2021 ANNUAL ELECTRIC SYSTEM RELIABILITY REPORT

Prepared By

ANAHEIM PUBLIC UTILITIES DEPARTMENT

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1. Executive Summary

1.1 Overview

The City of Anaheim Public Utilities (APU) Department provides reliable and high quality electric service to approximately 121,000 residential and business customers. In order to determine the reliability of the local grid, performance metrics are utilized to measure outage duration, number and type of outage events, as well as restoration time. Similar statistics are gathered by both private and public utilities and reported to respective regulatory agencies, boards and councils.

The Annual Electric System Reliability Report is intended to parallel industry practice of reporting on reliability metrics and inspection results. Investor-owned utilities are required to submit annual reports to the California Public Utilities Commission (CPUC) on (1) reliability metrics, (2) distribution equipment inspections per General Order (GO) 165, and (3) substation equipment inspections per GO 174. The objective of this report is to review Anaheim's reliability performance and inspection programs for calendar year 2021.

1.2 Reliability Metrics

Electric reliability is measured by recording how many times service is interrupted (frequency), how long the average customer is interrupted (duration), how long it takes to restore service once a customer is interrupted (restoration time). These three measures of reliability have been standardized and are recognized by the electric industry as best practices for comparing reliability performance among utilities, regardless of the number of customers.

The performance metrics discussed in this report are based on the definitions and calculations as shown below:

System Average Interruption Frequency Index (SAIFI): SAIFI is an indication of outage frequency, or how many outages an average customer may experience in a year. It is calculated based on the total number of customers affected by all outages in a given year divided by the number of customers served by the utility.

$$\text{SAIFI} = \frac{\text{Sum of All Sustained Customer Interruptions}}{\text{Total Number of Customers Served}}$$

System Average Interruption Duration Index (SAIDI): SAIDI is an indication of outage duration, or how long an average customer will be without service per year. It is calculated based on the total number of minutes that customers are without power in a given year divided by the number of customers served by the utility.

$$\text{SAIDI} = \frac{\text{Sum of All Sustained Customer Interruption Durations}}{\text{Total Number of Customers Served}}$$

Customer Average Interruption Duration Index (CAIDI): CAIDI is an indication of outage duration for those actually interrupted, or how long it takes to restore outages. It is calculated based on the total number minutes that customers are without power in a given year divided by the number of customers actually interrupted by such outages.

$$\text{CAIDI} = \frac{\text{Sum of All Sustained Customer Interruption Durations}}{\text{Total Number of Customer Interruptions}}$$

1.3 APU 2021 Reliability Performance Summary

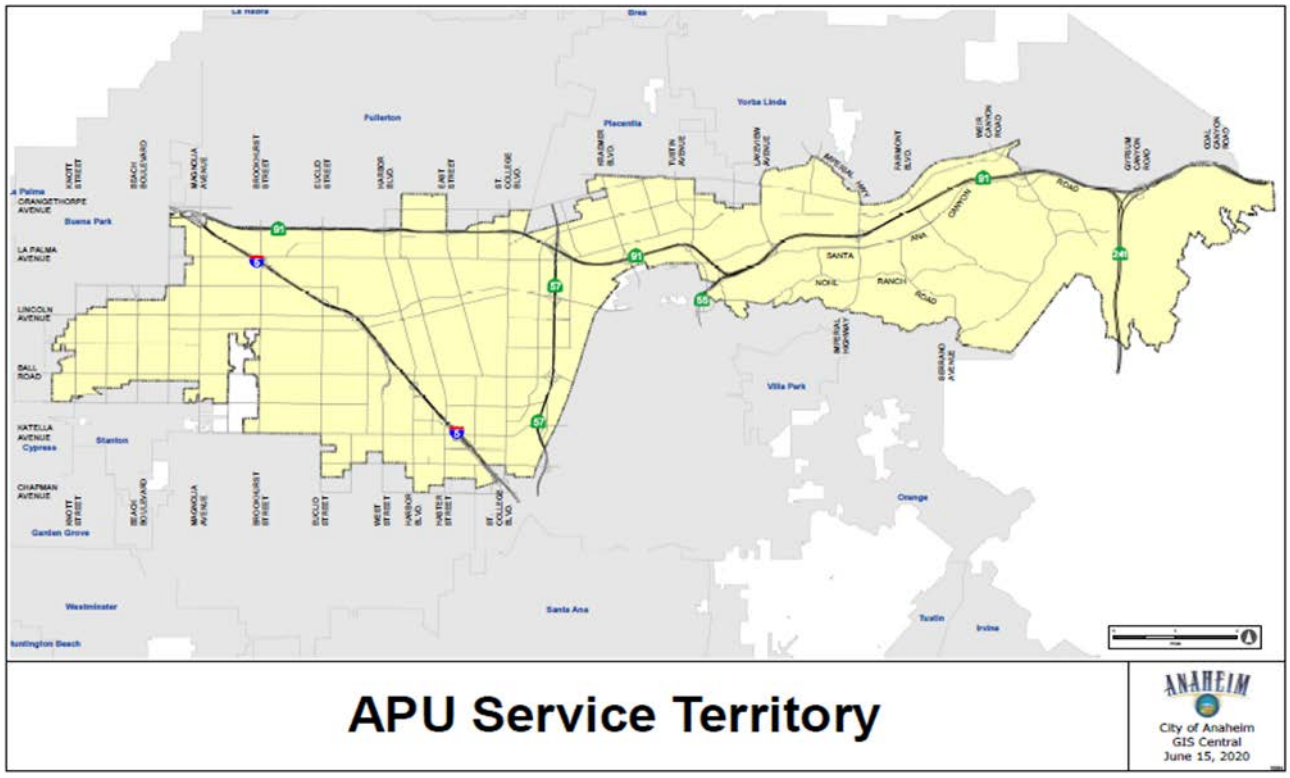
APU is committed to providing reliable electric service to its customers. Reliable electricity is delivered to Anaheim customers by combining a diverse portfolio of power resources with a modern and well-maintained distribution network. Below is a summary of APU reliability performance in 2021 and its performance, averaged over the past five years.

	All Interruptions Included [1]			Major Events Excluded		
YEAR	**SAIFI**	**SAIDI**	**CAIDI**	**SAIFI**	**SAIDI**	**CAIDI**
2021	0.86	70.90	82.04	0.69	40.96	59.77
5 Year Avg. (2017-2021)	0.58	40.38	68.27	0.54	34.39	63.81

1. All calculations include only sustained interruption, which is an interruption lasting greater than one minute and resulting in positive customer minute interruption (CMI). The above values were obtained from the Supervisory Control and Data Acquisition (SCADA) database and were calculated per IEEE Standard 1366.

2. APU Service Territory Map

Below is a geographical map showing APU's service territory and its boundaries. APU's service territory covers over 50 square miles of mostly urban and suburban areas located in northern Orange County, extending from neighboring communities of Buena Park, Stanton, and Cypress westerly to the Riverside County line in the east. APU's electric system is entirely surrounded by communities served by Southern California Edison (SCE).



3. APU Annual Reliability Data

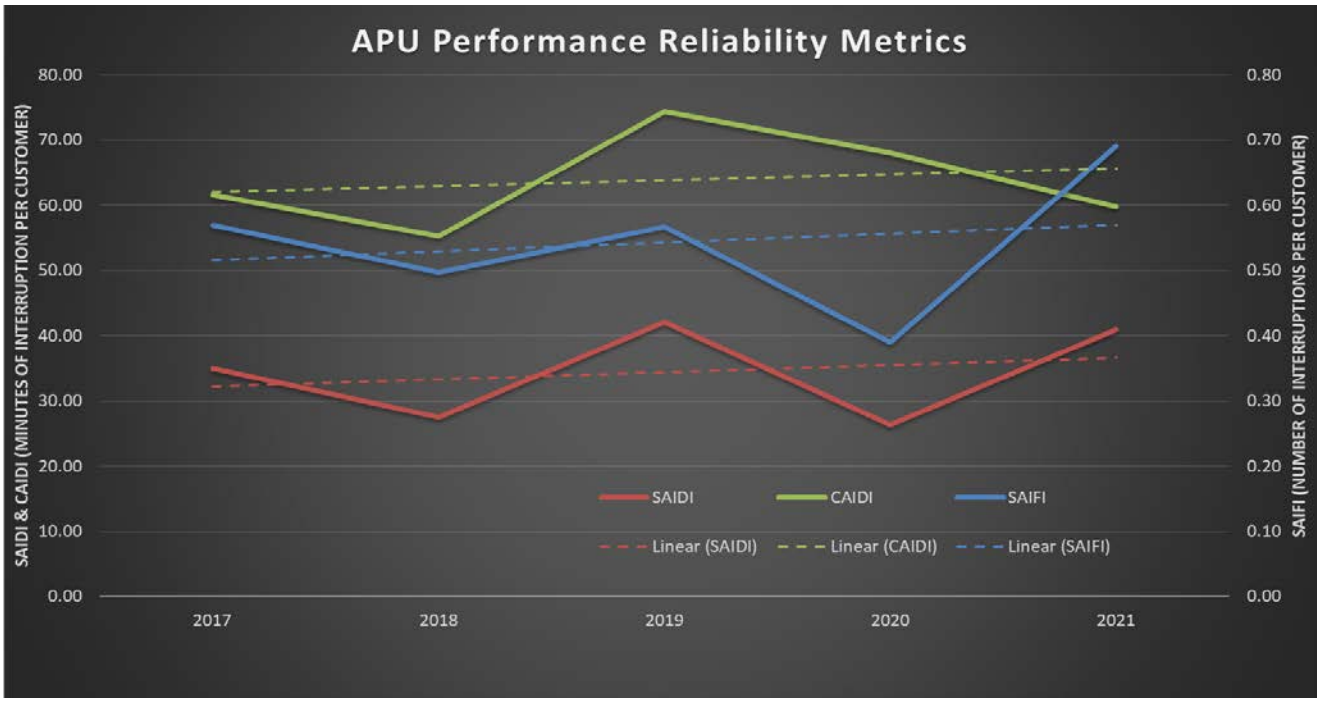
3.1 Five Year Reliability Performance

APU collects and reports on all outage data, and in-line with standard utility best practice, separately reports data on all outages, and outages excluding major events. The reason for this is to determine how the normal grid performs, exclusive of major wind or regional outages to provide a normalized basis for comparison.

In a tabular format, Anaheim's data is as follows:

All Interruptions Included [1]				Major Events Excluded		
YEAR	**SAIFI**	**SAIDI**	**CAIDI**	**SAIFI**	**SAIDI**	**CAIDI**
2017	0.57	35.04	61.6	0.57	35.04	61.6
2018	0.50	27.37	55.17	0.50	27.37	55.17
2019	0.57	42.12	74.34	0.57	42.12	74.34
2020	0.39	26.45	68.19	0.39	26.45	68.19
2021	0.86	70.90	82.04	0.69	40.96	59.77

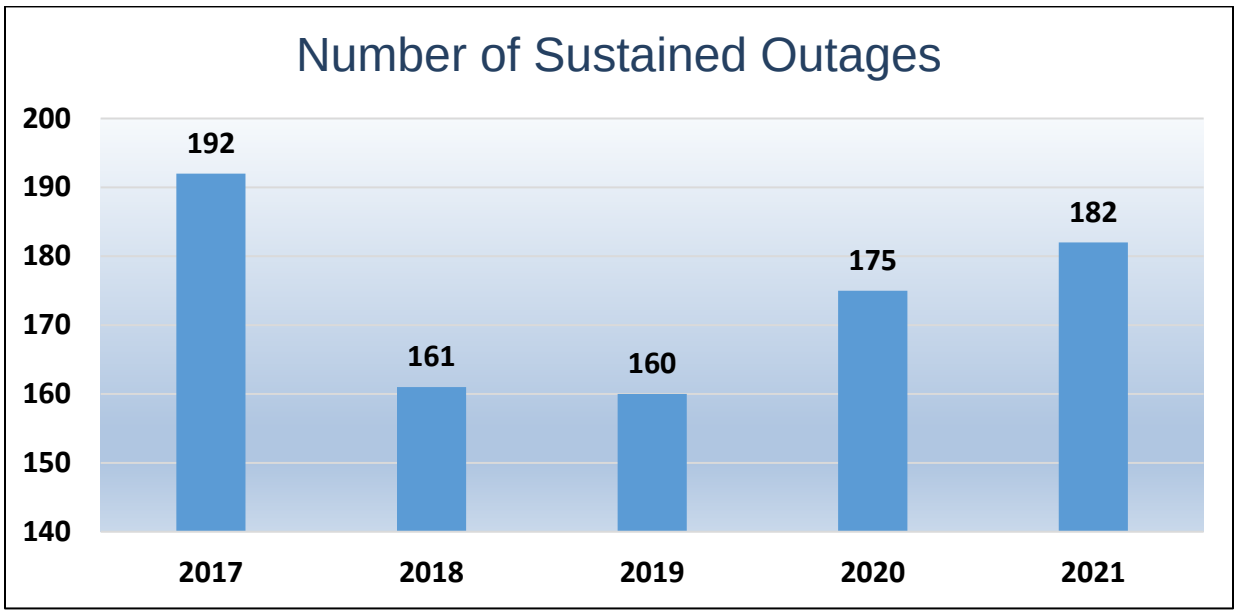
[1] All calculations include only sustained interruption, which is an interruption resulting in positive customer minute interruption (CMI). The above values were obtained directly from the Supervisory Control and Data Acquisition (SCADA) database and were calculated per IEEE Standard 1366.



The 2021 lower overall performance is mostly attributed to a major windstorm that occurred on November 25, 2021 and a wind-related outage on April 18, 2021. The wind related events accounted for almost one third of all customer minute interruptions in 2021. The widespread outages caused by these incidents are considered major events as defined by the Institute of Electrical and Electronic Engineers (IEEE) standard used industry-wide as discussed in Section 3.2, and therefore were separated in the reliability metrics to evaluate both total and typical system performance. In the absence of these two Major Event Days (MEDs) outages, CAIDI actually performed better while both SAIFI and SAIDI performed slightly worse than the 5-year averages. The below average performance of SAIFI and SAIDI were partly due a few outage incidents, one of which involved a vehicle hit pole which occurred on October 14, 2021, that affected a larger than average number of customers and took longer to restore power having to replace the pole and conductors within a heavily travelled intersection.

APU's continued investments in infrastructure upgrades has maintained the overall system reliability within APU's reliability targets and consistently placed APU in the top quartile of all public utilities nationwide in terms of reliability metrics. APU's continued first quartile system reliability ranking is primarily attributed to the ongoing direct buried cable replacement program, and other capital infrastructure replacement projects including transformers, pole upgrades, and branch line fusing. Installing automation, which isolates the problem area to reduce the number of customers affected, also facilitates faster power restoration. The CAIDI metric shows a modest reduction from the prior year, while the 5-year trend reflects that the outage restoration performance is slightly improved. With an increasing amount of underground infrastructure, the time to troubleshoot and make repairs takes longer due to the location of subsurface equipment and cables. Therefore, APU continues to conduct detailed inspection services to prioritize equipment replacement to reduce the risk of unplanned outages.

Below is a chart showing the five-year trend of the number of sustained outages that resulted in customer interruptions between 2017 and 2021. Although the total number of sustained outages was higher in 2021 than the past three years, some of the outages were the result of the November 2021 windstorm.



3.2 Major Event Exclusions

Major Event Exclusions are defined and have been widely adopted as the utility industry standard based on Institute of Electrical and Electronics Engineers (IEEE) 1366. The IEEE Standard 1366 provides a consistent benchmarking across utilities industry and uses standardized reliability metric (daily SAIDI) to define Major Event Days (MEDs) for exclusion. The Major Event definition is an event that exceeds reasonable design and/or operational limits of the electric power system. Like other California utilities adopting the IEEE Standard 1366 pursuant to CPUC D.16-01-008, APU also started applying the IEEE Std. 1366 in 2015. Anaheim had two major events over the past five years.

Year	Date	Primary Cause	Major Events Excluded			Basis for Exclusion
			SAIFI	SAIDI	CAIDI	
2017		*None*				
2018		*None*				
2019		*None*				
2020		*None*				
2021	04/18/21 11/25/21	*Wind*	0.69	40.96	59.77	Windstorm caused widespread outages; Daily SAIDI exceeded Major Event Days limit

3.3 Top Five Major Outage Events (2021)

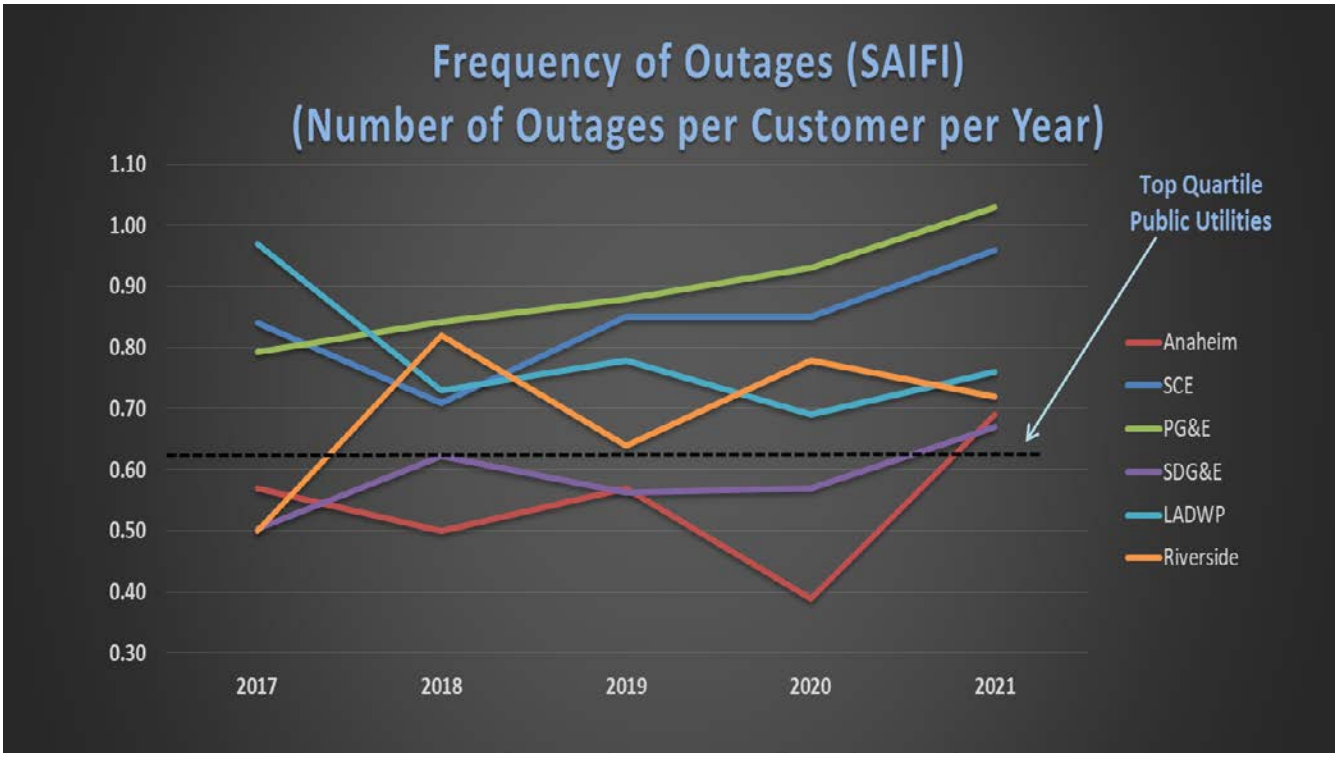
A table below captures the top five major outage events for 2021 that resulted in the highest customer minute interruptions including causes and number of customers affected.

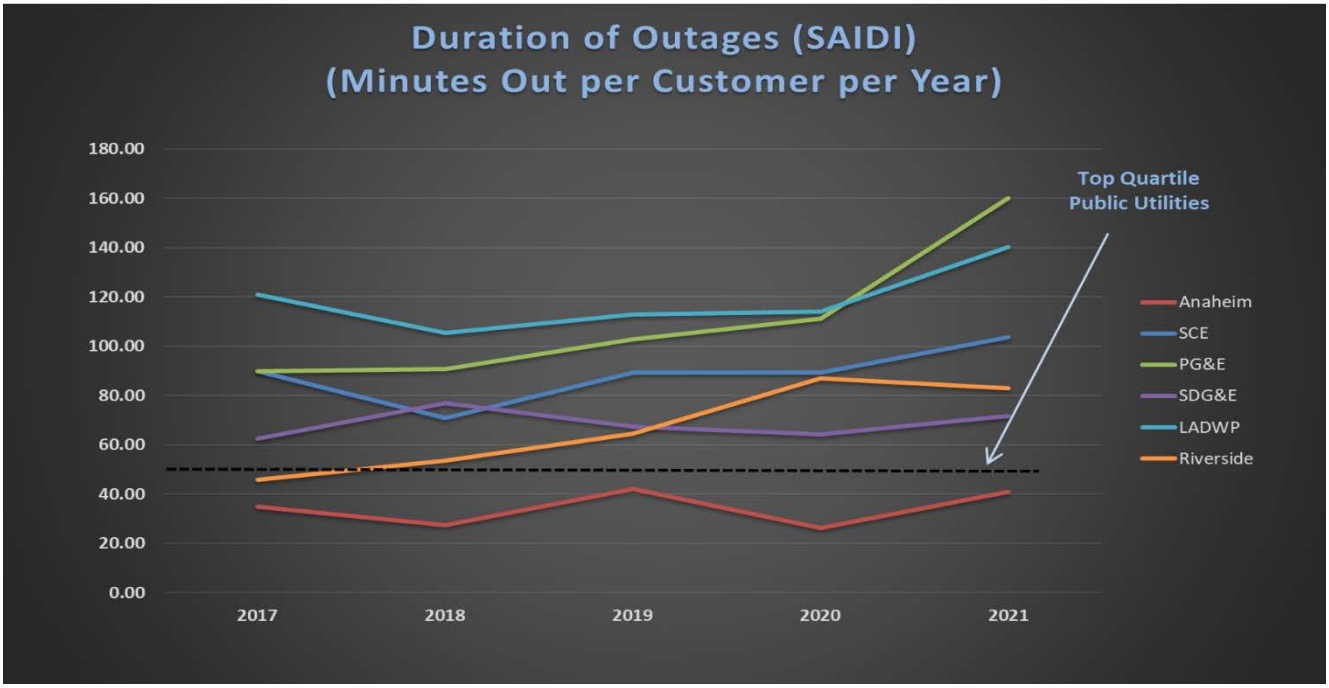
Rank	Date	Circuit	Substation	Customer Minutes Interruption	Customer Affected	Cause Description
1	4/18/2021	Armand	Hannum	862,420	2,015	Wind
2	11/25/2021	Newport	Southwest	561,082	1,530	Wind
3	11/25/2021	Jeanne	Sharp	524,172	2,508	Wind
4	11/25/2021	Laguna	Southwest	388,575	942	Wind
5	10/14/2021	Trident	Hannum	350,863	2,931	Vehicle Hit Pole

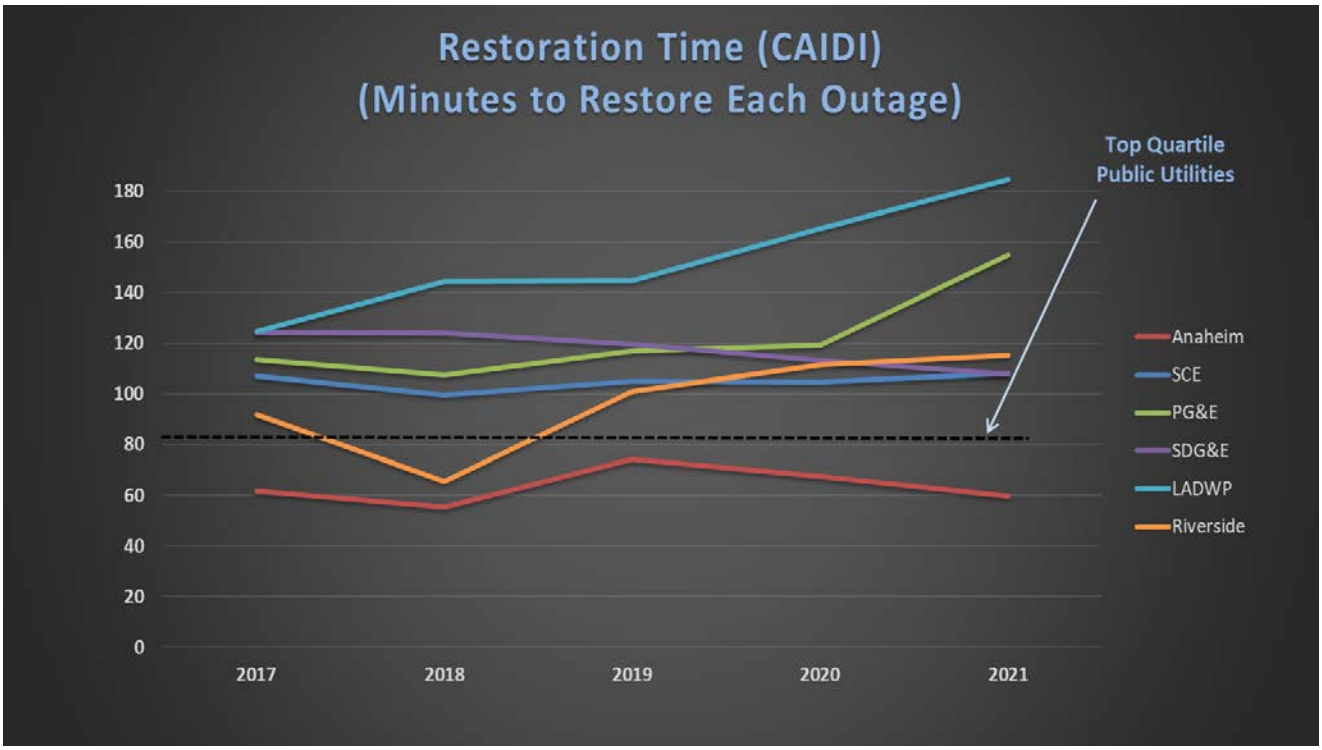
3.4 Utility Comparisons

In 2021, an Anaheim customer would have experienced, on average, 0.69 service interruptions (about one outage every one and half years), would have gone without power for 41 minutes, or would have experienced power outages that took about 60 minutes to restore. Generally, the reliability level experienced by Anaheim customers in 2021 is about 45% better than that of surrounding Orange County communities. In 2021, with the exception of SAIFI, Anaheim ranked in the top 25 percent (quartile) of Public Owned Utilities (POU) nationwide when it comes to electric system reliability, which means that Anaheim customers had shorter power outages than the other 75% of utilities nationwide.

The following graphs show the reliability metrics for APU as compared to other California utilities[1] in the past five years:







[1]The 2021 reliability indices for neighboring utilities were obtained from either the US Energy Information Administration (EIA), that collects, analyzes, and disseminates energy related information, or the CPUC. The 2021 top quartile indices, based on the previous five year data (2017-2021) published on the EIA data base for all publicly owned utilities are used in this report. Note that the 2021 EIA data is preliminary.

3.5 Worst Performing Circuits

3.5.1 Monitoring Individual Circuits

Individual circuits emanating from substations are monitored to determine overall performance. There may be indicators that equipment, geography (in large utility territories), or other factors may be affecting performance. APU reviews circuit performance and develops mitigation measures that include one or more of the following:

- Increased inclusion of automation
- Accelerated equipment replacements
- Capacity upgrades and/or re-distribute load onto adjacent circuits
- Implementation of branch line fuses or underground devices that separate from the backbone in the event of an outage
- Installation of automatic re-closers

The following tables show the past five years of circuits that had the highest number of outages excluding major events:

2017

Rank	Circuit Name	Substation	SAIFI
1	Beach	Clair	0.061
2	Crescent	Anaheim	0.047
3	Ball	Clair	0.046
4	Cravens	Yorba	0.046
5	Powers	Hannum	0.028
6	Dixie	Anaheim	0.025
7	Peralta	Yorba	0.022
8	Servite	Hannum	0.022
9	Keith	Dowling	0.019
10	Broadway	Hannum	0.018

2018

Rank	Circuit Name	Substation	SAIFI
1	Gilbert	Clair	0.043
2	Sycamore	Anaheim	0.041
3	La Verne	Sharp	0.031
4	Jeanne	Sharp	0.030
5	Powers	Hannum	0.024
6	Ball	Clair	0.021
7	Brenda	Sharp	0.020
8	Jewel	Anaheim	0.020
9	Trident	Hannum	0.019
10	Citron	Anaheim	0.015

2019

Rank	Circuit Name	Substation	SAIFI
1	Dale	Clair	0.051
2	Servite	Hannum	0.050
3	Newport	Southwest	0.043
4	Citron	Anaheim	0.038
5	Meadow	Fairmont	0.037
6	Hale	Hannum	0.025
7	Powers	Hannum	0.024
8	Moody	Hannum	0.023
9	Steven	Dowling	0.022
10	Peralta	Yorba	0.021

2020

Rank	Circuit Name	Substation	SAIFI
1	Sycamore	Anaheim	0.035
2	Knott	Clair	0.031
3	Walnut	Yorba	0.029
4	Debbie	Sharp	0.028
5	Newport	Southwest	0.026
6	Gilbert	Clair	0.022
7	Peralta	Yorba	0.021
8	Dixie	Anaheim	0.019
9	Armand	Hannum	0.018
10	Christine	Sharp	0.016

2021

Rank	Circuit Name	Substation	SAIFI
1	Dixie	Anaheim	0.059
2	Jeanne	Sharp	0.051
3	Christine	Sharp	0.049
4	Servite	Hannum	0.042
5	Sand	Harbor	0.042
6	Spruce	Park	0.038
7	Sycamore	Anaheim	0.035
8	Ball	Clair	0.034
9	Powers	Hannum	0.030
10	Dale	Clair	0.024

The Dixie circuit out of Anaheim substation had the highest frequency of sustained outages in 2021 with six (6) sustained outages, one of which was due to vehicle-hit pole that caused the primary circuit to trip and resulted in interruption to over 2,200 customers. Similarly, the Jeanne circuit out of Sharp Substation had the second highest frequency of sustained outages, one of which was caused by a windstorm that also resulted in a significant number of customer interruptions. Most of the affected customers of these mentioned outages were restored within minutes and the remaining customers restored within hours.

3.5.2 Top Five Worst Performing Circuits

As criteria for prioritizing circuits to escalate performance improvement, the top five (5) Worst Performing Circuits (WPC) are monitored using circuit performances over the past three years excluding MEDs based on system average SAIFI and SAIDI.

Top 5 SAIFI WPC

RANK	Circuit	Substation	SAIFI
1	Servite	Hannum	0.030
2	Dixie	Anaheim	0.026
3	Dale	Clair	0.025
4	Christine	Sharp	0.025
5	Sycamore	Anaheim	0.023

Top 5 SAIDI WPC

RANK	Circuit	Substation	SAIDI
1	Servite	Hannum	4.249
2	Knott	Clair	2.576
3	Gilbert	Clair	1.664
4	Dale	Clair	1.544
5	Newport	Southwest	1.289

When a circuit appears on both the Top 5 SAIFI and SAIDI WPC for two consecutive years, the circuit will be considered for further evaluation for prioritized mitigation plan, if technically feasible and economically justified, and the anticipated timeline for completing the mitigation measures. The Servite circuit out of Hannum Substation was identified as one of the top five WPC in 2021 in terms of both frequency and customer minutes. Most of the outages that resulted in the high customer interruptions were due to either metallic balloon or palm frond contacts. With the recent passing of Assembly Bill 847, California took a significant step towards reducing metallic balloons causing power outages. APU supported the bill, and will implement public educational programs to help with the transition from metallic balloons. Additionally, APU's has targeted its vegetation management program to reduce the number of palm frond-related outages going forward.

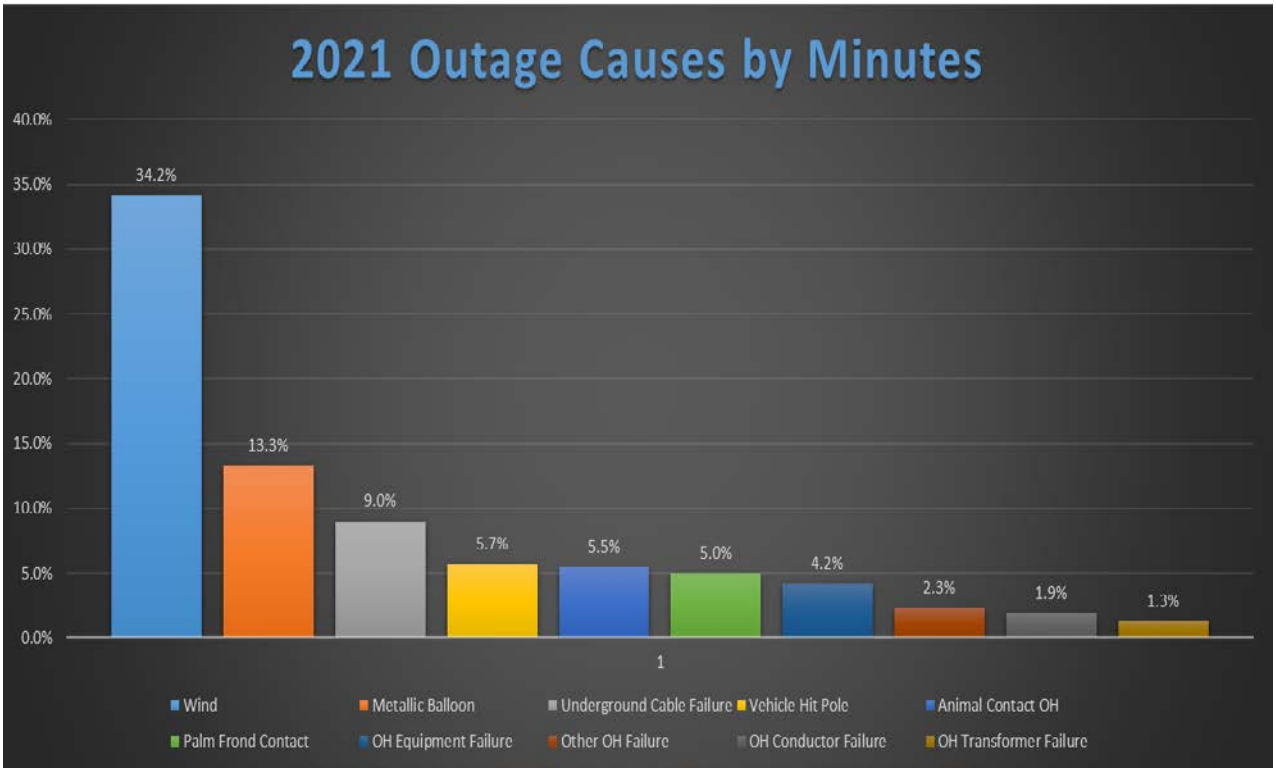
Dale circuit out of Clair Substation was also identified as a circuit that met the above criteria, and therefore was considered for further evaluation. The Dale circuit has experienced, on average, about four (4) outages per year, one of which was due to metallic balloon that resulted in the most customer interruptions and customer minutes. The Dale circuit consists mostly of overhead conductors and has been equipped with a number of branch line fuses and Automatic Reclosers (ARs)[1] in order to effectively isolate faulted circuit sections and minimize customer interruptions. There was one balloon contact related outage in 2021 that affected over 2,700 customers; however, an existing installed branch line fusing equipment detected the fault, isolated the faulted sections; and as a result, the service to 90% of the affected customers was quickly restored. The Dale circuit's performance will be closely monitored and reevaluated for technically feasible mitigation measures, if warranted.

3.6 Outage Causes

Outage causes are evaluated to determine how to structure operational and capital programs. The causes are tracked by frequency and by CMI.

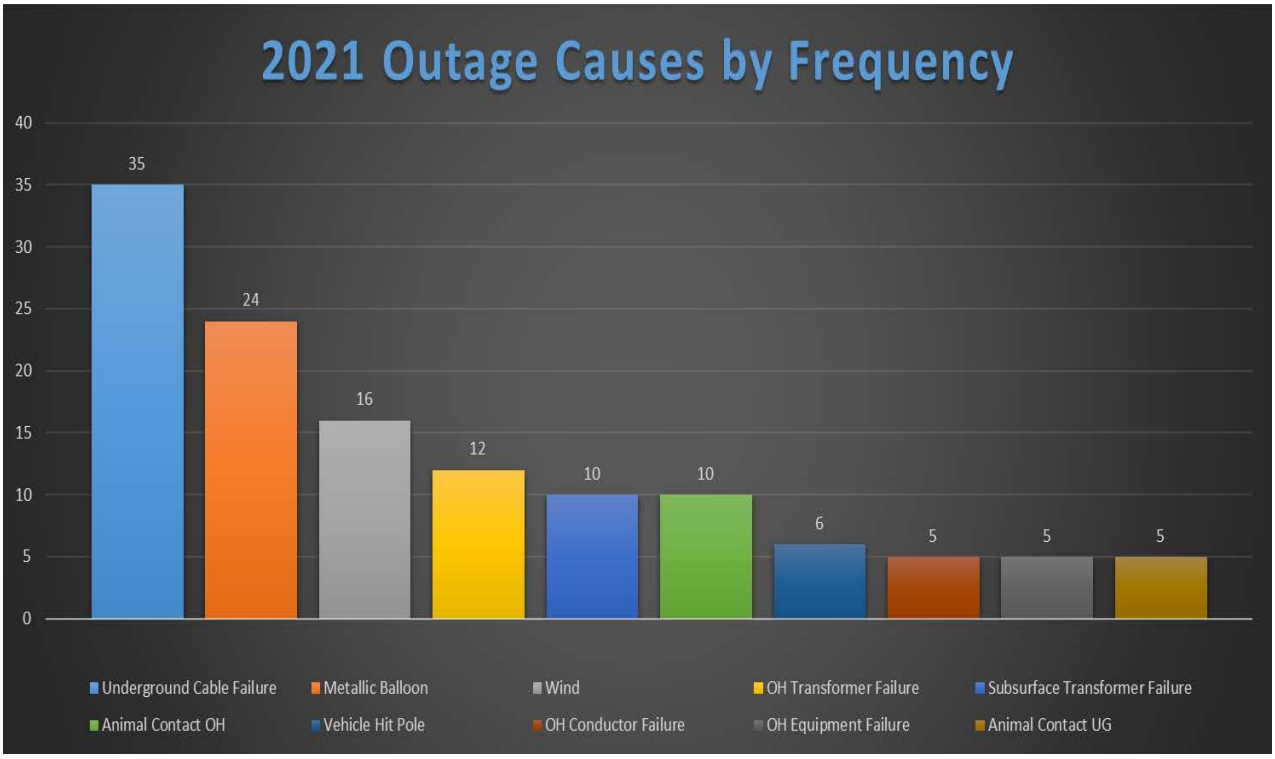
The top cause of 2021 outages by CMI was due to wind related outages. APU experienced an extreme windstorm in late November that resulted in extensive outages and widespread customer interruptions. The top outage cause was closely followed by metallic balloon and underground cable failure. The outages caused by metallic balloons in terms of both frequency and CMI were higher in 2021 than the prior year. As an industry, the percentage of all outages resulting from the metallic coated balloons contacting the overhead wires and substation equipment has impacted electric reliability. Recently, Assembly Bill 847 approved by the Governor of California on September 18, 2022, requires manufacturers of foil balloons to meet safety benchmark testing standards established by the IEEE to avoid initiating an electrical fault when in contact with energized power lines. IEEE in collaboration with the power industry has worked on developing an industry standard for testing the dielectric performance of metallic balloons in contact with overhead distribution lines. The legislation is effective January 1, 2023 and once standards are developed and approved, implementation phased in over time.

[1]Automatic Reclosers (ARs) are high voltage interrupting devices that shut off power when detecting fault currents and automatically reclose to restore power if the fault currents have been removed.



Underground cable failures followed by metallic balloon contacts were the top causes for the most number of outages (frequency) in 2021. APU's ongoing direct buried cable replacement program identifies, prioritizes, and replaces previously installed direct buried cables potentially subject to failure with cables encased in conduits. The frequency of cable failure outages has declined over the past five years from 47 in 2017 to 35 in 2021; however, further investment is needed to address different types of cable failures. In addition to direct buried cable, cable-in-conduit (CIC) and non-jacketed or cable without a protective layer are beginning to fail, and as a result APU is looking to expand cable replacement to include different types of underground cable.

With regards to overhead transformers, APU continues with the replacement strategy of all types of transformers through inspections, age assessment, and types that are more susceptible to outages. In previous years, a significant number of outages were occurring due to an older technology of Current-Protecting (CP) overhead transformers that are equipped with internal protective devices used in residential areas having the highest frequency and duration of outages than any other type of transformer in the system. Through the capital replacement program, these smaller transformers, both CP and non-CP type were prioritized for replacement due to factors including age, reduced capacity and visible condition, and are being replaced with a newer type of transformer with separate external protection. Approximately 15% of these transformers are replaced annually as part of the capital improvement program. The number and investment dollars allocated to 2021 equipment replacements are detailed further in this report.

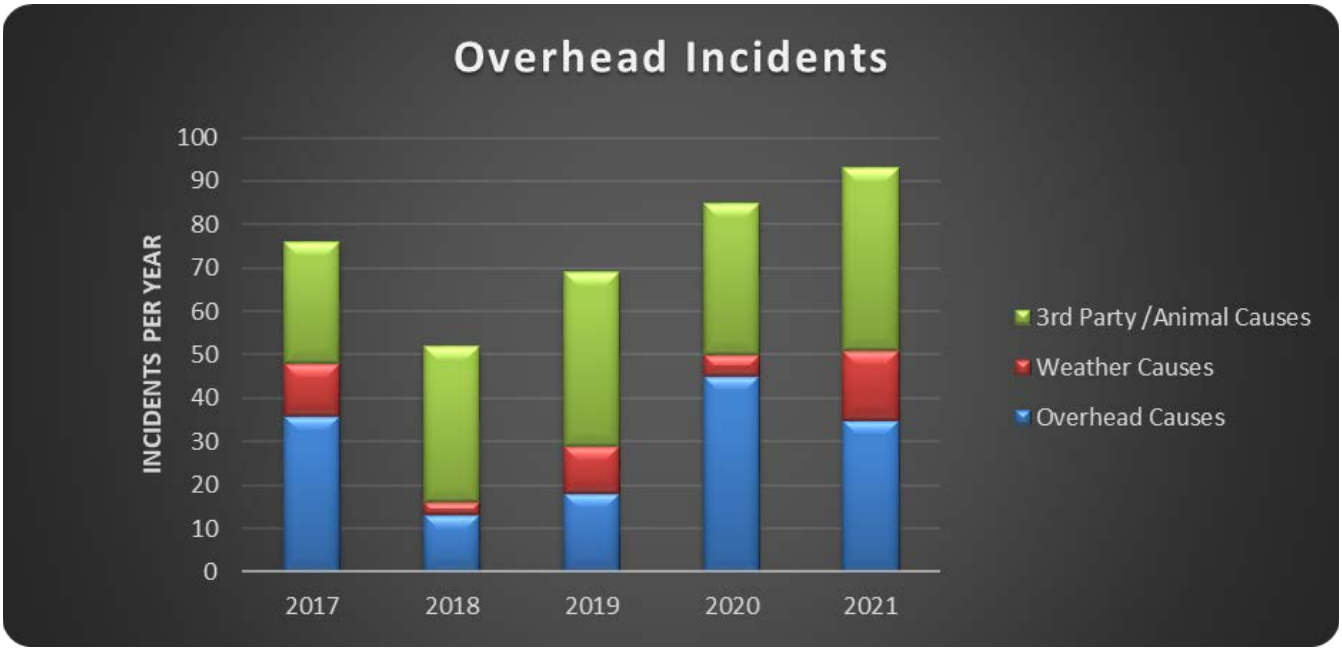


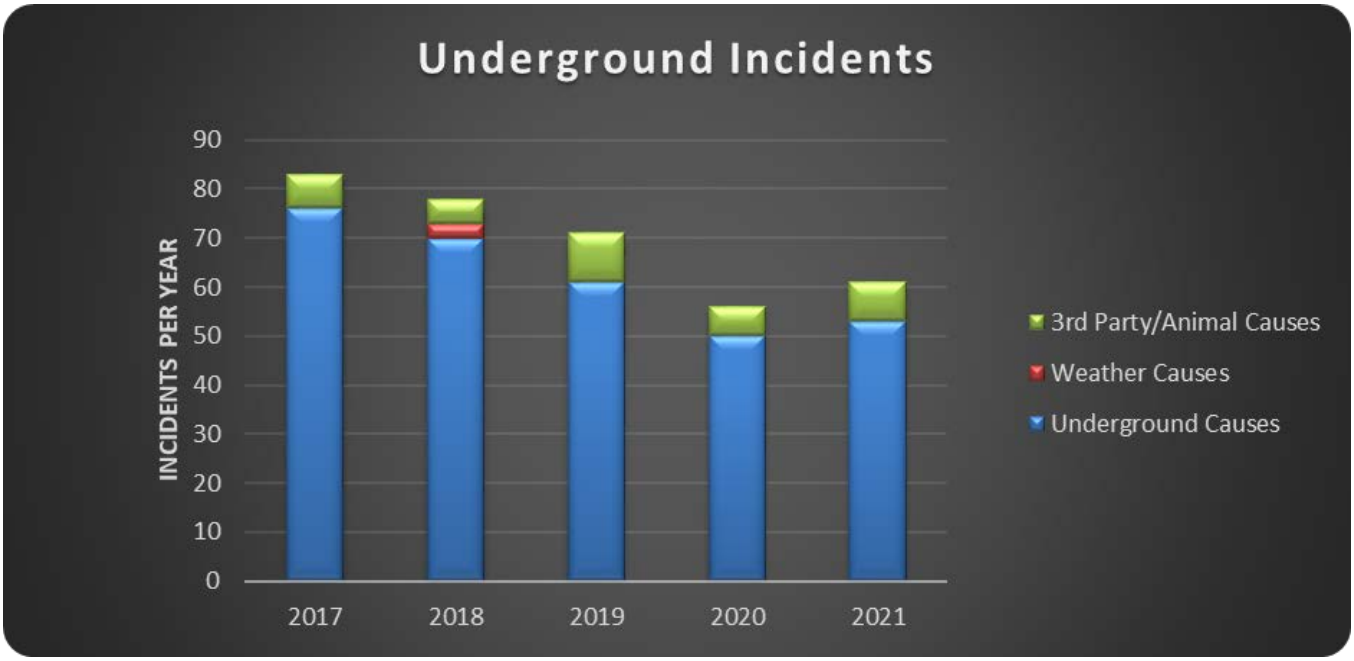
3.7 Overhead vs. Underground Performance

Anaheim's electric system is comprised of both overhead (OH) and underground (UG) infrastructure. With the implementation of the Underground Conversion Program that started in 1990, the Anaheim electric system is now about 65% underground.

In 2021, the number of OH incidents increased slightly as compared to last year. The overhead system is more prone to animals, metallic balloons, car hit poles, and weather when compared to the underground system. APU has piloted a series of lighted diverters on overhead power lines to ward off avian entanglement during the night and is expanding use in additional areas near flight paths. The number of UG outages over the past five years is trending downward, as a result of APU's continued effort in replacing direct buried cables and ongoing Underground Conversion Program.

Overhead versus Underground Incidents

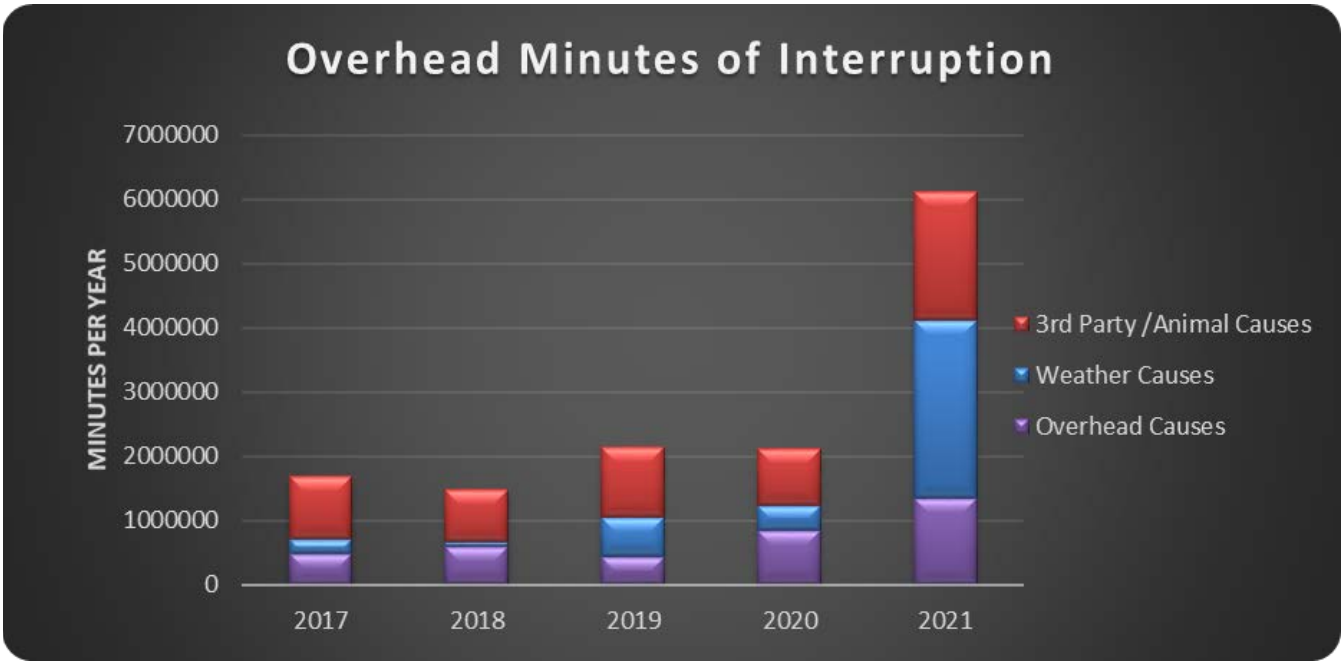


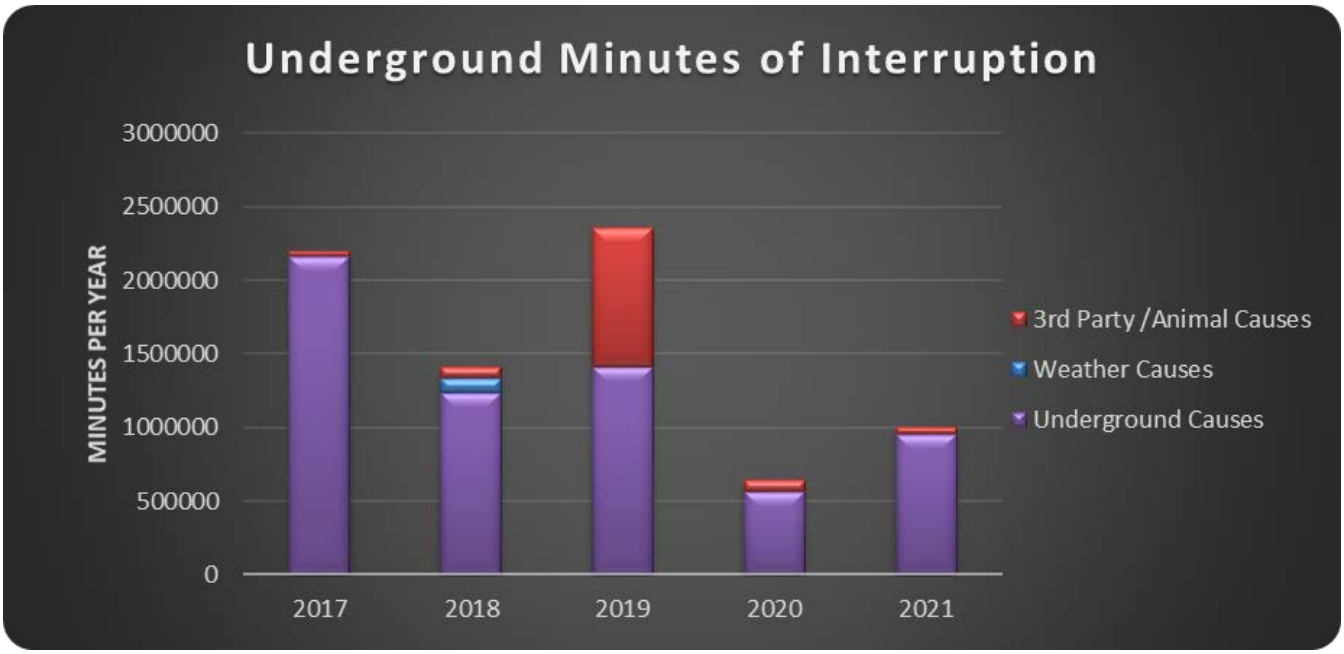


The increase in the duration of outages in the overhead system in 2021 was mostly attributed to an extreme windstorm that occurred on November 25, 2021. Other overhead related outages caused by 3rd party/animals or overhead equipment were also higher compared to those of last year. One of the overhead related outages was due to vehicle hit pole in west Anaheim that caused extensive damage and required replacement of pole and wire. APU continues to install more automated switching such as automatic re-closer (AR) in overhead facilities will isolate faulted circuit sections and restore customers on un-faulted sections faster, therefore reducing minutes of interruptions. The customer minutes of interruption for UG portion caused by 3rd

party/animal decreased slightly in 2021 as compared to those of last year. The improvement is primarily attributed to additional maintenance of equipment enclosures and vaults following the completion of the underground inspection cycle in 2022 and replacing aging infrastructure reducing exposure to energized parts by animals. The customer minutes of interruption for UG portion caused by underground equipment performed worse than last year's. Almost three quarter of those outages were due to underground cable failures. APU's ongoing capital improvement program in replacing direct buried cables would help mitigate these underground cable related outages in the future.

Overhead versus Underground Minutes of Interruption





4. Distribution Equipment Inspection Program

4.1 Overview

APU conducts routine inspections of distribution equipment to assess their condition for prioritization of any needed maintenance or replacement. The prioritization method follows industry practice, which aligns with CPUC guidelines as delineated in GO 165.

There are three condition levels. They are prioritized based on probable impact on safety or reliability, taking into account several factors. These factors include facility or equipment type and condition, loading, location, accessibility, and direct or potential impact on safety or reliability. The three conditions and their priority levels are:

Condition level "1": Maintenance required. Repair or replace within 90 days. If there is an imminent safety or reliability problem, inspector should contact Electric Operations for confirmation with field personnel and to identify and schedule mitigation procedures.

Condition level "2": Maintenance needed but deferrable, no immediate safety or reliability concern.

Condition level "3": Minor aging, fully serviceable, no safety or reliability concern. Okay for next scheduled inspection.

Accordingly, those maintenance items that pose the greatest public safety or system reliability risks will either: (a) be repaired immediately, or (b) if the repair proves too complex to complete immediately or requires materials that are unavailable, a temporary repair will be made to address the risks, and the item will be reprioritized for repairs to be completed at a later date.

Each year, equipment is prioritized for replacement, pursuant to an ongoing systematic infrastructure replacement program targeted for reliability improvement. In fiscal year 2021, the total capital expenditure for the following infrastructure upgrades was $25,909,391.

Program	Total Expenditure
T&D Infrastructure Improvements (poles, wires, cables, switches, circuit ties)	$5,966,853
Transformer Replacement (OH transformers, UG & Padmount transformers)	$4,167,524
Direct Buried Cable Replacement	$5,693,785
Underground Conversion Program	$10,081,229

Total = $25,909,391

4.2 Equipment Inspection

Underground distribution equipment is on a 3-year inspection cycle. Surface-mounted and overhead equipment is inspected on a 5-year inspection cycle, consistent with GO 165 guidelines. System patrols occur on a routine basis to ensure that immediate issues are addressed as quickly as possible. Detailed inspections are performed for more of a diagnostic and proactive evaluation of equipment conditions.

4.2.1 Patrol

A patrol is a visual inspection of applicable utility equipment and structures that is designed to identify obvious structural problems and hazards.

A.1 Distribution System Patrols

Annual patrols of applicable utility equipment and structures in urban areas are conducted by troubleshooters. Typical issues found during patrols include problems with wood poles or cross arms, equipment in need of repair or replacement, and equipment or lines in need of clearance from vegetation.

A.2 Streetlight Patrols

The electric utility has over 22,000 street lights in the entire system. Annual patrols are conducted on all major thoroughfares. Repairs are conducted when detected on patrols or reported by residents and businesses. Street lights in need of repair can be reported through the Anaheim Anytime web portal, 311 phone service, an online street light repair request form, and the MyAnaheim smart phone app. In 2021, APU staff repaired 1,350 streetlights within 1.9 days of being notified, on average. To date, approximately 81% of high pressure sodium (HPS) lights have been converted to light emitting diode (LED), which are more energy efficient, provide increased visibility, and last longer.

4.2.2 Intrusive and Detailed Inspections

APU initiated system inspections of the distribution system beginning in August 2015. In keeping with the GO 165 recommended inspection cycle, the underground electric system inspection is conducted on 3 year cycle and overhead system inspection on a 5 year cycle, respectively. Inspection of the overhead system, which includes approximately 20,000 poles and associated overhead conductors and equipment, was completed in the third quarter of 2018. Approximately 2% of the poles and associated overhead conductors and equipment were identified for maintenance, repair, or replacement were corrected in 2021. Underground inspection of over 8,800 underground substructures and above ground padmount equipment began in April 2021 and will be completed in October 2022. The next cycle of inspection will begin in 2023 for OH, and 2025 for UG, respectively.

5. Substation Equipment Inspection and Replacement Program

5.1 Overview

APU substations are designed, constructed, operated and maintained in accordance with accepted best industry standards, practices and equipment specifications for their intended use, in order to maintain safety and reliability. APU's substation inspection practices follow utility industry best practices using guidelines that meet or exceed the State adopted GO 174 requirements for inspections.

Qualified substation personnel inspect each of the fourteen (14) substations on a monthly basis for anomalies that may include rusting, leakage, or visible signs that maintenance or replacement is warranted. Findings are prioritized based on potential impact on safety or reliability, taking into account several factors. These factors include facility or equipment type and condition, loading, accessibility, and direct or potential impact on safety or reliability. The three conditions and their priority levels are:

Priority level "1": Maintenance required there is an imminent safety or reliability problem that substation field personnel will identify and schedule mitigation procedures.

Priority level "2": Maintenance needed but deferrable, no immediate safety or reliability concern.

Priority level "3": Minor aging, fully serviceable, no safety or reliability concern. Monitor during next scheduled inspection.

In fiscal year 2021, the total capital expenditure for substation upgrades was $3,347,014.

Program	Total Expenditure
Substation Improvement Projects	$3,347,014

These improvements included replacement of circuit breakers and switchgears, and the final commissioning stage of a 69/12kV substation (Harbor Substation) to improve operational flexibility in the Platinum Triangle. Other ongoing substation upgrade/improvement projects have multiyear capital expenditures currently in design or under construction. These capital projects are expected to add needed substation capacity and improve system reliability.

5.2 Substation Inspections

In 2021, there were 168 substation inspections completed. As an enhancement to the substation inspection program, 28 infrared inspections were conducted on all energized components. Infrared testing may identify where energized equipment has elevated temperatures called a "hot spot" which may lead to premature aging or reduced available capacity of equipment with increased risk to reliability. In 2021, infrared inspections identified 3 "hot spots" on substation equipment at various locations. The equipment was taken out of service and repairs performed avoiding potential substation equipment failure and customer interruption.