

# 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.

## 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.\*

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

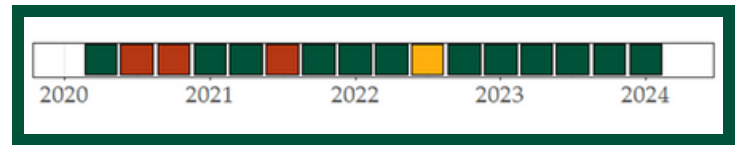
## Why this matters

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

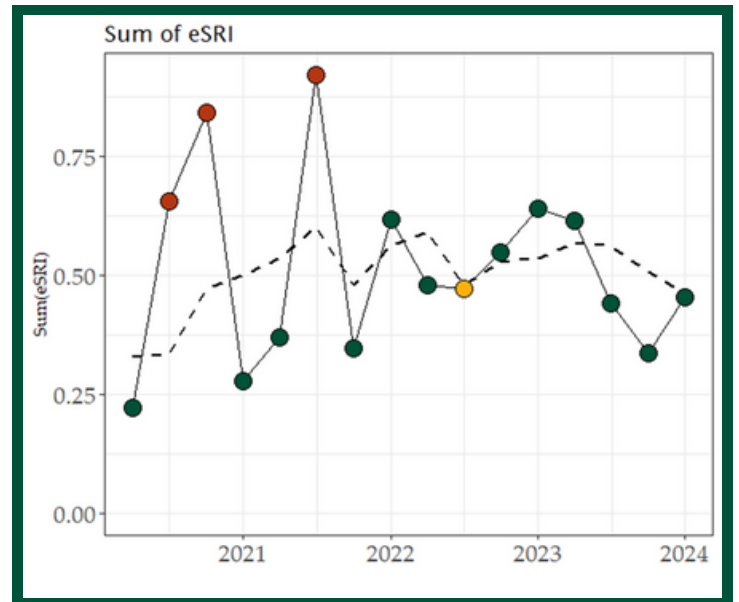
## What does the Q1 2024 evaluation tell us?

There were five categorized events in the Western Interconnection in Q1 of 2024. Three of these events were category 1a events, one was a category 1c, and the last was a category 1i for the loss of inverter-based resources.

Of these events, two affected customer loads, while three affected generation resources. The eSRI for the quarter has increased to the highest level since Q3 of 2021 but remains near the moving average and at the typical and good level.



Indicator Performance History



## DATA SOURCE

The Event Analysis Management System  
NERC eSRI metric

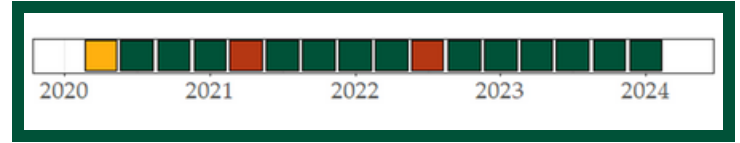


# Indicator 2: Rate of Protection System Misoperations



## What it measures

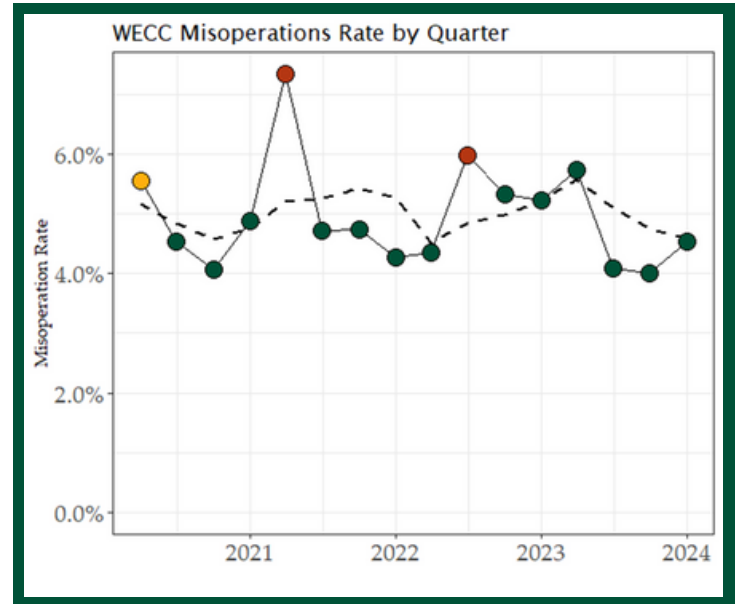
Indicator 2 measures the effectiveness of protection systems in safeguarding system reliability.



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 Q1 2024 evaluation tell us?

There were 49 misoperations reported in Q1 2024 along with 1,079 operations resulting in a misoperations rate of 4.5%. The leading causes for misoperations in the first quarter of 2024 were Incorrect Settings (27), Relay Failures/Malfunctions (9), and Communication Failures (5). This is fairly consistent with historical causes. A 4.5% misoperations rate is good, and consistent with previous quarters resulting in this indicator being green for the quarter.

## DATA SOURCE

Misoperation Information Data Analysis  
System (MIDAS)

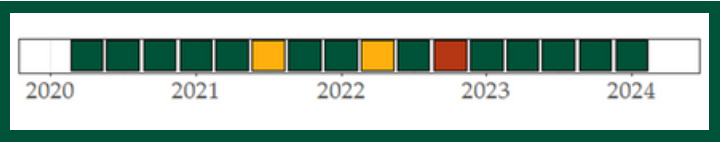


# Indicator 3: Unplanned Outages of Multiple Transmission Elements



## What it measures

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



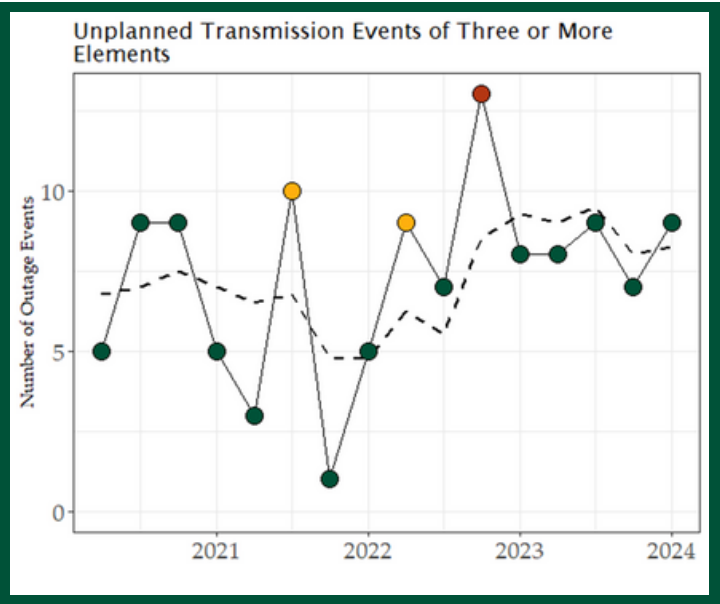
Indicator Performance History

## 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 Q1 2024 evaluation tell us?

In the first quarter of 2024, there were nine events with three or more outages. One of these events involved 13 outages with a duration of 482 hours. Another event involved three outages with a duration of 143 hours. The remaining seven events had durations of three minutes or less. The total number of events is near the mean number of events per quarter, so this indicator is "green."

## DATA SOURCE

Transmission Availability  
Data System (TADS)

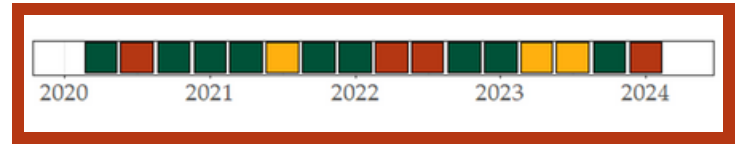


# Indicator 4: Number And Duration of Energy Emergency Alerts

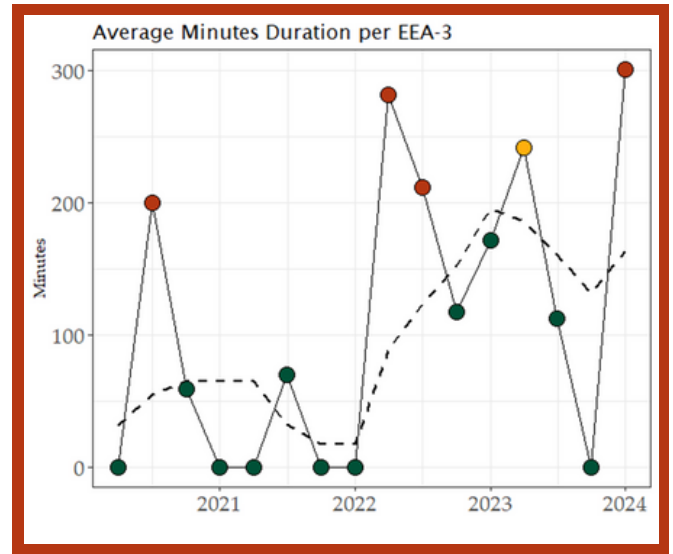
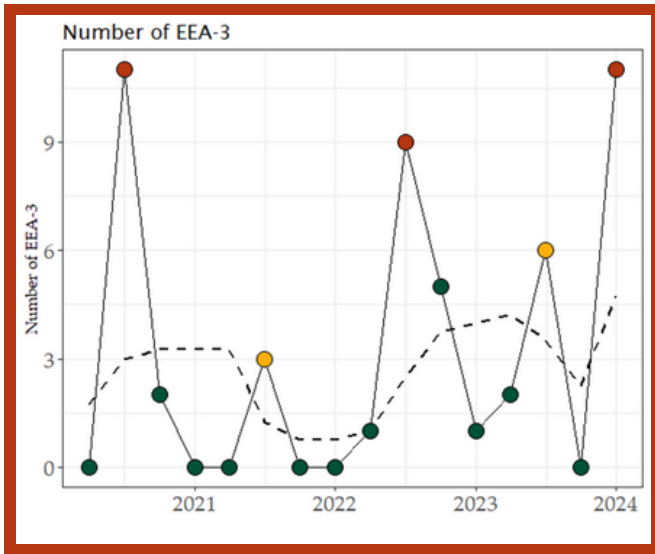


## What it measures

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 Q1 2024 evaluation tell us?

There were 11 EEA-3 events in the Western Interconnection in Q1 of 2024. Six of the events were due to loss of generation in one BA. One of those events lasted more than 15 hours, contributing heavily to the high average minute's duration. Five of the EEA-3 events occurred during the winter storm Gerri event in January. All were due to extreme cold, high demand, low wind, generation outages, and low availability of imports. Three of these events lasted five to six hours, contributing to the high average minute's duration.

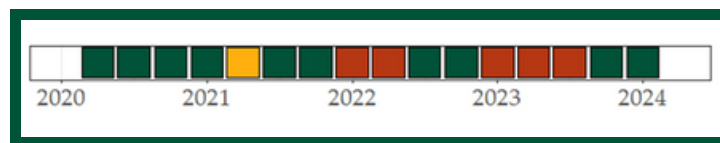


# Indicator 5: System Operation Outside Balancing Authority ACE Limit (BAAL)

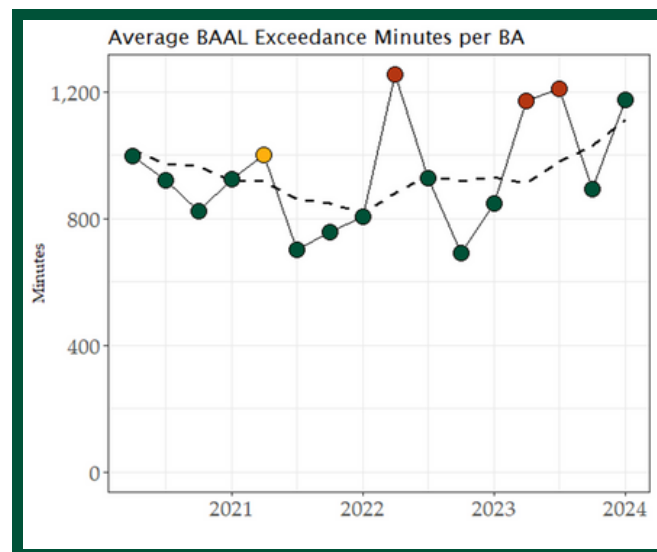
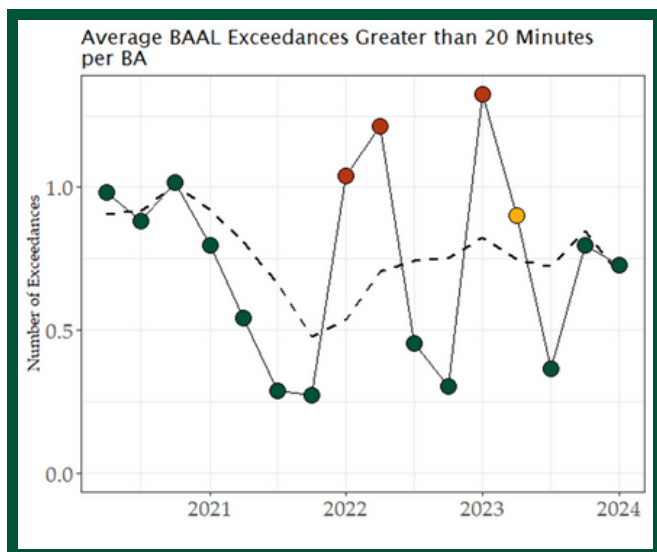


## What it measures

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 Q1 2024 evaluation tell us?

The indicator "Operating Outside of BAAL" can be influenced during periods of extreme weather, both hot and cold. Regardless, the winter storm Gerri/Heather did not have a negative impact on this indicator. Exceedances greater than 20 minutes remained green, staying on the rolling average for the quarter. Average exceedance minutes raised slightly but the rolling average remained green. Therefore, the indicator for Q1 2024 remains green, indicating consistent operating performance by the Balancing Authorities.

### DATA SOURCE

NERC BA Submission Site (BASS)

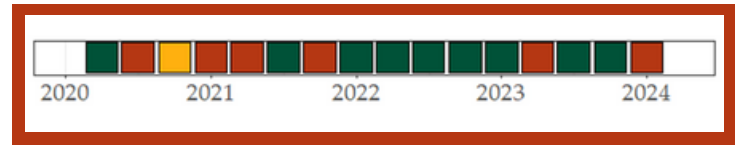


# Indicator 6: Interconnection Frequency Response and Performance

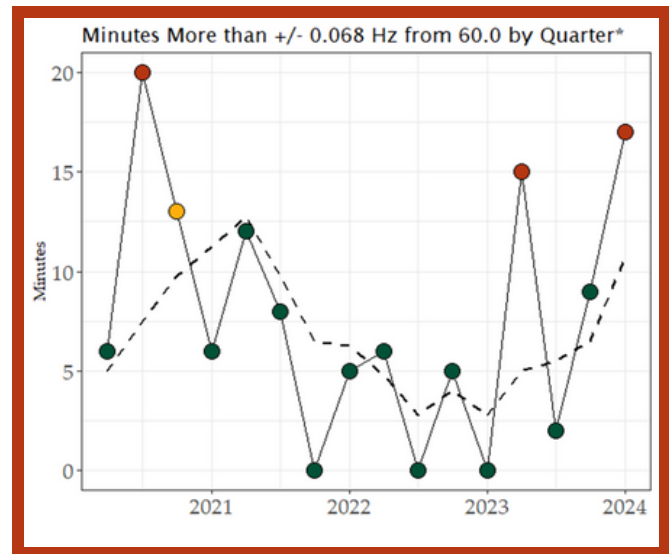
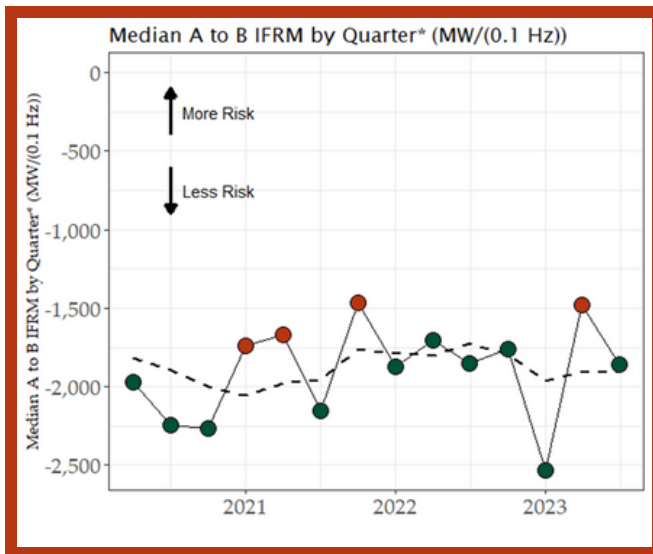


## What it measures

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-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 Q1 2024 evaluation tell us?

The frequency response metric (median IFRM) in Q1 2024 was equal to the rolling mean and improved from red to green from the previous quarter, indicating frequency response improved during events.

The frequency performance metric (number of minutes more than +/- 0.068 Hz from 60 Hz) increased from nine minutes to 17 minutes. One event accounted for seven minutes and another for six, changing the metric from green to red. Combining the performance of these two metrics, the indicator for Q1 2024 is red.

### DATA SOURCE

NERC IFR Master Event List (Redacted)

