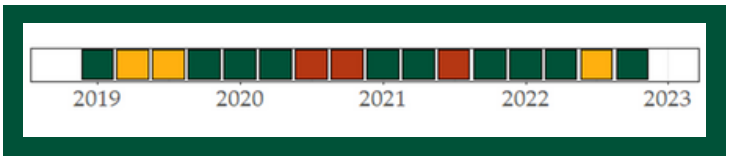
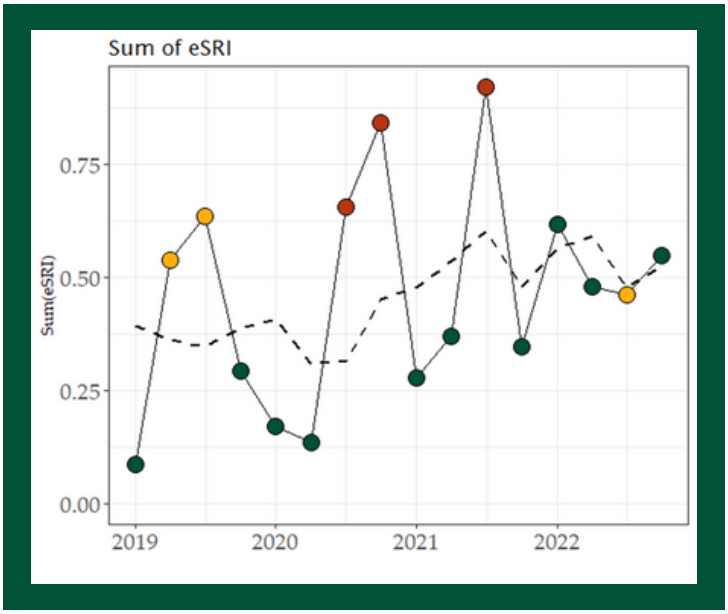
Indicator 1:
Number and Severity of Reported Events

What it measures

Indicator 1 measures the frequency and severity of events that occur on the system each quarter. This measurement is based on the NERC Event Analysis Process to track and evaluate events. The indicator measures only reported events evaluated through that process.



Indicator Performance History



How it is measured

Indicator 1 is based on two characteristics of reported events:

1. Sum of the Event Severity Risk Index (eSRI) number for each event every quarter.
2. Number of Category 2 and higher events each quarter.

Why this matters

Events pose a risk to system reliability. Category 2 or higher events are more significant events that have severe impacts on the system.

What does the Q4 2022 evaluation tell us?

There were nine categorized events in the Western Interconnection in Q4 of 2022; however, none of these were Category 2 or higher. There were seven Category 1a events, one Category 1c event, and one Category 1h event in Q4 of 2022. Of these events, four affected customer load, while three affected generation. The eSRI for the quarter is only slightly above the moving average for the year, resulting in the indicator being "green."

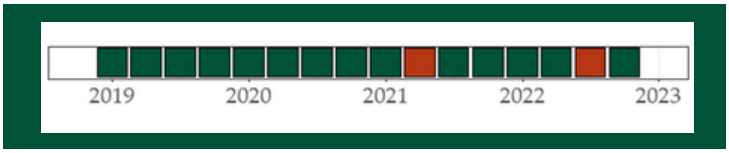
DATA SOURCE

The Event Analysis Management System
NERC eSRI metric

Indicator 2:
Rate of Protection System Misoperations

What it measures

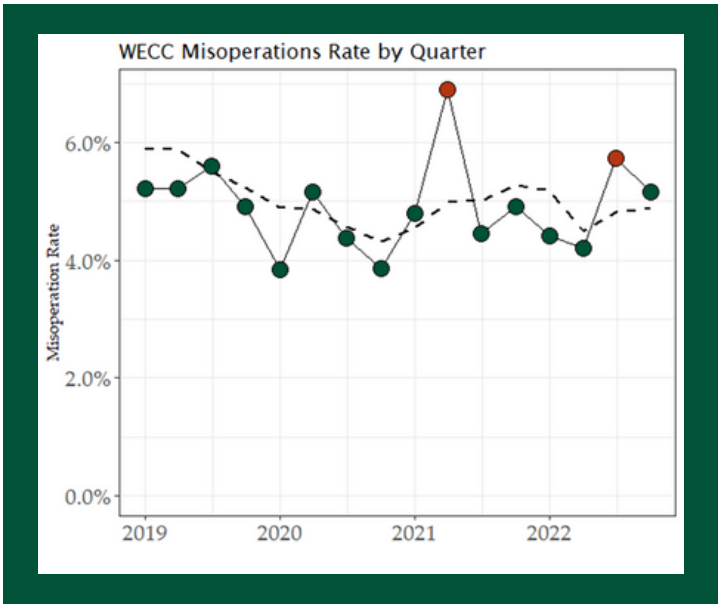
Indicator 2 measures the effectiveness of protection systems in safeguarding system reliability.



Indicator Performance History

How it is measured

Indicator 2 tracks the ratio of protection system misoperations to the total number of protection system operations.



Why this matters

System reliability is reduced when protection systems fail to operate, or they operate incorrectly ("misoperation"). Misoperations are a major contributor to transmission outage severity.

What does the Q4 2022 evaluation tell us?

The MIDAS reporting for Q4 2022 included 1,105 operations with 57 misoperations. This yields a 5.2% misoperations rate. This is a favorable rate, only slightly above the moving average for the year, and is therefore classified as "green."

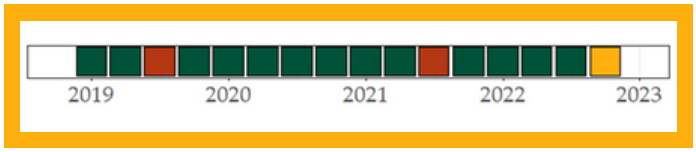
DATA SOURCE

Misoperation Information Data Analysis System (MIDAS)

Indicator 3:
Rate of Unplanned Outages of Multiple Transmission Elements

What it measures

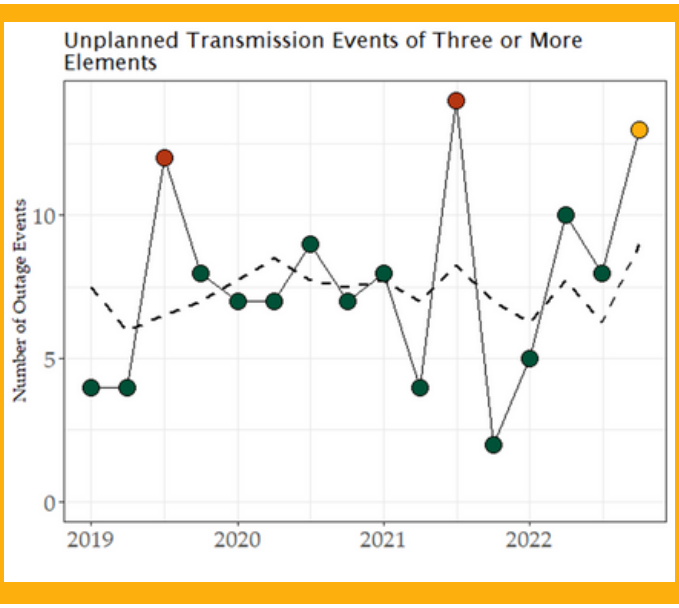
Indicator 3 measures how often potentially high-risk, unplanned transmission outages occur on the system.



Indicator Performance History

How it is measured

Indicator 3 tracks the number of unplanned transmission events involving three or more Bulk Electric System elements each quarter.



Why this matters

While most transmission events involve an outage of a single element, some events involve multiple elements. Though relatively uncommon, events involving three or more elements pose a higher risk because they are more extensive than the n-1 and n-2 contingencies typically considered by planners.

What does the Q4 2022 evaluation tell us?

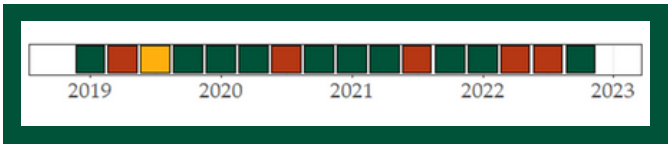
There were 13 unplanned transmission events involving three or more elements in Q4 of 2023, which is sufficiently greater than the moving average number to classify the quarter as "yellow." Four entities had multiple events adding to this category, representing 10 of the 13 events. The number of multi-element transmission events does not appear to be seasonal. Of the 13 events, 10 lasted less than one day, although two resulted in extended outages on elements that were out of service from early November until the end of the year.

DATA SOURCE
Transmission Availability Data System (TADS)

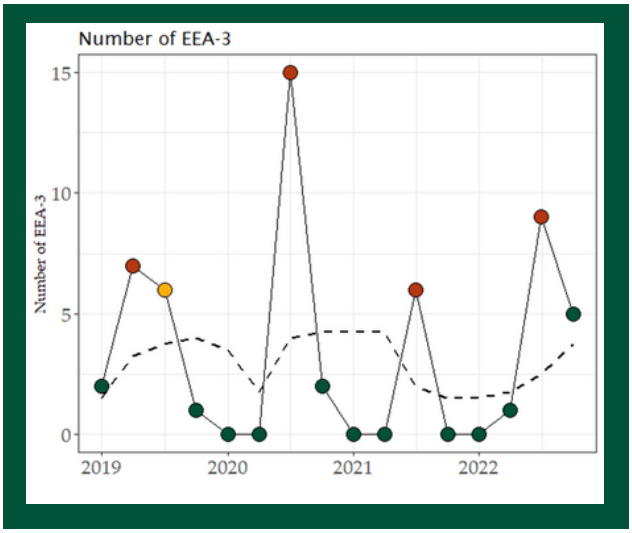
Indicator 4: Number And Duration of Energy Emergency Alerts

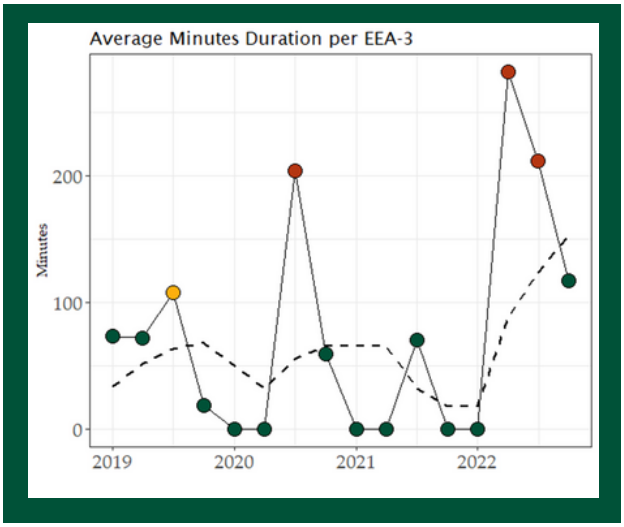
What it measures

Indicator 4 measures the number and duration of Level 3 Energy Emergency Alerts (EEA-3) issued to Balancing Authorities each quarter. An EEA-3 alert is defined as a situation in which firm load interruption is imminent or in progress.



Combined Indicator Performance History





How it is measured

Indicator 4 is based on two metrics related to EEA-3 alerts:

1. The number of EEA-3 alerts issued each quarter.
2. The mean duration of the EEA-3 alerts issued each quarter.

Why this matters

EEA-3 alerts can indicate a lack of sufficient bulk electric system generation capacity, energy, or transmission capability. EEA-3 alerts are an important indicator of system operational reliability.

What does the Q4 2022 evaluation tell us?

Five EEA-3 events lasted an average of 117 minutes in Q4 2022. Both of these metrics are close enough to their running averages that the indicator is "green" in Q4 2022. The five EEA-3 events occurred during an extreme cold event in December. The cold resulted in record peak demand for several BAs in the Pacific Northwest and Canada.

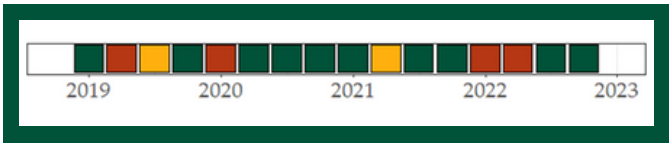
DATA SOURCE

NERC System Awareness

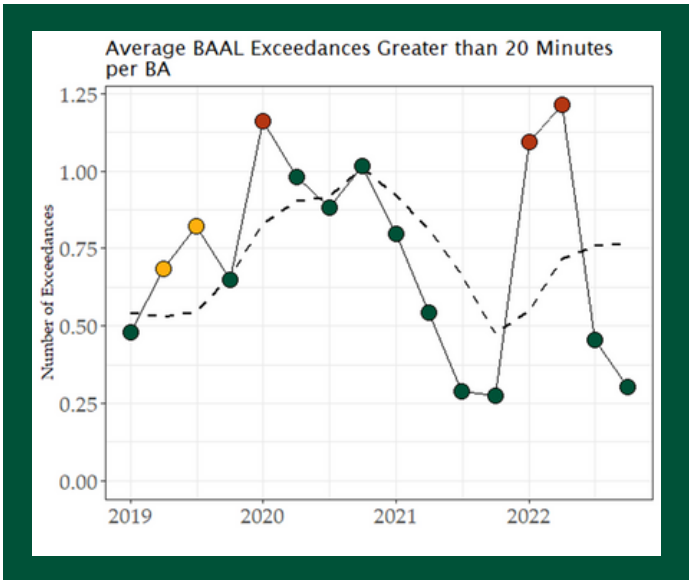
Indicator 5: System Operation Outside Balancing Authority ACE Limit (BAAL)

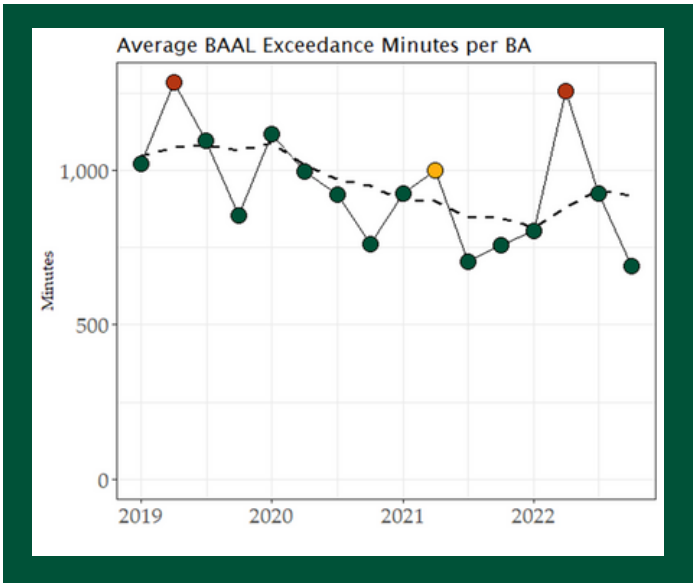
What it measures

Indicator 5 measures the system's ability to maintain frequency within defined limits.



Combined Indicator Performance History





How it is measured

Indicator 5 is based on two metrics related to Real Power Balancing Control Performance:

1. The mean number of Balancing Authority Area Control Error (ACE) Limit (BAAL) exceedance minutes per BA each quarter.
2. The mean number of BAAL exceedances greater than 20 minutes per BA each quarter.

Why this matters

Operation within the BAAL supports reliability by maintaining system frequency within defined limits. Instances, where the BAAL is exceeded, may put the reliability of the interconnection at risk.

What does the Q4 2022 evaluation tell us?

The number of BAAL exceedances greater than 20 minutes per BA, and the average BAAL exceedance minutes per BA, were less than the moving averages for those metrics. Consequently, this indicator is "green" for Q4 2022.

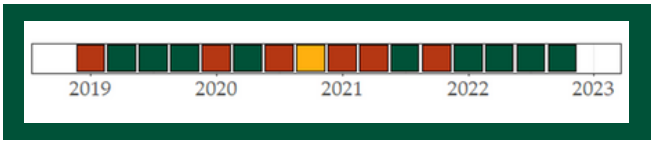
DATA SOURCE

NERC BA Submission Site (BASS)

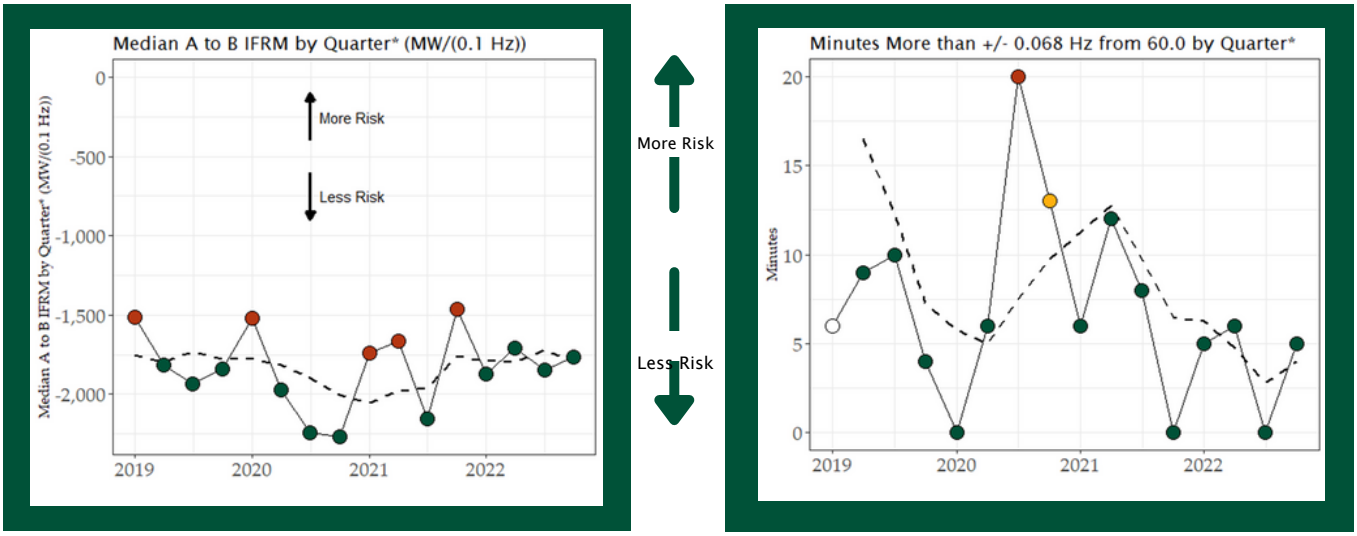
Indicator 6: Interconnection Frequency Response and Performance

What it measures

Indicator 6 measures the system's ability to respond to changes in frequency and maintain 60 Hz frequency.



Combined Indicator Performance History



How it is measured

Indicator 6 is based on two characteristics of system frequency:

1. Frequency response to large disturbances—Frequency stability in response to events such as sudden generation or load loss, measured by NERC's A to B IFRM metric.
2. Frequency performance under normal frequency behavior—Frequency stability at all times, measured as the number of minutes with a mean frequency exceeding +/-0.068 Hz from 60 Hz.

Beginning with Q1 2022, Indicator 6 has been modified to use the "operating calendar" rather than the "standard calendar." Per the operating calendar, December 2021 through February 2022 represents the first quarter of the 2022 operating year. This change will align Indicator 6 with the meeting, data availability, and reporting schedule of the NERC Resources Subcommittee (RS), which is the source of the IFRM data supporting this indicator. Other indicators will continue to use the standard calendar.

Why this matters

Frequency should be kept as close to 60 Hertz as possible. When large disturbances occur, frequency should not deviate far from 60 Hertz and should be restored quickly. Maintaining frequency is a coordinated effort among BAs to balance generation and load. When one BA is unable to perform this balance, it can adversely affect the entire interconnection and, if not resolved, can lead to issues on the BPS that may include shedding firm load.

What does the Q4 2022 evaluation tell us?

The Q4 median A-to-B IFRM, (based on nine events) was very close to the running average median number of events. Similarly, the number of minutes during which the system frequency was more than 0.068 Hz from 60.0 (five minutes), was very close to the running average of that metric. Consequently, Indicator 6 is "green" for Q4 2022.

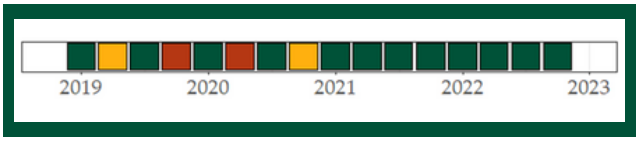
DATA SOURCE

NERC IFR Master Event List (Redacted)

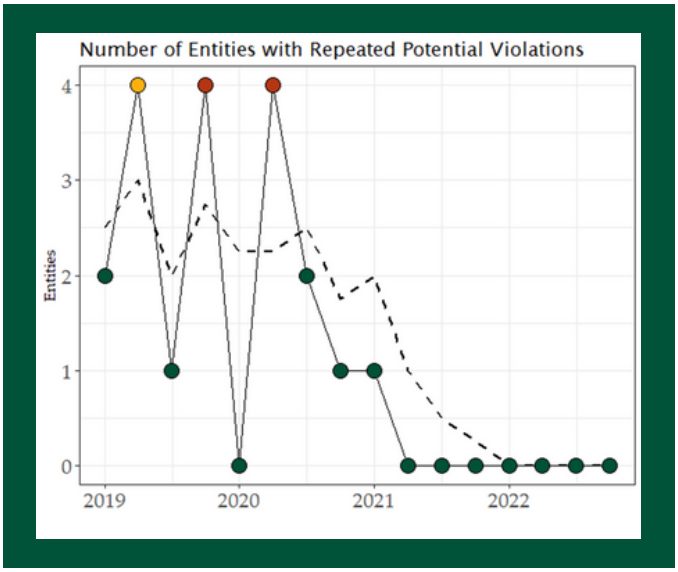
Indicator 7: Proportion of Entities With Repeated or Coincident Potential Compliance Violations

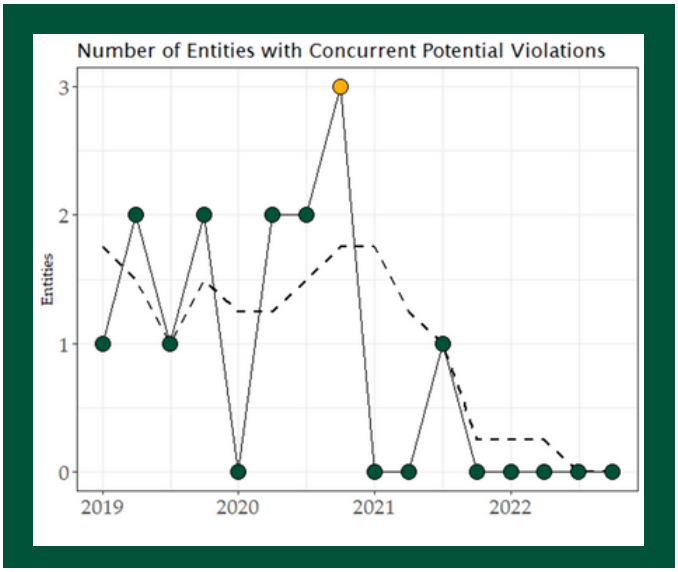
What it measures

Indicator 7 measures aspects of entity compliance behavior related to multiple potential violations.



Combined Indicator Performance History





How it is measured

Indicator 7 is based on two metrics:

1. Number of entities with repeat serious or moderate potential violations of the same standard and requirement within a five-year period.
2. Number of entities with three or more concurrent serious or moderate potential violations within a standard family issued during a given quarter.

Why this matters

Repeated or concurrent serious or moderate potential violations can be indicators of systemic or programmatic issues within the entity.

What does the Q4 2022 evaluation tell us?

Like previous quarters, the number of repeated and concurrent potential violations was zero. Consequently, this indicator is "green."

DATA SOURCE
webCDMS/Align

Indicator 8:
Rate of Detected Malicious Threats

Under Development

Indicator 8 is currently under development and will focus on reported cyber and physical threats to the Western Interconnection. WECC currently receives notification of these threats through the EOP-004-2 and OE-417 reporting process; however, these reports may not reflect the full spectrum of the threats. Consequently, WECC does not currently have adequate data to develop an accurate indicator for physical and cyber security. WECC is working with other organizations (ex., NERC, E-ISAC) to determine potential datasets for this indicator that can provide a broader and more complete assessment.