2021 SCE Reliability Review

December 14, 2022

Livestream

Meeting Topics

- Overview of Southern California Edison (SCE)
- Reliability Definition and Measurement
- SCE's 2021 System Reliability Performance
- How to Obtain Local Reliability Reports?
- 2021 Reliability Improvements

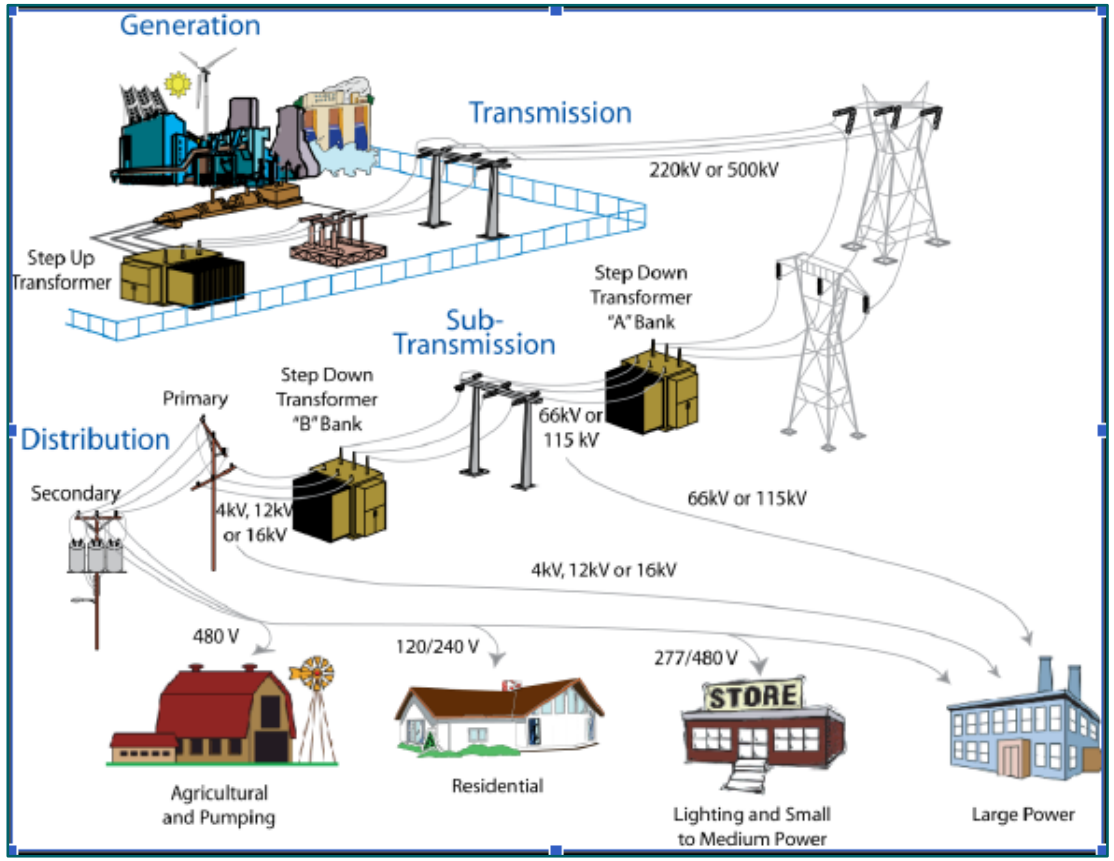
Who We Are

- Southern California Edison (SCE) is an Edison International company
- One of the nation's largest electric utilities
- More than 130 years of history
- Headquartered in Rosemead, California
- Regulated by the California Public Utilities Commission (CPUC) and the Federal Energy Regulatory Commission (FERC)
- 50,000 square miles of SCE service area across Central, Coastal, and Southern California

How We Serve

To deliver power safely, reliably and affordably, we monitor and maintain a vast electricity system.

- 5M Customers and 15M Residents
- 445 Communities and 13 Native American Tribes
- 4,600 Circuits
- 126,000 Miles of Transmission and Distribution Lines
- 730,000 Transformers



Reliability Definition and Measurement

What is Reliability?

- In Simplest terms:
  Having dependable electricity when you need it

- Outages:
  1. Maintenance outages (aka planned outages)

  2. Repair outages (aka unplanned outages)
     a) Sustained Outage (>5 mins)
     b) Momentary Outage (≤5 mins)

  3. Public Safety Power Shutoff (aka PSPS)

I. Major Event Day (MED): A day in which the daily system SAIDI exceeds a threshold value. 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 a threshold value are days on which the energy delivery system experienced stresses beyond that normally expected (such as severe weather).

II. Public Safety Power Shutoff (PSPS): An operational protocol that SCE implements under extreme weather conditions in order to minimize the threat of wildfires and keep communities safe from potentially dangerous situations. These types of sustained outages are temporary and usually involve situations where high fire areas are experiencing adverse weather or public safety is at risk.

How Do We Measure System Reliability?

SAIDI **SAIFI** **CAIDI** **MAIFI**

SAIDI = Total minutes every SCE customer was without power due to sustained outages (CMI) ÷ Total number of customers

System Average Interruption Duration Index

"What's the total time my power service will be unexpectedly interrupted this year?"

SAIFI = Number of sustained customer outages experienced by all SCE customers (CI) ÷ Total number of customers

System Average Frequency Duration Index

"How many times will my power service be unexpectedly interrupted this year?"

MAIFI = Number of momentary customer outages experienced by all SCE customers (MI) ÷ Total number of customers

Momentary Average Interruption Frequency Index

"How many times will my power service be momentarily interrupted (≤5 minutes) this year?"

CAIDI = System Average Interruption Duration Index (SAIDI) ÷ System Average Interruption Frequency Index (SAIFI)

Customer Average Interruption Duration Index

"How long will it take to restore my power after an unexpected interruption?"

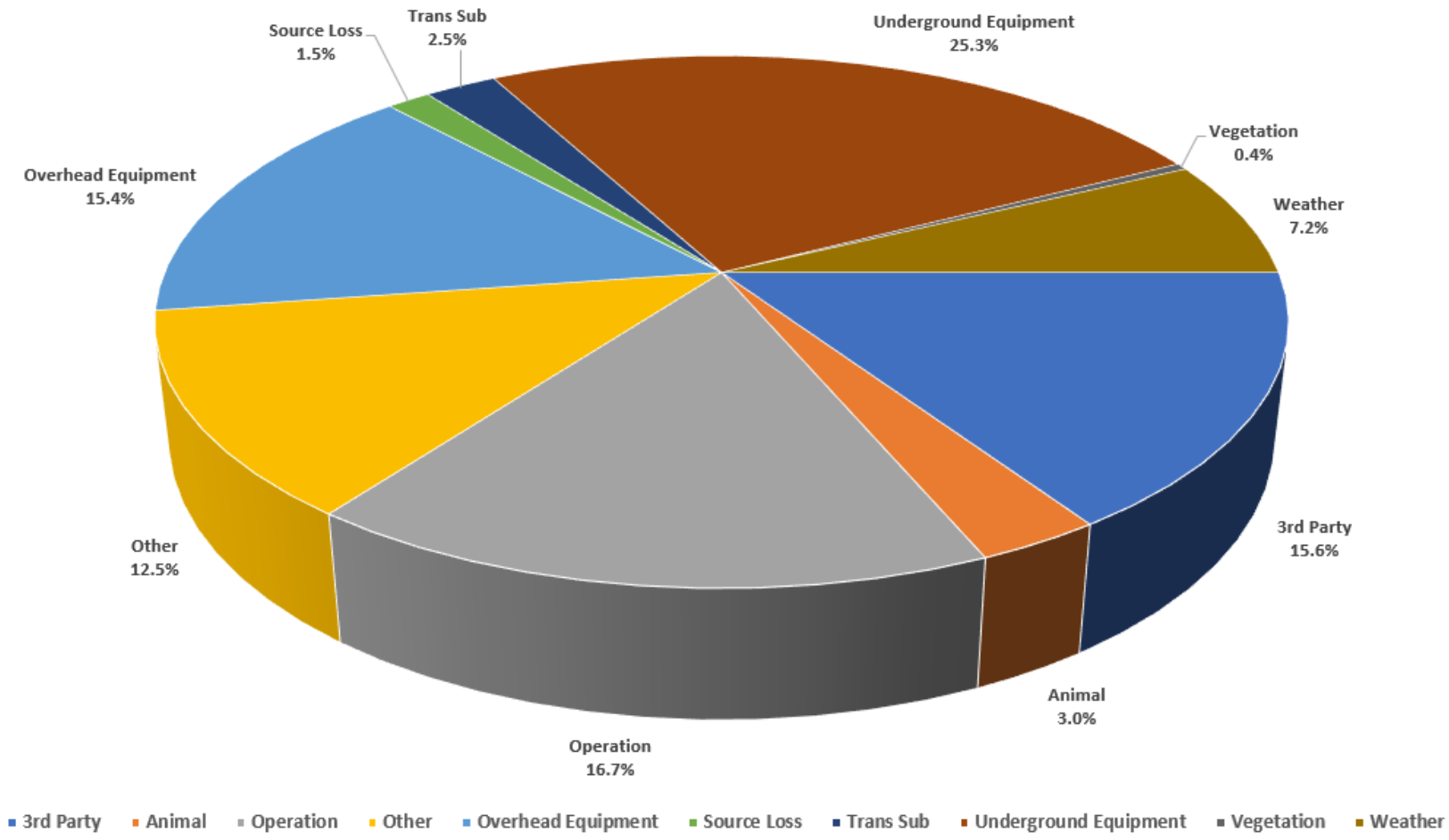
SCE 2021 System Reliability Performance

SOUTHERN CALIFORNIA EDISON®

2012 - 2021 System Reliability History (Excluding MED[1]) – Unplanned

[1]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 and meet MED threshold.

2021 Outage Causes



Worst 1% of Circuits by System SAIDI

1	2	3	4	5	6	7	8	9	10
Circuit	District	2021 Customer Count	Substation	Circuit Miles (d)	%UG	%OH	Circuit Breaker or Auto-Recloser Operation (a)	Sys-SAIDI Rank	Sys-SAIDI (b)
Mustang 12kV	53	2,111	Isabella	51.55	0.04	0.96	23	1	0.584195967
Tenneco 12kV*	36	4,712	Frazier Park	124.02	0.21	0.79	73	2	0.57171567
Pascoe 2.4kV	53	409	Greenhorn	9.65	0.10	0.90	12	3	0.499969375
Cuthbert 16kV*	35	2,347	Latigo	41.84	0.40	0.60	42	4	0.451432658
Melody 25kV	84	1,947	Hi Desert	320.19	-	1.00	81	5	0.450066627
Napoleon 12kV	31	1,907	Maraschino	42.36	0.78	0.22	61	6	0.330180546
Mist 16kV	49	421	Capitan	65.69	0.09	0.91	40	7	0.321450218
Ranger 2.4kV	40	698	Ranger P.T.	5.19	-	1.00	15	8	0.320809853
Atento 12kV*	43	2,746	Viejo	56.78	0.53	0.47	44	9	0.31997025
Cachuma 16kV	49	2,483	Vegas	70.82	0.17	0.83	45	10	0.316458681
Power 4kV	31	781	Muscoy	11.16	0.03	0.97	51	11	0.315281267
Eastmont 4kV*	22	1,325	Bicknell	3.94	0.07	0.93	6	12	0.311647038
Agate 12kV*	43	4,233	Morro	35.48	0.70	0.30	39	13	0.299803232
Capanero 2.4kV	51	300	Capanero P.T.	5.31	-	1.00	6	14	0.29058599
Trochu 16kV*	32	2,007	Bullis	16.23	0.20	0.80	14	15	0.290247348
Haskell 16kV	27	1,503	Arroyo	26.08	0.45	0.55	82	16	0.285663113
Abacus 12kV	31	2,416	Highland	27.71	0.62	0.38	17	17	0.283265401
Cabana 12kV	30	2,314	Bain	14.52	0.81	0.19	17	18	0.275936149
Firmona 16kV*	44	1,878	La Fresa	7.70	0.16	0.84	9	19	0.266442763
Thunderbolt 12kV	36	1,778	Oasis	19.95	0.49	0.51	14	20	0.261041838
Windjammer 16kV	39	7,436	Channel Islands	45.26	0.48	0.52	22	21	0.254185161
Concepcion 16kV*	49	245	Gaviota	62.75	0.50	0.50	8	22	0.238098236
Energy 16kV*	35	1,717	Chatsworth	46.80	0.29	0.71	42	23	0.23805466
Rim 12kV*	40	1,886	Burnt Mill	29.49	0.22	0.78	17	24	0.237482459
Courson 12kV	36	2,324	Palmdale	21.43	0.85	0.15	5	25	0.237198896
Landers 25kV	84	1,815	Nugget	144.36	0.01	0.99	73	26	0.235553901
Big Rock 16kV*	35	2,993	Chatsworth	29.94	0.44	0.56	17	27	0.235498253
Driskill 16kV	49	4,076	San Marcos	68.79	0.41	0.59	55	28	0.233859818
Roi-Tan 12kV*	31	2,322	Shandin	28.23	0.31	0.69	28	29	0.233721762
Canoe 12kV	33	3,152	Bolsa	18.30	0.60	0.40	26	30	0.227624491
Big Pines 12kV	36	2,232	Little Rock	69.41	0.48	0.52	44	31	0.226117215
Green Bear 2.4kV	40	667	Green Bear P.T.	7.73	-	1.00	13	32	0.218919328
Memphis 12kV	31	1,456	Tennessee	33.27	0.34	0.66	43	33	0.218680086
Autumn 12kV	85	2,119	Skiland	27.14	0.77	0.23	21	34	0.218263219
January 12kV*	33	4,309	Lafayette	20.01	0.92	0.08	34	35	0.218063315
Vallecito 16kV	49	4,324	Carpinteria	55.51	0.47	0.53	63	36	0.21671293
Milpas 16kV	49	4,869	Santa Barbara	20.67	0.39	0.61	32	37	0.211738866
Kay 16kV*	22	2,262	Alhambra	15.37	0.31	0.69	9	38	0.201946942
Exline 16kV	22	4,102	Amador	18.23	0.23	0.77	28	39	0.199117449
Hogan 12kV	33	2,733	Lafayette	12.39	0.49	0.51	30	40	0.195785857
Belpac 16kV	35	3,157	Newbury	40.33	0.87	0.13	25	41	0.193430413
Moritz 12kV	40	1,995	Huston	30.32	0.26	0.74	43	42	0.193394162
Norwood 12kV	31	2,207	Highland	18.04	0.36	0.64	23	43	0.191989821
Camp Nelson 4kV	51	520	Camp Nelson P.T.	9.90	0.01	0.99	24	44	0.191417736
Marbuck 12kV	34	2,317	Francis	15.30	0.50	0.50	40	45	0.190529427
Karen 12kV	48	2,371	Marion	19.14	0.14	0.86	18	46	0.188654588

The list captures the 1% worst performing circuits (WPC) by SAIDI. It shows the total number of circuits and the associated district. Worst performing circuits are calculated based on a historical three-year weighted average and excludes MEDs

Worst 1% of Circuits by System SAIFI

1	2	3	4	5	6	7	8	9	10
Circuit	District	2021 Customer Count	Substation	Circuit Miles (d)	%UG	%OH	Circuit Breaker or Auto-Recloser Operation (a)	Sys-SAIFI Rank	**Sys-SAIFI (b)**
Tenneco 12kV*	36	4,712	Frazier Park	124.02	0.21	0.79	73	1	**0.00374**
Corsica 16kV*	39	6,523	Gonzales	47.21	0.62	0.38	26	2	**0.00329**
Windjammer 16kV*	39	7,436	Channel Islands	45.26	0.48	0.52	22	3	**0.00306**
January 12kV*	33	4,309	Lafayette	20.01	0.92	0.08	34	4	**0.00286**
Blimp 16kV	32	3,674	Nola	30.50	0.23	0.77	28	5	**0.00283**
Margaret 16kV	44	5,224	Felton	16.71	0.27	0.73	18	6	**0.00227**
Salmon 16kV*	44	3,971	El Nido	18.46	0.42	0.58	21	7	**0.00227**
Spinnaker 16kV*	39	5,080	Channel Islands	34.19	0.29	0.71	23	8	**0.00219**
Roi-Tan 12kV*	31	2,322	Shandin	28.23	0.31	0.69	28	9	**0.00219**
Driskill 16kV	49	4,076	San Marcos	68.79	0.41	0.59	55	10	**0.00209**
Milpas 16kV	49	4,869	Santa Barbara	20.67	0.39	0.61	32	11	**0.00208**
Marbuck 12kV	34	2,317	Francis	15.30	0.50	0.50	40	12	**0.00207**
Kuehner 16kV*	35	3,070	Santa Susana	23.98	0.77	0.23	18	13	**0.00207**
Ricardo 16kV*	39	2,982	San Miguel	23.21	0.39	0.61	44	14	**0.00206**
Napoleon 12kV	31	1,907	Maraschino	42.36	0.78	0.22	61	15	**0.00205**
Gringo 16kV	39	4,736	San Miguel	28.68	0.90	0.10	31	16	**0.00203**
Agate 12kV	43	4,233	Morro	35.48	0.70	0.30	39	17	**0.00202**
Tri City 16kV*	22	3,153	Alhambra	17.01	0.26	0.74	19	18	**0.00200**
Exline 16kV	22	4,102	Amador	18.23	0.23	0.77	28	19	**0.00198**
Vallecito 16kV	49	4,324	Carpinteria	55.51	0.47	0.53	63	20	**0.00196**
Fantail 16kV*	42	5,839	Tahiti	12.90	0.87	0.13	9	21	**0.00195**
Haskell 16kV	27	1,503	Arroyo	26.08	0.45	0.55	82	22	**0.00195**
Ambrus 16kV	27	2,335	Bradbury	19.46	0.67	0.33	23	23	**0.00193**
Hooligan 16kV	35	3,164	Newbury	48.48	0.85	0.15	26	24	**0.00192**
Sweetwater 12kV	31	3,361	Shandin	33.32	0.92	0.08	24	25	**0.00191**
Campanula 25kV*	84	1,979	Nugget	135.78	0.07	0.93	89	26	**0.00187**
Kalmia 16kV	32	2,850	Calden	15.36	0.05	0.95	23	27	**0.00186**
Ryan 16kV	44	7,018	Lennox	27.13	0.20	0.80	10	28	**0.00185**
Sundown 12kV*	73	2,578	Helendale	46.98	0.85	0.15	26	29	**0.00184**
Diablo 16kV	39	4,284	San Miguel	36.71	0.60	0.40	29	30	**0.00177**
Queensland 12kV	36	2,437	Lancaster	26.74	0.71	0.29	20	31	**0.00176**
Surfside 16kV	39	5,623	Channel Islands	31.50	0.62	0.38	28	32	**0.00171**
Wintersburg 12kV	33	3,651	Oceanview	17.23	0.56	0.44	5	33	**0.00168**
Trochu 16kV*	32	2,007	Bullis	16.23	0.20	0.80	14	34	**0.00168**
Asteroid 16kV*	22	4,430	Alhambra	20.74	0.36	0.64	15	35	**0.00165**
Big Rock 16kV*	35	2,993	Chatsworth	29.94	0.44	0.56	17	36	**0.00164**
Kwis 12kV*	26	2,101	Walnut	26.64	0.54	0.46	27	37	**0.00162**
Mallet 12kV	26	2,723	Railroad	29.35	0.69	0.31	35	38	**0.00162**
Power 4kV	31	781	Muscoy	11.16	0.03	0.97	51	39	**0.00160**
Belpac 16kV	35	3,157	Newbury	40.33	0.87	0.13	25	40	**0.00157**
Tandem 16kV	44	1,975	Walteria	18.92	0.41	0.59	20	41	**0.00156**
Seminary 16kV	39	2,086	Somis	22.01	0.46	0.54	17	42	**0.00153**
Campbell 12kV*	51	2,622	Porterville	114.73	0.24	0.76	26	43	**0.00152**
Speaker 12kV	33	4,809	Hamilton	31.76	0.61	0.39	12	44	**0.00151**
Rhumba 16kV	44	4,121	Brighton	16.76	0.34	0.66	10	45	**0.00150**
McDonnell 16kV	44	2,017	Lennox	12.78	0.31	0.69	19	46	**0.00150**

The list captures the 1% worst performing circuits (WPC) by SAIFI. It shows the total number of circuits and the associated district. Worst performing circuits are calculated based on a historical three-year weighted average and excludes MEDs

How to Obtain Local Reliability Reports

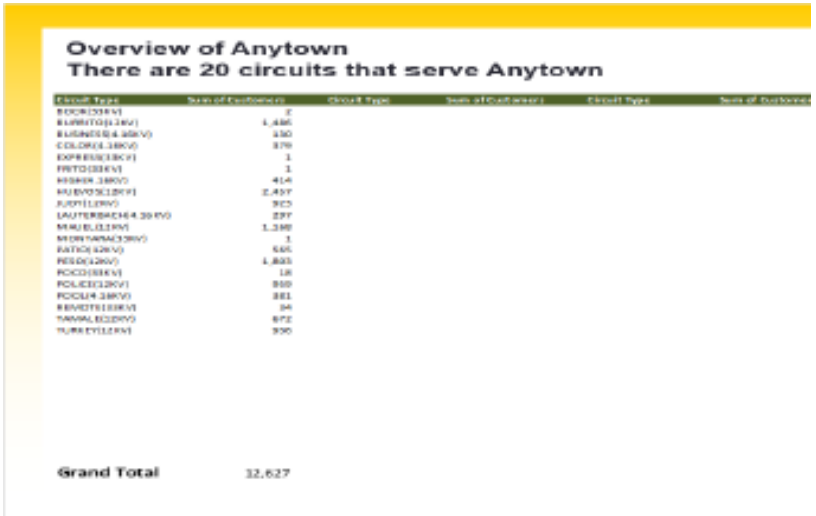
How can I get Reliability Information?

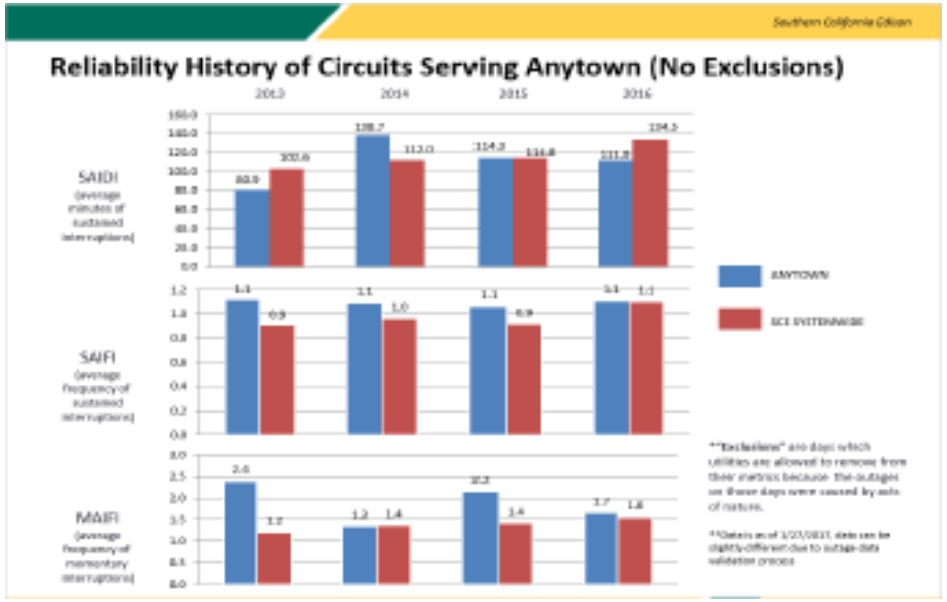
- City Reliability Reports can be found **at SCE > Outage Center > Reliability Reports**
- There are over 240 City Reliability Presentations available, including unincorporated cities
- These reports are updated annually
- City Reliability Reports include the following information:
  - Listing of circuits serving that city
  - Circuit reliability performance
  - Causes of repair outages on those circuits
  - Capital Improvement Plans on those circuits
  - Historical SAIDI/SAIDI for circuits

City Overview and Reliability Reports

- Each city report will list all circuits that serve that city as well as the number of customers on each of those circuits

- Provides reliability history for the current year and the prior 3 years
  - SAIDI
  - SAIFI
  - MAIFI

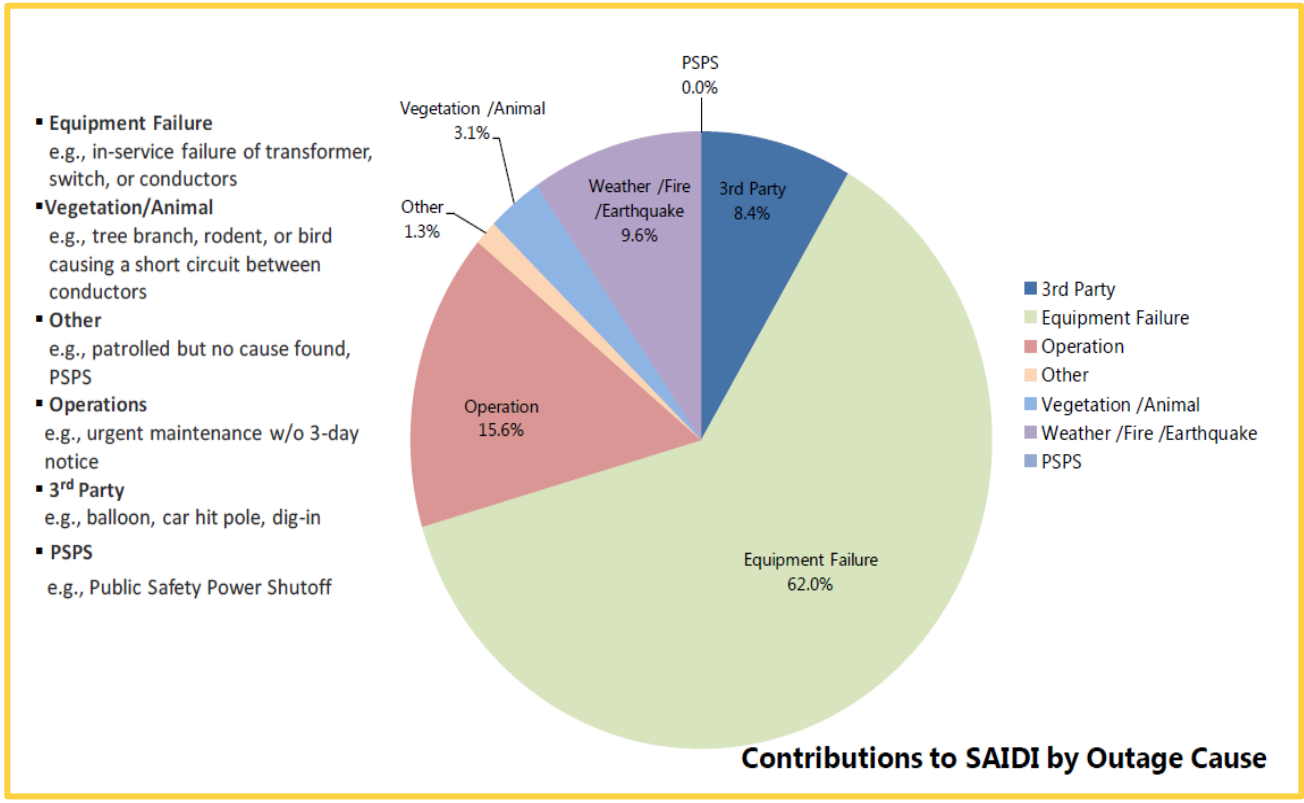




Outage Causes

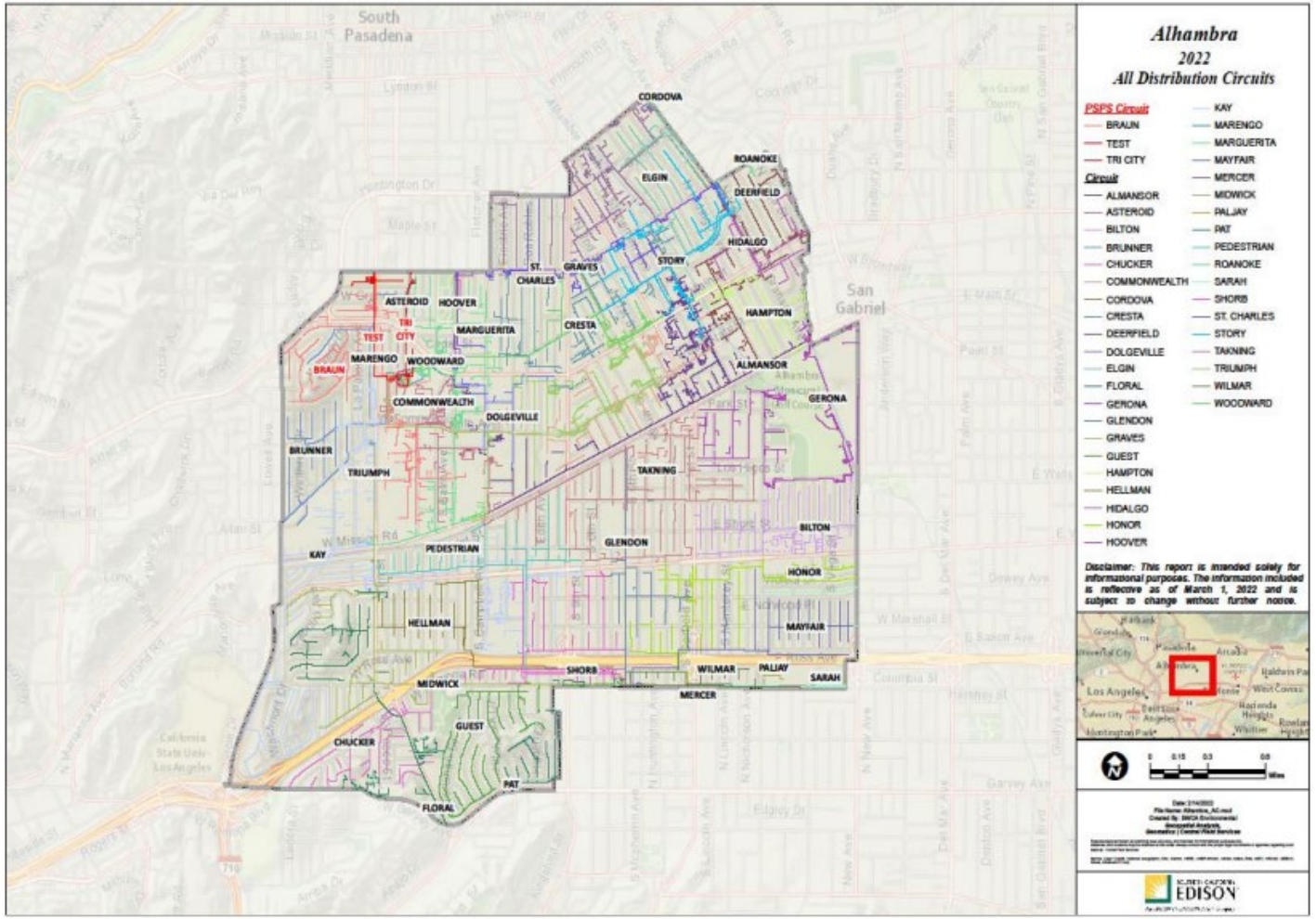
Each report will provide the % contribution by SAIDI and SAIFI based on the outage cause categories

- 3rd Party
- Equipment Failure
- Operation
- Other
- Vegetation/Animal
- Weather/Fire/Earthquake
- PSPS



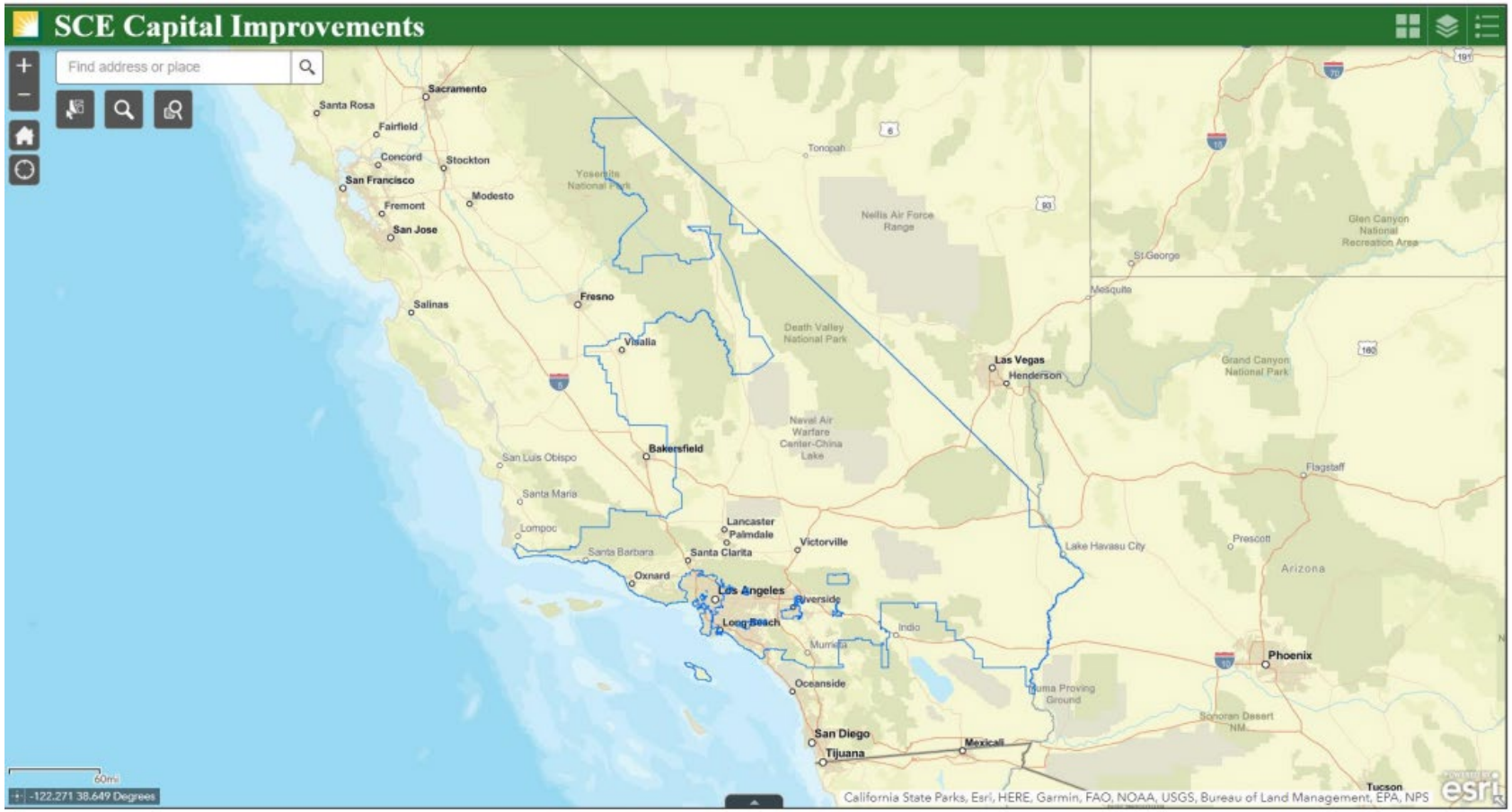
Circuit Maps

- The report provides a map of all the circuits that serve the jurisdiction, including PSPS circuits



Capital Improvement Map

- The capital improvement map has transitioned to a virtual format via SCE's capital improvements and can be accessed using the link [www.sce.com/CapitalImprovements.](www.sce.com/CapitalImprovements)



2021 Reliability Improvements

2021 Infrastructure Improvements

SCE plans to spend more than $5B each year to maintain, improve, and harden its infrastructure by focusing on the following areas:

- **Infrastructure reliability** – updating underground cables, poles, switches, and transformers
- **Wildfire mitigation** – hardening infrastructure, bolstering situational awareness capabilities, and enhancing operational practices
- **Transmission** – connecting renewables, installing new substations, and updating lines
- **Grid readiness** – updating the grid for impacts from new technologies
- **Long-term energy policy** – supporting energy storage, electric vehicles, and renewables

2021 Capital Investment

- 235 miles of underground cable replaced
- 97 miles of overhead conductor replaced for public safety
- 11.1k distribution poles replaced
- 3.6k transmission poles replaced
- 79 underground structure replacements

Addressing Wildfire Risk

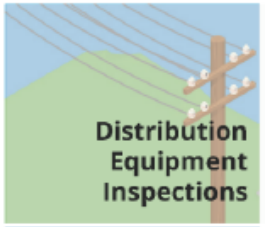
SCE will continue to further strengthen the system and provide customer assistance and resources to make communities safer, more resilient, and minimize the impact of PSPS events

Measures to reduce wildfire risks include:

- Inspecting and investing in electric equipment and infrastructure
- Improving situational awareness capabilities
- Managing vegetation around electric infrastructure
- Implementing Public Safety Power Shutoffs (PSPS) during potentially dangerous weather conditions

Wildfire Mitigation Activities
SCE SERVICE AREA

2021 Year-End Progress Report
Data as of 12/31/21

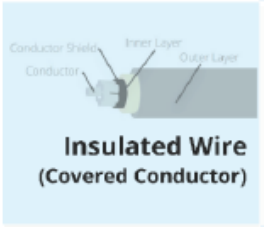


Distribution Equipment Inspections

2021 Completed/Target		Completed Since 2018
179,600/163,000 inspections	110% completed	764,000+ inspections

Transmission Equipment Inspections

2021 Completed/Target		Completed Since 2018
20,800/16,800 inspections	124% completed	106,900+ inspections



Insulated Wire (Covered Conductor)

2021 Completed/Target		Completed Since 2018
1,500/1,000 circuit miles installed	150% completed	2,900+ circuit miles installed

Fast-Acting Fuses

2021 Completed/Target		Completed Since 2018
350/330 fuses installed or replaced	106% completed	13,300+ fuses installed or replaced

Hazard Tree Management

2021 Completed/Target		Completed Since 2018
131,400/120,000 trees assessed	110% completed	359,900+ trees assessed

Weather Stations

2021 Completed/Target		Completed Since 2018
400/375 weather stations installed	107% completed	1,460+ weather stations installed

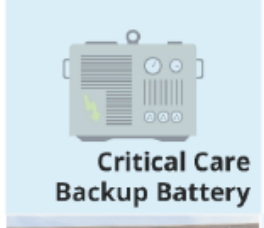
High-Definition Wildfire Cameras

Cameras currently provide visibility to about 90% of our high fire risk areas (HFRA) and the planned additional cameras in 2022 and beyond will increase coverage to nearly all of HFRA

Completed Since 2018: 166 cameras installed

Aerial Fire Suppression Resources

SCE contributed $18 million to support the creation of a quick reaction force of aerial firefighting assets across counties in SCE's service area to coordinate and reach wildfires in their early stages. These unique water and fire retardant dropping helitankers have the capability to operate day and night.



Critical Care Backup Battery

2021 Completed		Completed Since July 2020
6,000/3,600 batteries provided to eligible customers	167% completed	6,740+ batteries provided to eligible customers

Community Resource Centers

64 sites available

Community Crew Vehicles

8 vehicles available

Questions?

Contact
CircuitReliability@sce.com