



**Sample Joint Action Agency**

**2019**

# ANNUAL BENCHMARKING REPORT

**eRELIABILITY  
TRACKER**



# 2019 Joint Action Agency and State Association Report

## I. General Overview

The eReliability Tracker Annual Reports were created by the American Public Power Association to assist utilities in their efforts to understand and analyze their electric system. This particular report is intended for Joint Action Agency (JAA) or State Association (SA) subscribers and is customized to include statistics from member utilities of each organization. The report also includes distribution system reliability data aggregated across the country to provide a national basis for comparison.

The data used to generate this report reflect activity in the eReliability Tracker from January 1, 2019 to December 31, 2019. Note that this analysis reflects data recorded for your members as of February 23, 2020; therefore, any changes made after that date are not represented in this report.

Reliability reflects historic and ongoing engineering investment decisions within a utility. Proper use of reliability metrics ensures that the utility is performing its intended function and providing service in an efficient and effective manner. Even though the primary use of reliability statistics is for self-evaluation, utilities can use these statistics to compare with data from similar utilities. However, differences such as electrical network configuration, ambient environment, weather conditions, and number of customers served typically limit most utility-to-utility comparisons. Due to the diverse range of utilities that use the eReliability Tracker, this report endeavors to provide data for all utilities within the JAA/SA to improve comparative analyses while reducing differences.

Since this report contains overall data for all utilities that use the eReliability Tracker, it is important to consider the effect that a particularly large or small utility can have on the rest of the data. To ease the issues associated with comparability, reliability statistics are calculated for each utility with their respective customer weight taken into account prior to being aggregated with other utilities. All utilities are equally weighted for summary statistics and all utility-specific statistics are developed on a per customer basis.

The aggregate statistics displayed in this report are calculated from utilities that provided or verified their data and experienced more than two outages throughout the year. Also, utilities that experienced no outages this year, or did not upload any data, will have Null or no values in their report for their utility-specific data.

The aggregate national statistics provided in the following sections of the report are based on outages from 310 utilities.

## II. IEEE Statistics

When using reliability metrics, a good place to start is with the industry standard metrics found in the IEEE 1366 Guide. For each individual utility, the eReliability Tracker performs IEEE 1366 calculations for System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI), Customer Average Interruption Duration Index (CAIDI), Momentary Average Interruption Frequency Index (MAIFI) and Average Service Availability Index (ASAI).

When collecting the necessary data for reliability indices, utilities often take differing approaches. Some utilities prefer to include information as detailed as circuit type or phases impacted, while others include only the bare minimum required. In all cases, the more details a utility provides, the more practical their analysis will be. The indices provided in this section can be used by a JAA/SA to better understand the performance of their members' electric systems relative to other utilities nationally and to others within their membership.

Due to the differences in how some utilities analyze major events (MEs) relative to their base statistics, it is important to note how they are calculated and used in this report. An example of a major event is severe weather, which can cause unusually long outages when compared to your distribution system's typical outage. In this report, the APPA's major event threshold method is used to identify and remove major events. The APPA's major event threshold is a SAIDI value in minutes and is calculated based directly on SAIDIs for individual outage events, rather than daily SAIDIs. An outage event with SAIDI greater than the threshold value is classified as a major event. All outage events history up to 10 years were taken into account for the calculation of the APPA's major event threshold. In the eReliability Tracker, if a utility does not have at least 36 outage events prior to the year being analyzed, no threshold is calculated; therefore, the field below showing the utility's threshold will have NULL or no value and the calculations without MEs in the SAIDI section of this report will be the same as the calculations with MEs for the utility. More outage history will provide a better threshold for the utility.

**Table 1. IEEE Statistics**

| <b>Utility</b>  | <b>APPA ME Threshold</b> | <b>SAIDI</b>  | <b>SAIDI (no MEs)</b> | <b>SAIFI</b> | <b>CAIDI</b>  | <b>MAIFI</b> | <b>ASAI</b>    |
|---|--------------------------|---------------|-----------------------|--------------|---------------|--------------|----------------|
| Utility 1   | 1.81                     | 99.38         | 33.81                 | 1.27         | 79.76         | 0.00         | 99.9997        |
| Utility 2   | 8.27                     | 13.14         | 9.56                  | 0.41         | 53.71         | 0.00         | 99.9975        |
| <b>Average for Your Member Utilities (Weighted by Customers) :</b>  | <b>NULL</b>              | <b>47.05</b>  | <b>19.09</b>          | <b>0.75</b>  | <b>63.95</b>  | <b>0</b>     | <b>99.9984</b> |
| <b>Average for Your Member Utilities (Weighted Equally):</b>        | <b>NULL</b>              | <b>56.26</b>  | <b>21.68</b>          | <b>0.84</b>  | <b>66.73</b>  | <b>0</b>     | <b>99.9986</b> |
| <b>Average for All Utilities that Use the eReliability Tracker:</b> | <b>NULL</b>              | <b>116.73</b> | <b>55.63</b>          | <b>0.90</b>  | <b>169.35</b> | <b>0.65</b>  | <b>99.9778</b> |

## III. Outage Causes

Equipment failure, extreme weather events, wildlife and vegetation are some of the most common causes of electric system outages. However, certain factors, such as regional weather and animal or vegetation patterns, can make a different set of causes more prevalent to a specific group of utilities. The following sections of this report include tables depicting common causes of outages for each of your member utilities and all utilities using the eReliability Tracker.

The charts containing aggregate information are customer-weighted to account for differences in utility size for a better analytical comparison. For example, a particularly large utility will have a large number of outages compared to a small utility; in order to avoid having the collective information be more representative of the large utility, the number of occurrences is divided by customer size to account for the differences. In the charts below, the data represent the number of occurrences for each group of 1000 customers. For instance, a customer-weighted occurrence rate of "1" means 1 outage of that outage cause per 1000 customers for that year.

Note that the sustained outage cause analysis is more comprehensive than the momentary outage cause analysis due to a bigger and more robust sample size for sustained outages. Regardless, tracking both sustained and momentary outages helps utilities understand and reduce outages. To successfully use the outage information tracked by your utility, it is imperative to classify and record outages in detail. The more information provided per outage, the more conclusive and practical your analyses will be.

### III.1. Sustained Outage Causes

In general, sustained outages are the most commonly tracked outage type. In many analyses of sustained outages, utilities tend to exclude scheduled outages, partial power, customer-related problems, and qualifying major events from their reliability indices calculations. While this is a valid method for reporting, these outages should be included for internal review to make utility-level decisions. In this section, we evaluate common causes of sustained outages for each of your members and for all utilities that use the eReliability Tracker. It is important to note that in this report, sustained outages are classified as outages that last longer than five minutes, as defined by IEEE 1366.

### Top 3 Customer-weighted Occurrence Rates of Causes for Sustained Outages

For each utility, the number of occurrences for each cause is divided by that utility's customer size (in 1000s) to create an occurrence rate that can be compared across different utility sizes.

| Utility   | Cause 1            |             | Cause 2            |             | Cause 3          |             |
|---|--------------------|-------------|--------------------|-------------|------------------|-------------|
| Utility 1   | Equipment Worn Out | 3.30        | Tree               | 1.30        | Squirrel         | 0.65        |
| Utility 2   | Squirrel           | 2.41        | Electrical Failure | 1.12        | Overloaded       | 0.90        |
| <b>Top Sustained Outage Causes for Your Member Utilities:</b>                 | <b>None</b>        | <b>0</b>    | <b>None</b>        | <b>0</b>    | <b>None</b>      | <b>0</b>    |
| <b>Top Sustained Outage Causes for All Users of the eReliability Tracker:</b> | <b>Tree</b>        | <b>1.27</b> | <b>Storm</b>       | <b>0.71</b> | <b>Equipment</b> | <b>0.38</b> |

### III.2. Momentary Outage Causes

The ability to track momentary outages can be difficult or unavailable on some systems, but due to the hazard they pose for electronic equipment, it is important to track and analyze their causes. In this section, we evaluate common causes of momentary outages for each of your members as well as for all utilities that use the eReliability Tracker. Please note that only outages lasting less than five minutes in duration are classified as momentary, as defined by IEEE 1366.

#### Top 3 Customer-weighted Occurrence Rates of Causes for Momentary Outages

For each utility, the number of occurrences for each cause is divided by that utility's customer size (in 1000s) to create an occurrence rate that can be compared across different utility sizes.

| Utility   | Cause 1        |             | Cause 2                                |             | Cause 3                      |             |
|---|----------------|-------------|--|-------------|------------------------------|-------------|
| Utility 1   | None           | 0.00        | None                                   | 0.00        | None                         | 0.00        |
| Utility 2   | None           | 0.00        | None                                   | 0.00        | None                         | 0.00        |
| <b>Top Momentary Outage Causes for Your Member Utilities:</b>                 | <b>None</b>    | <b>0</b>    | <b>None</b>                            | <b>0</b>    | <b>None</b>                  | <b>0</b>    |
| <b>Top Momentary Outage Causes for All Users of the eReliability Tracker:</b> | <b>Unknown</b> | <b>0.15</b> | <b>Utility Maintenance and Repairs</b> | <b>0.12</b> | <b>Equipment Replacement</b> | <b>0.05</b> |

Thank you for using the eReliability Tracker,  
and we hope this report is useful to your utility  
in analyzing your system. If you have any  
questions regarding the material provided in  
this report, please contact:

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