



# 2016 SCE Reliability Review

**November 27<sup>th</sup>, 2017**  
**Irwindale, California**

# Meeting agenda

## Overview of SCE

- Reliability definition and measurement
- SCE's 2016 Reliability performance
- How to obtain local reliability report?
- How is SCE working on improving Reliability

# How We Do It

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

50K Square Mile

5M Customers

4,600 Circuits

1.5M Poles

119K Miles of D&T lines

730K Transformers



- Overview of SCE

## Reliability definition and measurement

- SCE's 2016 Reliability performance
- How to obtain local reliability report?
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# What is Reliability?

- In simplest terms:  
*Having dependable electricity when you need it.*
- Outages:
  - Maintenance outages (aka planned outages)
  - Repair outages (aka unplanned outages)
    - Sustained Outage = An outage lasting > **5 minutes**
    - Momentary Outage = An outage lasting  $\leq$  **5 minutes**



**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).

# How Do We Measure Reliability?

## **SAIDI** - System Average Interruption Duration Index

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

## **MAIFI** - Momentary Average Interruption Frequency Index

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

## **SAIFI** - System Average Interruption Frequency Index

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

## **CAIDI** - Customer Average Interruption Index

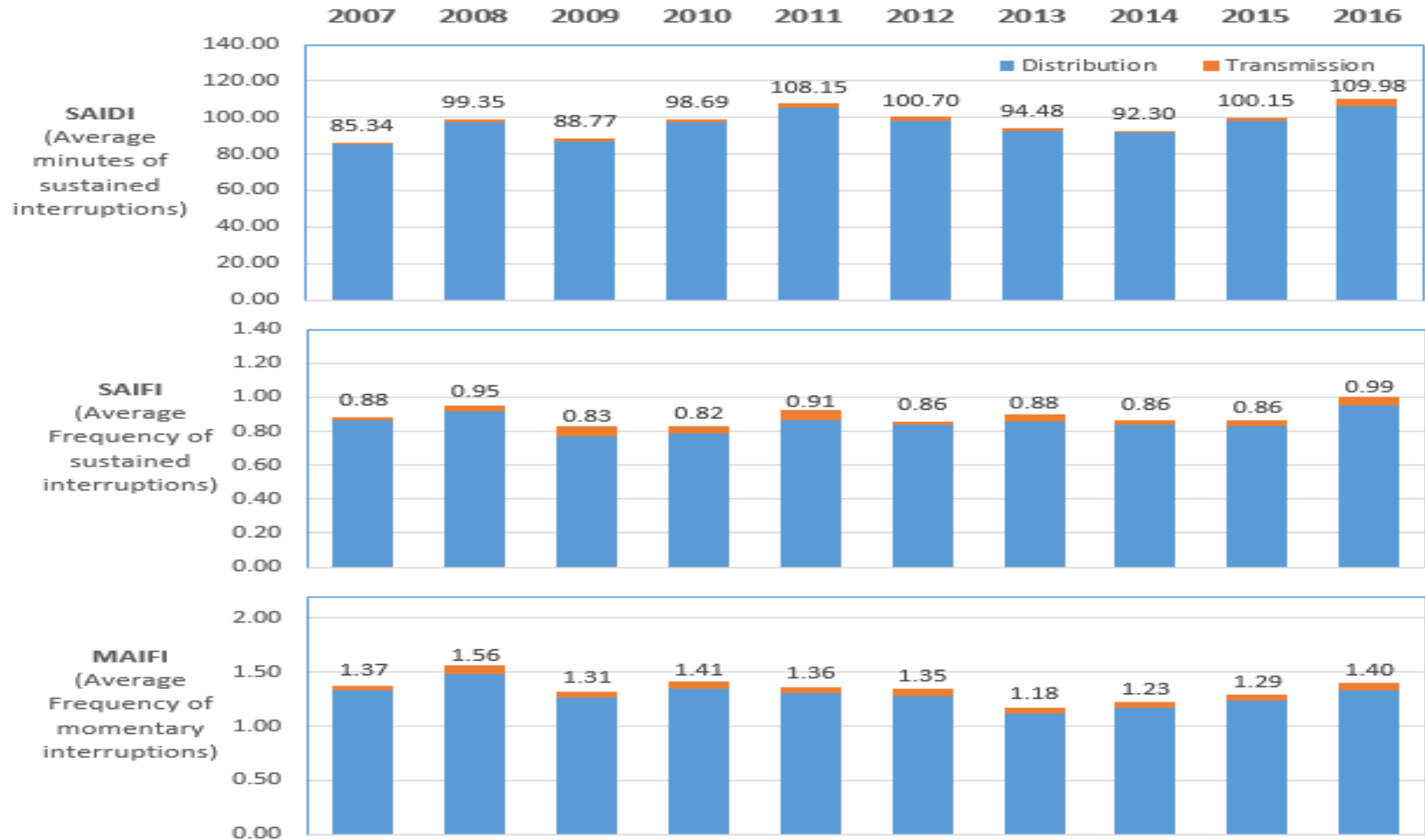
The average time required to restore service after an outage each year.

- Overview of SCE
- Reliability definition and measurement

## SCE's 2016 Reliability performance

- How to obtain local reliability report?
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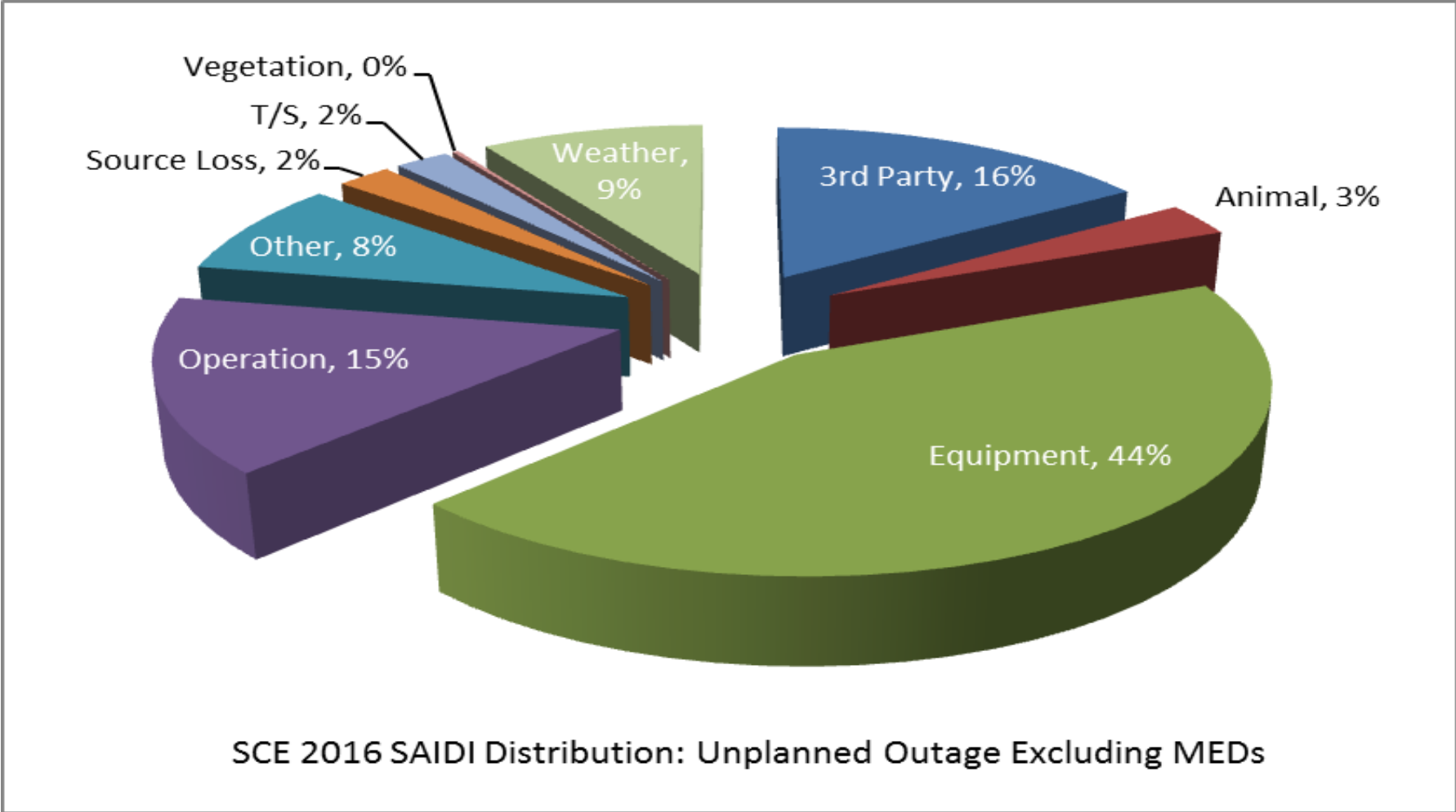
# 2007- 2016 System Reliability History (Excluding MED<sup>1</sup>) – Unplanned



<sup>1</sup>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.



# 2016 Outage Causes



# Worst 1% of Circuits by System SAIDI

The list below captures the 1% worst performing circuits (WPC) by SAIDI. The following are the total number of circuits and the associated district and cities.

1% Worst Performing Circuits by System SAIDI		
District	Cities	Count of Circuit(s)
ANTELOPE VALLEY	LANCASTER	1
ARROWHEAD	SAN BERNARDINO County - DISTRICT 1 &2	1
COVINA	INDUSTRY, LA PUENTE, WEST COVINA	1
FOOTHILL	FONTANA, RIALTO, ORANGE	2
HUNTINGTON BEACH	COSTA MESA, HUNTINGTON BEACH, NEWPORT BEACH, SEAL BEACH	4
KERNVILLE	KERN County - DISTRICT 1, TULARE County - DISTRICT 5	2
LONG BEACH	LONG BEACH	2
MENIFEE	LAKE ELSINORE, PERRIS, MORENO VALLEY	2
MONTEBELLO	ALHAMBRA, SAN MARINO, SOUTH PASADENA, PASADENA, EL MONTE, INDUSTRY, SOUTH EL MONTE, MONTEREY PARK, ROSEMEAD, SAN GABRIEL	4
REDLANDS	HIGHLAND, SAN BERNARDINO, SAN BERNARDINO County - DISTRICT 3	2
RIDGECREST	INYO County - DISTRICT 5	1
SADDLEBACK	IRVINE	1
SANTA ANA	SANTA ANA	1
SANTA BARBARA	SANTA BARBARA	1
SANTA MONICA	Marina del Rey	1
SOUTH BAY	PALOS VERDES ESTATES, RANCHO PALOS VERDES, ROLLING HILLS ESTATES, HERMOSA BEACH, REDONDO BEACH, TORRANCE, EL SEGUNDO, GARDENA, HAWTHORNE, INGLEWOOD, LAWNDALE, INGLEWOOD, LOS ANGELES County - DISTRICT 2	12
THOUSAND OAKS	MALIBU, THOUSAND OAKS	2
VENTURA	OXNARD, PORT HUENEME	1
VICTORVILLE	SAN BERNARDINO County - DISTRICT 1	1
WHITTIER	DOWNEY, PICO RIVERA, SANTA FE SPRINGS	1
YUCCA VALLEY	SAN BERNARDINO County - DISTRICT 3, TWENTYNINE PALMS, YUCCA VALLEY	3
Total		46

# Worst 1 % of Circuits by System SAIFI

The list below captures the 1% worst performing circuits (WPC) by SAIFI. The following are the total number of circuits and the associated district and cities.

1% Worst Performing Circuits by System SAIFI		
District	Cities	Count of Circuit(s)
ARROWHEAD	SAN BERNARDINO County - DISTRICT 1 &2	1
DOMINGUEZ HILLS	COMMERCE, MONTEBELLO, CUDAHY, HUNTINGTON PARK, LYNWOOD, SOUTH GATE	2
HUNTINGTON BEACH	COSTA MESA, HUNTINGTON BEACH, NEWPORT BEACH, FOUNTAIN VALLEY, WESTMINSTER	5
LONG BEACH	ARTESIA, CERRITOS, NORWALK, LONG BEACH, SIGNAL HILL	3
MONTEBELLO	ALHAMBRA, SAN MARINO, SOUTH PASADENA, PASADENA, EL MONTE, INDUSTRY, SOUTH EL MONTE, MONTEBELLO, MONTEREY PARK	4
REDLANDS	HIGHLAND, SAN BERNARDINO	1
SADDLEBACK	LAGUNA BEACH, LAGUNA HILLS, LAGUNA WOODS, IRVINE	3
SANTA ANA	SANTA ANA	1
SANTA BARBARA	SANTA BARBARA	3
SANTA MONICA	Marina del Rey, SANTA MONICA	2
SOUTH BAY	PALOS VERDES ESTATES, RANCHO PALOS VERDES, ROLLING HILLS ESTATES, HERMOSA BEACH, REDONDO BEACH, TORRANCE, EL SEGUNDO, GARDENA, HAWTHORNE, LAWNSDALE, INGLEWOOD, LOMITA,	10
THOUSAND OAKS	AGOORA HILLS, MALIBU, SIMI VALLEY	4
VENTURA	CAMARILLO, OXNARD, PORT HUENEME, VENTURA	4
VICTORVILLE	SAN BERNARDINO County - DISTRICT 1	1
YUCCA VALLEY	SAN BERNARDINO County - DISTRICT 3, YUCCA VALLEY	2
Total		46

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# How can I get reliability information?

## City Reliability Reports

- 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

# City Overview and Reliability Metrics

- 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

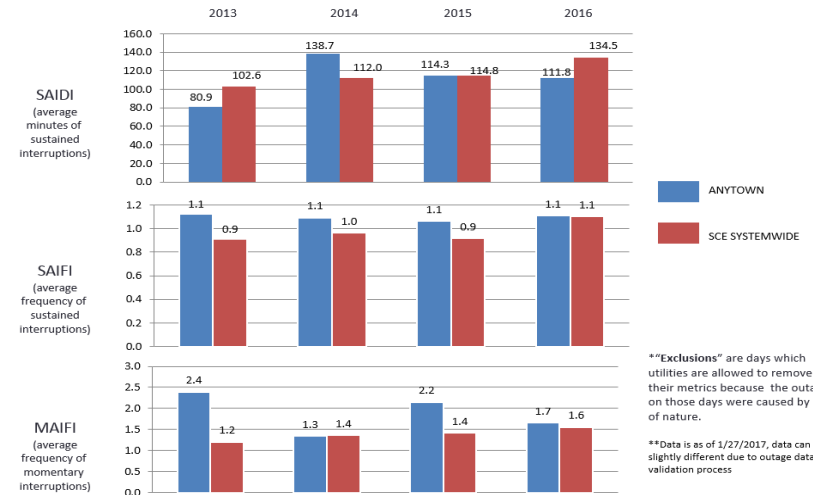
## Overview of Anytown There are 20 circuits that serve Anytown

Circuit Type	Sum of Customers	Circuit Type	Sum of Customers	Circuit Type	Sum of Customers
BOOK(33KV)	2				
BURRITO(12KV)	1,486				
BUSINESS(4.16KV)	130				
COLOR(4.16KV)	379				
EXPRESS(33KV)	1				
FRITO(33KV)	1				
HIGH(4.16KV)	414				
HUEVOS(12KV)	2,457				
JUDY(12KV)	923				
LAUTERBACH(4.16KV)	297				
MAUEL(12KV)	1,168				
MONTARA(33KV)	1				
PATIO(12KV)	565				
PESO(12KV)	1,803				
POCO(33KV)	18				
POLICE(12KV)	959				
POOL(4.16KV)	381				
REMOTE(33KV)	34				
TAMALE(12KV)	672				
TURKEY(12KV)	936				

**Grand Total** 12,627

Southern California Edison

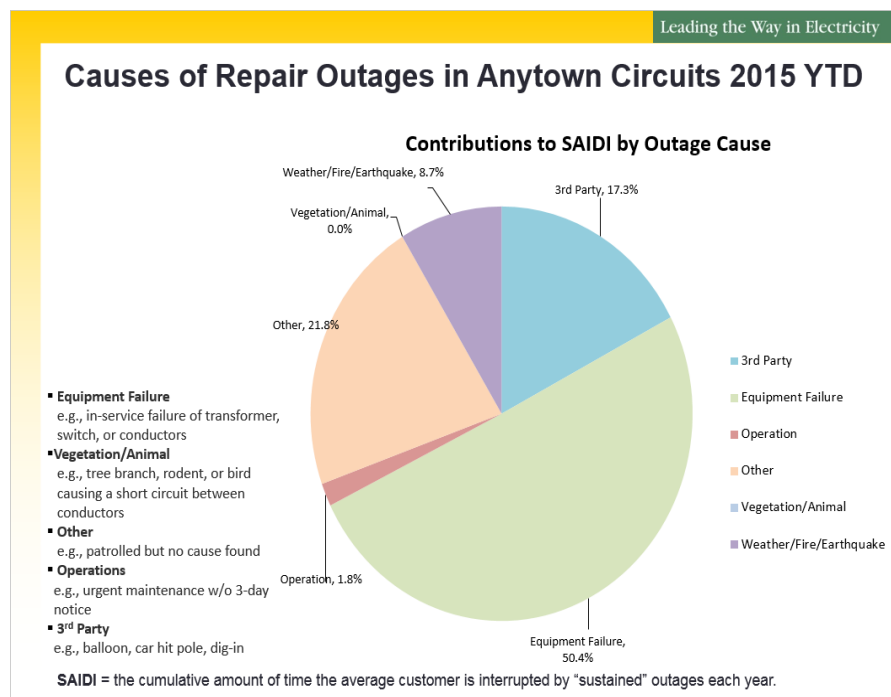
## Reliability History of Circuits Serving Anytown (No Exclusions)



# Outage Causes

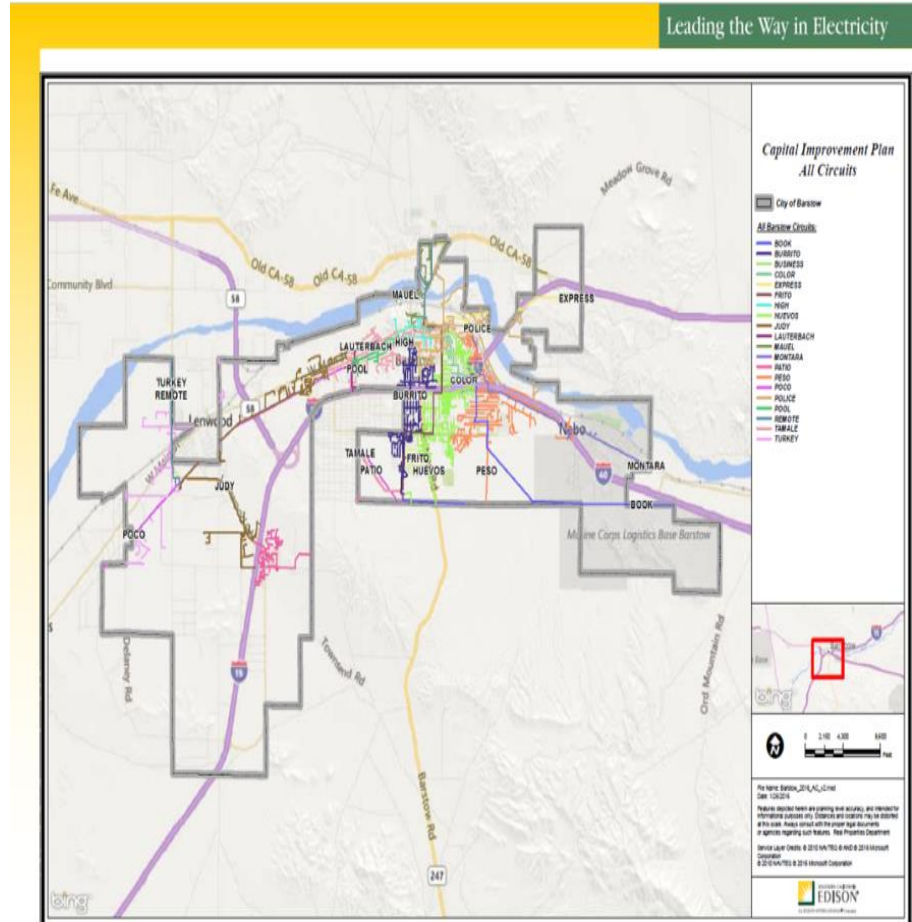
- Each report will provide the % contribution by SAIDI & SAIFI based on the outage cause categories

- 3<sup>rd</sup> Party
- Equipment Failure
- Operation
- Other
- Vegetation/Animal
- Weather/Fire/Earthquake



# Capital Improvement Work

- The report provides a map of all the circuits that serve that city
- The map will also highlight capital improvement work being performed on the circuits (includes Transmission work, if applicable).
  - Pole Replacement
  - Circuit Rebuild
  - Electrical Equipment Replacement
  - Etc.





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How is SCE working on improving Reliability

# 2016 Capital Investment

21K Distribution poles replaced

4K Transmission poles replaced

520 Conductor miles  
205 New Circuit miles

200 Underground structure  
replacements



# What is SCE doing to improve reliability?

- Keeping the Grid Reliable
  - We have a long term plan to upgrade and modernize the grid
  - Projects in progress for Kern County, Los Angeles County, Riverside County, San Bernardino County, Santa Barbara County and Ventura County
  - **Home > About Us > Reliability > Projects in Progress**
- Prevention
  - Preventive maintenance
  - Predictive maintenance
- Outage response
  - 1st responder
  - Restoration
- Impact to customers

# Questions?

Contact

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