2019 ERO Enterprise Dashboard Metrics
1. Fewer, less severe events (Goals 1-5)*
2. Compliance violations (Goals 1 & 2)
3. Protection system misoperations rate and misoperations with loss of load (Goals 1-4)
4. Events caused by generating unit forced outages due to cold weather or fuel unavailability (Goals 1-4)
5. Reduce AC Transmission line forced outages (Goals 1-4)
6. Unauthorized physical or electronic access (Goals 1-3 & 5)
7. Disturbance control events greater than the most severe single contingency (Goals 1-4)

8. Interconnection Frequency Response (Goals 1-4)


Inferential statistics will be calculated when sample sizes are appropriate at a 95% confidence interval.
Metric Status Definitions*

*Dashboards are for illustrative purposes only and are not meant to represent current status or projections.

**Green**
Risk indicator getting better

**Neutral**
Risk indicator between getting better and getting worse

**Red**
Risk indicator getting worse

**Pass/Fail**
Risk indicator either met or did not
• **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)**
- No Category 3 or above events: *Zero is green, else is red*

**Data (Compared to a 3-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 3-year rolling average (Positive, Flat or Negative), not just the 2019 performance
Metric 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 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)

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<tr>
<th>2019 Status</th>
<th>48</th>
<th>45</th>
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Data (Annual Measurement)
- Percent of noncompliance self-reported (Self-certified noncompliance is not included) (same as 2018 metric)

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<th>75%</th>
<th>80%</th>
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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)

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<th>5%</th>
<th>4%</th>
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* 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.
• Why is it important?
  ▪ Protection system misoperations exacerbate the impacts

• How is it measured?
  ▪ Annual Misoperations rate and the annual cumulative loss of load for events with misoperations (cumulative rate through Q2 2019)

Data (Year-Over-Year Comparison)
  ▪ Q3-Q2 comparison misoperations rate based on collection interval (95% Confidence Interval) (Based on 2018 Metric)

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) (New)
Metric 4: Events Caused by Gas-Fired Unit Forced Outages Due to Cold Weather or Gas Unavailability

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- **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*

### Data (Annual Measurement)
- No firm load loss due to gas unavailability: *Zero is green, else is red*

### 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 (Winter season January – March and December of the same calendar year)

### 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)

### 2019 Status
- Percent of MWhrs Lost Due to Lack of Fuel vs Winter Storms
  - Lack of fuel
  - Storms (ice, snow, etc)
  - 2014: 0.0000, 2015: 0.0001, 2016: 0.0002, 2017: 0.0003, 2018: 0.0005
  - 2019: 0.0010, 2020: 0.0019

- 2019 Status:
  - 2019 Status: 0.192% Lack of Fuel, 0.0898% Storms (ice, snow, etc)
  - 2018 Status: 0.00149%, 0.00053%

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

**Data (Compared to a 3-year rolling average)**
- Annual outage rate* decreasing compared to a 3-year rolling average (95% Confidence Interval) (Based on 2018 metric)

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

**2019 Status**
- *Increasing*
- *Flat*
- *Decreasing*
• How is it measured?
  - Number of possible FAC-003 violations*

  Year: #
  2018: 4
  2017: 6
  2016: 0
  2015: 3
  2014: 0
  Mean = 2.6 Standard deviation = 2.33

Data* (Compared to a 5-year rolling average)
  - Number of vegetation encroachments reported as possible FAC-003 violations decreasing (within one standard deviation, based on small sample size) (Based on 2018 metric)

Data** (Compared to a 5-year rolling average)
  - Fall-ins: Number of vegetation fall-ins resulting in sustained outages decreasing (within one standard deviation, based on 6-year sample size)
• **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*
  - No disruption** of BES operations due to physical attacks

<table>
<thead>
<tr>
<th>Data (Annual Measurement), based on 2018 metric</th>
<th>2019 Status</th>
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<tbody>
<tr>
<td>No disruption** of BES operations due to cyber attacks: <em>Zero is green, else is red</em></td>
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*As more data becomes available this metric will be enhanced to provide increased granularity of this risk.

**A disruption means that a BES facility was removed from service as a result of the cyber or physical incident.
• 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
  ▪ Measures a rolling 7 year quarterly time trend testing for statistical significance

Data (Quarterly Measurement), New
  ▪ **Green**: a rolling 7 year trend line with a negative slope that compares the number of DCS events greater than the MSSC
  ▪ **Middle**: no statistically significant trend for the slope
  ▪ **Red**: a rolling 7 year trend line with a positive slope that compares the number of DCS events greater than the MSSC

*Calculated quarterly: Green, Middle or Red to 95% confidence level*
• **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 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

### 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

### 2019 Status