Avista Utilities
Electric Service Reliability Report
2022

April 2023

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Avista's Electric System Service Reliability Report for 2022

Introduction

Background

Avista's Electric System Service Reliability Report (Report) documents the annual reliability performance of our electric system for the prior reporting year, which is filed each year with the Washington Utilities and Transportation Commission (WUTC or the Commission).[1] This Report contains results of the Company's electric service in 2022.

For this annual Report, our definition of "electric system" has always referred to our overall network[2] of transmission lines, substations, and the distribution lines, or "feeders," that carry electricity to every home and business in our Washington and Idaho service area. "Service reliability" refers to the "uptime"[3] our customers experience for the year. Interruptions in service to our customers (service outages) reduce the uptime they experience. Like all electric utilities, Avista tracks and reports various measures regarding the number of times throughout the year our customers experience a service outage and the length of time these outages persist (outage duration). In accordance with Commission rules,[4] the Company established its reliability measures and then reports on the results with the most-recent five-year period. In addition to reporting reliability statistics, Avista must also report any changes to the methods used to collect and report the results, identify the geographic areas of greatest reliability concern on the Company's electric system, and explain our plans to improve reliability performance in those areas. The detailed reporting requirements are provided within the "Definitions" of Appendix A. Additionally, Avista reports on the complaints received from its customers related to power quality and service reliability in Appendix E.

[1] Pursuant to Washington Administrative Code (WAC) 480-100-398.

[2] Entire electric system, irrespective of state jurisdiction.

[3] Uptime is a measure of the time electric system is available and in service for customers during the year. A customer who experiences no service outages during the year would have a service uptime of 100%.

[4] WAC 480-100-393.

Providing Our Customers Reliable Electric Service

Avista is focused on maintaining a high degree of reliability as an important aspect of the quality of our service, particularly as our society becomes ever more reliant upon electronic technologies. The Company's objective has been to *generally uphold our current level of reliability,* which we believe is acceptable to our customers. Providing a level of system reliability that is adequate for our customers represents a complex balance of customer expectations, cost, and performance. Because it is expensive to achieve every new increment of system reliability, and because these investments must be sustained over a period of many years to achieve objectives measured at the level of the overall system, it is important to ensure that we are prudently investing only the amount of money it takes to achieve a satisfactory level of performance. Our customers' satisfaction with their service reliability is also heavily dependent on factors other than the actual reliability of our physical system. For example, perceptions of the priority Avista places on avoiding outages and quickly restoring service when outages occur, as well as the quality and timeliness of information we provide them during an outage, have much greater bearing on customer satisfaction than our actual reliability performance.[5] Avista believes the current reliability performance of our system, along with our customer care and communications, achieves an effective balance, and because of this represents a cost-effective value for our customers. This assessment is evidenced by our high level of customer satisfaction with their overall service from Avista, including aspects of electric reliability, our customers' satisfaction with their power quality and reliability, by the low number of complaints we receive each year that are related to reliability issues, and by our performance being in a reasonable range for the electric utility industry.

Purpose of this Report

As noted above, this Report describes results of the Company's annual monitoring of several key reliability indices, statistics, metrics, or measures. Primary indices are industry-standard measures developed by the Institute of Electrical and Electronic Engineers (IEEE), which are important in promoting standardized and comparable reporting across the utility industry. In addition to these IEEE indices, the Company also monitors and uses in its analyses several other reliability measures, all of which are briefly described below.

- **System Average Interruption Frequency Index:** Often referred to by its acronym **SAIFI**, is the average number of sustained[6] interruptions or outages per customer for the year. This index value, developed by the IEEE, is calculated by dividing the total number of outages on the system each year by the average total number of customers on the system for that year. Dividing the value by the total number of customers normalizes the number of outages for comparison with other utilities.
- **System Average Interruption Duration Index**: Often referred to by its acronym **SAIDI**, is the average duration (or length) of sustained interruptions per customer for the year. This index value, developed by the IEEE, is calculated by dividing the total number of customer outage hours (number of customers experiencing an outage multiplied by the duration of the outage) experienced on the system for the year by the average total number of customers on the system for that year. Dividing the value by the total number of customers normalizes the number of outages for comparison with other utilities.

[5] Assessing Residential Customer Satisfaction for Large Electric Utilities. L. Douglas Smith, et al., University of Missouri St. Louis, Department of Economics Working Paper #1007, May 2015.

[6] Any service interruption greater than five minutes in duration.

- **Customer Average Interruption Duration Index**: Often referred to by its acronym **CAIDI**, is the average duration of sustained interruptions for those customers who experienced a service outage that year. This index value, developed by the IEEE, is calculated by dividing the total number of customer outage hours experienced on the system for the year by the total number of customers who experienced an outage that year. Since this measure reflects the duration of outages for customers experiencing those outages, it is often used to represent the utility's average outage restoration time.

- **Customer Experiencing Multiple Interruptions**: Often referred to by its acronym **CEMI** (for purposes of this Report, CEMI3), this metric is the number of customers who experience greater than an identified or set number of interruptions for the year.
- **Customer Average Interruption Frequency Index**: Often referred to by its acronym **CAIFI**, this metric represents the average number of sustained outages, or interruptions, for customers who experienced a sustained interruption. The standard reliability statistics and their calculations are discussed in greater detail in Appendix B.
- **Average Outage Duration**: This measure is used by Avista to describe the average duration of outages on the system. Since this average number of hours per outage is not divided by any number of customers or any other value, it is not an index value.
- **Average Number of Customers per Outage Event:** This measure is used by Avista to describe the average number of customers that were impacted by all outages on the system during the year. This value is calculated by totaling all customers impacted by outage events for the year and dividing by the number of outage events for the year. This measures the effectiveness of our efforts to minimize the impact of individual outage events on our customers.
- **Number of Outage Events**: This measure is the number of outage events on our system each year that result in a sustained outage for our customers. Since the number of outage events is not divided by any other number it is not an index value.
- **Total Customer Outage Hours**: This measure is the total number of customer outage hours that were experienced by the customers on our system for the year. For each event, the number of customers experiencing the sustained outage is multiplied by the duration of the outage to yield the customer outage hours for each event. Summing all individual events' customer outage hours over a year yields the total customer outage hours. Since this total number of customer hours is not divided by any other number it is not an index value.

The Company is also required to report on any changes it has made in the prior year in the collection of reliability data or in calculating values for each reliability index. A brief record of such changes the Company has made historically is provided in Appendix C. All of the data included in this Report, as noted above, is based on system data representing Avista's entire electric service territory in Washington and Idaho; however, as agreed-upon in Docket Nos. UE-220053, UG-220054, and UE-210854 (*Consolidated*), Avista has also broken this system data down into Washington-only statistics for each of the nine reliability metrics reported.

Baseline Reliability Statistics

In its Electric Service Reliability Plan (Plan),[7] which serves as the basis for this Report, Avista states:

> *The Company also calculates a statistical Reliability Target, which is based on the average value for the Reliability Statistic over a specific time period and adding two standard deviations for that mean. Year to year variations in reliability performance typically fall below this target, however, any exceedance of the target does not represent a "failure" in reliability performance or provide a basis for any repercussions, regulatory or otherwise.*

As approved in the most recent Plan, the Company's established baseline for its reliability statistics, required per WAC 480-100-393(3)(b), will be the five-year rolling average for each statistic. The aforementioned Reliability Target, which adds two standard deviations to the mean of the given metric over time, has not been reported on since Avista's 2016 Customer Service Quality and Electric System Reliability Report.[8] The Company's currently-approved Plan inadvertently omitted the word "sometimes" within the above phrasing, as it was stated in all previous Plans/Reports to account for the target not often being used as a comparative tool within the annual Reports. Avista's 2017 Report[9] provides additional detail, at length, regarding the nuances of and potential inefficacy of including a Reliability Target in its annual reporting. As such, while the Company has provided Reliability Target information for this 2022 Report, Avista does not anticipate providing such information in all future reporting periods, and will likely remove such reference from forthcoming Electric Service Reliability Plans.

The table below provides a statistical Reliability Target for the five industry-standard indices, based upon the average value for the index over the 2018 to 2022 five-year period and adding two standard deviations.

Index	Target
SAIFI	1.36
SAIDI	3.21
CAIDI	2.72
$CEMI_3$	8.02
CAIFI	2.23

Table 1: Reliability Targets for Key Indices

[7] As approved in Final Order 10/04 in Docket No. UE-220053 (et al).
[8] See Docket No. UE-170338.
[9] See Docket No. UE-180376.

Results for Avista's Electric Service Reliability in 2022

System Results

Results for several of the above-referenced reliability measures for 2022 are provided in Table 1 below. In addition to the current year results we have also listed the prior year result, and the five-year average for each measure.

Reliability Measure	2022 Results	2021 Results	Prior 5-Year Average (2017-2021)
SAIFI	0.92	1.24	1.01
SAIDI	146 minutes (2.43 hours)	164 minutes (2.74 hours)	148 minutes (2.46 hours)
CAIDI	158 minutes (2.64 hours)	132 minutes (2.21 hours)	147 minutes (2.45 hours)
$CEMI_3$	6.02%	7.48%	5.88%
CAIFI	2.05	2.14	2.06

Table 2: Reliability Results for Key Measures in 2022[10]

Washington-Only Results

Reliability Measure	2022 Results	2021 Results	Prior 5-Year Average (2017-2021)
SAIFI	0.84	1.11	0.89
SAIDI	135.6 minutes (2.26 hours)	147 minutes (2.45 hours)	128.4 minutes (2.14 hours)
CAIDI	161 minutes (2.69 hours)	132 minutes (2.20 hours)	145 minutes (2.41 hours)
$CEMI_3$	5.92%	6.54%	4.86%
CAIFI	2.05	1.98	1.95

Table 3: Washington-Only Reliability Results for Key Measures in 2022[11]

Major Event Days

Avista tracks and reports on reliability issues associated with major events,[12] and lists in Table 4 the Major Event Days (MEDs) affecting its system in 2022. A historic record of MEDs on our system is provided in Appendix G.

[10] Excludes outage results for qualifying major event days.

[11] Excludes outage results for qualifying major event days.

[12] Major Events and Major Event Days as used in this report are defined by the IEEE *Guide for Electric Power Distribution Reliability Indices*, IEEE P1366-2012. Avista's definition and use of the terms 'major event' and 'major event days' are taken from this IEEE Standard. The Company will use the process defined in IEEE P1366 to calculate the threshold value of T_{MED} and to determine MEDs. All indices will be reported both including and excluding MEDs. The comparisons of service reliability to the baseline statistics in subsequent years will be made using the indices calculated without MEDs.

Major Event Days (2022)	SAIDI (hours)	Event Cause
2022 Major Event Day Threshold (T_{MED})	9.90	
April 4	12.5	Weather-Wind Storm
November 4	21.6	Weather-Wind Storm
November 5	24.3	Weather-Wind Storm

Table 4: Major Event[13] and Major Event Days[14] Experienced in 2022

System Average Interruption Frequency Index

Figure 1 below shows the SAIFI on the Company's system for the five-year period of 2018-2022, including the linear trend.[15] As shown, after an increase in 2021, in 2022 SAIFI decreased to be more in-line with the 2018 to 2020 time period. The lower number of weather events and planned work in 2022 were contributing factors. In addition to the decrease in planned work fewer minor weather events and favorable summer conditions reduced the number of feeders in "fire safe mode".[16] As noted in Table 1, the SAIFI value of customer outages in 2022 is 0.92, as compared to 1.24 in 2021.

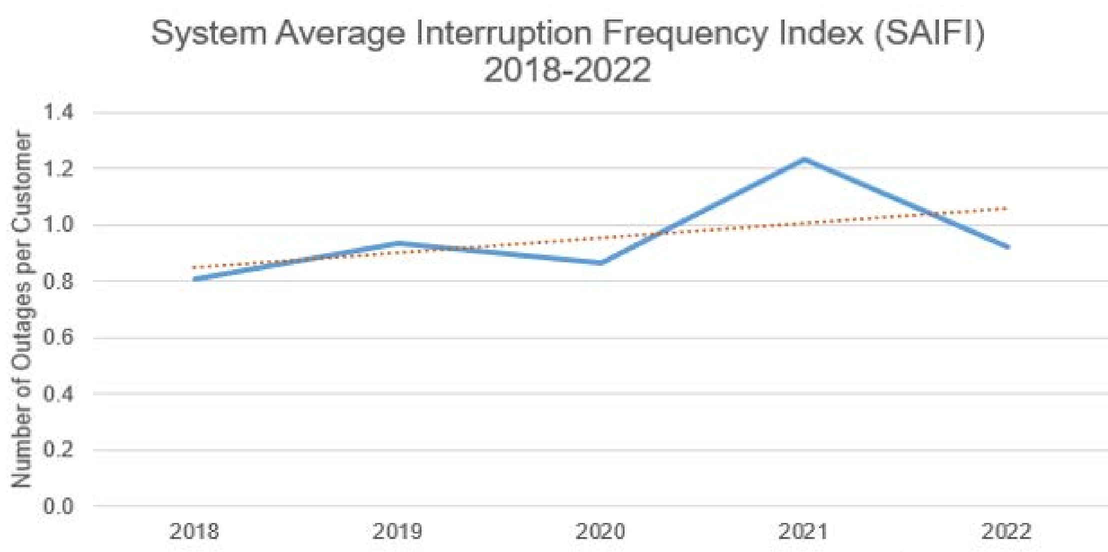

Figure 1: SAIFI – 2018-2022

A historical summary of SAIFI data since 2004 is included in Appendix F.

SAIFI – Washington Only

Figure 2 below shows the Washington-only SAIFI for the five-year period of 2018-2022, including the linear trend.[17] As expected, the performance in Washington only mirrored, to a degree, the overall system. After relatively stable years in 2018 to 2020, there was a spike in 2021 after which 2022 returned to levels slightly higher than 2018 to 2020.

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[13] Major Event – Designates an event that exceeds reasonable design and or operation limits of the electric power system. A Major Event includes at least one Major Event Day.

[14] Major Event Day – A day in which the daily system SAIDI exceeds a threshold value, T_{MED}. For the purposes of calculating daily system SAIDI, any interruption that spans multiple calendar days is accrued to the day on which the interruption began. Statistically, days having a daily system SAIDI greater than T_{MED} are days on which the energy delivery system experienced stresses beyond that normally expected, such as severe weather. Activities that occur on major event days should be separately analyzed and reported.

[15] Excluding outages associated with Major Event Days.

[16] Fire safe mode reduces wildfire ignition risk by changing system protection and operations in response to increased fire threat.

[17] Excluding outages associated with Major Event Days.

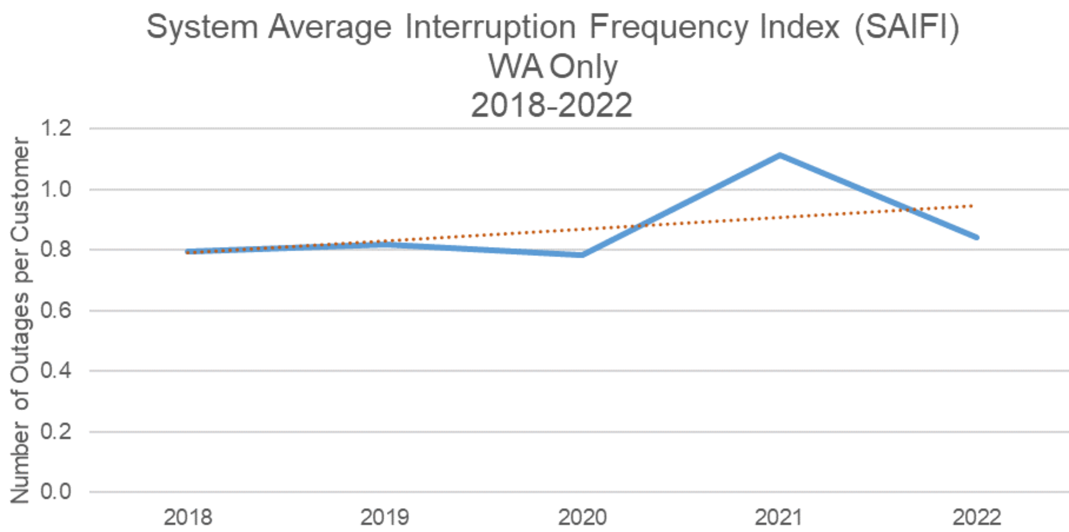

Figure 2: SAIFI Washington – 2018-2022

System Average Interruption Duration Index

Figure 3 below shows the SAIDI on the Company's electric system for the five-year period of 2018-2022, including the linear trend.[18] The average duration of outages for all customers decreased to 2.43 hours in 2022 from 2.74 hours in 2021, as noted in Table 1.

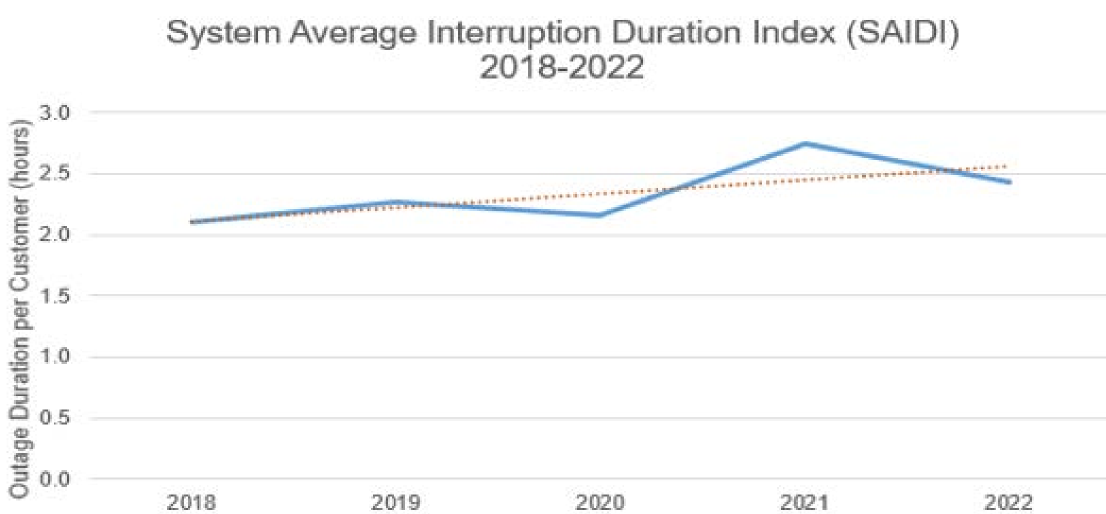

Figure 3: SAIDI – 2018-2022

A historical summary of SAIDI data since 2004 is included in Appendix F.

[18] Excluding Major Event Days.

SAIDI – Washington Only

Figure 4 below shows the Washington-only SAIDI for the five-year period of 2018-2022, including the linear trend.[19] Similar to the overall system, after flat to slightly declining results, a peak in 2021 was followed by a decrease in 2022.

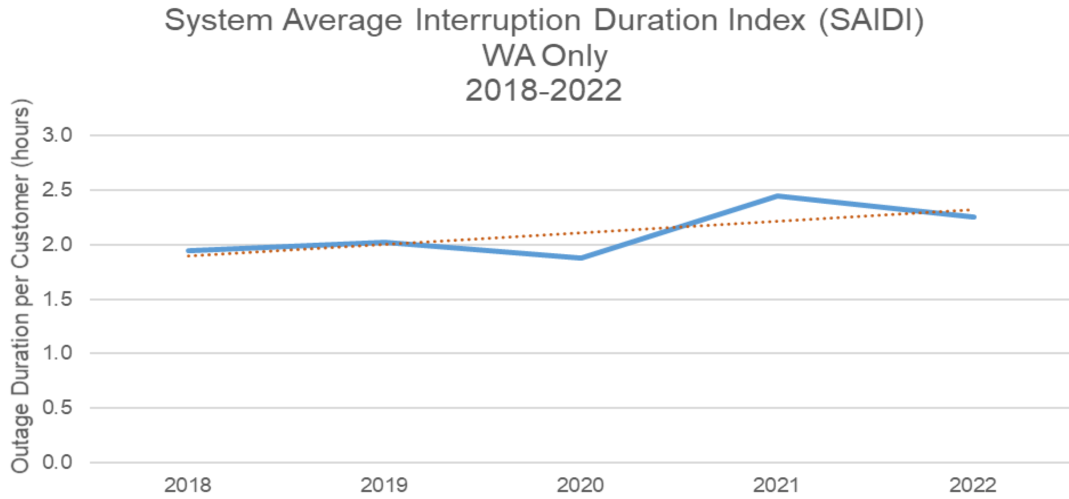

Figure 4: SAIDI Washington – 2018-2022

Customer Average Interruption Duration Index

Figure 5 below shows the CAIDI on the Company's system for the five-year period of 2018-2022, including the linear trend.[20] Results from 2018 to 2022 have experienced both highs (2022) and lows (2021), however, the linear trend continues its slight downward path. The trend continues to show the metric's longer-term improvement as system improvements have resulted in shorter outages. As noted in Table 1, the CAIDI value in 2022 is 2.64 hours. Given that CAIDI is a ratio of SAIDI/SAIFI, the increase in 2022 was primarily a result of the faster improvement in SAIFI than in SAIDI in 2022.

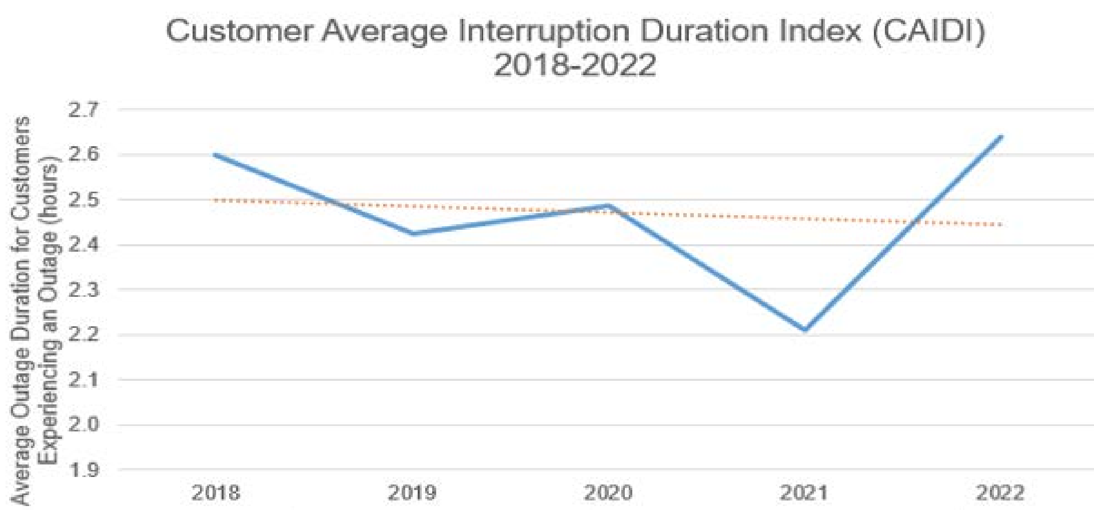

Figure 5: CAIDI – 2018-2022

[19] Excluding Major Event Days.

[20] Excluding Major Event Days.

CAIDI – Washington Only

Figure 6 below shows the Washington-only CAIDI for the five-year period of 2018-2022, including the linear trend.[21] After a significant decrease from 2020 to 2021, CAIDI increased in 2022. These Washington results follow the system-wide results in terms of faster improvements in SAIFI.

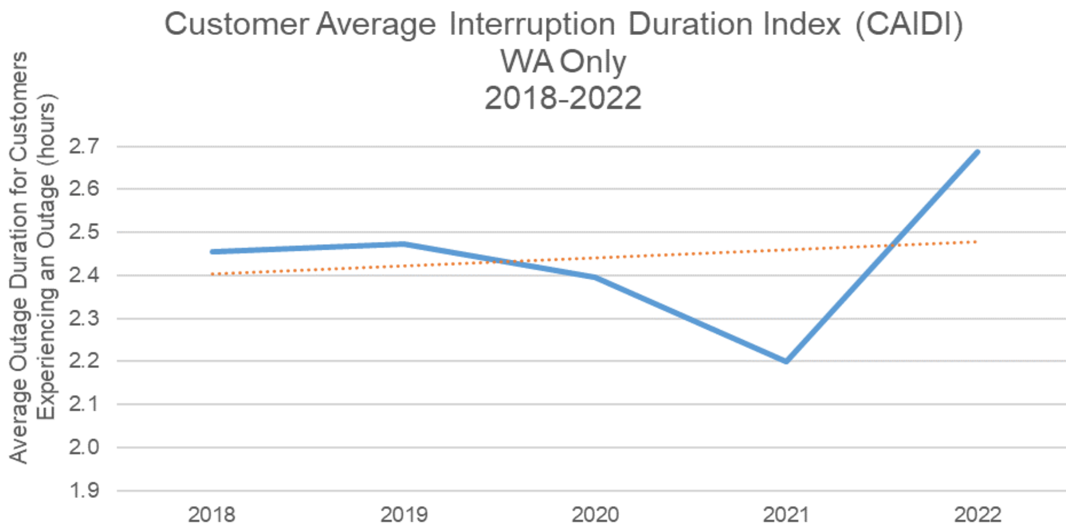

Figure 6: CAIDI Washington – 2018-2022

Customer Average Interruption Frequency Index

Figure 7 below shows the CAIFI on the Company's system for the five-year period of 2018-2022, including the linear trend.[22] After decreasing from 2018 to 2020, 2021 experienced an increase that nearly reversed 2022's decrease. This index tracks only those customers who have experienced an outage during the year, thus, given the aforementioned work on the system in 2021 that pushed outages up, the decrease in 2022 was somewhat expected.

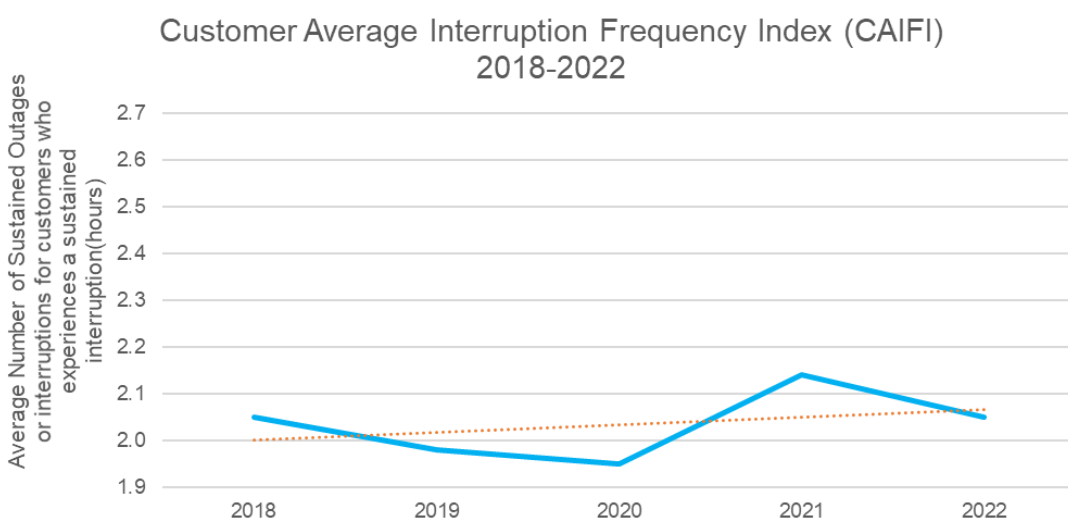

Figure 7: CAIFI – 2018-2022

[21] Excluding Major Event Days.
[22] Excluding Major Event Days.

CAIFI – Washington Only

Figure 8 below shows the Washington-only CAIFI for the five-year period of 2018-2022, including the linear trend.[23] The previous two years' increases in Washington are related primarily to more planned work on the system being done in Washington versus the system overall.

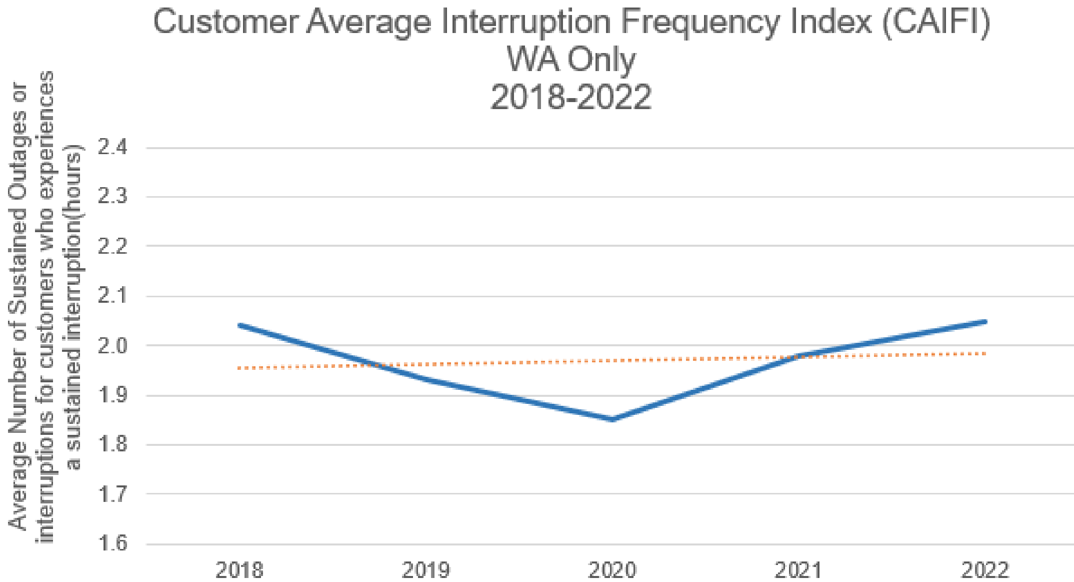

Figure 8: CAIFI Washington – 2018-2022

Customers Experiencing Multiple Interruptions

Figure 9 below shows the $CEMI_3$ on the Company's system for the five-year period of 2018-2022, including the linear trend.[24] This represents those customers who have seen 3 or more outages during the year. Improvements to the system, as well as calmer weather, contributed to the decrease experienced between 2021 and 2022.

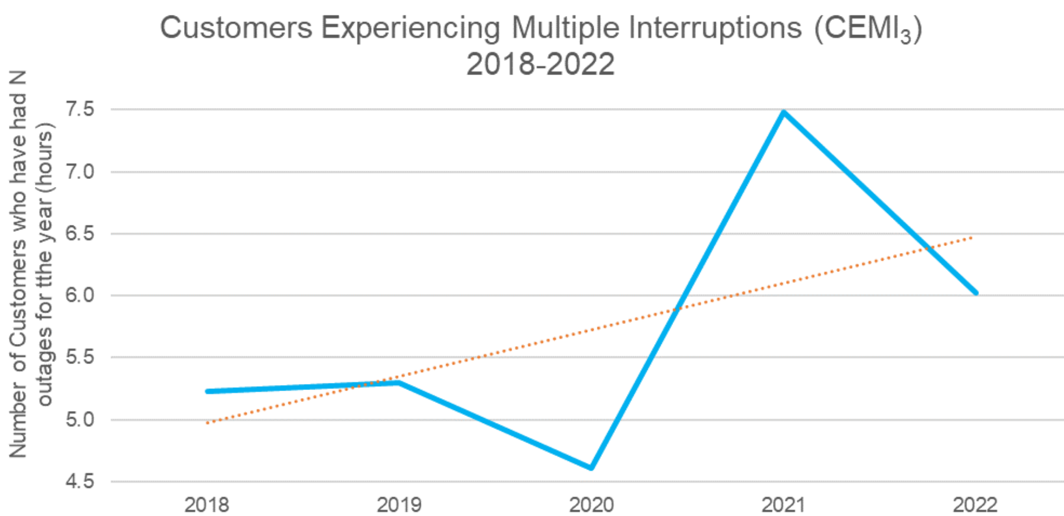

Figure 9: $CEMI_3$ – 2018-2022

[23] Excluding Major Event Days.
[24] Excluding Major Event Days.

CEMI$_3$ – Washington Only

Figure 10 below shows the Washington-only CEMI$_3$ for the five-year period of 2018-2022, including the linear trend.[25] Results in Washington were comparable to system-wide for the same reasons stated above.

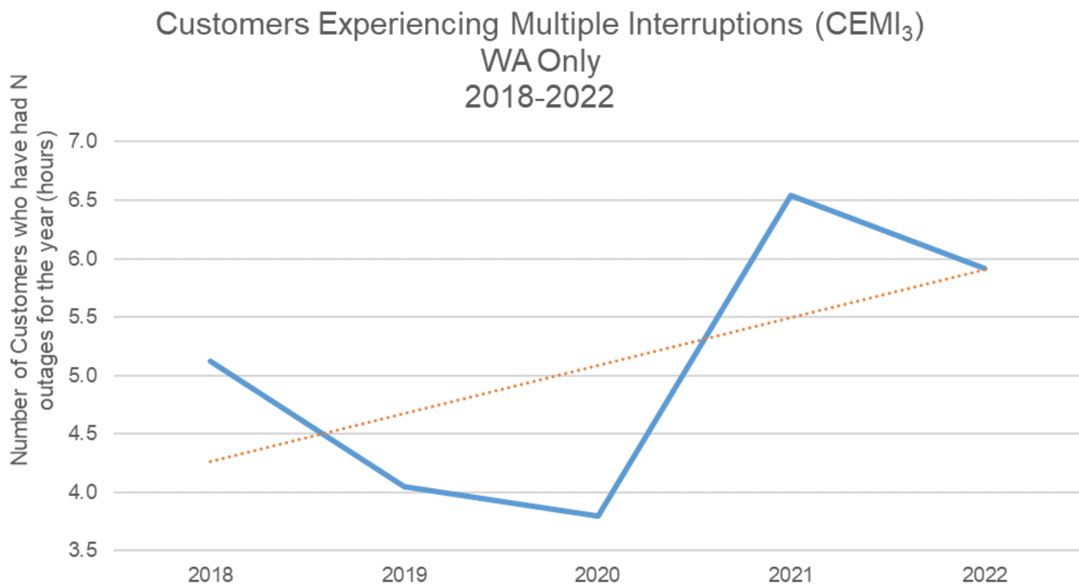

Figure 10: CEMI$_3$ Washington – 2018-2022

Average Outage Duration

Figure 11 below shows the average outage duration on Avista's system for the five-year period of 2018-2022, including the linear trend.[26] The trend reflects a leveling off in the average duration of outage events on Avista's system. In 2022, the average duration of outages remained relatively aligned with the duration in 2021. While this trend may appear to conflict with the trend for CAIDI shown above in Figure 5, this measure considers only the *average* of outage duration times and does not include the total number of customers or number of customers associated with the outages, and therefore is not an index value.[27]

[25] Excluding Major Event Days.

[26] Excluding Major Event Days.

[27] Avista understands this trend in reduced outage duration is likely the result of the increasing number of outage events associated with maintenance and upgrades on the Company's system. These planned outages typically involve a small number of customers and short in duration, such that they serve to reduce the overall average duration for outages of all causes.

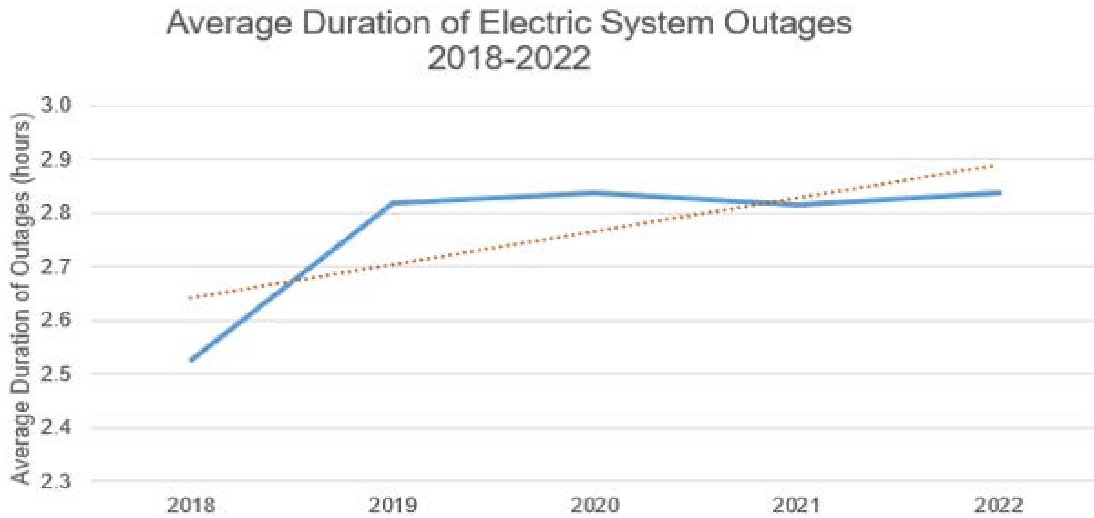

Figure 11: Average Outage Duration – 2018-2022

Average Outage Duration – Washington Only

Figure 12 below shows the average outage duration for Avista's Washington service territory for the five-year period of 2018-2022, including the linear trend.[28] After two years of a decrease, the Washington-only outages experienced a slight increase in 2022. This is in-line with what was experience with CAIDI.

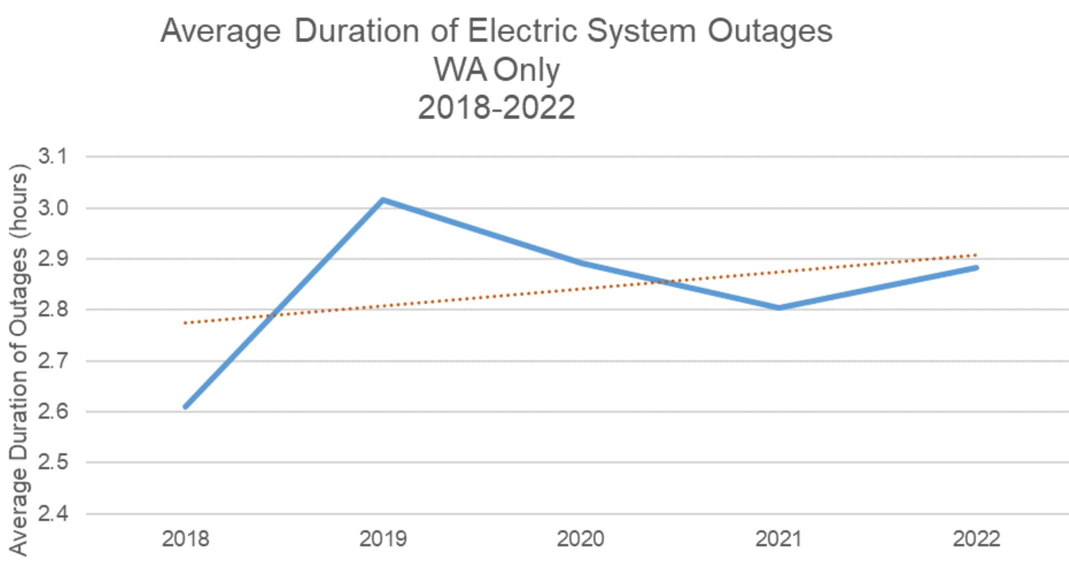

Figure 12: Average Outage Duration, Washington – 2018-2022

Average Number of Affected Customers per Outage Event

Figure 13 below shows the average number of affected customers per outage event on Avista's electric system for the five-year period of 2018-2022, including the linear trend.[29] The trend shows after 4 years of increases, in 2022 the average number of customers experienced a noticeable decrease in the average affected per outage event. The 2022 improvement was a result of a decrease in planned outages, as a

[28] Excluding Major Event Days.
[29] Excluding Major Event Days.

number of those outages were completed in 2021 to address underperforming feeders. There was also less of an impact from trailing outages due to fewer weather events (MEDs) and favorable weather conditions that reduced the number of fire safe mode outages experienced in a typical year. Some of the activities in 2022 to improve feeders included efforts to improve fuse coordination on feeders and laterals, install midline reclosers on feeders of all types, and implement feeder automation and communications with Fault Detection Isolation and Restoration (FDIR) and other Distribution Management System (DMS) capabilities.

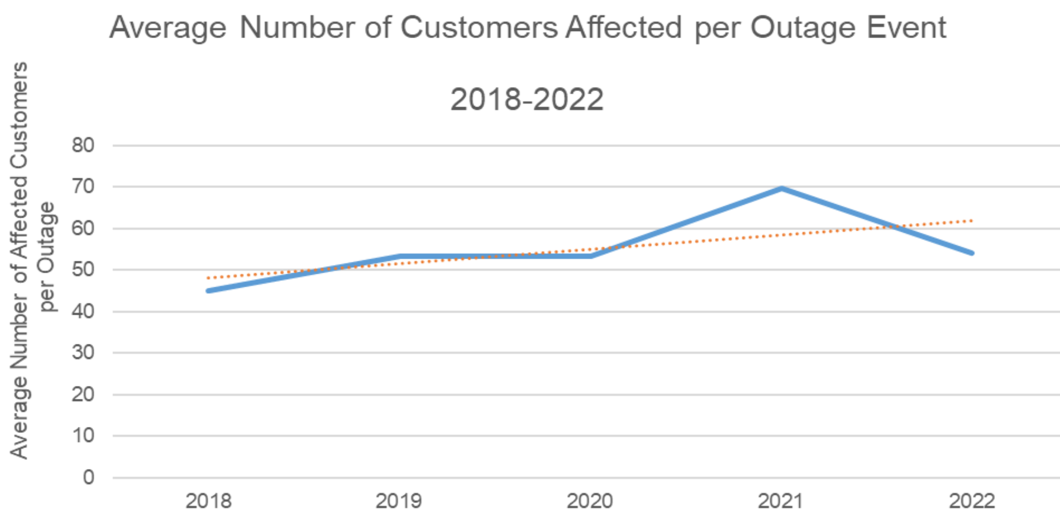

Figure 13: Average Number of Customers Affected per Outage Event – 2018-2022

Average Number of Affected Customers per Outage Event – Washington Only

Figure 14 below shows the average number of affected customers per outage event on Avista's Washington portion of the system for the five-year period of 2018-2022, including the linear trend.[30] In Washington, after 4 years of increases, customers experienced a noticeable decrease in the average affected per outage event in 2022. This can be attributed to the improvements made to the system in 2021.

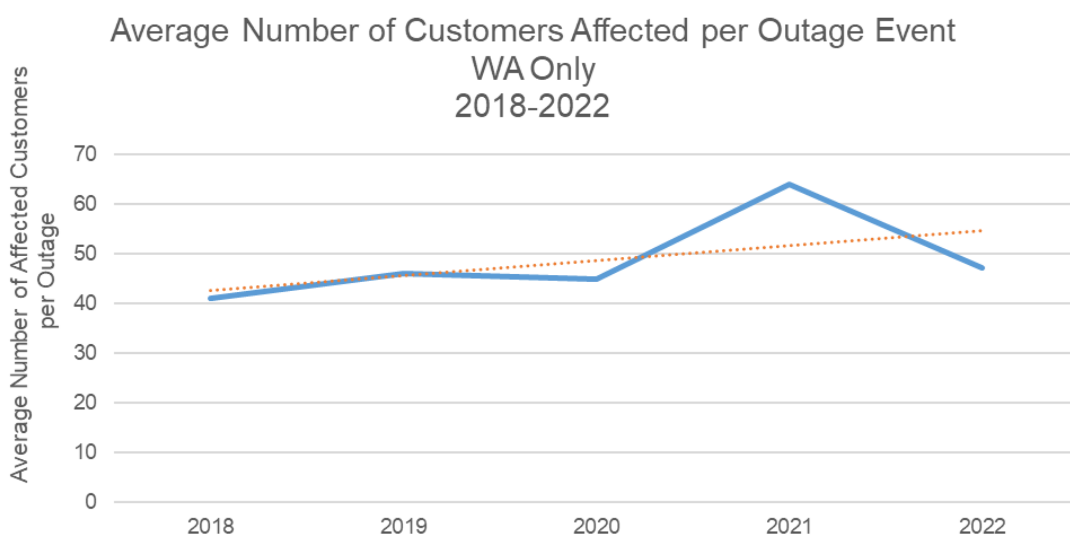

Figure 14: Average Number of Customers Affected per Outage Event, Washington – 2018-2022

[30] Excluding Major Event Days.

Number of Outage Events

Figure 15 below shows the number of outage events on Avista's system for the five-year period of 2018-2022, including the linear trend.[31] The results for 2022 show a decrease in outages due to improvements in the system and less storm impacts.

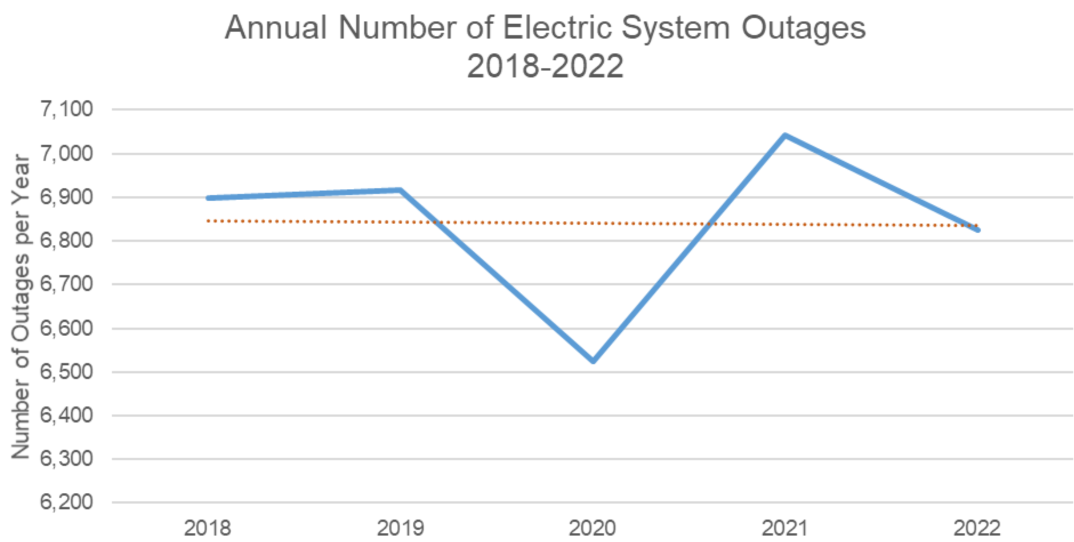

Figure 15: Annual Number of Outage Events – 2018-2022

Number of Outage Events – Washington Only

Figure 16 below shows the number of outage events on the Washington portion of Avista's system for the five-year period of 2018-2022, including the linear trend.[32] After several years of trending downward, the number of outages have slightly increased over the past two years, though the linear trend remains on a downward path. The increases can be attributed partially to planned outages to improve the system.

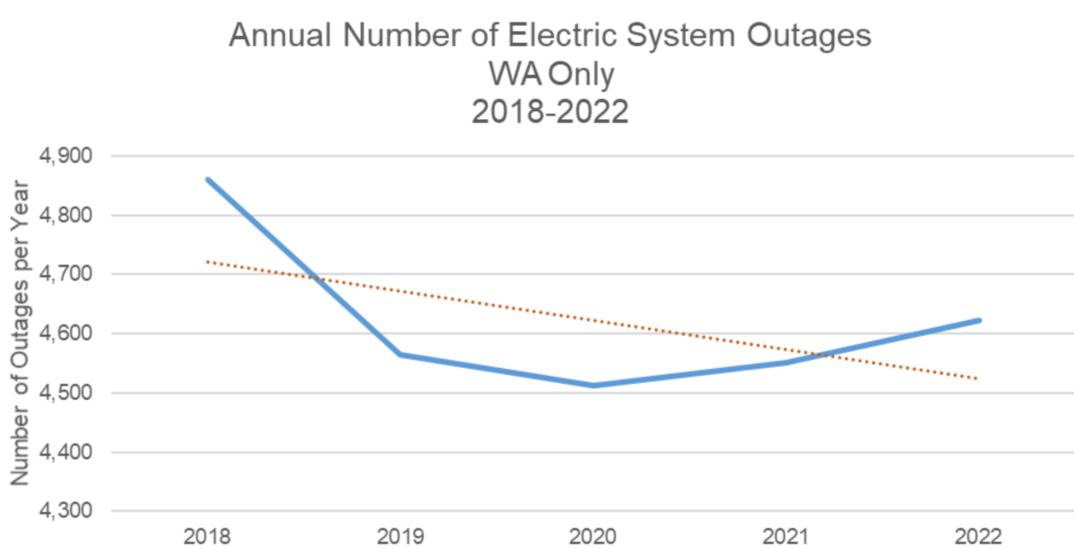

Figure 16: Annual Number of Outage Events, Washington – 2018-2022

[31] Excluding Major Event Days.

[32] Excluding Major Event Days.

Customer Outage Hours

Figure 17 below shows the number of customer outage hours on Avista's system for the five-year period of 2018-2022, including the linear trend. After a spike in 2021 outage hours, 2022 experienced a decrease, bringing results closer in-line to the years prior. It should be noted that as there is growth in the system (more customers), the likelihood of an increase in outage counts and total customer outage hours becomes more probable . The formulas for calculation of the number of outages (SAIDI) and outage restoration time (CAIDI) share the same numerator, which is the number of customer outage hours. Therefore, the number of outages and the duration of these outages impact the customer outage hours metric; both these factors are discussed briefly in their respective sections.

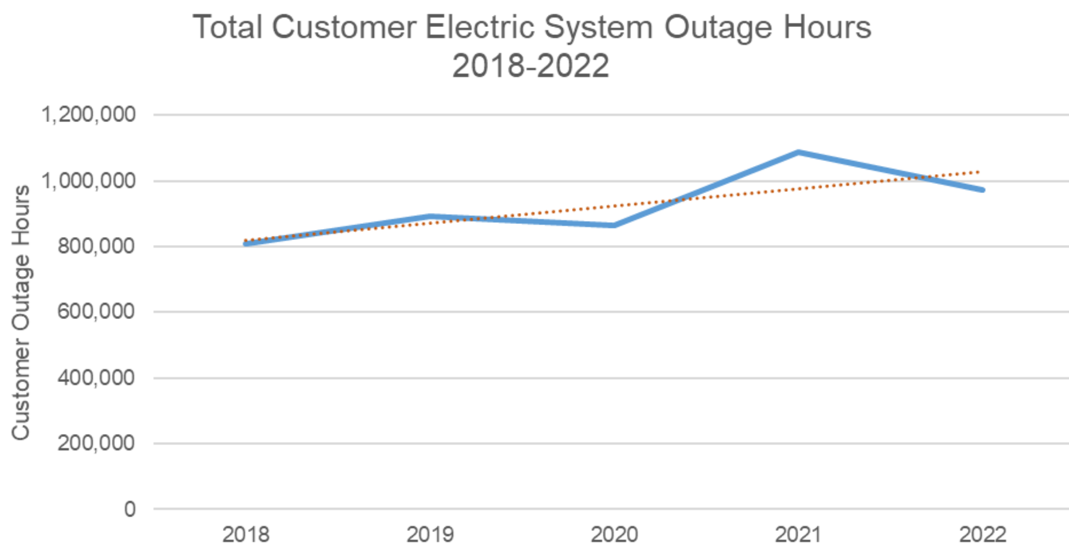

Figure 17: Total Customer Outage Hours – 2018-2022

Customer Outage Hours – Washington Only

Figure 18 below shows the number of customer outage hours on Avista's Washington portion of the system for the five-year period of 2018-2022, including the linear trend. The trend from 2018 to 2020 was relatively flat, but beginning in 2021 and continuing into 2022, customer outage hours in Washington experienced a decrease as improvements and fewer weather events occurred. Continuing into 2022, customer outage hours in Washington experienced a decrease as improvements and fewer weather events occurred.

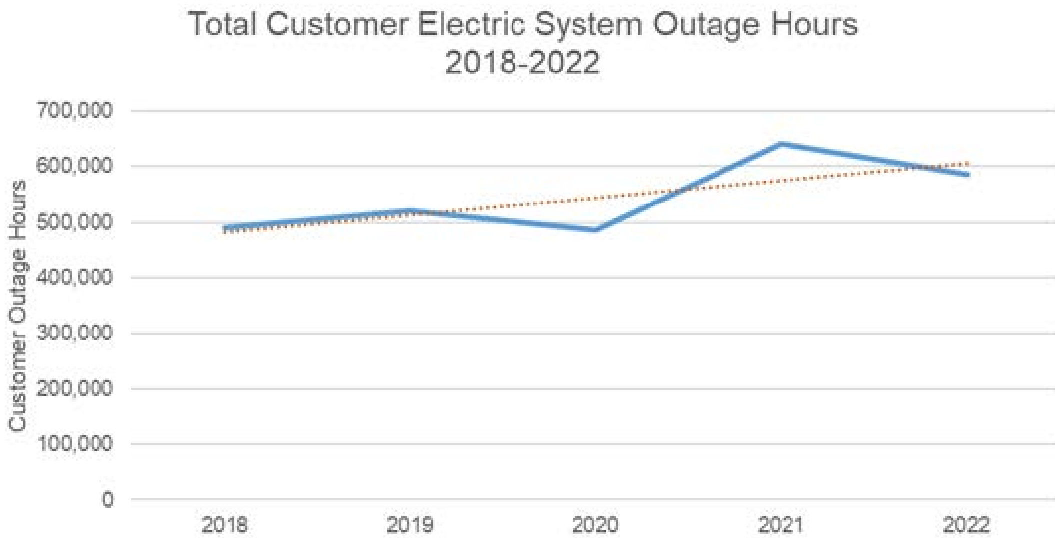

Figure 18: Total Customer Outage Hours, Washington – 2018-2022

Analysis of System Reliability Measures by Feeder Classification

Classification of Feeders by Customer Density

Following the evaluation of the system reliability measures presented previously, summary statistics for the electric system, segmented into urban, suburban, and rural feeders is shown in Table 5 below.[33]

Feeder Classification	Customer Distribution	Energy Consumption	Contribution to Customer Outage Hours	Contribution to Number of Outage Events
Urban	10.01%	9.04%	3.3%	6.1%
Suburban	54.98%	45.45%	23.2%	32.2%
Rural	35.01%	45.51%	73.5%	61.6%

Table 5: Summary Comparison of Feeder Data, Outage Hours, and Outage Events [34]

This summary data provides insight as to the unique characteristics and diversity of Avista's service territory. While customers on suburban feeders represent more than half the service population, this group experiences just 32% of the outage events. Conversely, customers on rural feeders represent just of one-third of the customer base but experience almost 62% of the outage events. These summary characteristics also highlight:

- Customer outage hours on rural feeders account for nearly 74% of the system total, despite accounting for only 35% of the customer base.
- Customers on a suburban feeder accounted for 23% of total outage hours compared to just 3% for the urban customers.

[33] Avista's feeder classification is based on customer density per feeder mile: Urban is more than 150 customers per mile, Suburban is between 50 and 150 customers per mile, and Rural is less than 50 customers per mile.

[34] Results for this table are based on number of customers and electricity consumption in 2021, and their contribution to customer outage hours and number of outage events for the 2015-2021 period.

SAIFI by Feeder Type

The system-level trend for this reliability measure, as shown in Figure 1 above, after a decrease in 2021, rebounded to improve in 2022. Again, this was attributable to a decrease in fire safe mode days, fewer planned outages and the lower amount of weather events reducing any trailing weather-related impacts. Figure 19 below illustrates that after an increase in 2021, both rural and suburban feeders saw decreases in 2022, while urban feeders in 2022 remained relatively consistent with the prior years' results.

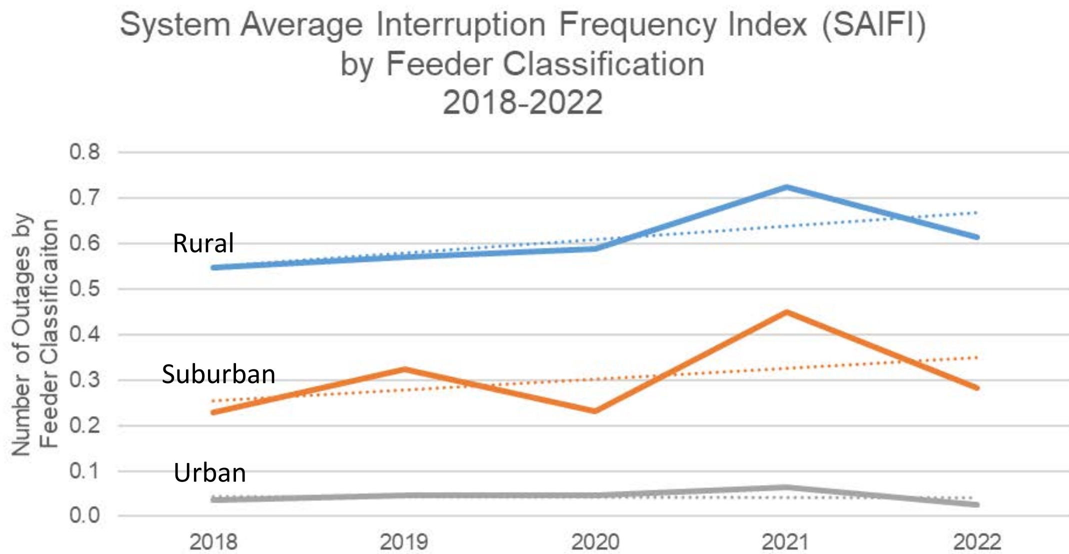

Figure 19: SAIFI by Feeder Classification – 2018-2022

SAIDI by Feeder Type

The system-level trend for this reliability measure, as shown in Figure 3 above, reflects a continued consistency in reliability performance over the five-year reporting period. After an increase in SAIDI in 2021, the index saw a decrease in rural and suburban feeders in 2022, with urban remaining flat. Results for the remaining feeder classification, shown in Figure 20 below, indicate that rural and suburban are on an upwards trend.

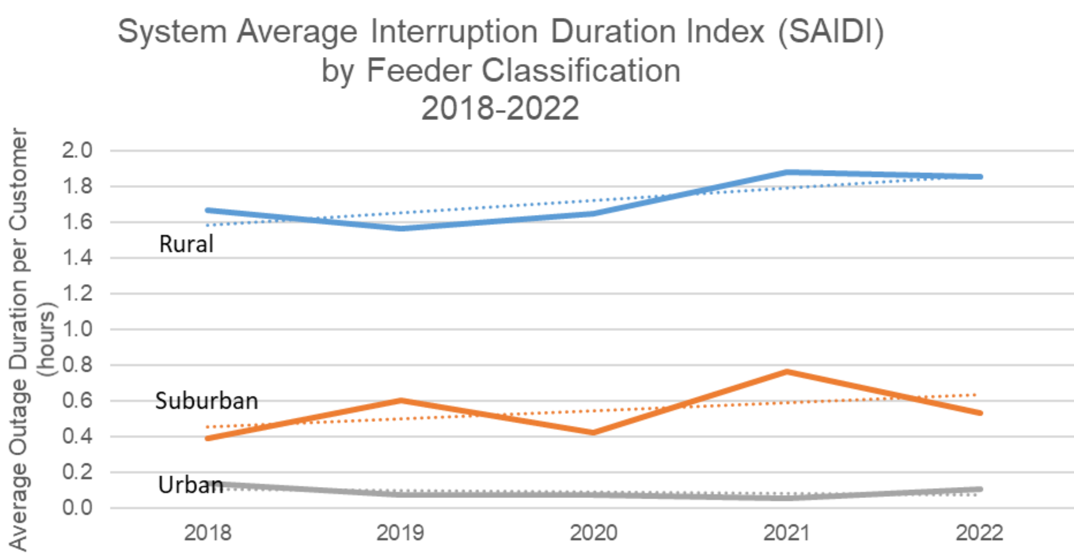

Figure 20: SAIDI by Feeder Classification – 2018-2022

CAIDI by Feeder Type

The system-level trend for this reliability measure, as shown in Figure 5 above, reflected an increase in restoration time for Avista's customers who experienced an outage during 2022; this increase carried over into feeder classification as well. Figure 21 below shows that after decreasing in 2021 there was an increase in 2022 for the feeders. Despite the increase in this metric, when looking at the other two indices (SAIDI and SAIFI), overall system performance is improving.

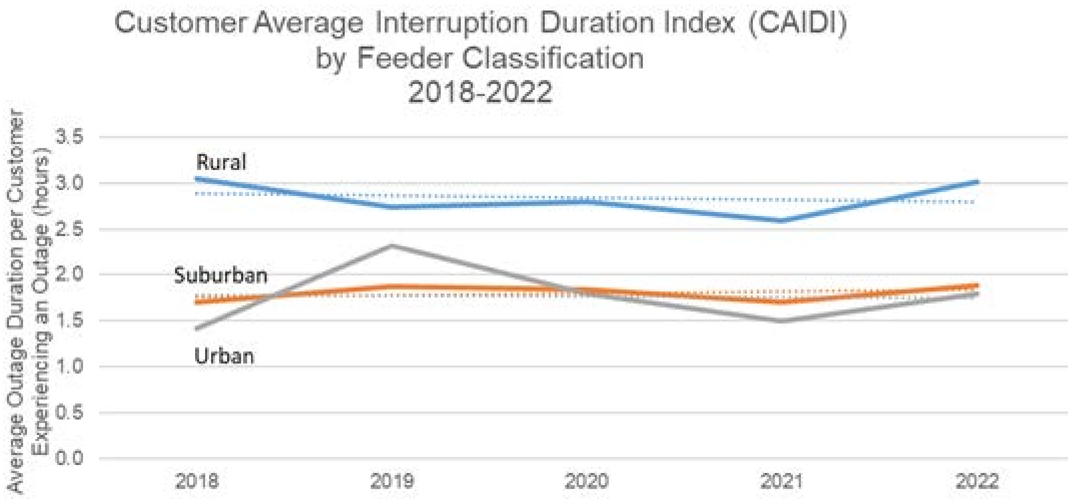

Figure 21: CAIDI by Feeder Classification – 2018-2022

CAIFI by Feeder Type

The system-level trend for this reliability measure, as shown in Figure 7 above, reflects a continued consistency in reliability performance over the five-year reporting period. Other than a slight decrease in 2021 and subsequent increase in 2022, results for CAIFI have remained relatively flat, as indicated by the trend line in Figure 22 below.

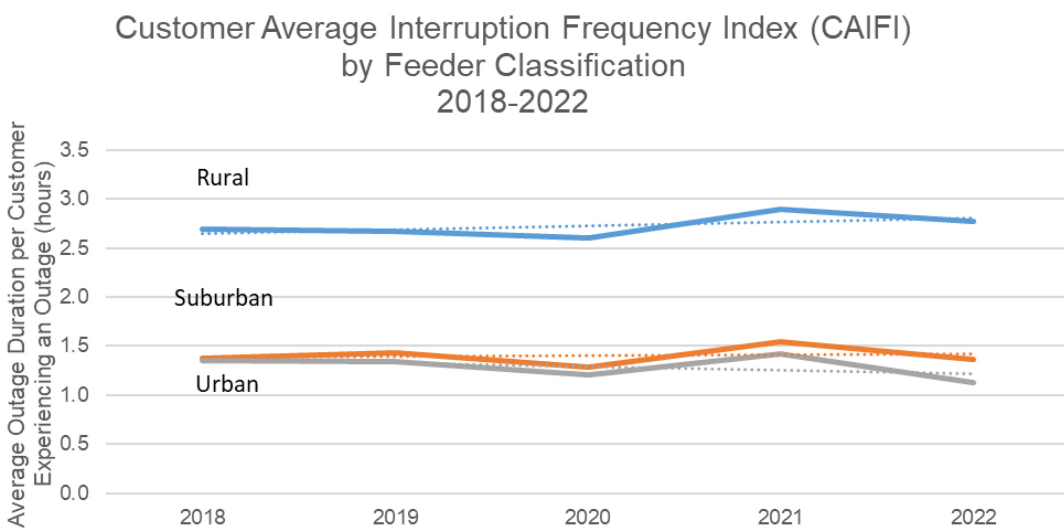

Figure 22: CAIFI by Feeder Classification – 2018-2022

CEMI$_3$ by Feeder Type

The system CEMI$_3$ has had an increasing trend over the past 5 years as shown in Figure 9. The overall trend has been driven by the sharp increase in 2021. And while 2022 saw a drop, results were still above 2018 to 2020. Results by feeder classification, as shown in Figure 23, demonstrate that urban and suburban have remained relatively level while the rural trend has increased, primarily driven by the 2021 results, which offset the improvement in 2022.

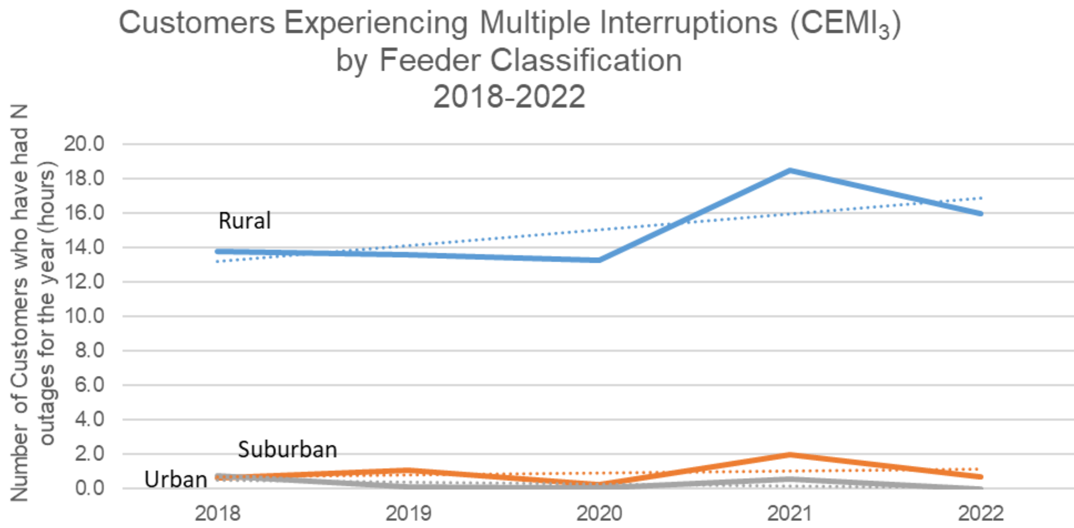

Figure 23: CEMI$_3$ by Feeder Classification – 22018-2022

Average Outage Duration Time by Feeder Type

The system average outage duration was relatively level compared to 2021, as shown in Figure 11 above. The results by feeder classification shown below in Figure 24 demonstrate that the slight increase in rural outage duration was offset by the decrease in urban, while suburban remained relatively flat.

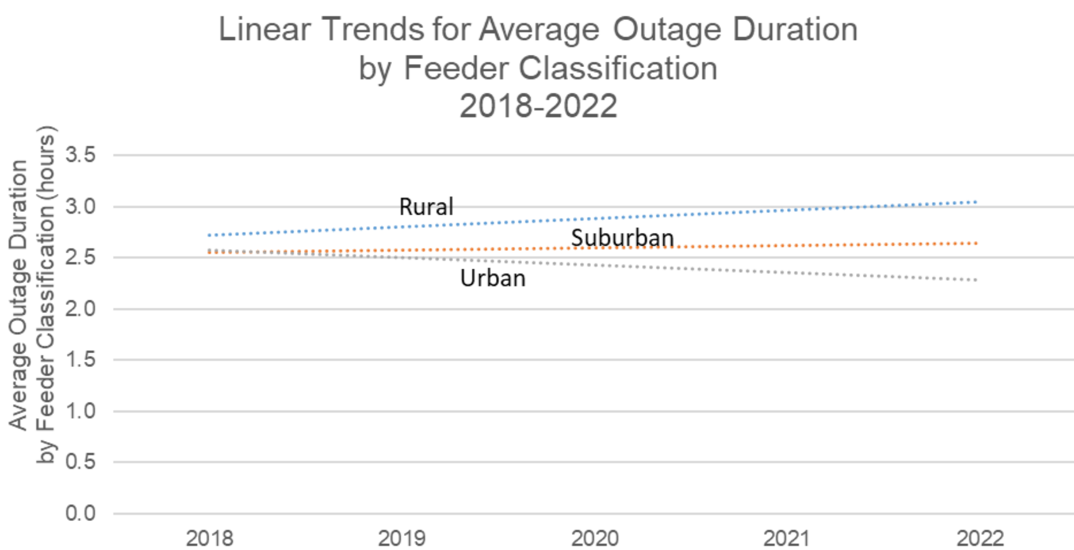

Figure 24: Linear Trend for Average Outage Duration by Feeder Classification – 2018-2022

Average Number of Affected Customers per Outage Event by Feeder Type

The system average number of affected customers experienced a noticeable decrease in 2022 (after a noticeable increase in 2021), as shown above in Figure 13 and below in Figure 25. All feeders reflected decreases in the number of affected customers, with fewer planned outages and "dry land" days being the primary contributing factors.

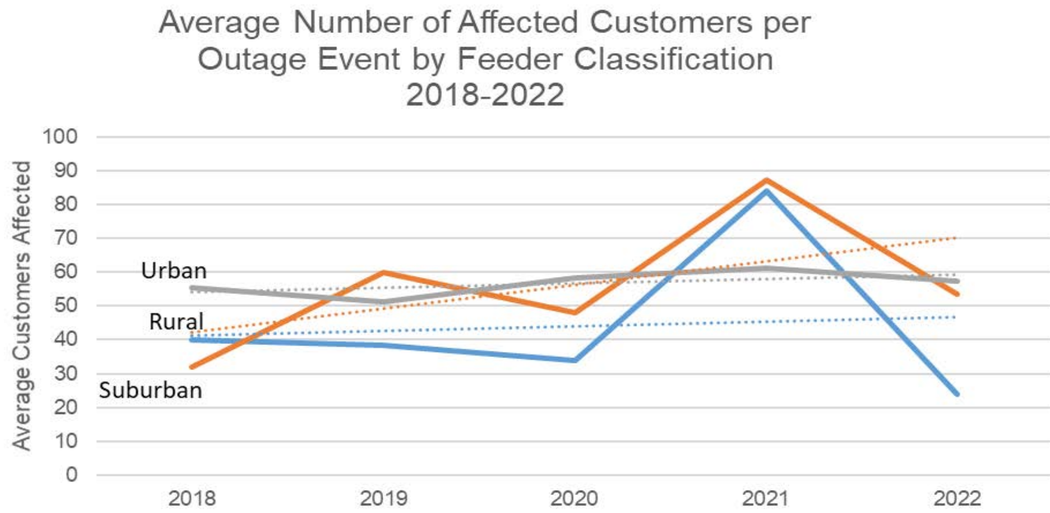

Figure 25: Average Number of Affected Customers per Outage Event by Feeder Classification – 2018-2022

Number of Outage Events by Feeder Type

As shown in Figure 15 above, after two years of atypical outage events, the number of outage events in 2022 was more in-line with prior years (2018 and 2019). Breaking down these events by feeder classification, shown in Figure 26 below, demonstrates that although the outages decreased in 2022, rural feeders continue to have the most outages. The number of outage events on suburban and urban feeders remained relatively flat, with urban having the most consistent results over time. The results also show the much greater contribution of outage events associated with our rural feeders, which accounted for approximately 62% of outages in 2022.

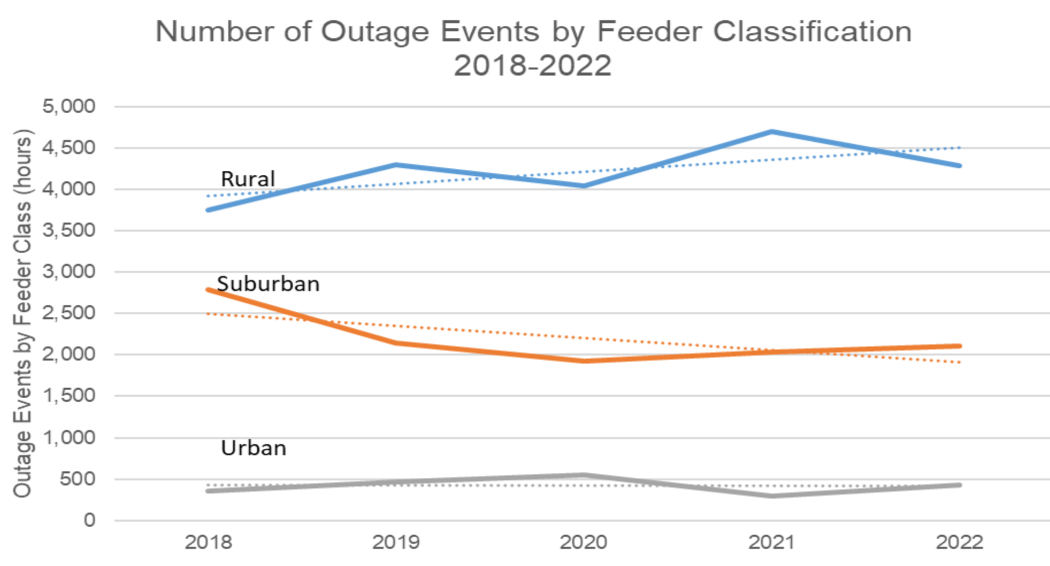

Figure 26: Number of Outage Events by Feeder Classification – 2018-2022

Customer Outage Hours by Feeder Type

Figure 17 above shows the total number of customer outage hours on the Company's electric system remaining level over the current five-year period. Based on the data shown in Figure 27 below, the contribution of outage hours by feeder classification shows that rural feeders leveled out in 2022, after a few years of increasing, while urban remained relatively consistent. Suburban feeders experienced an increase in 2021 that was offset almost completely by the decrease in 2022. As discussed above, rural feeders accounted for nearly 74% of total outage hours in the current five-year period.

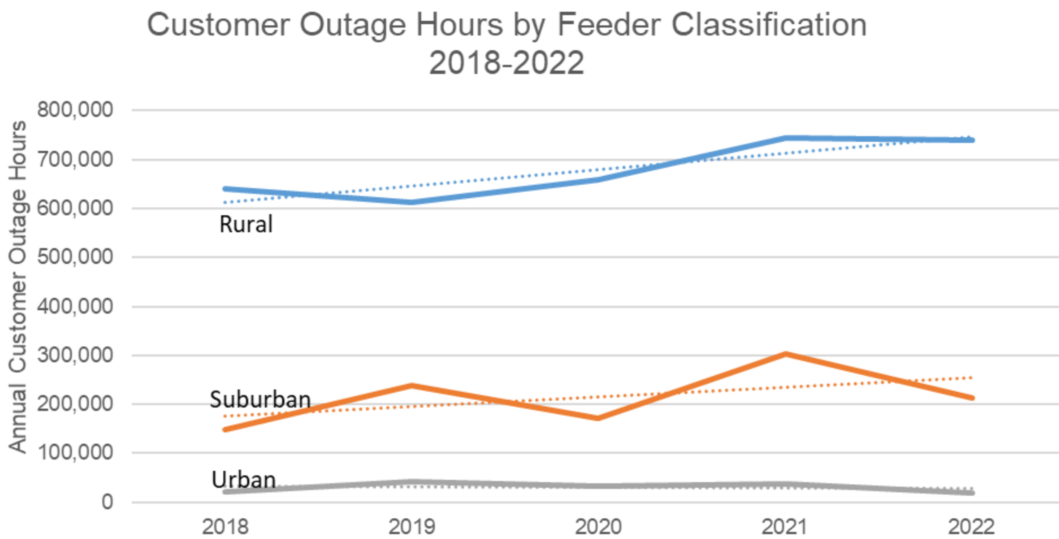

Figure 27: Customer Outage Hours by Feeder Classification – 2018-2022

Service Reliability of Avista's Rural Feeders

Customer Outage Hours for Rural Feeders

In 2022, the Company's rural feeders experienced an improvement compared to 2021, as outage hours decreased by approximately 4,000 hours compared to an increase of approximately 85,000 in 2021. Comparing the 5-year periods of 2017 to 2021 vs. 2018 to 2022 (see Table 6 below), there was a decrease of approximately 127,744 in outage hours. The two largest contributors to outages continue to be weather (a decrease of 71k hours) and planned outages (increase 74k hours), which essentially offset each other. The biggest contributors to the fewer outages between the two 5-year periods were a reduction in outages caused by the public (43k) and undetermined causes (59k). The remaining categories offset themselves.

Outage Cause Category	2017-2021 (hours)	2018-2022 (hours)	Change (hours/year (F)/U)
Tree Intrusion	511,555	477,966	(33,589)
Undetermined	345,910	286,859	(59,051)
Public	284,273	241,433	(42,841)
Weather	1,001,501	930,339	(71,162)
Pole Fire	223,420	205,134	(18,286)
Miscellaneous	5,098	3,158	(1,940)
Company Operations	18,742	33,842	15,099
Underground Equipment	41,278	35,903	(5,376)
Animal Intrusion	117,569	126,567	8,998
Overhead Equipment	366,244	380,111	13,867
Substation Equipment	33,034	25,573	(7,461)
Planned Operations	577,741	651,739	73,997
Total	3,526,368	3,398,625	(127,744)

Table 6: Average Annual Change in Customer Outage Hours by Cause for Rural Feeders – 22018-2022

Consistent with previous years, this assessment continues to show that outages are impacted, for the most part, by factors outside of Avista's control. These include weather, tree interference and public events such as a car hitting a pole. For Avista's part, the Company's work to improve the condition of the feeders, while it does contribute to outages via planned operations/outages, these efforts have the long-term goal of continuing to focus on improving and minimizing interruptions to the customer. Investments made in the system are seen in the outage hours for overhead and underground equipment as well as substation equipment. The Company's ongoing maintenance and upgrade work on its rural feeders should continue to positively influence this data in subsequent periods.

The top twelve reasons contributing to customer outage hours on Avista's rural feeders are shown in Figure 28 below.

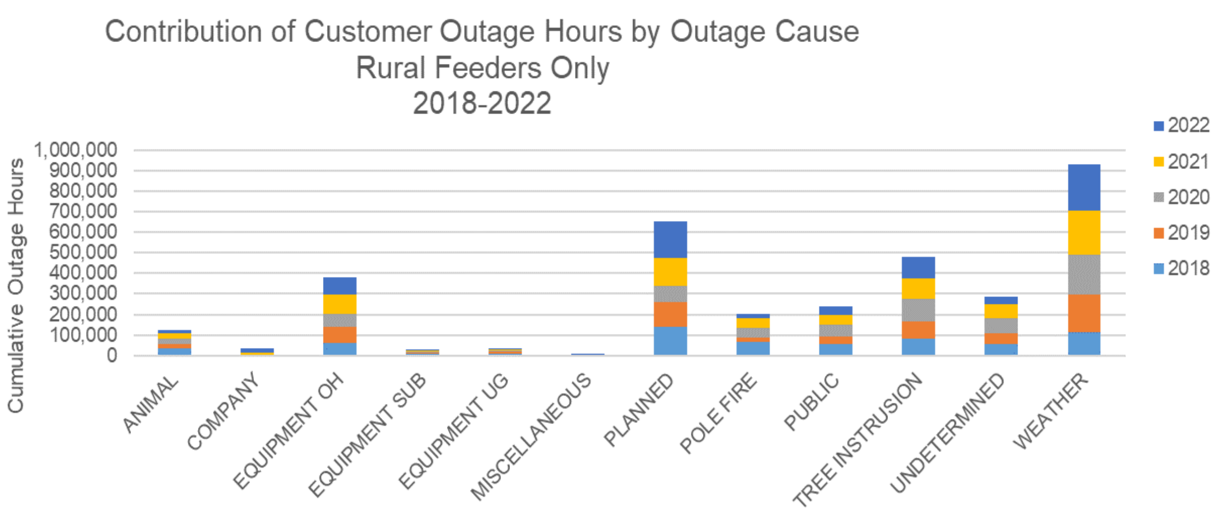

Figure 28: Contribution to Customer Outage Hours by Outage Cause on Rural Feeders – 2018-2022

As remains typical of Avista's system, weather-related outages continue to be the leading contributor to customer outage hours on rural feeders, contributing more than 1.0 million hours over the five-year period. The second leading cause is Avista's planned maintenance and upgrade activities that contributed approximately 578k outage hours, an increase of approximately 74,000 hours from the prior five-year period (2017-2021). The remaining causes of outages, in order of contribution, include tree intrusion, overhead equipment failure, undetermined events, public events such as car-hit pole, pole fires, animal intrusions, underground equipment, substation equipment, Company activities, and finally, miscellaneous outages.

Named Communities

The Clean Energy Transformation Act (CETA) of 2019, codified as RCW 19.405, brought with it the definitions of "Highly impacted community" and "Vulnerable population", collectively referred to as "Named Communities". As part of its work in tracking and reporting on its electric service reliability, Avista has incorporated information regarding the electric service reliability for these Named Communities, as defined by the Washington State Department of Health (DOH), for Washington only. For purposes of this Report, the Company is providing reliability data for Named Communities for 2021 and 2022 only. Once a five-year rolling average can be established, this value will be reported as well, and the five-year rolling average will replace the 2021 year as the baseline for the Named Community metrics.

As stated in Avista's Plan, the reliability indices that most accurately reflect the experience of the customers in these communities are CAIDI, $CEMI_3$, and CAIFI. Historically, Avista determines system reliability statistics based on system connectivity and does not aggregate reliability data spatially, which is needed to analyze the DOH Named Community census tracts. While comparison between historical connectivity-based reliability and this new spatially aggregated reliability is not supported by IEEE reliability standards, scalable and customer focused indices, such as CAIDI, CEMI, and CAIFI are most appropriate for analysis by census tract.

Table 7 below provides the reliability performance within Avista's Washington Named Communities. Avista recognizes that this data demonstrates a need for improved reliability within these communities, as the reliability measures in these areas are higher than the Washington-only performance. The Company expects that with the ongoing programs intended to improve reliability performance in such areas, progress is being (and will be) made in improving these Named Communities' reliability metrics.

	CAIDI	$CEMI_3$	CAIFI
Named Communities - 2022	3.18	6.61%	2.32
Named Communities - 2021	2.55	5.94%	2.10
Washington Averages	2.69	5.92%	2.05

Table 7: Named Communities Reliability Indices – 2021 and 2022

Feeders with Greatest Service Reliability Challenges

For the purposes of this limited discussion, the top ten feeders defined on Avista's system that have faced the greatest reliability challenges in the current reporting period, based on five of the reliability measures discussed above for the same five-year reporting period, are listed in 8 below. In addition, a five-year trend in outage events on these feeders is included. The individual feeders are listed by the code abbreviations Avista uses as a naming convention for feeders in its system, with the first three characters in each label signifying the originating substation for the feeder.

System Average Interruption Frequency Index (SAIFI)	System Average Interruption Duration Index (SAIDI)	Customer Average Interruption Duration (CAIDI)	Total Customer Outage Hours	Annual Number of Outage Events	Five-year Trend in Outage Events
CLV34F1	CLV34F1	WEI1289	CLV34F1	CLV34F1	CLV34F1
STM633	GRV1273	GRV1273	GRV1273	VAL12F1	ORI12F3
GRV1273	GIF34F1	SPI12F2	GIF34F1	GIF34F2	GIF34F2
GIF34F1	WEI1289	GIF34F2	GIF34F2	ORI12F3	STM633
STM631	GIF34F2	WAL543	WEI1289	CHW12F3	GIF34F1
ORI12F3	STM633	KET12F2	STM633	LEO611	VAL12F1
GIF34F2	ORI12F3	GIF34F1	ORI12F3	GIF34F1	CHW12F3
DER651	DER651	GIF12F1	DER651	ORI12F1	STM631
BLU321	BLU321	GRN12F1	BLU321	IDR252	BLU321
CLV12F4	WAL543	BLU321	WAL543	LOO12F2	KET12F2

Table 8: Top Ten Most Challenging Feeders by Reliability Measure

When considering the implications of feeders on these lists of reliability measures, the frequency of inclusion provides significant awareness for opportunities to improve the performance of those feeders. Since the increase in outage events on rural feeders has been a key contributor to customer outage hours, that reliability measure is also included. Evaluating feeders by this measure brings attention to those feeders that have improved performance or in some cases saw a deterioration. For example, in 2022 the five-year trend saw the addition of CLV12F4, GIF12F1, GRN12F1, LEO611, and LOO12F2 while SPI12F1, ODN731, and RAT233 dropped off.

Considering the measure for customer outage hours, the cumulative outage hours for the 2018-2022 reporting timeframe are calculated for the top ten most challenging feeders by outage reason or cause and shown in Figure 29 below.

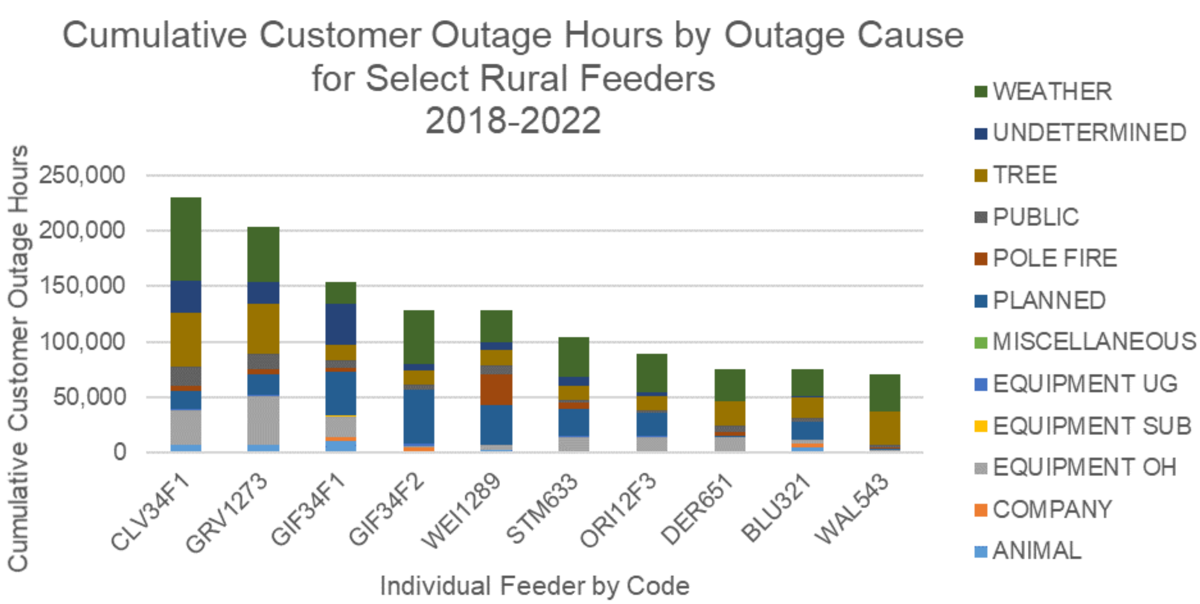

Figure 29: Cumulative Outage Hours by Feeder and Outage Cause – 2018-2022

Depending on the reliability objectives being pursued and the reliability measure determined to be important, this analysis may be useful in identifying the types of programs that could be effective to improve specified reliability performance.

Summary of Investments in Rural Feeders in 2022

Avista's engineering and operations staff, apart from our ongoing Asset Maintenance programs,[35] are continuously evaluating opportunities to maintain the overall performance of the Company's rural feeders. These include specific investments that have the benefit of improving the service reliability of poorly performing circuits. Among these programs are Grid Modernization, Failed Plant and Operations, Feeder Tie and Reconductor, and Feeder Minor Rebuild. A brief summary of the program investments made in 2022 is provided in Table 9 below. In addition to the projects listed below, more than 30 Asset Replacement projects were completed, upgrading poles and equipment on portions of other rural feeders.

Feeder	Key Objectives	Work Performed	Investment
RIT731	Reconductor to Ritzville Hospital	Replaced conductor to increase reliability and capacity to the Ritzville hospital.	$25,000
ROX751	Add functionality and communications to recloser.	Replace Kyle with Viper	$32,000
L&R515	Add capacity for feeder tie increasing flexibility	Reconductor replaced	$175,000
GIF34F1	Feeder improvements	Replace cutouts with Kyle to reduce sustained outages.	$17,000
DVP12F2	Increase feeder flexibility	Add phase and reconductor to enable feeder tie to increase flexibility.	$25,600
ORO1282	Reduce outages	New recloser to reduce outages and restoration time. Tie SW Viper ZG821R. Install Viper switch ZG823R.	$4,742
COT2402	Substation road line move.	Proactive replacement of old inaccessible poles with underground cable.	$252,797
ORO1281	Reduce outages	New recloser to reduce outages and restoration time.	$885
PDL1204-DRY1208	Operational flexibility	Establish new tie between circuits for operation flexibility	$30,215
LOL1359	Reduce faults and outages	Replacement of overhead feeders that have a history of faults with underground cable.	$56,547

[35] Avista's Asset Maintenance programs include Wood Pole Management, Vegetation Management, Street Lighting, and Overhead Transformer Changeout.

WOR471	New viper	New recloser to reduce outages and restoration time.	$19,144
DER651	New viper	New recloser to reduce outages and restoration time.	$109,493
ECL221	Replace of conductor.	Proactive replacement of unreliable conductor.	$5,346
LEO611	Reduce outages	Proactive replacement of old overhead poles and conductor with underground cable.	$9,501
ORI12F3	Improve voltage and reliability.	Rebuilt portion of feeder. Installed 3ph voltage regulators, created new tie to split up long single phase lateral and replaced overloaded #1 URD cable.	$971,000
GLN/SE12F6	Creating a tie line to connect the feeders for more available capacity for emergency switching scenarios.	Single to Dbl Ckt Conv, 556AAC, 1600ft	$102,000
NE12F1	Reconductor lateral to accommodate area load.	Reconductor 2800ft	$218,000
AIR12F1	Reconductor lateral to accommodate area load.	Reconductor 5600ft	$302,000
GRA12F2	Reconductor lateral to area load.	Reconductor 0.5 mile	$310,000
SE12F2/GLN12F2	Add primary dip in order to unload existing primary dip hitting 89% loading.	Add 1ph Dip, 700 ft BPh Pri UG lateral.	$49,000
GRA12F2	Mitigate low voltage exceptions on Mica Peak	Add line Regs to Mica Peak. Phase balance the lateral.	$89,000
DEP12F1 Weber Lateral	Reconductor and add regulators to mitigate low voltage exceptions on this lateral.	Add 3ph line regs & reconductor, 5300 ft.	$382,000
BLD12F4 to LIB12F2	Reconductor section that has limited capacity for emergency switching.	Reconductor 0.4 mi	$157,000
COB12F1 to MEA12F2/WAK12F1	Build tie line to provide ability to unload multiple feeders with the future install of a substation.	Add 1.5 miles (in total) of conductor.	$623,000
GRA12F1	Create underground tie to feed growing	Conduit and vaults for future 600A UG and	$228,000

	commercial and development loads.	conduits across new WSDOT bridge.	
SIP12F4 IRV-BLD	Transfer existing feeder trunk from distribution poles to transmission poles.	Transfer 3.5 miles of conductor for future double distribution. Add and relocate switches.	$200,000
BLD12F4	Reconductor feeder between 2 locations.	Reconductor 1 mile	$231,000

Table 9: Brief Summary of Feeder Investments in 2022

Appendices

Appendix A - Definitions

Baseline reliability statistic - Avista will compare its reliability statistics to the five-year rolling average.

Commission Complaint - When a customer is not satisfied with the Company as it relates to electric reliability and files a complaint directly with the Commission.

Customer Complaint - When a customer is not satisfied with the Company as it relates to electric reliability and makes a complaint directly to a Company representative.

Electric Service Reliability - The continuity of electric service experienced by retail customers.

Electric System Reliability Reporting Requirements - The minimum reporting requirements are as follows:

> *(1) The report must be consistent with the electric service reliability monitoring and reporting plan filed under WAC 480-100-393. As set forth in the plan, in an identified year, baseline reliability statistics must be established and reported. In subsequent years, new reliability statistics must be compared to the baseline reliability statistics and to reliability statistics from all intervening years. The utility must maintain historical reliability information necessary to show trends for a minimum of seven years.*
>
> *(2) The report must address any changes that the utility may make in the collection of data and calculation of reliability information after initial baselines are set. The utility must explain why the changes occurred and explain how the change is expected to affect comparisons of the newer and older information. Additionally, to the extent practical, the utility must quantify the effect of such changes on the comparability of new reliability statistics to baseline reliability statistics.*
>
> *(3) The report must identify the utility's geographic areas of greatest reliability concern, explain their causes, and explain how the utility plans to address them.*
>
> *(4) The report must identify the total number of customer complaints about reliability and power quality made to the utility during the year and must distinguish between complaints about sustained interruptions and power quality. The report must also identify complaints that were made about major events.*

Full-system - All equipment and lines necessary to serve retail customers whether for the purpose of generation, transmission, distribution, or individual service.

Interruption Cause Code - Used to describe the cause of an interruption (i.e., animal, tree, public, etc.).

Major Event - Designates an event that exceeds reasonable design and or operation limits of the electric power system. A Major Event includes at least one Major Event Day (MED).

Major Event Day - A day in which the daily system SAIDI exceeds a threshold value, T_{MED}. For the purposes of calculating daily system SAIDI, any interruption that spans multiple calendar days is accrued to the day on which the interruption began. Statistically, days having a daily system SAIDI greater than T_{MED} are days on which the energy delivery system experienced stresses beyond that normally expected (such as severe weather). Activities that occur on major event days should be separately analyzed and reported.

Momentary Event Interruption - An interruption of duration five minutes or less. Each event consists of a single trip and reclose operation that occurs within five minutes. For example, if an interrupting device operates three times and then holds the circuit energized, this would be counted as three events with the number of customers affected as three times the N_i.

Power Quality – Characteristics of electricity, primarily voltage and frequency, that must meet certain specifications for safe, adequate, and efficient operations.

Reliability Statistic – Standard Statistics measures and calculation methods are per the IEEE Standard P1366-2012 (or latest version) titled *IEEE Guide for Electric Power Distribution Reliability Indices*. Same as Reliability Indices.

Sustained Interruption - An interruption lasting longer than five minutes.

Appendix B - Index Calculations

SAIFI – System Average Interruption Frequency Index

- The average number of sustained interruptions per customer
- = The number of customers which had ***sustained interruptions***
  Total number of customers served
- $= \dfrac{\sum N_i}{N_T}$

SAIDI – System Average Interruption Duration Index

- Average sustained outage time per customer
- = Outage duration multiplied by the customers effected for all ***sustained interruptions***
  Total number of customers served
- $= \dfrac{\sum r_i N_i}{N_T}$

CAIDI – Customer Average Interruption Duration Index

- Average restoration time
- = Outage duration multiplied by the customers effected for all ***sustained interruptions***
  The number of customers which had ***sustained interruptions***
- $= \dfrac{\sum r_i N_i}{\sum N_i}$

Quantities:
i = An interruption event;
r_i = Restoration time for each interruption event;
T = Total;
ID_E = Number of interrupting device events;
N_i = Number of interrupted customers for each interruption event during the reporting period;
N_T = Total number of customers served for the area being indexed;

$CEMI_n$ – Customers Experiencing Multiple Sustained Interruptions more than *n*.

- $CEMI_n$
- = Total Number of Customers that experience more than *n* **sustained interruptions**
  Total Number of Customers Served
- $= \dfrac{CN_{(k>n)}}{N_T}$

CAIFI – Customer Average Interruption Frequency Index - gives the average frequency of sustained interruptions for those customers experiencing sustained interruptions. The customer is counted once, regardless of the number of times interrupted for this calculation.

- CAIFI
- $\dfrac{\sum \text{Total Number of Customer Interruptions}}{\text{Total Number of Distinct Customers Interrupted}}$

MED - Major Event Day
A major event day is a day in which the daily system SAIDI exceeds a threshold value. Its purpose is to allow major events to be studied separately from daily operation, and in the process, to better reveal trends in daily operation that would be hidden by the large statistical effect of major events.

The MED identification threshold value, T_{MED}, is calculated based on the IEEE P1366-2012 Standard. T_{MED} is calculated at the end of each reporting period, typically one year, for use during the next reporting period as follows:

a) Collect values of daily SAIDI for five sequential years ending on the last day of the last complete reporting period. If fewer than five years of historical data are available, use all available historical data until five years of historical data are available.

b) Only those days that have a SAIDI/Day value will be used to calculate the T_{MED} (do not include days that did not have any interruptions).

c) Take the natural logarithm (*ln*) of each daily SAIDI value in the data set.

d) Find α (Alpha), the average of the logarithms (also known as the log-average) of the data set.

e) Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.

f) Compute the major event day threshold, T_{MED}, using equation (25).

$$T_{MED} = e^{(a+2.5\,b)}$$

g) Any day with daily SAIDI greater than the threshold value T_{MED} that occurs during the subsequent reporting period is classified as a major event day. Activities that occur on days classified as major event days should be separately analyzed and reported.

When an event has reached the threshold to constitute a MED described in subpart (f) above, all outage incidents associated with the MED will be flagged in the Company's Outage Management Tool. As the Company further assesses damage in the field while making repairs, new subsequent outage incidents that were a result of the MED may be created as more accurate information is made available. The subsequent incidents will be flagged and included as part of original outage event and MED.

Methodology for Calculating CEMI

The IEEE Standard P1366-2012 provides for two methods to analyze data associated with customers experiencing multiple momentary interruptions and/or sustained interruptions. Avista's Outage Management Tool (OMT) and Geographical Information System (GIS) provide the ability to geospatially associate an outage to individual customer service points. This association allows for graphically showing Customers Experiencing Multiple Sustained Interruptions ($CEMI_n$) with Major Event Day data included onto GIS produced areas. Data can be exported to Excel to also create graphs representing different values of *n*. The calculation for $CEMI_n$ and Customers Experiencing Multiple Sustained and Momentary Interruptions $CEMSMI_n$ is provided in Attachment B of the Standard.

Avista has used the data from the OMT system integrated with the GIS system to geospatially display reliability data for specific conditions. The specific conditions imply looking at the number of sustained interruptions for each service point, such as a meter point. This process would be similar to the SAIFI index but related to a certain number of sustained interruptions. Avista includes all sustained interruptions including those classified under Major Event Days. This provides a view of what each customer on a specific feeder experience on an annual basis. Momentary Interruptions are not included in the $CEMI_n$ index because by IEEE definition only applies to sustained outages. Other Momentary Indices are not included because of the lack of indication at many rural substations and line locations.

Appendix C - Methods and Measures

WAC 480-100-398 (2) requires the Company to report changes made in data collection or calculation of reliability information after initial baselines are set. This section addresses changes that the Company has made to data collection.

Since Avista's Electric Service Reliability Monitoring and Reporting Plan was filed in 2001 (UE-011428), there have been several improvements in the methods used to collect outage data. In late 2001, centralizing the distribution trouble dispatch and data collection function for Avista's entire service territory began. The distribution dispatch office is located at the Spokane headquarters complex. At the end of September 2005, 100% of the Company's feeders, accounting for 100% of the customers, are served from offices that employ central dispatching.

The data collected for 2020 represents almost twenty years of outage data collected through the Outage Management Tool (OMT). Since 2016, all data has been collected using OMT based on the Company's Geographic Information System (GIS). The OMT system automates the logging of restoration times and customer counts.

Even as good as the OMT system is at quantifying the number of customers and duration of the outage duration, there still are areas where the data collection is not precise. Determining the exact starting time of an outage is dependent on when a customer calls in, how well the Avista Distribution Dispatcher determines where the outage is and defines the device that has opened to remove the faulted section.

As AMR and AMI metering reaches full implementation and the customer meter provides outage information to the OMT system through an interface, the SAIDI and CAIDI numbers are expected to increase, consistent with the discussion above.

Use of the OMT system and GIS data has improved the tracking of the numbers of customers without power, allowed for better prioritization of the restoration of service, and the improved dispatching of crews.

Beginning with the report for 2020, a minor revision to the number of MED outages for 2015 has been incorporated. The original sustained outage data used in the creation of this report had some outages that occurred in November 2015 erroneously excluded from the MED dataset. When the comprehensive data extract of sustained outage data from 2015 was refreshed, the identified outages from November 2015 were now correctly included as MED datapoints. Most reliability calculations exclude MED designated outages, so some minor changes may impact the results for 2015.

To determine the customer count for Avista system reliability data, the number of active service points are recorded at the beginning of the reporting year. While working on the report for 2021, the 2020 and 2019 customer counts used in those reports were found to be higher than the recorded service point count at the beginning of those years by 1.7% and 0.6%, respectively. For the 2021 report, the active service points recorded at the beginning of the reporting year are being used again, leading to slightly elevated (worse) reliability metric results compared to the method used in the 2020 and 2019 reliability reports.

Appendix D - Areas of Greatest Concern

Please see Table 7 above for the Company's current listing of its worst performing feeders based on current service reliability results. Figure 2 above also provides feeder specific information related to outage causes by reason and sub-reason, and Figure 26 represents the outage events based on feeder classifications. As noted in the discussion above, because there are several approaches for determining "worst" performance, the designation of worst performing feeders should be informed by the reliability objectives the Company is intending to achieve. Avista continues to develop and update electric system reliability performance measures and strategic supporting plans to improve the reliability of its electric system.

Appendix E – Customer Complaint Summary

Commission Complaints are customer issues that require investigation and resolution by the Commission and are recorded in the UTC's Consumer Complaint Database. Complaint categories include power quality, electric reliability, or major events. This table summarizes the Commission Complaints that occurred during 2022.

Commission Complaints			
Customer Location (Feeder)	**Complaint**	**Category**	**Resolution**
Spokane, Washington (ROS12F5)	Customer Complaint: Very upset that Avista only gives 48 hour notice for a planned outage--they feel that they can't go to work now on Monday because they have to be home for their kids who do not have a way to get in the house because the house is ran off of an electric security system-- Upset that all the meat in his freezer is going to go bad in the 4 hours that the power is out -- Upset because our crews are working in his neighborhood right now & they are standing around smoking & talking & not actually doing work-- Wants to also file a complaint w the City Council potentially	Outage	Customer called - at 4:37 on 2-18-2022 - everything has been resolved.
Spokane Valley, Washington (VAL12F2)	Customer Complaint: experienced a power surge & has been experiencing many outages/power surges & is wanting to know more detailed information on why this keeps happening. Discussed outage history, all seem to be from a tripped feeder, but she is wanting more detailed info. She had outages on 6/3, 6/16, 6/21, 6/23 & 6/30. Customer not happy with information w/in CCB that TL can provide and wanted to know what is going to be done to prevent all of these outages in the future.	Outage	Avista called the customer and explained the outages are due to incidents associated with work being done to improve the system. Satisfied. Close case.
Nine Mile Falls, Washington (INT12F2)	Customer Complaint: Regarding planned outage on Highway 291 today 8/1, customer said the traffic back up took an hour to get through and she was upset she was not notified. I did advise we notified those customers who would lose power due to the outage and she was not part of the outage.	Outage	Company Upheld

Customer Complaints are customer issues received by the Company specifically related to power quality, electric reliability, or major events. These complaints are managed and tracked internally by the Company. This table summarizes the Customer Complaints that occurred during 2022.

Customer Complaints			
Customer Location (Feeder)	**Complaint**	**Category**	**Resolution**
Airway Heights, Washington (AIR12F2)	Customer Complaint: fire department shut off main breaker to complex due to flooding, Avista was dispatched to assist with issues and customer was not happy with ERT and arrival time, wants to speak to manager as he is very upset, made referral to CARES due to medical equip in the home.	Outages	Avista spoke to customer, resolved issue. This is an issue with the apartment complex and the sprinkler system and could not turn back on until it was safe. Closed case.
Hunters, Washington (GIF34F1)	Customer Complaint: Customer is searching for an explanation regarding the outage that took place on 5/12/2022 incident #1327383. What she would like is a technical explanation about 3 loud noises that sounded like a tornado or jet engine and then after a brilliant flash of white light. She has never seen this occur during a power outage in 20 years in Hunters. She has spoken to Claims Department, but they were unable to explain this incident. She would also like to ensure that there will be no recurring issues from this incident in the future. She was frightened and is just seeking information as to why the noise and light happened. She is not angry, just seeking information.	Outages	Avista spoke with the customer and explained this occurred due to her close proximity to a fault occurring in the OH primary line. Explained the nature of the occurrence and common sounds and sights associated with fault current. Closed case.
Nine Mile Falls, Washington (FOR12F1)	Customer Complaint: Has had 2 outages in the last month and is requesting one month credit for the inconvenience. Explained he is not being charged for outages but is not satisfied with that.	Outages	Did not receive a call back from customer. Closed case.

Appendix F – Historical Summary of SAIFI and SAIDI

For reference, the SAIFI and SAIDI values for each year since 2004 are included in the table below. In addition, the rolling average of the prior five years is provided. For example, the *Prior 5-year Average* value reported for 2020 is the average of the reported values from 2015-2019.

	SAIFI		SAIDI	
Year	Reported Value	Prior 5-year Average	Reported Value (minutes)	Prior 5-year Average (minutes)
2004	1.01	--	126	--
2005	0.97	--	108	--
2006	1.29	0.99	143	117
2007	1.14	1.09	132	126
2008	1.40	1.10	159	127
2009	1.52	1.16	193	134
2010	1.23	1.26	146	147
2011	1.08	1.32	118	155
2012	1.14	1.27	138	150
2013	1.05	1.27	138	151
2014	1.11	1.20	139	147
2015	1.05	1.12	163	136
2016	0.86	1.09	133	139
2017	1.20	1.04	183	142
2018	0.81	1.05	126	151
2019	0.94	1.01	136	149
2020	0.87	0.97	129	148
2021	1.24	0.93	164	156
2022	0.92	1.01	146	148

Appendix G - Historical Major Event Days on Avista's System

The following table is provided as an initial review of Major Event Day information. The main premise of the IEEE Major Event Day calculation is that using the 2.5b method should classify 2.3 days each year as MEDs. This table lists the historical major event days, shows the daily SAIDI value for each MED, and reports the T_{MED} value calculated for each year.

Year	Date	SAIDI	T_{MED}
2004	5/21/2004	7.11	6.35
	08/02/2004	7.36	
	12/08/2004	31.00	
2005	06/21/2005	39.53	4.92
	06/22/2005	9.03	
	08/12/2005	19.60	
2006	01/11/2006	12.10	7.06
	03/09/2006	8.58	
	11/13/2006	30.79	
	12/14/2006	29.26	
	12/15/2006	158.31	
2007	01/06/2007	9.98	8.02
	06/29/2007	32.64	
	07/13/2007	12.79	
	08/31/2007	21.30	
2008	01/27/2008	17.57	9.22
	07/10/2008	36.74	
	08/18/2008	9.49	
2009	None		9.93
2010	5/3/2010	21.04	11.11
	11/16/2010	68.67	
2011	None		10.85
2012	1/19/2012	9.93	9.49
	12/17/2012	14.35	
2013	8/25/2013	24.97	8.96
	8/26/2013	11.78	
	9/15/2013	14.01	
	11/16/2013	11.09	
2014	7/23/14	92.95	8.72
	7/24/14	35.66	
	8/25/14	121.05	
	8/3/14	38.52	
	8/12/14	9.84	

2015	8/29/15	13.42	8.22
	9/30/15	9.99	
	11/17/15	2093.19	
	11/18/15	399.34	
	11/19/15	147.97	
	11/20/15	66.96	
	11/21/15	47.30	
	11/22/15	32.61	
	11/23/15	15.38	
	11/24/15	12.19	
	12/23/15	29.35	
	12/24/15	19.24	
2016	None		10.17
2017	12/19/17		10.19
2018	1/24/18	12.08	10.47
	11/24/18	13.30	
2019	7/23/19	26.64	9.55
	10/9/19	45.06	
2020	1/12/20	13.80	8.90
	1/13/20	9.57	
	2/1/20	12.57	
	2/23/20	9.14	
	3/14/20	9.25	
	9/7/20	94.09	
	9/8/20	15.75	
	10/23/20	35.97	
	10/24/20	15.53	
	11/13/20	21.27	
	12/6/20	10.10	
2021	1/13/21	495.30	7.86
	1/14/21	36.84	
	1/15/21	28.06	
	1/16/21	11.91	
	3/28/21	21.94	
	4/18/21	20.30	
	11/15/21	41.36	
2022	4/4/22	12.5	9.90
	11/4/22	21.6	
	11/5/22	24.3	

Appendix H - Interruption Cause Codes

Cause code information is provided in this report to give readers a better understanding of outage sources. Further, the Company uses cause information to analyze past outages and, if possible, reduce the frequency and duration of future outages.

Since 2011, Avista has stopped using the subcategory "protected" under the "Animal" category. Almost all birds are considered protected, so there is little differentiation between the "Bird" and "Protected" subcategories. Avista will include additional information in the Remarks section as reported from the field personnel.

MAIN CATEGORY	SUBCATEGORY	Definition
ANIMAL	Bird Squirrel Underground Other	Outages caused by animal contacts. Specific animal called out in subcategory.
PUBLIC COMPANY	Car Hit Pad Car Hit Pole Dig In Fire Tree Other Dig in Other	Underground outage due to car, truck, construction equipment etc. contact with pad transformer, junction enclosure etc... Overhead outage due to car, truck, construction equipment etc. contact with pole, guy, neutral etc. Dig in by a customer, a customer's contractor, or another utility. Outages caused by or required for a house/structure or field/forest fire. Homeowner, tree service, logger etc. fells a tree into the line. Other public caused outages Dig in by company or contract crew. Other company caused outages

EQUIPMENT OH	Arrestors Capacitor Conductor/Pri Conductor/Sec Connector/Pri Connector/Sec Crossarm/rotten Cutout/Fuse Insulator Insulator Pin Other Pole/Rotten Recloser Regulator Switch/Disconnect Transformer/OH Wildlife Guard	Outages caused by equipment failure. Specific equipment called out in subcategory. Wildlife guard failed or caused an outage
EQUIPMENT UG	URD Cable/Pri URD Cable/Sec Connector/Sec Elbow Junctions Primary Splice Termination Transformer/UG Other	Outages caused by equipment failure. Specific equipment called out in subcategory.
EQUIPMENT SUB	High side fuse Bus Insulator High side PCB High side Swt/Disc Lowside OCB/Recloser Low side Swt/Disc Relay Misoperation Regulator Transformer Other	
MISCELLANEOUS		For causes not specifically listed elsewhere
NOT OUR PROBLEM (*Outages in this category are not included in reported statistics*)	Customer Equipment Other Utility	Customer equipment causing an outage to their service. If a customer causes an outage to another customer this is covered under Public. Outages when another utility's facilities cause an outage on our system.
POLE FIRE		Used when water and contamination cause insulator leakage current and fire. If insulator is leaking due to material failure list under equipment failure. If cracked due to gunfire use customer caused other.

PLANNED TREE UNDETERMINED	Maintenance/Upgrade Forced Tree fell Tree growth Service Weather	Outage, normally prearranged, needed for normal construction work. Outage scheduled to repair outage damage. For outages when a tree falls into distribution primary/secondary or transmission during normal weather. Tree growth causes a tree to contact distribution primary/secondary or transmission during normal weather. For outages when a tree falls or grows into a service. When snow or windstorms cause a tree or branch to fall into or contact the line. Includes snow loading and unloading. Use when the cause cannot be determined.
WEATHER	Snow/Ice Lightning Wind	Outages caused by snow or ice loading or unloading on a structure or conductor. Use weather tree for snow and ice loading on a tree. Lightning flashovers without equipment damage. Equipment failures reported under the equipment type. Outages when wind causes conductors to blow into each other, another structure, building etc.