

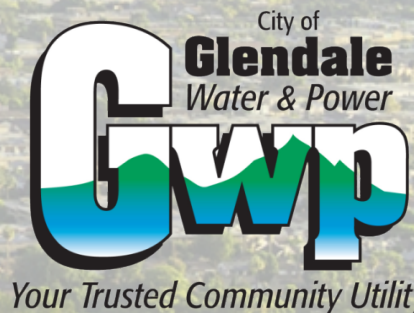


ELECTRIC RELIABILITY REPORT

Glendale Water & Power Commission

April 04, 2022

Catherine Babakhanlou, Senior Electrical Engineer
City of Glendale Water & Power



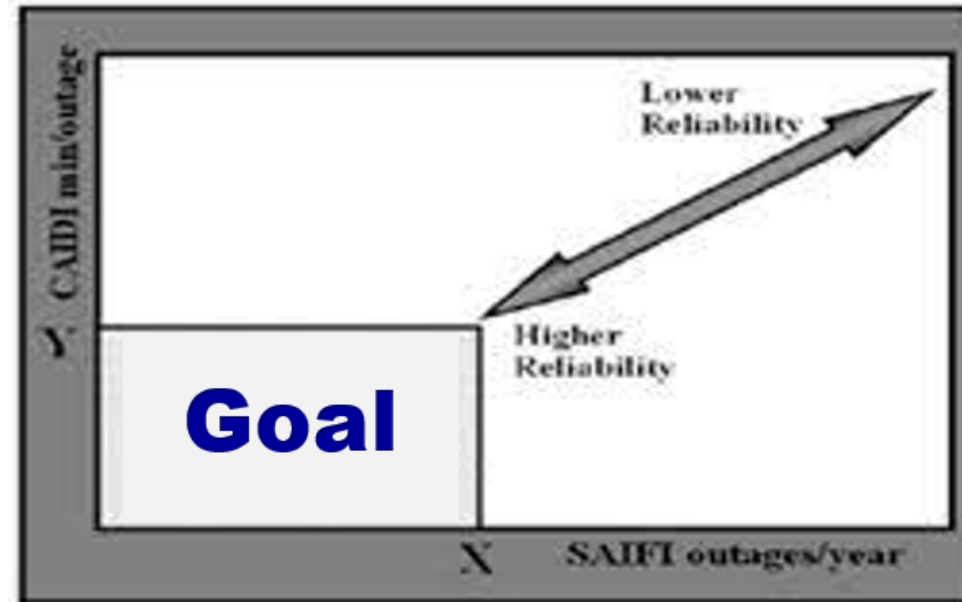
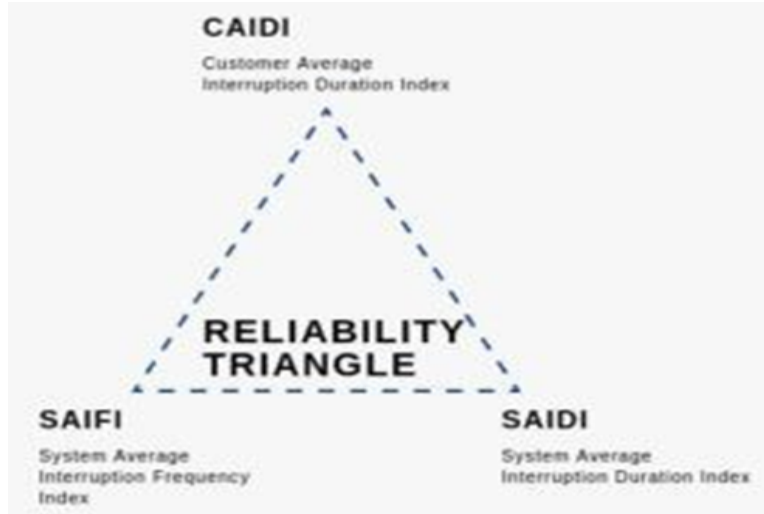


INDICES TRACKED (EACH YEAR)

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

$$SAIDI = \frac{\text{Total Duration of Customer Interruptions}}{\text{Total Number of Customers Served}}$$

$$CAIDI = \frac{\text{Total Duration of Customer Interruptions}}{\text{Total Number of Customer Interruptions}} = \frac{SAIDI}{SAIFI}$$



INDICES TRACKED

SAIFI = System Average Interruption Frequency Index

How often the average customer experiences a sustained interruption

SAIDI = System Average Interruption Duration Index

Total duration of interruption for the average customer (time-in minutes)

CAIDI = Customer Average Interruption Duration Index

The average duration of interruptions per customer that experience an interruption. The average time to restore service (time-in minutes)



REPORTING EXCLUSIONS (IEEE 1366 STANDARD)

- Interruptions that occur as a result of outages on customer-owned facilities
- Interruptions due to loss of supply from another utility
- Major Events (15% of System Facilities and/or 10% of Utility Customers)
- Outages less than 5 minutes in duration (IEEE 1366 Standard/NERC 1996 ... one main reason is due to automatic re-closers A/Rs)*.
- Pre-planned Interruptions

* Note Also CPUC Definition - Sustained outages are defined as 5 minutes or longer and momentary outages are less than 5 minutes long.



BENCHMARK (5 YEARS)

	SAIFI			
Year	SCE	SDG&E	PG&E	GWP
2017	0.87	0.51	0.88	1.30
2018	0.72	0.62	0.96	1.12
2019	0.87	0.60	1.01	1.45
2020	0.87	0.63	1.07	1.07
2021	Not available	Not available	Not available	0.78

SAIFI = System Average Interruption Frequency Index
How often the average customer experiences a sustained interruption



BENCHMARK (5 YEARS)

Year	SAIDI			
	SCE	SDG&E	PG&E	GWP
2017	91.72	64.51	97.30	65.30
2018	71.25	77.76	99.90	60.64
2019	90.75	68.64	117.70	76.32
2020	91.40	68.95	125.80	76.30
2021	Not available	Not available	Not available	58.82

SAIDI = System Average Interruption Duration Index
Total duration of interruption for the average customer (minutes)



BENCHMARK (5 YEARS)

Year	CAIDI			
	SCE	SDG&E	PG&E	GWP
2017	105.40	125.92	110.80	48.62
2018	99.58	123.84	103.80	51.69
2019	104.75	115.23	116.50	50.21
2020	105.51	109.92	117.80	60.78
2021	Not available	Not available	Not available	70.11

CAIDI = Customer Average Interruption Duration Index
The average duration of interruptions per customer that experience an interruption.
The average time to restore service (minutes)



BENCHMARK (5 YEARS)

SAIFI					
Year	Burbank	Anaheim	Pasadena	LADWP	GWP
2017	0.50	0.57	0.24	0.94	1.31
2018	0.41	0.50	0.17	0.70	1.12
2019	0.31	0.57	0.22	0.76	1.46
2020	0.42	0.88	0.42	0.69	1.20
2021	0.31	0.88	0.42	0.69	0.78

SAIFI = System Average Interruption Frequency Index
How often the average customer experiences a sustained interruption



BENCHMARK (5 YEARS)

Year	SAIDI				
	Burbank	Anaheim	Pasadena	LADWP	GWP
2017	10.44	35.04	29.71	119.06	65.30
2018	20.44	27.43	19.95	100.74	60.64
2019	4.64	42.12	16.92	112.84	76.32
2020	10.11	26.35	35.89	114.13	76.30
2021	16.40	70.9	29.47	129.28	58.82

SAIDI = System Average Interruption Duration Index
Total duration of interruption for the average customer (minutes)



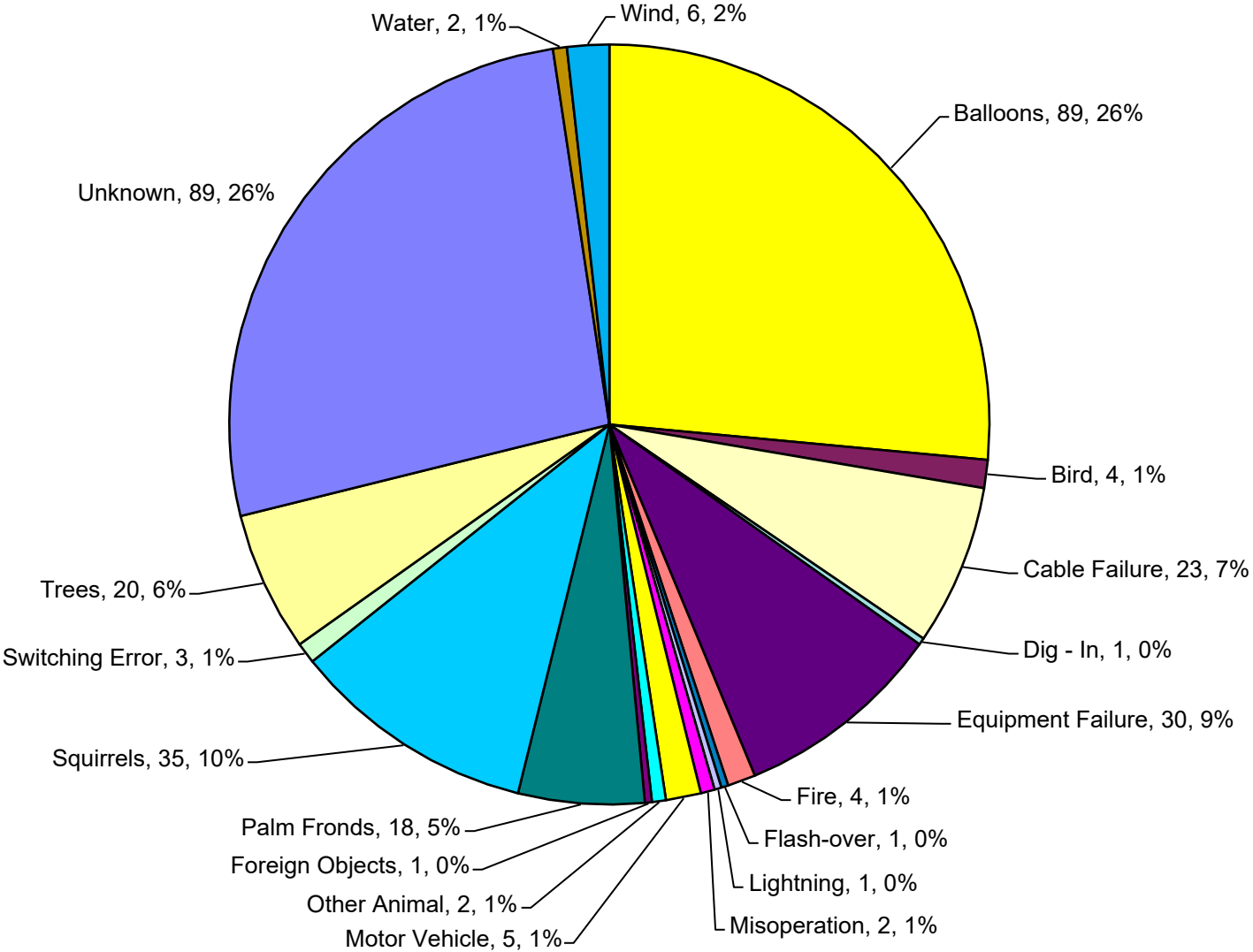
BENCHMARK (5 YEARS)

CAIDI					
Year	Burbank	Anaheim	Pasadena	LADWP	GWP
2017	20.89	61.60	126.26	129.1	48.62
2018	49.37	55.25	114.62	143.8	51.69
2019	14.75	74.34	78.39	148.4	50.21
2020	23.86	67.56	85.86	165.4	60.78
2021	52.83	82.04	Not available	Not available	70.11

CAIDI = Customer Average Interruption Duration Index
The average duration of interruptions per customer that experience an interruption.
The average time to restore service (minutes)



Outage Summary by Cause - January 2017- December 2021



Total Primary Outages (5 years): 336



SIMULATION OF OUTAGE INCIDENT DUE TO MYLAR BALLOONS



MYLAR BALLOONS

- 26% of the outages that occurred during the past five years were due to Mylar balloons.
- Just last year, we had 89 outages caused by Mylar Balloons.
- GWP is grateful to the City Council. On October 13, 2020, the Glendale City Council adopted the Mylar Balloon Ordinance, which prohibits the sale of the electrically conducted Mylar Balloons filled with helium or gas lighter than air within the city limits.



TREE TRIMMING PROGRAM

- Two line clearance forestry supervisors to oversee contractors
- Trim branches that are close to power lines (Primary and Secondary)
- Cyclical for the City
- Trimming cycles vary from min 1.5 to max 2 years, depending on annual rainfall and growth.
- Tree trimming budget for FY 21-22 is \$2,500,000.
- We budgeted \$2,800,000 for the next three years.



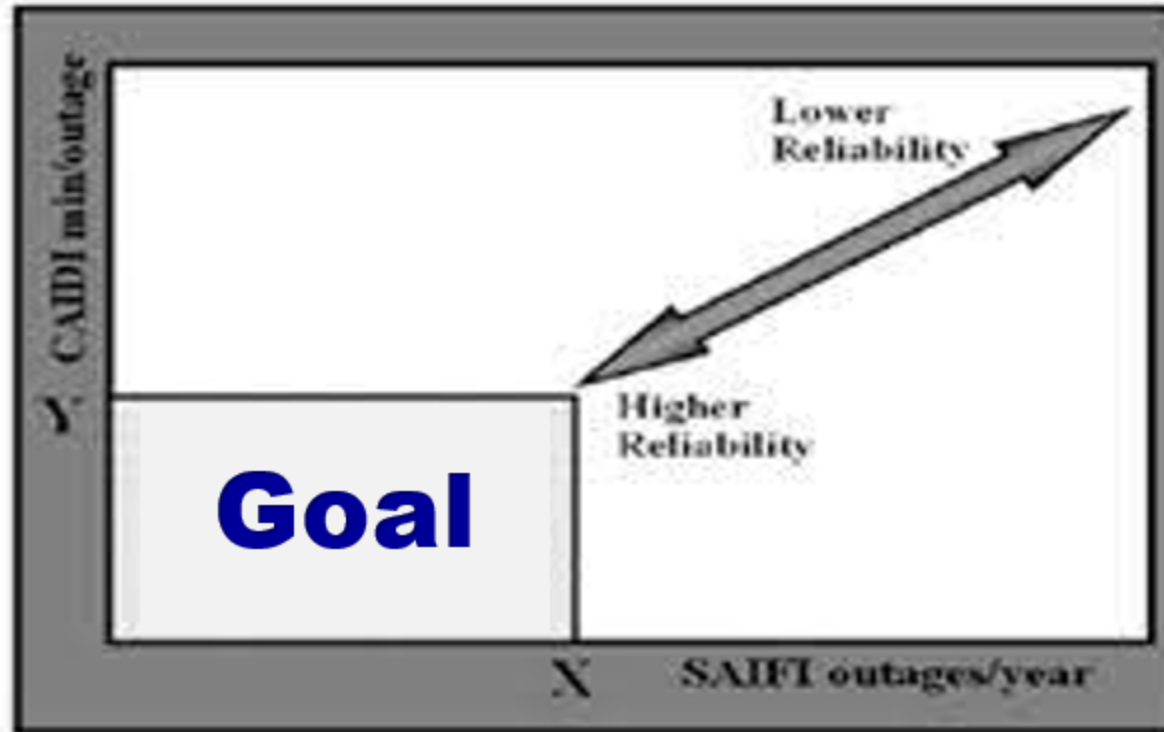
4KV/12KV CONVERSION PROGRAM

- Conversion of Feeders from 4kV to 12kV
 - ❑ Wider Span of Cross arms
 - ❑ Better Spread of phases on the cross arms
 - ❑ Less chances of wire contact forced by high speed winds
 - ❑ Harder for tree limbs to settle across overhead wires
- Increased budget for feeder reconstruction for FY 22-23.
We budgeted \$7,000,000 for each year



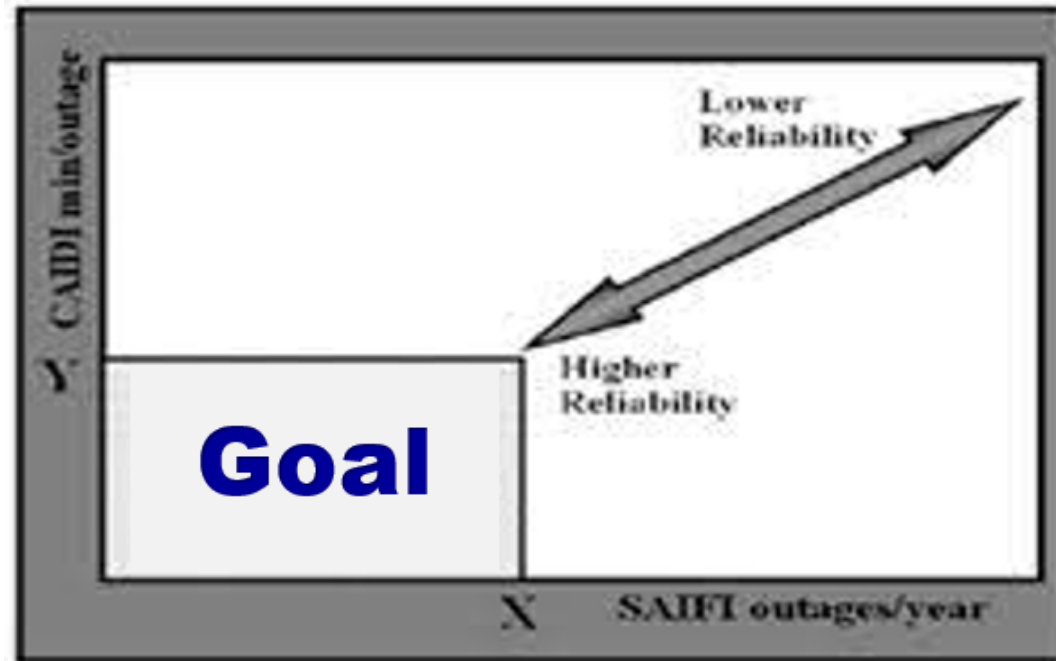
CABLE REPLACEMENT PROJECT

- Conduct researches and identify old feeder and transmission line cables
- Proactively replace aging cables



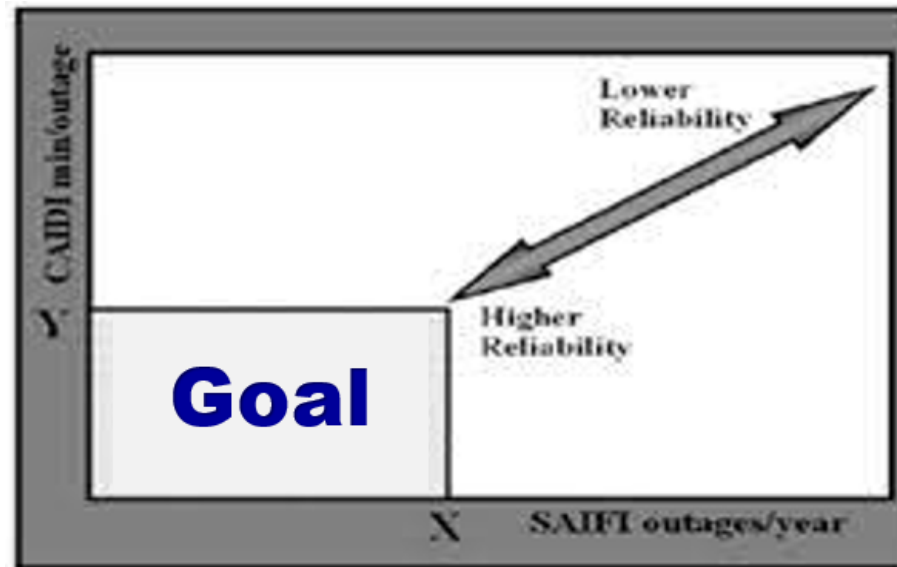
VAULT & POLE REPLACEMENT PROJECTS

- Conduct researches and identify old deteriorated distribution vaults and power poles
- Proactively replace/refurbish deteriorated vaults
- In calendar year 2021, we replaced 56 deteriorated power poles, and 80 transformers



EQUIPMENT INSPECTION

- Enhance the Transmission and Distribution Inspection Program.
- Budgetary funds are proposed for the next four fiscal years to upgrade or replace aging equipment.
- Inspection program is designed to identify the high risk facilities.



Electric Reliability Report





Thank You!

