Indicator 1: Number and Severity of Reported Events



What it measures

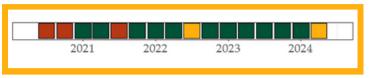
Indicator 1 measures the frequency and severity of events that occur on the system each quarter. This measurement is based on the <u>NERC Event Analysis Process</u> to track and evaluate events. The indicator measures only <u>reported events</u> evaluated through that process.

How it is measured

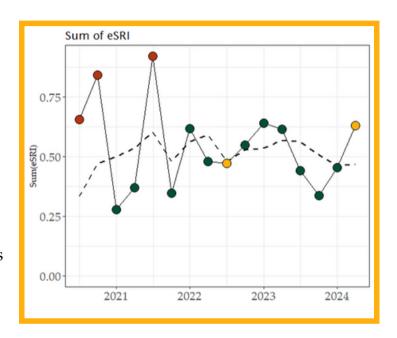
Indicator 1 is based on two characteristics of reported events:

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

*Category 2 and higher events are rare, typically fewer than one per year. One Category 2 event occurred in Q3 2022.



Indicator Performance History



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 Q2 2024 evaluation tell us?

There were 14 categorized events in the Western Interconnection in Q2 of 2024. Six of these were category 1a events, five were category 1h events, and three were category 1i events (loss of inverter-based resources).

Of these events, one affected customer loads, while seven affected generation resources. The eSRI sum for the quarter is above the rolling average and has increased to the highest level since Q1 of 2023 driven largely by the impact of the category 1i events. These three 1i events, in addition to the six category 1a events, have resulted in a status change to "somewhat unusual" and may be of concern for this quarter.

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.



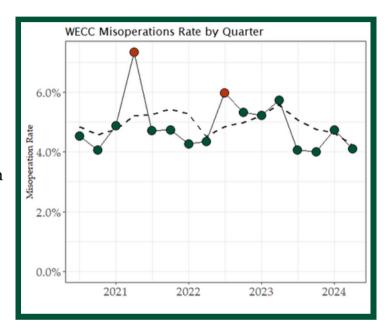
Indicator Performance History

How it is measured

Indicator 2 tracks the ratio of protection system <u>misoperations</u> 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 Q2 2024 evaluation tell us?

There were 44 misoperations reported in Q2 2024 along with 1,072 operations resulting in a misoperations rate of 4.1%. The leading causes for misoperations in the second quarter of 2024 were Incorrect Settings(16), AC Systems (7), and As-Left Personnel Error and Relay Failures/Malfunctions(5 for each cause). There was a higher number of AC System caused misoperations this quarter. Six of these occurred when there was no fault on the system, with some of the causes being incorrect wiring of CTs, rodents chewing on CT wiring, and CT saturation on a temporary configuration. All but one misoperation for the quarter were unnecessary trips, which generally have less impact on the system. The 4.1% misoperations rate is favorable, resulting in this indicator being green for the quarter.

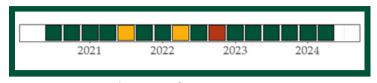


Indicator 3: Unplanned Outages of Multiple Transmission Elements



What it measures

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



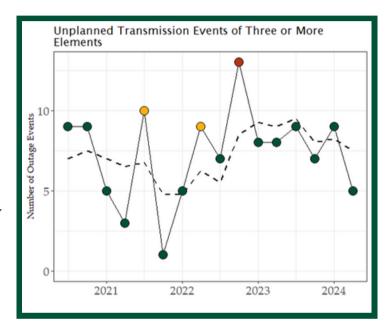
Indicator Performance History

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 Q2 2024 evaluation tell us?

In the second quarter of 2024, there were five events with three or more outages. One of these events involved three outages with a duration of 57 hours. Another event involved three outages with a duration of 38 hours. The remaining three events had durations of six hours or less. The total number of events is below the mean number of events per quarter, so this indicator is "green."

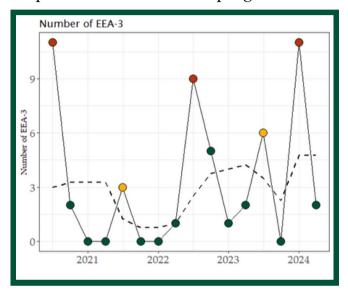


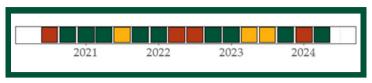
Indicator 4: Number And Duration of Energy Emergency Alerts



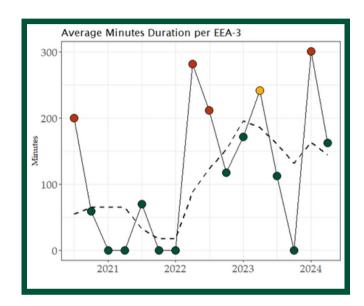
What it measures

Indicator 4 measures the number and duration of Level 3 Energy Emergency Alerts (EEA-3) issued to Balancing Authorities each quarter. An <u>EEA-3</u> 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 Q2 2024 evaluation tell us?

There were two EEA-3 events in the Western Interconnection in Q2 of 2024. Both occurred in the same BA in April. Both events were affected by generation supply shortfalls caused by scheduled generation outages as part of a commissioning plan and a forced outage, low wind, and solar output. The first EEA happened during the evening peak and did not result in firm load shed. The second, two days later, began during the morning ramp and lasted four hours. This event did result in 250 MW of firm load shed. The BES remained stable during this event with no further concerns. The number of events returned below the mean of four, and average minutes per event returned to the mean average.

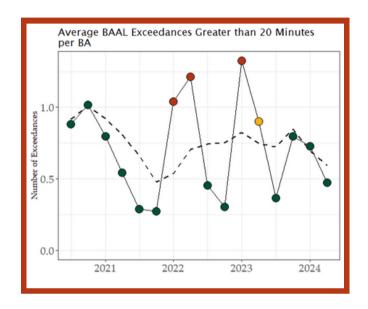
DATA SOURCENERC System Awareness

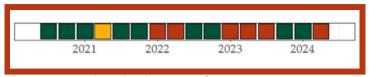
Indicator 5: System Operation Outside Balancing Authority ACE Limit (BAAL)



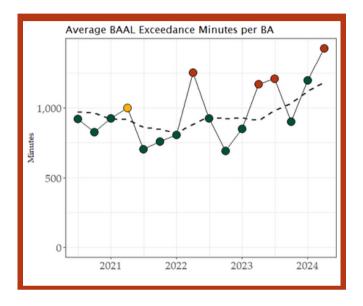
What it measures

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 Q2 2024 evaluation tell us?

TThis risk indicator is high because three relatively large BAs had abnormally high numbers of BAAL minutes this quarter. The historical trend for BAAL minutes indicates that Q2 of the year is the most challenging quarter for this metric. This year is consistent with that historical performance. The 20-minute trend shows year over year increasing performance. The 20-minute trend is stable or improving.

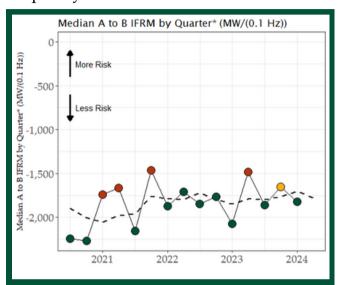


Indicator 6: Interconnection Frequency Response and Performance



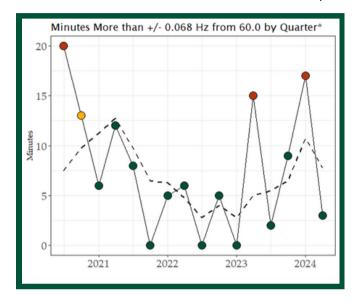
What it measures

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-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.

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 impact the entire interconnection and, if not resolved, can lead to issues on the BPS that may include shedding firm load.

What does the Q2 2024 evaluation tell us?

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.

The number of frequency events this quarter was not sufficient to evaluate frequency response. So, for this quarter, Indicator 6 will be based entirely on the system frequency measure, and not on frequency response. Indicator 6 is green for the quarter and well below the mean.

