SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

Circuit Reliability Review

San Fernando

January 2017

Providing Safe, Reliable, and Affordable Power

Southern California Edison is modernizing the power grid to meet the changing needs and expectations of our customers and to help California achieve its clean energy goals.

We are investing more than $12 billion into our power grid between 2015 – 2017 with the goal of increasing power reliability through significant upgrades. These investments include:

- Updating thousands of transmission and distribution poles
- Replacing hundreds of miles of underground cables
- Replacing hundreds of underground structures such as vaults and manholes
- Upgrading critical distribution equipment; capacitor banks, switches, and circuit breakers
- Building new distribution circuits to serve electrical demands in our communities
- Inspecting and replacing overhead conductor and equipment to improve public safety

Our investments in local communities will help ensure that customers receive safe, reliable, and affordable electricity now and in the future.

Understanding Your Reliability Report

As your electric utility, we want you to always have power when you need it. To get there, we constantly track and monitor electric outages across our service territory, and we measure our “system reliability” from this data.

The two metrics we rely on are common in the electric utility industry: the System Average Interruption Duration Index (SAIDI) and the System Average Interruption Frequency Index (SAIFI). Both are described in more detail on the next page.

Replacing and upgrading our infrastructure will help SCE maintain or improve SAIDI and SAIFI measurements.

This report provides historical reliability data for the circuits that serve your jurisdiction and our proposed infrastructure upgrades for the current year.

To view other reliability reports, visit sce.com>Outage Center>Maintaining Reliable Service

Reliability Metrics

MOMENTARY OUTAGES:

OUTAGES LASTING 5 MINUTES OR LESS

MAIFI:

- The number of times the average customer is interrupted by Momentary outages each year.

SUSTAINED OUTAGES:

OUTAGES LASTING LONGER THAN 5 MINUTES

SAIFI:

- The number of times the average customer is interrupted by Sustained outages each year.

SAIDI:

- The cumulative amount of time the average customer is interrupted by Sustained outages each year.

Cities in the Valencia District

Los Angeles
Piru
San Fernando
Santa Clarita
Val Verde

Reliability by SCE District (No Exclusions)

	2012				2013				2014				2015				2016			
District Name	District SAIDI	SAIDI RANKING	District SAIFI	SAIFI Ranking	District SAIDI	SAIDI RANKING	District SAIFI	SAIFI Ranking	District SAIDI	SAIDI RANKING	District SAIFI	SAIFI Ranking	District SAIDI	SAIDI RANKING	District SAIFI	SAIFI Ranking	District SAIDI	SAIDI RANKING	District SAIFI	SAIFI Ranking
ANTELOPE VALLEY	78.60	28	0.56	31	94.42	22	0.62	31	51.05	35	0.59	34	104.34	22	0.68	30	107.67	24	0.87	29
ARROWHEAD	129.58	13	1.31	7	180.59	7	1.39	8	193.25	5	1.59	5	362.61	4	3.97	1	659.46	3	2.85	5
BARSTOW	184.80	7	1.15	12	204.33	6	1.40	7	201.53	4	1.34	10	187.11	8	1.17	12	134.83	18	1.35	9
BIG CREEK	1184.25	1	4.52	1	176.51	8	3.08	1	920.25	1	1.34	11	422.77	2	3.42	2	1062.01	2	4.99	1
BISHOP	463.09	2	1.25	9	104.44	17	0.51	35	118.79	17	0.59	35	298.11	6	2.22	4	168.59	8	1.22	14
BLYTHE	225.88	6	1.53	3	483.13	1	1.38	9	707.54	2	2.42	2	427.00	1	1.52	7	396.38	5	2.71	6
CATALINA	78.46	30	0.72	29	105.94	16	2.97	2	97.02	24	4.17	1	42.56	35	2.25	3	65.01	35	3.66	3
COVINA	108.73	19	0.92	19	100.51	19	0.86	20	91.60	27	0.87	22	100.08	23	0.81	25	112.13	22	0.97	24
DOMINGUEZ HILLS	117.22	18	0.82	24	89.17	26	0.80	21	82.30	29	0.71	28	130.63	15	0.97	17	146.38	12	1.11	17
FOOTHILL	91.69	25	0.90	20	85.80	27	0.79	24	93.35	25	0.93	21	109.64	20	0.95	20	142.81	14	1.03	21
FULLERTON	68.99	33	0.42	35	90.57	25	0.79	22	82.23	30	0.72	27	76.59	29	0.67	31	92.72	30	0.76	34
HUNTINGTON BEACH	95.78	23	0.89	21	66.51	32	0.68	29	79.61	31	0.78	25	98.32	25	0.95	19	128.02	20	1.26	12
KERNVILLE	226.76	5	1.31	6	232.18	4	1.96	3	178.69	8	1.99	3	286.38	7	0.96	18	2421.32	1	3.67	2
LONG BEACH	75.83	31	0.55	33	75.11	30	0.70	28	66.33	34	0.61	32	164.46	9	0.89	23	135.16	17	0.86	31
MENIFEE	99.32	22	0.84	23	107.39	15	1.26	10	156.68	11	1.32	12	111.46	19	0.98	16	156.75	9	1.31	10
MONROVIA	108.11	20	1.13	15	99.12	20	1.02	16	133.32	14	1.16	16	96.68	26	0.88	24	116.57	21	0.84	32
MONTEBELLO	131.06	12	1.13	14	118.08	13	1.17	12	158.34	10	1.16	15	150.28	12	1.18	11	133.52	19	1.17	15
ONTARIO	93.09	24	0.87	22	77.39	29	0.79	23	97.91	23	1.00	19	94.04	27	0.74	27	105.07	27	0.93	27
PALM SPRINGS	175.92	8	1.27	8	112.80	14	0.77	25	107.04	20	0.71	29	99.54	24	0.80	26	107.58	25	1.07	19
REDLANDS	120.13	16	1.11	16	96.48	21	1.04	15	154.25	12	1.04	18	124.52	17	1.01	14	137.11	16	0.98	23
RIDGECREST	229.65	4	1.44	4	161.95	9	1.12	13	176.84	9	1.57	6	148.90	13	1.01	15	254.31	6	1.05	20
SADDLEBACK	83.01	27	0.73	27	70.69	31	0.53	34	99.07	22	0.74	26	46.03	34	0.39	35	65.99	34	0.65	35
SAN JOAQUIN	135.90	10	1.04	18	244.44	2	1.45	6	138.25	13	1.17	14	127.50	16	1.05	13	108.44	23	1.09	18
SANTA ANA	78.60	29	0.55	32	93.35	24	0.74	26	91.68	26	0.84	23	67.46	32	0.71	29	97.27	29	1.00	22
SANTA BARBARA	153.81	9	1.15	13	82.00	28	0.70	27	183.78	7	1.38	9	152.37	11	1.52	6	156.66	10	1.41	8
SANTA MONICA	101.69	21	0.79	25	122.78	12	1.00	17	110.76	19	0.99	20	75.41	30	0.62	32	91.08	31	0.95	26
SOUTH BAY	122.68	15	1.17	10	142.15	10	1.49	5	125.28	16	1.39	8	164.07	10	1.31	8	183.90	7	1.88	7
TEHACHAPI	117.96	17	1.43	5	232.67	3	1.12	14	130.70	15	1.29	13	298.96	5	1.21	9	97.29	28	1.13	16
THOUSAND OAKS	127.73	14	1.05	17	93.86	23	0.91	18	104.37	21	1.10	17	106.59	21	0.92	21	143.78	13	1.31	11
VALENCIA	62.01	35	0.46	34	51.04	34	0.53	33	79.23	32	0.61	33	72.27	31	0.61	33	105.09	26	0.97	25
VENTURA	134.81	11	1.15	11	100.52	18	1.21	11	183.79	6	1.65	4	148.85	14	1.19	10	150.41	11	1.24	13
VICTORVILLE	67.70	34	0.66	30	61.33	33	0.63	30	68.85	33	0.63	31	87.03	28	0.91	22	79.35	33	0.92	28
WHITTIER	72.60	32	0.74	26	135.04	11	0.86	19	87.60	28	0.70	30	114.52	18	0.73	28	137.34	15	0.81	33
WILDOMAR	88.54	26	0.72	28	40.51	35	0.56	32	118.49	18	0.81	24	52.70	33	0.60	34	84.01	32	0.87	30
YUCCA VALLEY	319.82	3	3.41	2	216.97	5	1.50	4	304.25	3	1.49	7	389.08	3	1.80	5	463.68	4	3.39	4
SCE SystemWide	**108.13**		**0.89**		**102.61**		**0.91**		**112.00**		**0.96**		**114.83**		**0.92**		**134.48**		**1.10**	

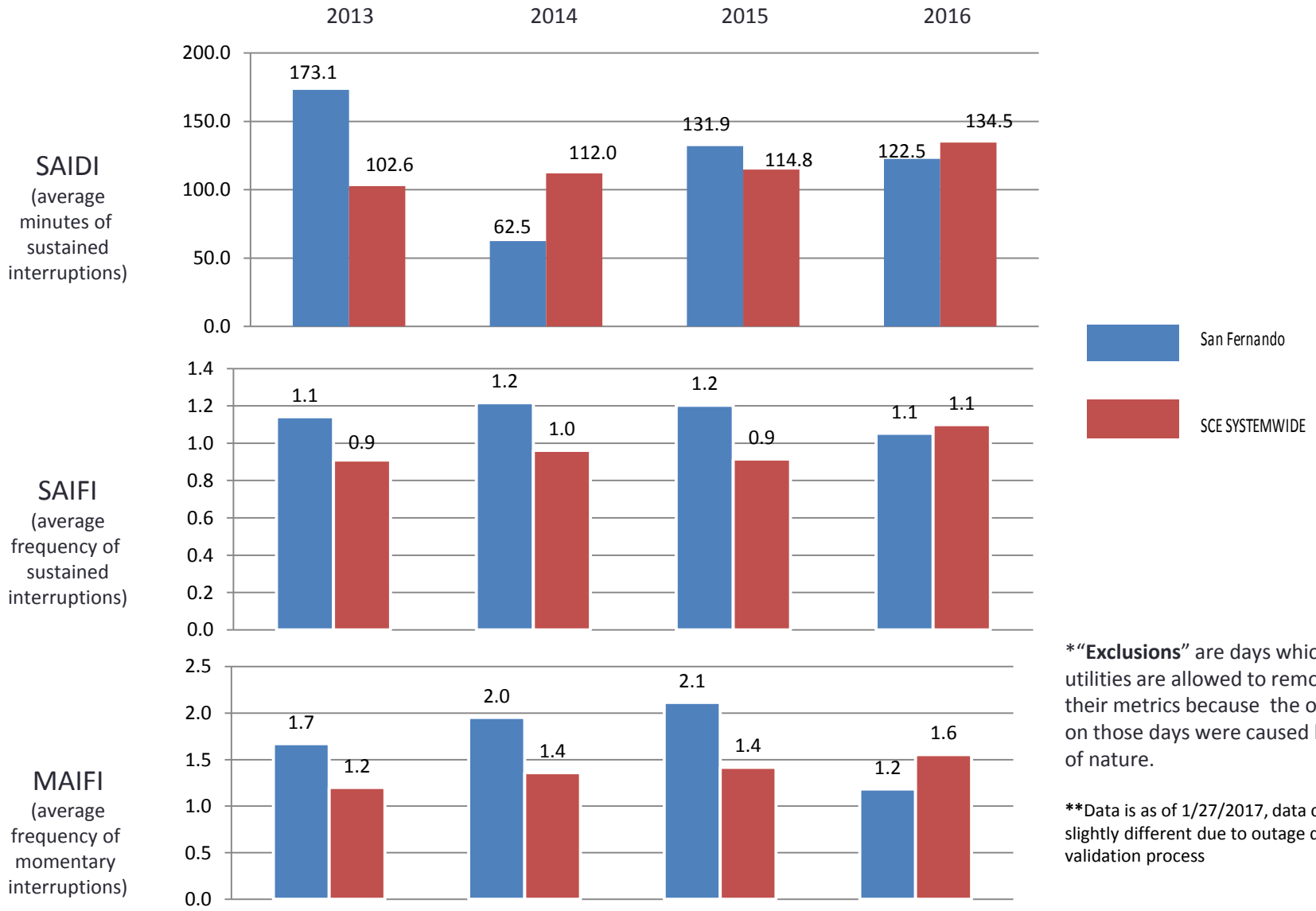
*"Exclusions" are days which utilities are allowed to remove from their metrics because the outages on those days were caused by a severe acts of nature.
**In the columns showing "Rank," lower numbers indicate poorer performance.

Overview of San Fernando

There are 4 circuits that serve San Fernando

Circuit Type	Sum of Customers	Circuit Type	Sum of Customers	Circuit Type	Sum of Customers	Circuit Type	Sum of Customers
KALISHER(16KV)	2,477						
LOPEZ(16KV)	1,475						
MISSION(16KV)	1,694						
VETERANS(16KV)	1,711						
Grand Total	7,357						

Reliability History of Circuits Serving San Fernando (No Exclusions)

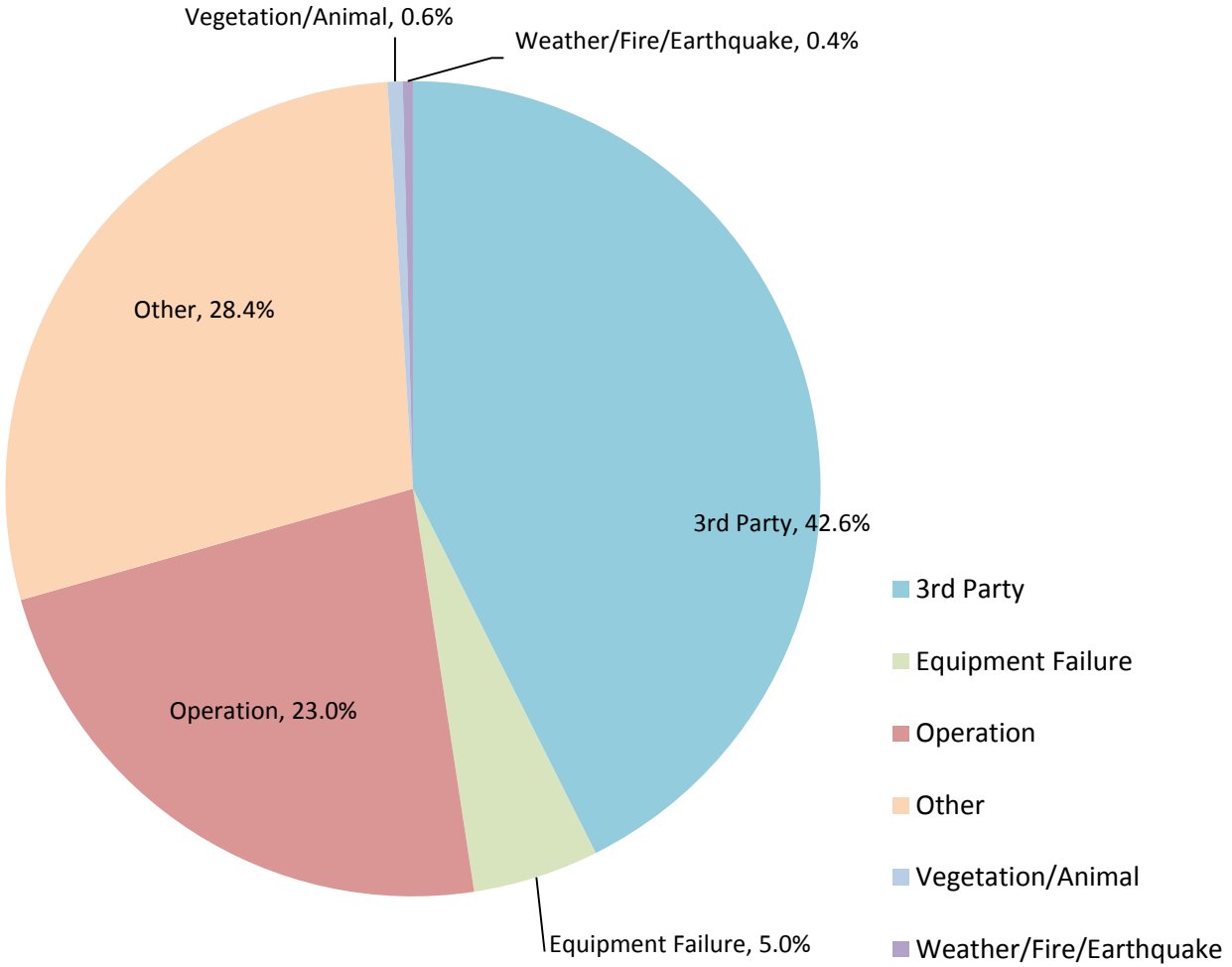


*"**Exclusions**" are days which utilities are allowed to remove from their metrics because the outages on those days were caused by acts of nature.

****Data is as of 1/27/2017, data can be slightly different due to outage data validation process

Causes of Repair Outages in San Fernando Circuits 2016 YTD

Contributions to SAIDI by Outage Cause

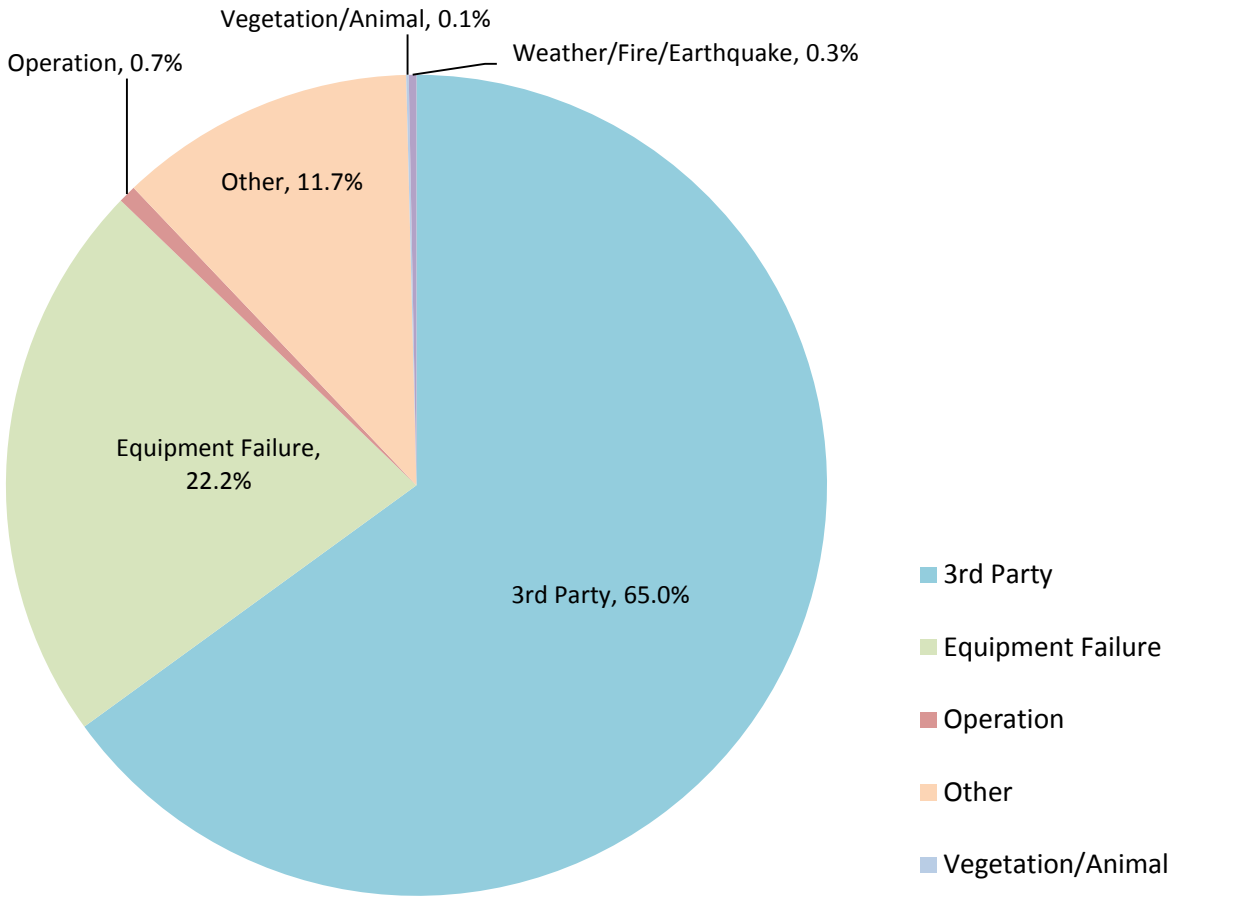


- **Equipment Failure**
  e.g., in-service failure of transformer, switch, or conductors
- **Vegetation/Animal**
  e.g., tree branch, rodent, or bird causing a short circuit between conductors
- **Other**
  e.g., patrolled but no cause found
- **Operations**
  e.g., urgent maintenance w/o 3-day notice
- **3rd Party**
  e.g., balloon, car hit pole, dig-in

SAIDI = the cumulative amount of time the average customer is interrupted by "sustained" outages each year.

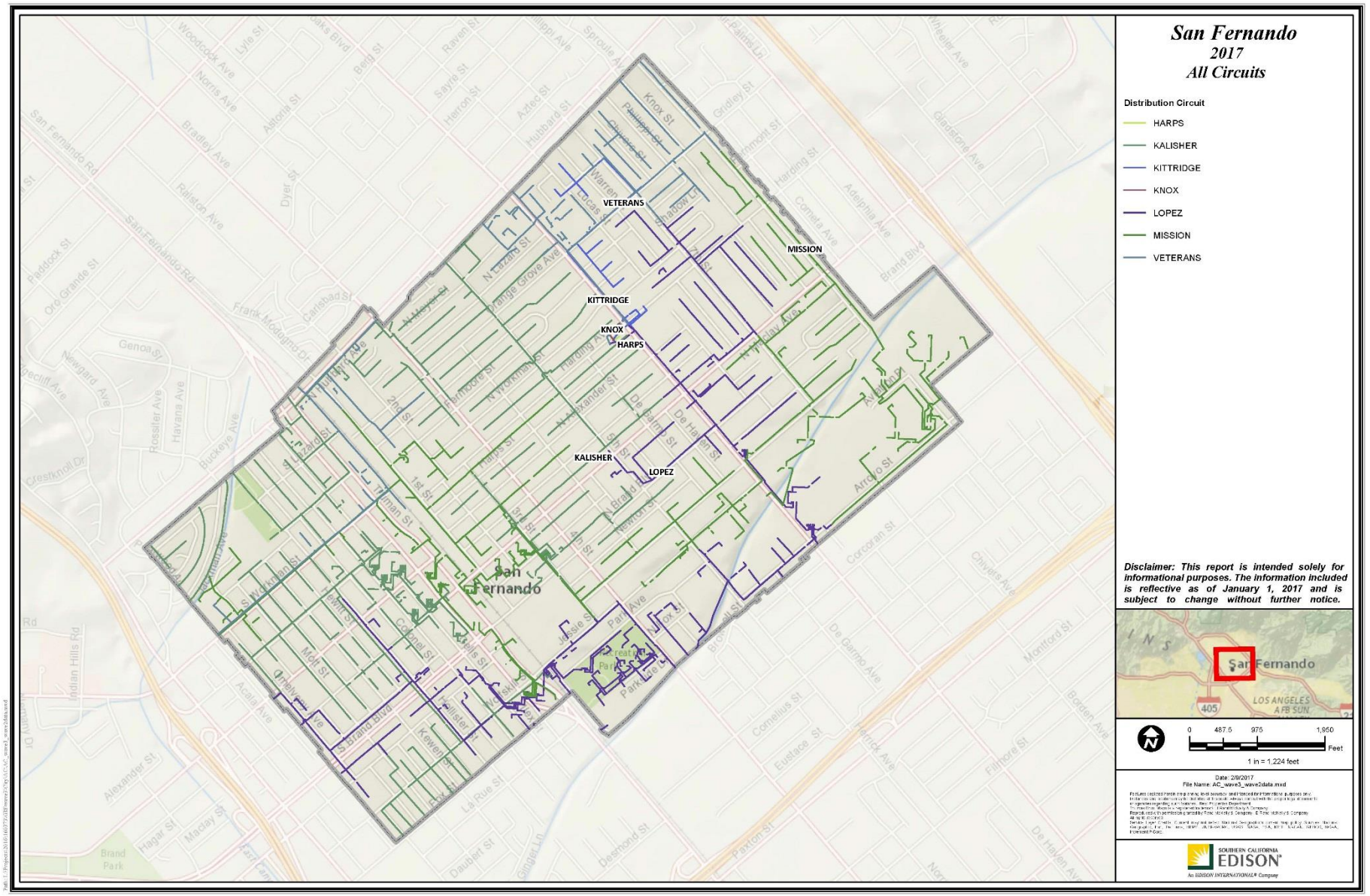
Causes of Repair Outages in San Fernando Circuits 2016 YTD

Contributions to SAIFI by Outage Cause



- **Equipment Failure**
  e.g., in-service failure of transformer, switch, or conductors
- **Vegetation/Animal**
  e.g., tree branch, rodent, or bird causing a short circuit between conductors
- **Other**
  e.g., patrolled but no cause found
- **Operations**
  e.g., urgent maintenance w/o 3-day notice
- **3rd Party**
  e.g., balloon, car hit pole, dig-in

SAIFI = the number of times the average customer is interrupted by "sustained" outages each year.


San Fernando
2017
All Circuits
Distribution Circuit
HARPS
KALISHER
KITTRIDGE
KNOX
LOPEZ
MISSION
VETERANS
VETERANS
MISSION
KITTRIDGE
KNOX
HARPS
KALISHER
LOPEZ
San Fernando
Disclaimer: This report is intended solely for informational purposes. The information included is reflective as of January 1, 2017 and is subject to change without further notice.
San Fernando
405
LOS ANGELES AFB SUN
0
487.5
975
1,950
Feet
1 in = 1,224 feet
Date: 2/8/2017
File Name: AC_wave3_wave2data.mxd
SOUTHERN CALIFORNIA EDISON
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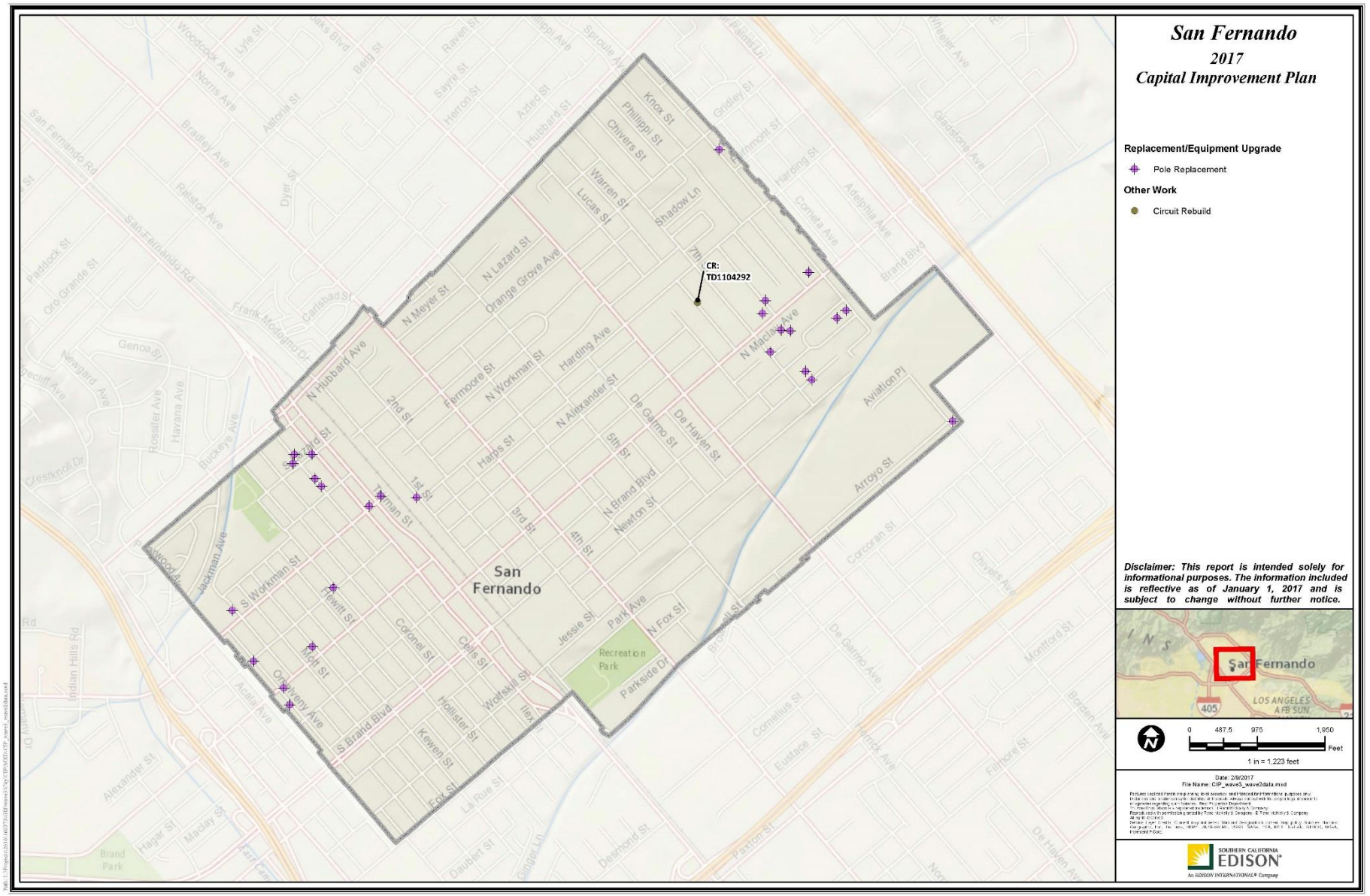
San Fernando
2017
Capital Improvement Plan
Replacement/Equipment Upgrade
Pole Replacement
Other Work
Circuit Rebuild
CR:
TD1104292
San Fernando
Disclaimer: This report is intended solely for informational purposes. The information included is reflective as of January 1, 2017 and is subject to change without further notice.
0 487.5 975 1,950
Feet
1 in = 1,223 feet
Date: 2/8/2017
File Name: CIP_wave3_wave2data.mxd
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An EDISON INTERNATIONAL Company

Back-up Slides

Reliability Histories of Circuits Serving San Fernando

Updated through Year-End 2016

Average Reliability of 4 Circuits Serving San Fernando

	2013			2014			2015			1st Qtr 2016			2nd Qtr 2016			3rd Qtr 2016			4th Qtr 2016			2016		
	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI
San Fernando	**173.1**	**1.1**	**1.7**	**62.5**	**1.2**	**2.0**	**131.9**	**1.2**	**2.1**	**36.9**	**0.1**	**0.4**	**57.4**	**0.9**	**0.4**	**28.1**	**0.0**	**0.3**	**0.0**	**0.0**	**0.0**	**122.5**	**1.1**	**1.2**
3rd Party	14%	6%	11%	17%	10%	7%	20%	19%	11%	0%	0%	0%	91%	75%	0%	0%	0%	0%	0%	0%	#DIV/0!	43%	65%	0%
Equipment Failure	55%	54%	3%	55%	17%	14%	75%	78%	7%	2%	2%	0%	9%	25%	54%	0%	0%	0%	100%	100%	#DIV/0!	5%	22%	20%
Operation	0%	0%	2%	3%	1%	0%	2%	2%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%	#DIV/0!	23%	1%	0%
Other	21%	20%	37%	14%	52%	29%	4%	1%	72%	94%	95%	19%	0%	0%	46%	0%	0%	0%	0%	0%	#DIV/0!	28%	12%	23%
Vegetation/Animal	0%	0%	35%	9%	19%	50%	0%	0%	10%	2%	1%	1%	0%	0%	0%	0%	0%	100%	0%	0%	#DIV/0!	1%	0%	29%
Weather/Fire/Earthquake	10%	19%	12%	2%	1%	0%	0%	0%	0%	1%	2%	80%	0%	0%	0%	0%	0%	0%	0%	0%	#DIV/0!	0%	0%	28%
SCE Systemwide	**102.6**	**0.9**	**1.2**	**112.0**	**1.0**	**1.4**	**114.8**	**0.9**	**1.4**	**40.5**	**0.3**	**0.4**	**34.8**	**0.3**	**0.4**	**29.4**	**0.2**	**0.3**	**29.8**	**0.3**	**0.4**	**134.5**	**1.1**	**1.6**

Notes:

No outages are excluded from the metrics.

Outage Causes:

Other: e.g., patrolled but no cause could be found
Operations: e.g., urgent maintenance w/o 3-day notice to customers
3rd Party: e.g., balloons, car hit pole, dig-in
Vegetation/Animal: e.g., tree branch, rodent, or bird causing short circuit across conductors

SAIDI (minutes) = the cumulative amount of time the average customer is interrupted by “sustained” (longer than 5 minutes) outages.

SAIFI (interruptions) = the number of times the average customer is interrupted by “sustained” outages.

MAIFI (interruptions) = the number of times the average customer is interrupted by “momentary " (lasting 5 minutes or less) outages.

0.0	**0.0**	**0.3**	**16.6**	**1.3**	**0.3**	**112.8**	**1.0**	**2.9**	**1.5**	**0.0**	**1.0**	**150.8**	**2.0**	**0.0**	**0.0**	**0.0**	**1.0**
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	100%	99%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	4%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	96%	98%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%
93.9	**1.3**	**1.4**	**77.9**	**1.6**	**3.7**	**106.8**	**0.9**	**3.7**	**177.8**	**0.6**	**0.4**	**5.8**	**0.0**	**1.0**	**140.8**	**0.0**	**0.0**
0%	0%	0%	61%	31%	17%	39%	11%	27%	0%	0%	0%	100%	100%	0%	0%	0%	0%
95%	95%	0%	7%	1%	27%	51%	75%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	9%	2%	1%	0%	10%	14%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%
5%	4%	11%	23%	65%	30%	0%	0%	31%	98%	99%	94%	0%	0%	100%	0%	0%	0%
0%	0%	72%	0%	0%	26%	0%	0%	27%	2%	1%	6%	0%	0%	0%	0%	0%	0%
0%	0%	9%	7%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
52.4	**1.8**	**2.0**	**112.4**	**1.3**	**2.6**	**170.0**	**1.9**	**1.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
23%	10%	23%	0%	0%	0%	45%	47%	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%
26%	30%	0%	85%	47%	5%	55%	53%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
33%	30%	38%	0%	0%	34%	0%	0%	88%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	33%	14%	53%	61%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
17%	29%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
80.3	**0.8**	**3.4**	**8.4**	**0.0**	**0.9**	**146.9**	**1.0**	**0.2**	**3.6**	**0.0**	**0.0**	**22.6**	**1.0**	**1.0**	**0.0**	**0.0**	**0.0**
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
00%	100%	11%	0%	0%	0%	84%	95%	100%	100%	100%	0%	100%	100%	100%	0%	0%	0%
0%	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	58%	0%	0%	0%	16%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%