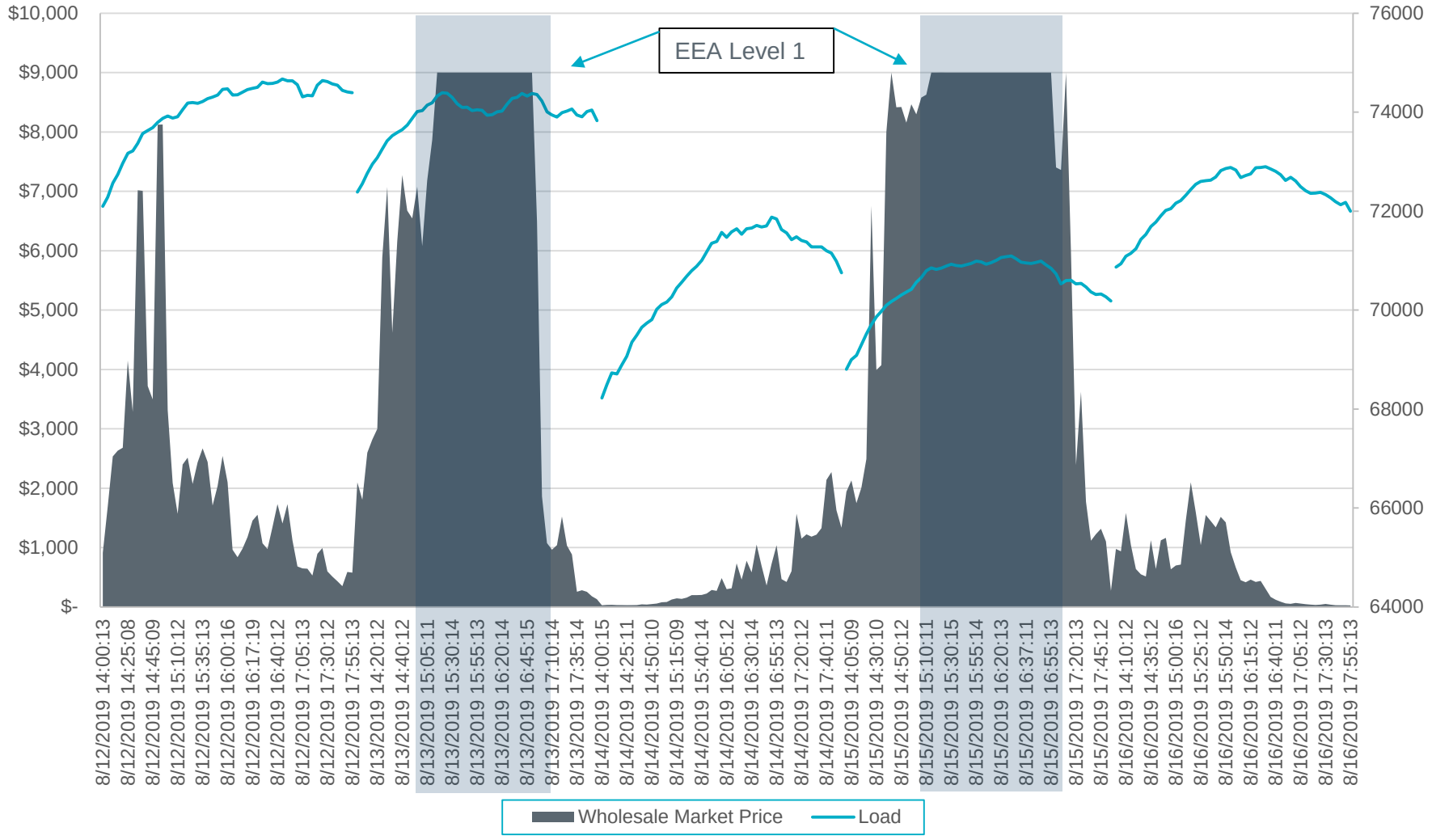


Aug. 15 Emergency Response Service (ERS) Deployment

- Fleet-wide, ERS deployment exceeded the obligation.

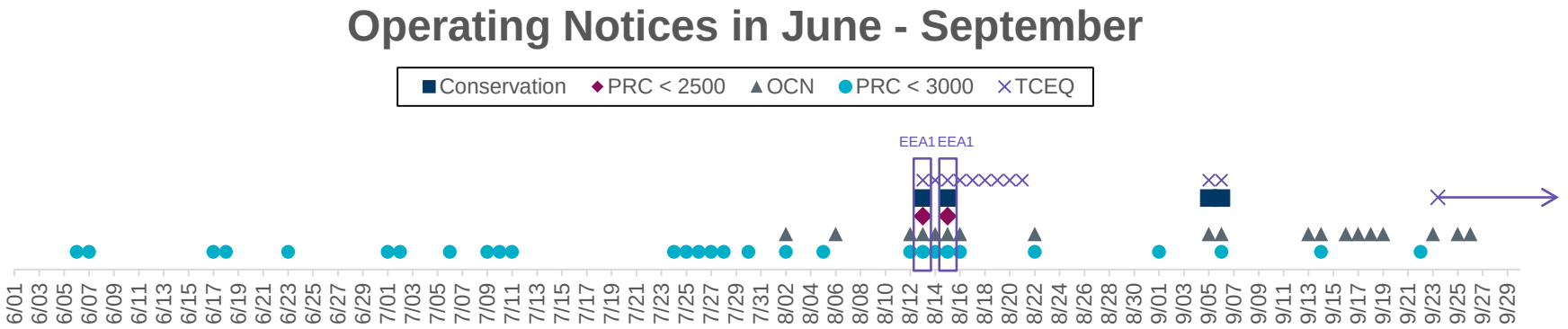


Peak Week: Wholesale Prices and Load (2 to 6 p.m.)



Operating Notices Issued in June – September 2019

- 19 Operating Condition Notices (OCNs) for reserve capacity shortage
- 29 Advisories due to Physical Responsive Capability (PRC) less than 3,000 MW
- 2 Watches due to PRC less than 2,500 MW
- 2 EEA Level 1 events
- 3 conservation requests
  - 2 request during August EEAs and 1 for Operating Days 9/5 and 9/6
- 3 TCEQ Notice of Enforcement Discretion
  - 2 system-wide notices, for Operating Days 8/13-8/21 and Operating Days for 9/5-9/6
  - 1 notice for Permian Basin units for Operating Days beginning 9/25



Key Observations for Summer 2019

- Early summer was mild, but August was very hot and September was well above normal. Based on mean temperature, June – September 2019 ranks as the 4th hottest summer on record in Texas.
- Tightest conditions frequently occurred earlier than time of peak demand (the peak net load).
- Resource performance continues to outpace historical patterns.
- Overall, the market outcomes supported reliability needs.

Recent FERC Activity

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Federal Energy Regulatory Commission
November 5, 2019

The views expressed in this presentation are my own and do not represent those of the Commission or any individual Commissioner

Staff Report on Lessons Learned from Commission-Led CIP Reliability Audits

- Commission staff issued report on October 4, 2019
- Findings in report are based on non-public CIP audits of registered entities that completed in fiscal year 2019
- Report offers recommendations to registered entities to improve their compliance with CIP Reliability Standards as well as their overall cybersecurity posture
  - Consider all generation assets, regardless of ownership, when categorizing bulk electric system cyber systems associated with transmission facilities;
  - Ensure that all employees and third-party contractors complete the required training and that the training records are properly maintained
  - Verify employees' recurring authorizations for using removable media; and
  - Review all firewalls to ensure there are no obsolete or overly permissive firewall access control rules in use

FERC/NERC Staff White Paper on CIP Standards Notices of Penalties

- White Paper issued August 27, 2019 in AD19-18-000
- Since 2018, FERC has received an unprecedented number of FOIA requests for nonpublic information in NOPs for violations of CIP standards
- In order to provide transparency and public access to information on violations of CIP Reliability Standards while protecting sensitive information, White Paper proposes that:
  - NERC submit each notice with a public cover letter disclosing name of violator, which standards were violated, and amount of penalties assessed
  - Each notice contains non-public attachments detailing nature of violation, mitigation activity and potential vulnerabilities to cyber system
  - Attachments would also include a request for designation of information as CEII
- FERC seeks comment on White Paper, including:
  - Potential security benefits and risks associated with proposed NOP format
  - Difficulties or concerns associated with implementation
  - Level of transparency changes would provide
- Comments on White Paper due October 28, 2019

Technical Conference on Managing Transmission Line Ratings

- Staff-led conference in AD19-15 held September 10-11, 2019 at FERC headquarters
- Panels addressed issues related to transmission line ratings, with a focus on dynamic line ratings (DLRs) and ambient-adjusted line ratings (AARs), exploring which transmission line rating and related practices might constitute best practices, and what, if any, Commission action in these areas might be appropriate
- Panelists shared their experience with DLR/AAR, noting:
  - R&D in DLR systems technology has advanced significantly
  - DLR systems technology is rarely used by TOs
  - Most line ratings are either static or seasonal calculations
  - Most support using AARs, but there is no agreement on how to develop them

Observations from Transmission Line Ratings Tech Conference

- Potential benefits of DLRs/AARs include:
  - Increased capacity to benefit integration of renewables
  - Congestion reduction and fewer curtailments
  - Improved TO flexibility and power system situational awareness
  - Increased transparency of line ratings for all users of the power system
- Potential challenges to DLRs/AARs include:
  - Possible reduction in available capacity during summer and winter seasons
    - Winter-when ambient temperatures exceed 32 degrees F
    - Summer-when ambient temperatures exceed 104 degrees F
  - Ambient condition forecasting is vital to DLR systems and transmission line AARs
  - AARs may not apply to all transmission lines
- Post-Technical Conference comments due November 1; reply comments due November 16

Grid-Enhancing Technologies Workshop

- Staff-led, two-day workshop in AD19-19 to be held November 5-6, 2019 at FERC headquarters
- Staff believes that a definition of Grid-Enhancing Technologies (GETs) should be technology-neutral and should account for both hardware and software that increases the capacity of the transmission system, apart from a new transmission line or substation
- Panels will address:
  - Grid-enhancing technologies (GETs) that increase the capacity, efficiency or reliability of transmission facilities
  - How GETs are currently used in transmission planning and operations
  - The challenges to deployment and implementation of GETs
  - Regulatory approaches and actions the Commission can take to facilitate adoption of GETs
  - Technologies addressed will include: power flow control and transmission switching equipment, storage technologies, and advanced line rating methodologies
- Workshop will be webcast and open for the public to attend
- Attendees can register on ferc.gov
- Written comments can be submitted after the workshop

Compliance Filings on Storage Rule

- First orders on compliance for Order No. 841 issued October 17, 2019
- Commission approved Order No. 841 compliance filings for SPP and PJM, finding that PJM and SPP generally complied with the rule by:
  - Enabling electric storage resources to provide all services they are capable of providing
  - Allowing electric storage resources to be compensated for those resources for those services in the same manner as other resources
  - Recognizing the unique physical and operational characteristics of electric storage resources
- FERC largely accepted filings but provided additional directives for further action due within 60 days
- FERC also initiated section 206 proceedings to address the specific issue of minimum run-time requirements for resource adequacy and capacity, with filings due no later than 45 days after publication in Federal Register
- FERC, grid operators and stakeholders must review, revise and implement all Order No. 841 compliance filings by December 3, 2019

- Thank you!
- Questions?