NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Actions

Howard Gugel, Vice President of Engineering and Standards
Board of Trustees Meeting
February 6, 2020

RELIABILITY | RESILIENCE | SECURITY




Project 2017-07 Standards Alignment with Registration

- Background
  - Address Reliability Standards impacted by the Risk Based Registration (RBR) initiative
- Action
  - Adopt:
    - FAC-002-3 – Facility Interconnection Studies; IRO-010-3 – Reliability Coordinator Data Specification and Collection; MOD-031-3 – Demand and Energy Data; MOD-033-2 – Steady-State and Dynamic System Model Validation; NUC-001-4 – Nuclear Plant Interface Coordination; PRC-006-4 – Automatic Underfrequency Load Shedding; and TOP-003-4 – Operational Reliability Data.

Project 2018-04 Modifications to PRC-024-2

- Background
  - Based on disturbance analyses and the PRC-024-2 Gaps Whitepaper
  - Clarifies and corrects technical issues for inverter-based resources
- Action
  - Adopt PRC-024-3 – Frequency and Voltage Protection Settings for Generating Resources

Project 2019-01 Modifications to TPL-007-3

- Background
  - Corrective action plans (CAP) for supplemental GMD event vulnerabilities
  - ERO approval required for CAP extension requests
- Action
  - Adopt TPL-007-4 – Transmission System Planned Performance for Geomagnetic Disturbance Events

Texas RE – Primary Frequency Response in the ERCOT Region

- Reliability Benefits
  - Drafting team revised BAL-001-TRE-1 to:
    - remove the governor deadband and droop setting requirements for steam turbines in a combined cycle train; and
    - seek clarification of the responsible entity for Frequency Measurable Event exclusion requests.
  - Drafting team made changes specified in the Summary of Changes
- Action
  - Adopt BAL-001-TRE-2 - Primary Frequency Response in the ERCOT Region

Questions and Answers

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2019 ERO Enterprise Dashboard

Fourth Quarter Status

Thomas Coleman, Director of Risk Issue Management

Board of Trustees Meeting

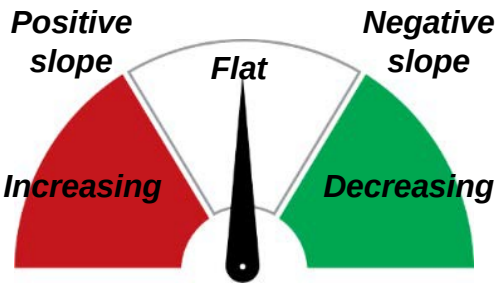
February 6, 2020

RELIABILITY | RESILIENCE | SECURITY




Reliability Indicator 1: Fewer, Less Severe Events

- **Why is it important?**
  - Measures risk to the bulk power system (BPS) from events on the Bulk Electric System (BES)
- **How is it measured?**
  - Cumulative eSRI line in the composite daily event Severity Risk Index (eSRI) for Category 1–3 events (see pages 2-3 of ERO Event Analysis Process for category determination)

Data (Annual Measurement) ▪ Threshold: No Category 3 or above events: *Zero is green, else is red*	**2019 Status** 
Data (Compared to a 5-year rolling average) ▪ Slope of eSRI line is flat to decreasing and does not show an increase above zero that is statistically significant (95% Confidence Interval). ▪ "2019 Status" relates to the slope of the 5-year rolling average (Positive, Flat or Negative), not just the 2019 performance.	

Reliability Indicator 2: Compliance Violations

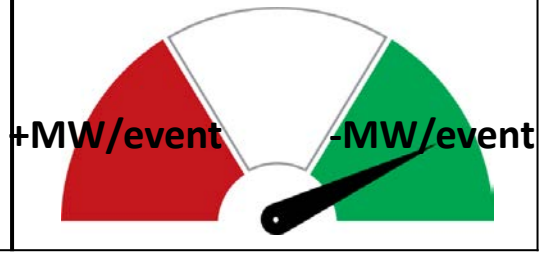
- **Why is it important?**
  - Reduce risk to BPS reliability from Standard violations by registered entities
- **How is it measured?**
  - Compliance History* of with moderate/serious risk noncompliance
  - The number of violations discovered through self-reports, audits, etc.
  - Risk to the BPS based on the severity of Standard violations

Data (Annual Measurement) ▪ Moderate and serious risk repeat violations filed with FERC on organizations that have Compliance History (based on 2017 metric) ---- Current number is 102	**2019 Status** 
Data (Annual Measurement) ▪ Percent of noncompliance self-reported (Self-certified noncompliance is not included) (same as 2018 metric) ----Current number is 75%	
Data (Compared to a 3-year rolling average) ▪ The number of serious risk violations resolved compared to the total noncompliance resolved (based on 2018 metric) --- Current number is 1.4%	

* To measure the effectiveness of the risk-based CMEP in reducing noncompliance, NERC reviews moderate and serious risk violations and includes them in one of three categories: 1) noncompliance with no prior compliance history; 2) noncompliance with prior compliance history that does not involve similar conduct; and 3) noncompliance with compliance history that includes similar conduct.

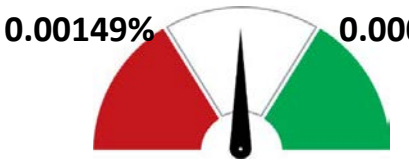
Reliability Indicator 3: Protection System Misoperations Rate

- **Why is it important?**
  - Protection system misoperations exacerbate the impacts
- **How is it measured?**
  - Annual Misoperations rate and the annual loss of load for events with misoperations

Data (Year-Over-Year Comparison) ▪ Q3-Q2 comparison misoperations rate based on collection interval (95% Confidence Interval) (Based on 2018 Metric) ▪ *Includes four years through Q2 2018. Data for year five not available until Q3 dashboard.*	**2019 Status** 
Data (Year-Over-Year Comparison) ▪ Q3-Q2 comparison for qualified events with misoperations and loss of load (load loss/number of events) during the collection interval (95% Confidence Interval)	**No Change** 

RI 4: Events Caused by Gas-Fired Unit Forced Outages Due to Cold Weather or Gas Unavailability

- **Why is it important?**
  - Reduce risk to BPS reliability due to gas-fired unit outages during cold weather or gas unavailability
- **How is it measured?**
  - Firm load loss due to cold weather or gas unavailability
  - MWh of potential production lost initiated by cold weather and gas unavailability

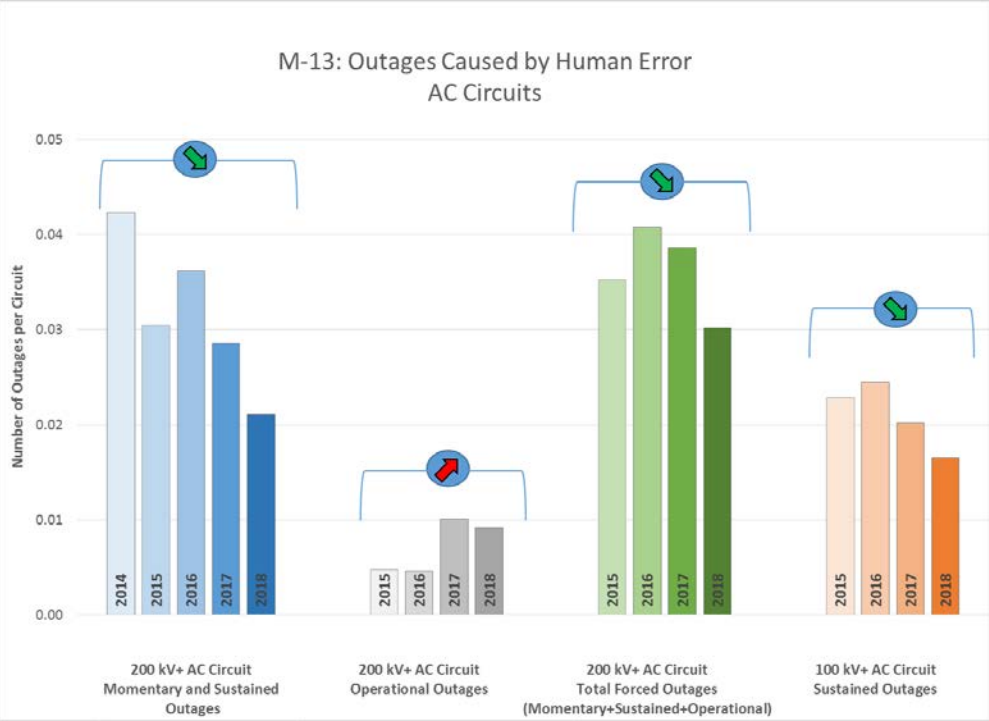
Data (Annual Measurement) ▪ No firm load loss due to gas-fired unit outages during cold weather: *Zero is green, else is red* (Cold weather months: January – March and December of the same calendar year) *As of 12/31/2019, Metric status is Green.*	**2019 Status** 
Data (Annual Measurement) (Match with 4.4, year defined as Q3-Q2) ▪ No firm load loss due to gas unavailability: *Zero is green, else is red* *As of 12/31/2019, Metric status is Green.*	
Data (Compared to a 5-year rolling average) ▪ Percentage of winter period net MWh of potential production lost due to gas-fired unit outages during cold weather (Cold weather months: January – March and December of the same calendar year) *Five-year average: 0.0067%*	
Data (Compared to a 5-year rolling average) ▪ Percentage of annual net MWh of potential production lost due gas unavailability compared to a 5-year rolling average (Due to data availability, year defined as Q3-Q2) *Five-year average: 0.1483%*	

Reliability Indicator 5: Reduce AC Transmission Line Forced Outages

- **Why is it important?**
  - Measures risks to BPS reliability from three priority causes:
    1. Operator or other human performance issues
    2. Substation equipment failures or failed circuit equipment
    3. Vegetation encroachment

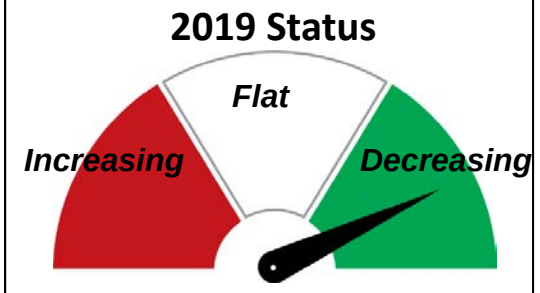
Reliability Indicator 5a: Operator or Other Human Performance Issues

- **How is it measured?**
  - Number of transmission line outages caused by Human Error divided by the total inventory of circuits



Data (Compared to a 5-year rolling average)

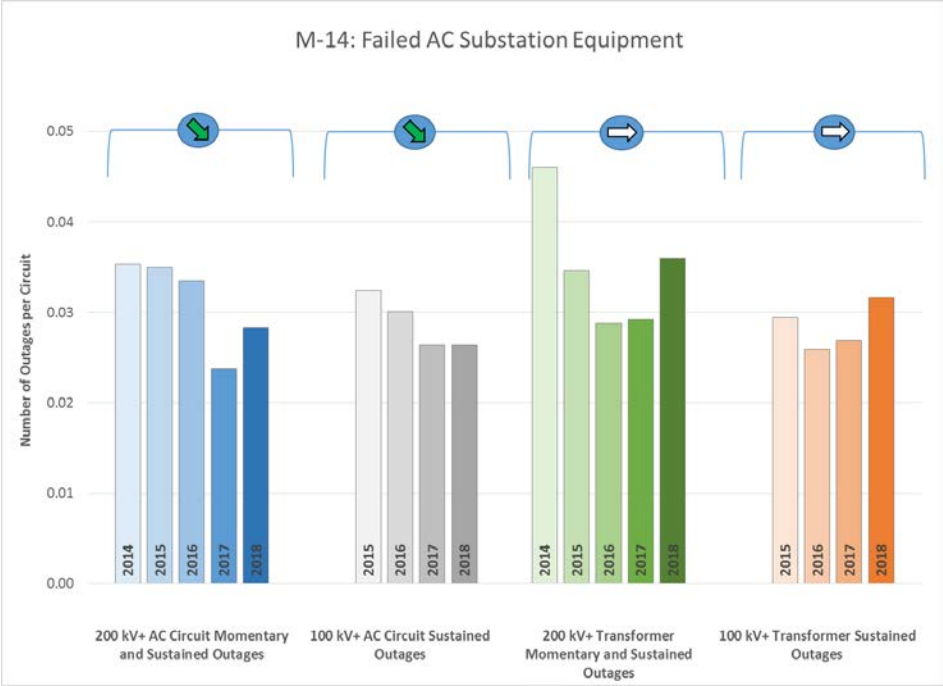
- Annual outage rate* decreasing compared to a 5-year rolling average (95% Confidence Interval) (Based on 2018 metric)



*Due to data availability, collection year defined as Q3-Q2

Reliability Indicator 5b: Substation Equipment Failures or Failed Circuit Equipment

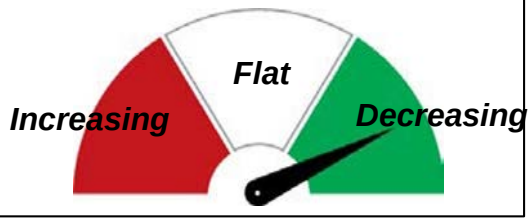
- **How is it measured?**
  - Number of transmission line outages caused by AC substation equipment outage failures and failed AC circuit equipment (such as transformers), divided by the total inventory of circuits



Data (Compared to a 5-year rolling average)

- Annual outage rate* decreasing compared to a 5-year rolling average (95% Confidence Interval) (Based on 2018 metric)

2019 Status

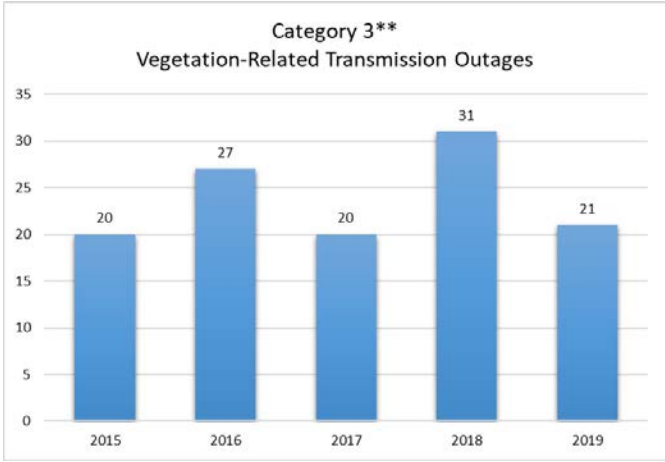


*Due to data availability, collection year defined as Q3-Q2

Reliability Indicator 5c: Vegetation Encroachment

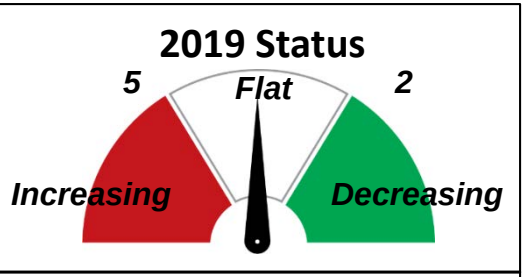
- **How is it measured?**
  - Number of potential FAC-003 violations*

    Year: #
    2019: 0
    2018: 3
    2017: 6
    2016: 0
    2015: 3
    Mean = 3 Standard deviation = 2.7



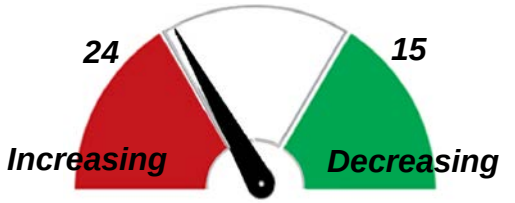
Data* (Compared to a 5-year rolling average)

- Number of vegetation encroachments, excluding fall-ins, decreasing (within one standard deviation, based on small sample size) (Based on 2018 metric) -- 5-year average is 3.0



Data (Compared to a 5-year rolling average)**

- Fall-ins: Number of vegetation encroachments decreasing (within one standard deviation, based on 6-year sample) -- 5-year average is 23.8



Reliability Indicator 6 : Unauthorized Physical or Electronic Access

- **Why is it important?**
  - Measures risk and impact to the BPS from cyber or physical security attacks
- **How is it measured?**
  - Based on industry-submitted OE-417 and/or EOP-004 Electric Emergency Incident and Disturbance Reports*

    One cyber security and 34 physical security events were reported in Q4 2019.

*As more data becomes available this metric will be enhanced to provide increased granularity of this risk

Data (Annual Measurement), based on 2018 metric

- No disruption** of BES operations due to cyber attacks

  Zero disruptions of BES operations due to cyber attacks in 2019 Q4
- No disruption** of BES operations due to physical attacks: *Zero is green, else is red*

  Five disruptions of BES operations due to physical attacks in 2019 Q4

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

2019 Status

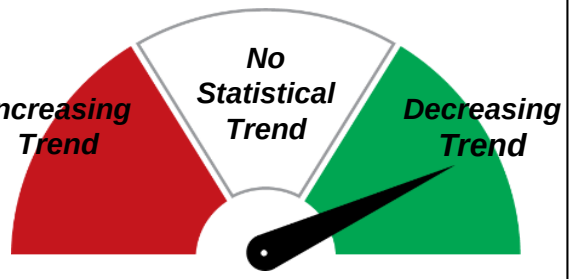
RI 7: Disturbance control events greater than the most severe single contingency

- **Why is it important?**
  - Measures risk to the BPS by monitoring the number of Disturbance Control Standard (DCS) events that are greater than the Most Severe Single Contingency (MSSC)
- **How is it measured?**
  - Information received by NERC based on the BAL-002 Reliability Standard
  - Due to the timing in Balancing Authority data submittals the metric is updated one quarter in arrears
  - Measures a rolling 7 year quarterly time trend testing for statistical significance

Data (Quarterly Measurement), New

- **Green**: a time trend line of the most recent 7 years of quarterly DCS events > MSSC has a statistically significant negative slope
- **Middle**: no statistically significant trend for the slope
- **Red**: a time trend line of the most recent 7 years of quarterly DCS events > MSSC has a statistically significant positive slope
- **Metric Results through 3Q19: Green** - DCS data for the most recent 28 quarters shows a statistically significant decreasing trend

2019 Status



Reliability Indicator 8: Interconnection Frequency Response

- **Why is it important?**
  - Measures risk and impact to the BPS by measuring the interconnection frequency response performance measure (IFRM) for each BAL-003-1 event as compared to the Interconnection Frequency Response Obligation (IFRO)
- **How is it measured?**
  - IFROs are calculated and recommended in the Frequency Response Annual Analysis Report for Reliability Standard BAL-003-1.1 implementation
  - IFRM performance is measured for each event by comparing the resource (or load) MW loss to the frequency deviation
  - Due to the timing in selection of events the metric is updated one quarter in arrears.

Data (Quarterly & Annual Measurement), New

- IFRM for each BAL-003-1 event is compared to the IFRO for each quarter of the 2019 operating year
- Success is no Interconnection experiencing a BAL-003-1 frequency event where IFRM performance is below their respective IFRO: *Zero is green, else is red*
- **Metric Results through 3Q19:** No Interconnection experienced a BAL-003-1 event where their IFRM was below their IFRO

2019 Status

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Questions and Answers

WECC

Reliability Coordination in the Western Interconnection

February , 2020

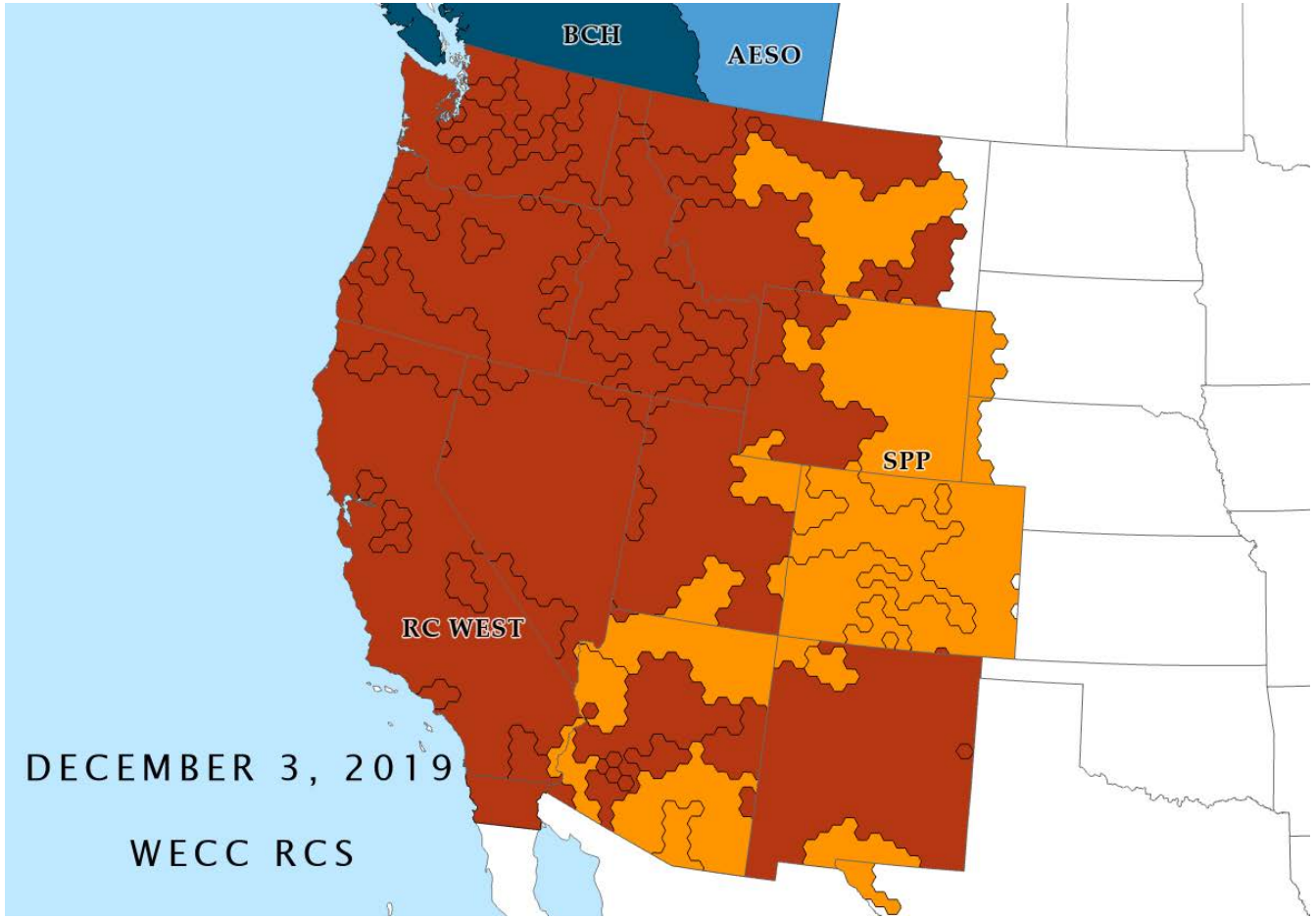
Branden Sudduth

Vice President RPPA

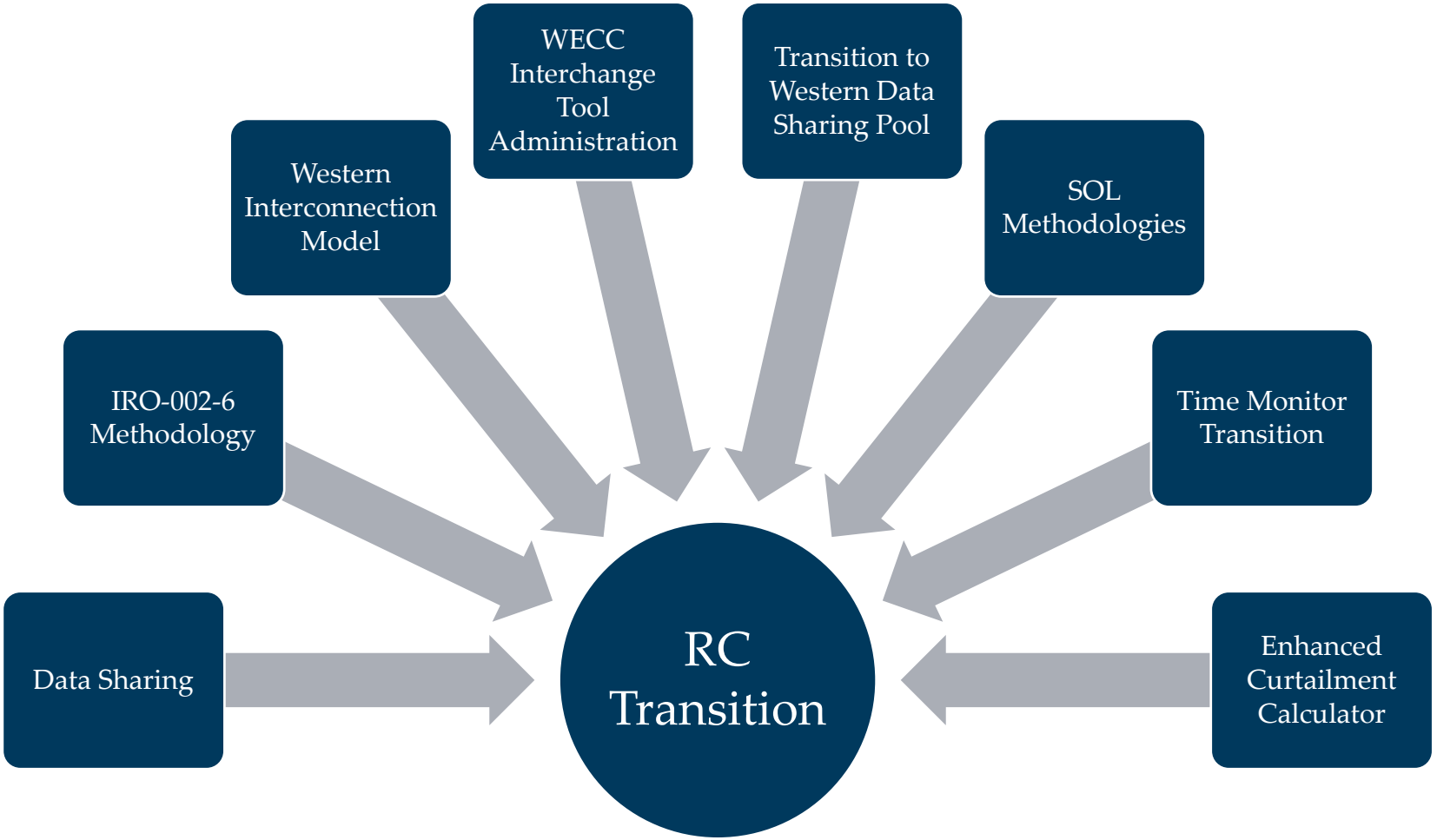
RC Transition Status

- RC West began operations of its expanded RC footprint on November 1
- SPP RC began operations of the SPP West RC footprint on December 3
- Peak Reliability ceased operations December 3

2019 RC Transition



Transition Accomplishments



Next Steps

- Transition to Reliability and Security Oversight activities
- Assurance visits around coordination and collaboration
- Regular updates at WECC Operating Committee meetings
- Engagement with RC governance and coordination committees

WECC

Electric Reliability and Security for the West

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