



# Circuit Reliability Review City of Manhattan Beach

March 2014

# 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 South Bay District

EL SEGUNDO  
GARDENA  
HAWTHORNE  
HERMOSA BEACH  
INGLEWOOD  
LAWNDALE  
LOMITA  
**MANHATTAN BEACH**  
PALOS VERDES  
RANCHO PALOS VERDES  
REDONDO BEACH  
ROLLING HILLS  
ROLLING HILLS ESTATES  
TORRANCE

# Reliability by District

District Name	2008			2009			2010			2011			2012			2013								
	District SAIDI	District SAIFI	District SAIFI Ranking	District SAIDI	District SAIFI	District SAIFI Ranking	District SAIDI	District SAIFI	District SAIFI Ranking	District SAIDI	District SAIFI	District SAIFI Ranking	District SAIDI	District SAIFI	District SAIFI Ranking	District SAIDI	District SAIFI	District SAIFI Ranking						
ANTELOPE VALLEY	92.18	22	0.96	20	71.23	29	0.52	33	131.05	17	0.77	31	208.16	11	1.25	13	78.60	28	0.56	31	94.42	22	0.62	31
ARROWHEAD	1239.36	1	5.43	2	534.08	2	3.41	1	537.40	4	3.84	2	792.79	3	4.40	1	129.58	13	1.31	7	180.59	7	1.39	8
BARSTOW	403.16	7	2.36	8	153.49	10	1.14	14	123.02	23	1.51	11	308.76	8	1.63	8	184.80	7	1.15	12	204.33	6	1.40	7
BIG CREEK	104.92	17	2.50	7	259.27	3	1.44	8	5700.99	1	12.89	1	1667.05	2	4.22	2	1184.25	1	4.52	1	176.51	8	3.08	1
BISHOP	265.07	8	1.09	17	143.55	12	1.36	9	407.92	6	2.50	5	666.06	5	1.55	10	463.09	2	1.25	9	104.44	17	0.51	35
BLYTHE	454.70	6	3.09	4	83.88	25	0.82	21	1332.78	2	2.03	6	378.39	7	1.40	11	275.88	6	1.53	3	483.13	1	1.38	9
CATALINA	29.73	35	1.36	13	98.59	19	2.54	21	67.23	35	1.55	10	65.03	34	3.45	3	78.46	30	0.72	29	105.94	16	2.97	2
COVINA	84.55	28	0.64	32	78.04	27	0.68	26	117.66	26	0.81	28	166.97	15	0.87	24	108.73	19	0.92	19	100.51	19	0.86	20
DOMINGUEZ HILLS	81.30	30	0.70	28	89.81	22	0.68	27	119.23	24	0.78	30	109.41	23	0.72	31	117.22	18	0.82	24	89.17	26	0.80	21
FOOTHILL	85.54	27	0.64	33	94.33	21	0.62	30	76.60	33	0.46	35	117.40	22	0.96	21	91.69	25	0.90	20	85.80	27	0.79	24
FULLERTON	91.89	23	0.78	26	62.35	31	0.46	34	135.22	16	1.19	15	90.11	30	0.61	32	68.99	33	0.42	35	90.57	25	0.79	22
HUNTINGTON BEACH	84.50	29	0.78	27	109.42	14	1.04	16	129.50	18	1.02	21	122.54	20	0.96	20	95.78	23	0.89	21	66.51	32	0.68	29
KERNVILLE	590.92	2	3.90	3	585.93	1	2.01	4	584.74	3	1.80	7	165.69	16	1.02	18	226.76	5	1.31	6	232.18	4	1.96	3
LONG BEACH	52.54	34	0.44	35	41.50	35	0.42	35	72.28	34	0.63	34	58.48	35	0.58	34	75.83	31	0.55	33	75.11	30	0.70	28
MENIFEE	111.19	15	1.57	9	106.45	16	1.81	5	100.65	29	0.76	32	100.48	27	0.89	22	99.32	22	0.84	23	107.39	15	1.76	10
MONROVIA	103.79	18	0.85	23	219.77	4	0.87	20	124.34	21	1.08	18	2414.04	1	1.89	6	108.11	20	1.13	15	99.12	20	1.02	16
MONTBELLO	90.36	24	0.69	29	192.33	5	1.19	11	147.85	14	1.12	17	678.33	4	1.21	15	131.06	12	1.13	14	118.08	13	1.17	12
ONTARIO	99.04	21	0.79	25	88.19	23	0.75	23	90.45	32	0.81	26	117.66	21	0.82	26	93.09	24	0.87	22	77.39	29	0.79	23
PALM SPRINGS	170.54	9	1.51	10	151.66	11	1.11	15	180.69	11	1.04	20	164.77	17	0.89	23	175.92	8	1.27	8	112.80	14	0.77	25
REDLANDS	103.67	19	0.91	22	107.20	15	0.90	19	216.76	8	1.69	9	253.70	9	1.63	9	120.13	16	1.11	16	96.48	21	1.04	15
RIDGECREST	167.19	10	1.42	11	58.34	34	0.68	25	153.38	12	1.41	12	89.26	31	0.74	30	229.65	4	1.44	4	161.95	9	1.12	13
SADDLEBACK	89.74	25	0.93	21	78.99	26	0.70	24	137.24	15	0.96	24	75.94	33	0.55	35	83.01	27	0.73	27	70.69	31	0.53	34
SAN JOAQUIN	102.29	20	1.01	19	96.59	20	0.91	18	126.68	20	1.04	19	83.99	32	0.74	29	135.90	10	1.04	18	244.44	2	1.45	6
SANTA ANA	77.54	31	0.68	30	67.83	30	0.60	31	104.57	27	0.81	27	102.01	26	0.82	27	78.60	29	0.55	32	93.35	24	0.74	26
SANTA BARBARA	535.53	4	6.31	1	178.87	7	1.80	6	151.19	13	1.01	22	104.82	25	0.87	25	153.81	9	1.15	13	82.00	28	0.70	27
SANTA MONICA	60.49	33	0.80	24	86.23	24	0.65	28	98.32	30	0.89	25	95.08	29	0.58	33	101.69	21	0.79	25	122.78	12	1.00	17
SOUTH BAY	110.98	16	1.07	18	158.30	9	1.16	13	190.92	9	1.21	14	178.72	13	1.35	12	122.68	15	1.17	10	142.15	10	1.49	5
TEHACHAPI	538.56	3	3.01	5	168.04	8	2.01	3	434.02	5	3.23	3	231.23	10	1.81	7	117.96	17	1.43	5	232.67	3	1.12	14
THOUSAND OAKS	129.11	14	1.42	12	103.16	17	0.99	17	124.26	22	1.37	13	146.69	18	1.34	16	127.73	14	1.05	17	93.86	23	0.91	18
VALENCIA	154.45	11	1.28	15	101.70	18	0.81	22	117.82	25	0.81	29	130.85	19	1.04	17	62.01	35	0.46	34	50.94	34	0.53	33
VENTURA	134.88	13	1.33	14	112.42	13	1.29	10	182.74	10	1.72	8	167.85	14	2.25	4	134.81	11	1.15	11	100.52	18	1.21	11
VICTORVILLE	136.46	12	1.25	16	61.93	32	0.64	29	96.45	31	1.01	23	196.85	12	1.01	19	67.70	34	0.66	30	61.33	33	0.63	30
WHITTIER	85.70	26	0.64	31	74.92	28	0.53	32	101.33	28	0.70	33	99.74	28	0.75	28	72.60	32	0.74	26	135.04	11	0.86	19
WILDOMAR	65.20	32	0.61	34	59.71	33	1.48	7	127.12	19	1.12	16	109.41	24	1.22	14	88.54	26	0.72	28	40.51	35	0.56	32
YUCCA VALLEY	465.37	5	2.79	6	192.28	6	1.16	12	307.67	7	3.02	4	436.44	6	2.16	5	319.82	3	3.41	2	216.97	5	1.50	4
SCE SystemWide	118.91		1.06		105.80		0.90		140.91		1.05		252.39		1.04		108.13		0.89		102.61		0.91	

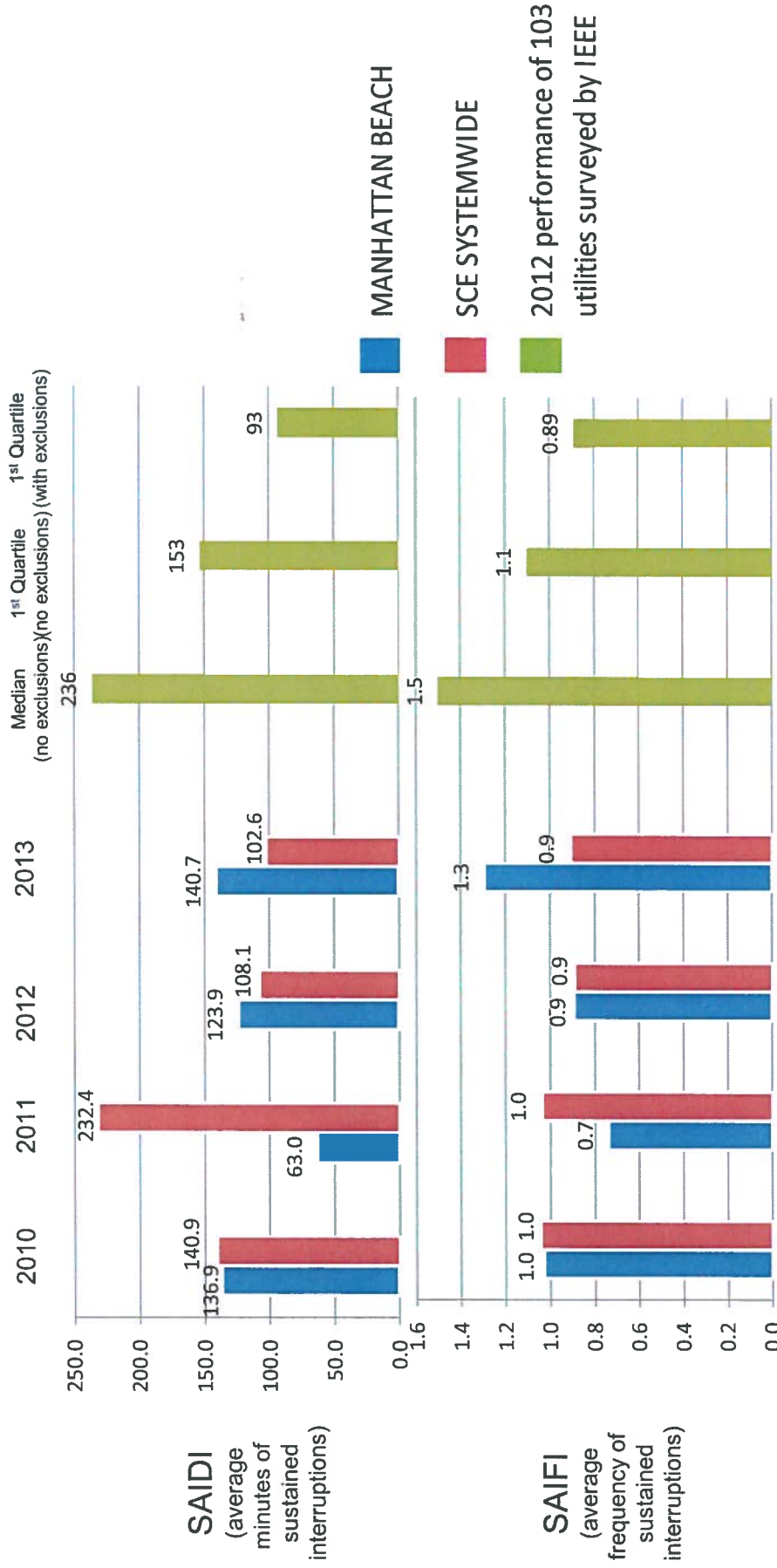
\*\*In the columns showing "Rank," lower numbers indicate poorer performance.

# Overview of Manhattan Beach

There are 21 circuits that serve the City of Manhattan Beach

Circuit Type	Sum of Customers
BARRACUDA(16kV)	286
KATHLEEN(16kV)	654
PENGUIN(16kV)	183
SALMON(16kV)	2,246
GRIZZLEY(16kV)	2,572
CLEO(4kV)	1,038
CYLINDER(16kV)	1,546
LARSON(4kV)	557
NO BEACH(4kV)	781
OZONE(4kV)	530
SO STRAND(4kV)	615
BLANCHE(4kV)	913
BORDEN(4kV)	726
GULL(4kV)	668
HARKNESS(4kV)	830
HILL(4kV)	764
KEATS(4kV)	342
MEADOWS(4kV)	786
PISTON(16kV)	4,032
SANDPIPER(4kV)	968
VALVE(16kV)	3,125
Grand Total	24,162

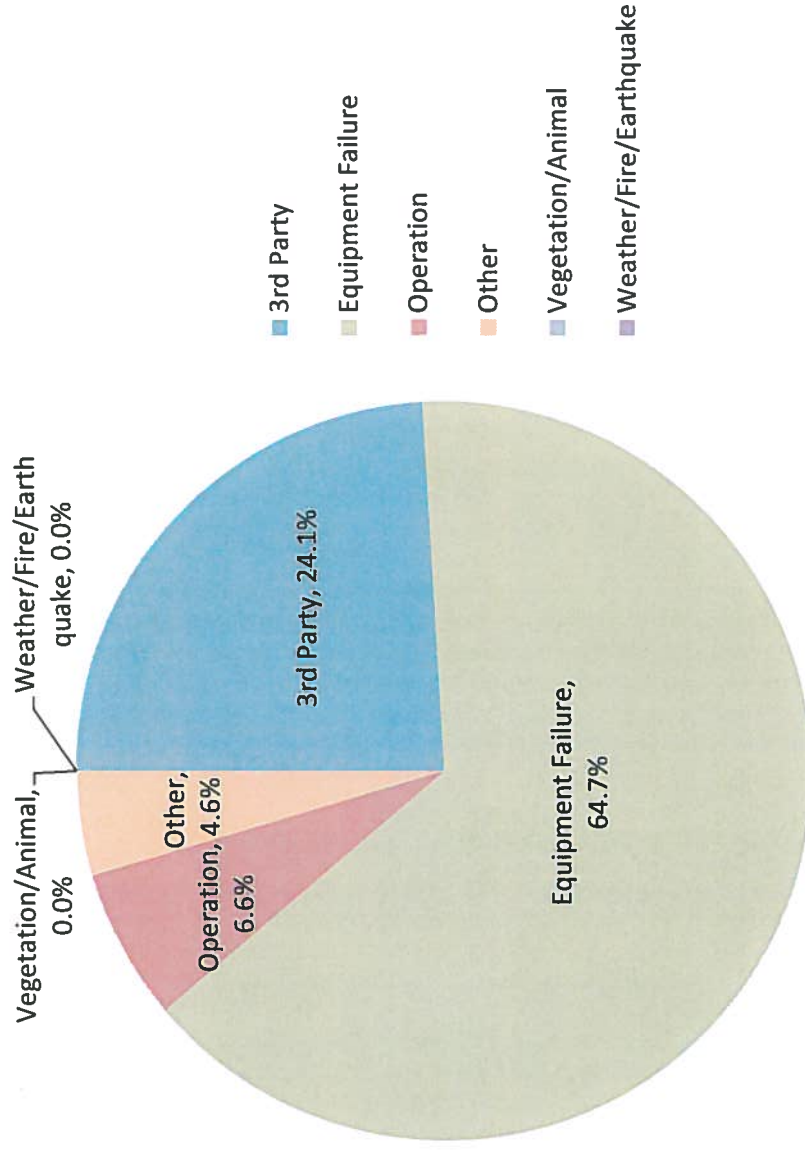
# Reliability History of Circuits Serving Manhattan Beach (No Exclusions)



# Causes of Unplanned Outages in Manhattan Beach Circuits 2013

- **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

Contributions to SAIDI by Outage Cause

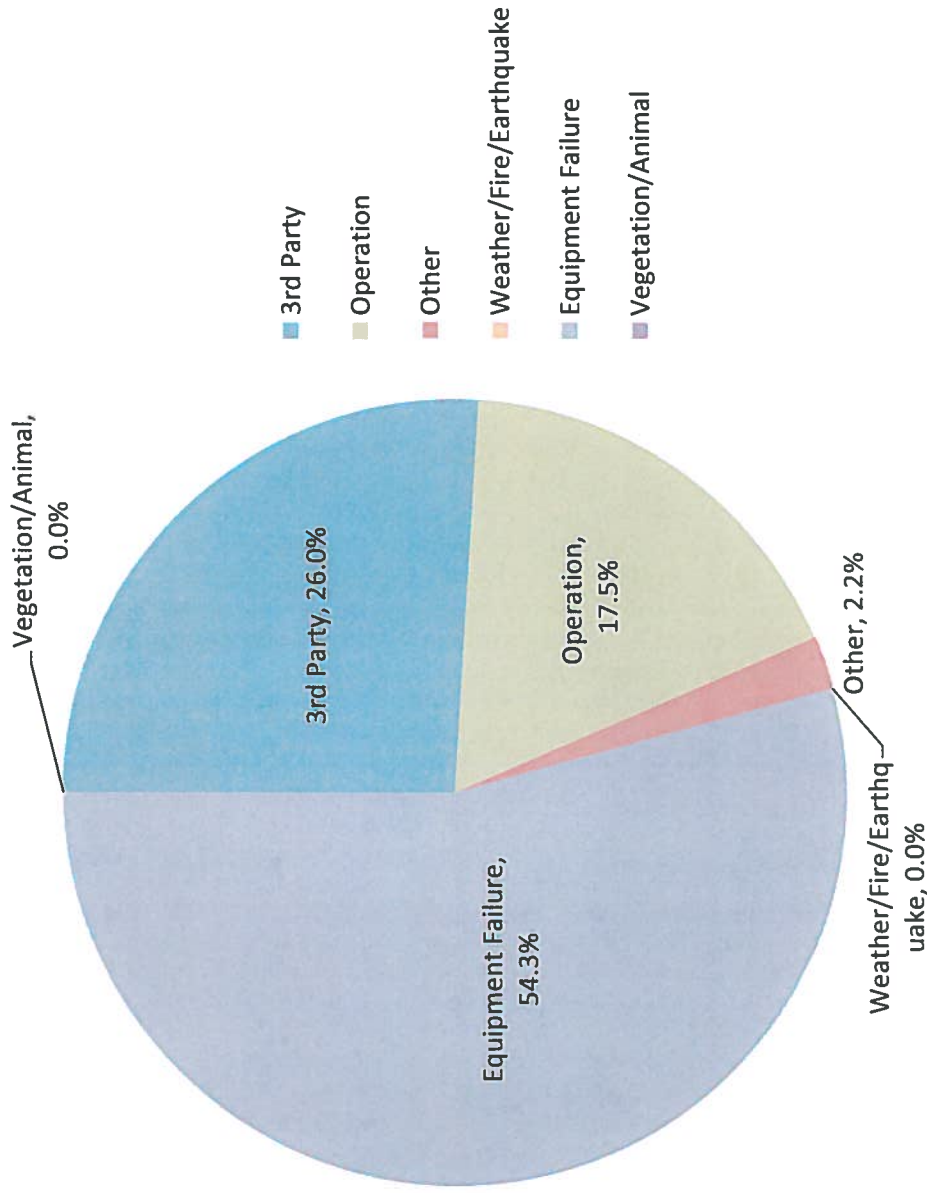


**SAIDI** = the cumulative amount of time the average customer is interrupted by “sustained” outages each year.

# Causes of Unplanned Outages in Manhattan Beach Circuits

2013

Contributions to SAIFI by Outage Cause



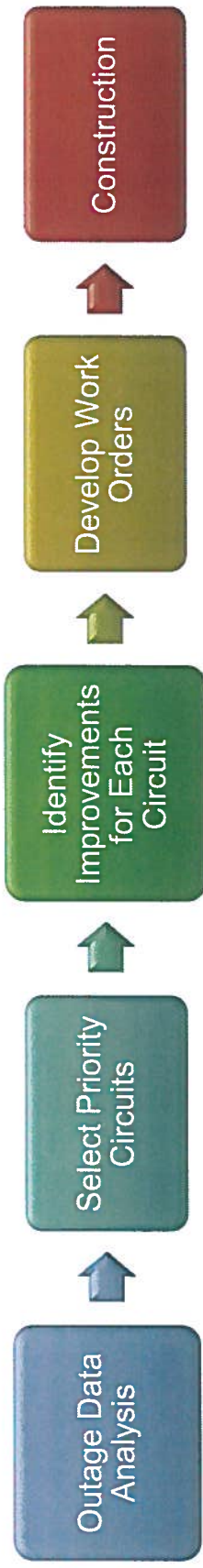
- **Equipment Failure**  
e.g., in-service failure of transformer, switch, or conductors
- **Vegetation/Animal**  
e.g., tree branch, rodent, or bird causing a short circuit between conductors
- **Other**  
e.g., patrolled but no cause found
- **Operations**  
e.g., urgent maintenance w/o 3-day notice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



# Circuit Reliability Management

To perform circuit rehabilitation in 2014, the process started in 2012



2012: Review circuit outage records for 2009 – 2011.

**Note:** The significant volatility in circuit performance requires evaluation of performance over a long period of time to ensure the targeting of "actual" versus "apparent" problem circuits.

2012: Identify candidate Priority circuits based on outage statistics.

Refine list of circuits based on field personnel input, e.g., engineering, operations, public affairs.

2012: For each targeted circuit, identify improvements and/or replacements which would cost-effectively improve future reliability based on past outage causes and locations, equipment age, and circuit design.

Work may include equipment replacement, installation of isolation devices, and provisions for providing alternate sources of power

2013: Survey the job sites, develop the construction Work Orders, obtain easements, & identify needed permits.

2014: Project construction.

**Circuit rehabilitation:**

**is systematic and objective  
focuses on performance trends  
requires extensive planning**

# Back-up Slides

## Reliability Histories of Circuits Serving Manhattan Beach

## Average Reliability of 21 Circuits Serving Manhattan Beach

	2010		2011		2012		1st Qtr 2013		2nd Qtr 2013		3rd Qtr 2013		4th Qtr 2013		2013										
	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI							
<b>MANHATTAN BEACH</b>	<b>136.9</b>	<b>1.0</b>	<b>1.3</b>	<b>63.0</b>	<b>0.7</b>	<b>0.7</b>	<b>123.9</b>	<b>0.9</b>	<b>1.6</b>	<b>8.8</b>	<b>0.1</b>	<b>0.1</b>	<b>90.2</b>	<b>0.5</b>	<b>0.4</b>	<b>24.1</b>	<b>0.3</b>	<b>0.8</b>	<b>16.9</b>	<b>0.4</b>	<b>0.2</b>	<b>140.7</b>	<b>1.3</b>	<b>1.5</b>	
3rd Party	11%	13%	31%	7%	7%	19%	10%	3%	19%	19%	24%	70%	27%	29%	17%	31%	53%	30%	0%	0%	0%	24%	26%	26%	
Operation	21%	33%	2%	38%	35%	6%	9%	26%	1%	1%	1%	0%	1%	1%	0%	1%	0%	0%	46%	64%	28%	7%	18%	4%	
Other	1%	4%	19%	17%	10%	21%	0%	0%	5%	0%	0%	20%	7%	5%	26%	0%	0%	44%	0%	0%	0%	5%	2%	31%	
Weather/Fire/Earthquake	35%	19%	13%	0%	0%	17%	7%	17%	52%	0%	0%	0%	0%	0%	9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Equipment Failure	33%	30%	22%	35%	26%	15%	72%	44%	21%	80%	75%	10%	64%	65%	49%	67%	47%	26%	54%	36%	72%	65%	54%	36%	
Vegetation/Animal	0%	0%	14%	2%	22%	21%	3%	11%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
<b>SCE Systemwide</b>	<b>140.9</b>	<b>1.0</b>	<b>1.7</b>	<b>232.4</b>	<b>1.0</b>	<b>1.5</b>	<b>108.1</b>	<b>0.9</b>	<b>1.4</b>	<b>19.7</b>	<b>0.2</b>	<b>0.3</b>	<b>25.6</b>	<b>0.2</b>	<b>0.3</b>	<b>34.0</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>23.3</b>	<b>0.2</b>	<b>0.3</b>	<b>102.6</b>	<b>0.9</b>	<b>1.2</b>

**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.

## Reliability Histories for Individual Circuits Serving Manhattan Beach

	2010		2011		2012		1st Qtr 2013		2nd Qtr 2013		3rd Qtr 2013		4th Qtr 2013		2013			
	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI
<b>BARRACUDA(16KV) - Customers: 286</b>	0.0	0.0	0.0	0.0	1.8	0%	0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.2	0.9	0.0
3rd Party						0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure						0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operation						50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other						50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal						0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake						0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>BLANCHE(4KV) - Customers: 913</b>	180.0	1.2	2.1	40.8	0.1	0.0	11.3	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	49.3	0.2	3.9
3rd Party	0%	0%	51%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	26%
Equipment Failure	9%	4%	0%	69%	73%	100%	100%	100%	39%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operation	45%	90%	0%	31%	27%	0%	0%	0%	0%	100%	100%	48%	100%	100%	100%	100%	100%	48%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	26%
Weather/Fire/Earthquake	46%	6%	49%	0%	0%	0%	0%	0%	61%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>BORDEN(4KV) - Customers: 726</b>	20.9	0.0	3.1	6.3	0.0	0.0	45.4	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	1.2
3rd Party	100%	100%	66%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%
Equipment Failure	0%	0%	0%	100%	100%	11%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operation	0%	0%	0%	0%	0%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	34%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	0%	0%	0%	84%	97%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>CLEO(4KV) - Customers: 1,038</b>	1.1	0.0	1.0	36.8	0.1	0.0	191.7	0.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0
3rd Party	0%	0%	0%	0%	0%	0%	93%	97%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	0%	0%	0%	19%	40%	0%	7%	3%	0%	100%	100%	0%	0%	0%	0%	0%	0%	0%
Operation	100%	100%	0%	8%	12%	86%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	100%	73%	48%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

## Reliability Histories for Individual Circuits Serving Manhattan Beach

	2010		2011		2012		1st Qtr 2013		2nd Qtr 2013		3rd Qtr 2013		4th Qtr 2013		2013			
	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI
<b>CYLINDER(16KV) - Customers: 1,546</b>	<b>85.1</b>	<b>0.7</b>	<b>1.2</b>	<b>38.3</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.9</b>	<b>2.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.9</b>
3rd Party	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	2%	0%	0%	0%	0%	71%	4%						0%	100%	100%	100%	100%	0%
Operation	1%	0%	0%	17%	18%	29%	96%						0%	0%	0%	0%	0%	0%
Other	28%	94%	100%	83%	82%	0%	0%					100%	0%	0%	0%	0%	0%	100%
Vegetation/Animal	0%	0%	0%	0%	0%	0%	0%					0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	70%	6%	0%	0%	0%	0%	0%					0%	0%	0%	0%	0%	0%	0%
<b>GRIZZLEY(16KV) - Customers: 2,572</b>	<b>439.1</b>	<b>4.6</b>	<b>2.9</b>	<b>62.7</b>	<b>0.1</b>	<b>0.0</b>	<b>286.6</b>	<b>2.1</b>	<b>3.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>103.2</b>	<b>1.1</b>	<b>1.1</b>	<b>103.2</b>	<b>1.0</b>	<b>0.9</b>
3rd Party	32%	28%	12%	0%	0%	14%	4%	56%				0%	0%	0%	0%	0%	0%	0%
Equipment Failure	35%	36%	31%	57%	26%	85%	96%	44%				100%	100%	100%	100%	100%	100%	100%
Operation	0%	0%	0%	43%	74%	0%	0%	0%				0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%				0%	0%	83%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	0%	0%	0%	0%	0%	0%				0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	33%	36%	56%	0%	0%	0%	0%	0%				0%	0%	0%	0%	0%	0%	0%
<b>GULL(4KV) - Customers: 668</b>	<b>2.2</b>	<b>0.0</b>	<b>2.0</b>	<b>0.0</b>	<b>0.0</b>	<b>5.2</b>	<b>3.8</b>	<b>0.0</b>	<b>4.2</b>	<b>0.0</b>	<b>1.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.0</b>
3rd Party	0%	0%	50%		20%	0%	0%	0%				0%	0%	0%	0%	0%	0%	50%
Equipment Failure	100%	100%	50%		0%	100%	100%	25%				0%	38%	49%	0%	0%	0%	0%
Operation	0%	0%	0%		0%	0%	0%	0%				0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%		80%	0%	0%	0%				100%	62%	51%	0%	0%	0%	50%
Vegetation/Animal	0%	0%	0%		0%	0%	0%	0%				0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%		0%	0%	75%	0%				0%	0%	0%	0%	0%	0%	0%
<b>HARKNESS(4KV) - Customers: 830</b>	<b>44.9</b>	<b>0.1</b>	<b>0.0</b>	<b>2.0</b>	<b>0.0</b>	<b>1.0</b>	<b>3.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>5.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
3rd Party	0%	0%		0%	0%	100%	0%	0%				0%	0%	0%	0%	0%	0%	0%
Equipment Failure	93%	88%		0%	0%	0%	0%	0%				100%	100%					100%
Operation	0%	0%		100%	100%	0%	100%	100%				0%	0%					0%
Other	0%	0%		0%	0%	0%	0%	0%				0%	0%					0%
Vegetation/Animal	0%	0%		0%	0%	0%	0%	0%				0%	0%					0%
Weather/Fire/Earthquake	7%	12%		0%	0%	0%	0%	0%				0%	0%					0%

## Reliability Histories for Individual Circuits Serving Manhattan Beach

	2010		2011		2012		1st Qtr 2013		2nd Qtr 2013		3rd Qtr 2013		4th Qtr 2013		2013			
	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI
<b>HILL(4KV) - Customers: 764</b>	<b>7.8</b>	<b>0.0</b>	<b>1.0</b>	<b>107.3</b>	<b>2.3</b>	<b>1.1</b>	<b>37.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>1.0</b>
3rd Party	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	17%	39%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operation	83%	61%	0%	5%	1%	0%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	88%	49%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%
Vegetation/Animal	0%	0%	100%	7%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>KATHLEEN(16KV) - Customers: 654</b>	<b>77.2</b>	<b>1.2</b>	<b>1.0</b>	<b>160.1</b>	<b>1.1</b>	<b>0.0</b>	<b>65.0</b>	<b>1.1</b>	<b>4.3</b>	<b>62.3</b>	<b>1.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>115.2</b>	<b>1.0</b>	<b>0.0</b>
3rd Party	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	41%	2%	0%	4%	4%	0%	41%	5%	0%	0%	0%	100%	100%	0%	0%	0%	0%	0%
Operation	59%	98%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%
Other	0%	0%	0%	95%	95%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	100%	0%	0%	0%	58%	95%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>KEATS(4KV) - Customers: 342</b>	<b>142.9</b>	<b>2.1</b>	<b>6.0</b>	<b>90.7</b>	<b>1.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>23.2</b>	<b>0.1</b>	<b>1.0</b>
3rd Party	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	49%	52%	17%	93%	18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operation	51%	48%	0%	0%	0%	0%	100%	100%	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%
Other	0%	0%	50%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%
Vegetation/Animal	0%	0%	17%	7%	82%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	17%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>LARSON(4KV) - Customers: 557</b>	<b>448.7</b>	<b>2.1</b>	<b>2.0</b>	<b>261.7</b>	<b>3.2</b>	<b>0.0</b>	<b>5.8</b>	<b>0.0</b>	<b>1.0</b>	<b>486.3</b>	<b>1.0</b>	<b>0.0</b>	<b>0.0</b>	<b>60.1</b>	<b>0.3</b>	<b>0.0</b>	<b>544.7</b>	<b>1.3</b>
3rd Party	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	2%	1%	0%	56%	34%	0%	100%	100%	0%	100%	100%	0%	0%	100%	100%	0%	0%	0%
Operation	17%	50%	51%	42%	33%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	49%	3%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	81%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

## Reliability Histories for Individual Circuits Serving Manhattan Beach

	2010		2011		2012		1st Qtr 2013		2nd Qtr 2013		3rd Qtr 2013		4th Qtr 2013		2013				
	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	
<b>MEADOWS(4KV) - Customers: 786</b>	1.0	0.0	1.0	11.5	0.1	2.2	53.1	1.1	5.6	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	2.1	
3rd Party	0%	0%	100%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%
Equipment Failure	0%	0%	0%	35%	22%	0%	0%	0%	20%	100%	100%	0%	0%	0%	0%	0%	100%	100%	0%
Operation	100%	100%	0%	0%	0%	0%	7%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%
Weather/Fire/Earthquake	0%	0%	0%	65%	78%	100%	93%	98%	60%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>NO BEACH(4KV) - Customers: 781</b>	773.4	2.2	1.0	314.9	3.8	1.0	538.8	2.6	3.4	0.0	0.0	0.0	0.0	0.0	0.0	524.3	1.1	0.9	
3rd Party	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	17%	7%	0%	42%	28%	0%	86%	56%	0%	99%	96%	0%	0%	100%	100%	99%	96%	0%	0%
Operation	0%	0%	0%	55%	45%	100%	0%	0%	0%	1%	4%	0%	0%	0%	0%	1%	4%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	100%	2%	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	83%	93%	0%	0%	0%	0%	14%	44%	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
<b>OZONE(4KV) - Customers: 530</b>	11.5	0.0	1.1	10.8	1.2	2.3	4.3	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd Party	81%	69%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	19%	31%	0%	26%	1%	0%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	50%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	100%	74%	99%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
<b>PENGUIN(16KV) - Customers: 183</b>	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	0.0	654.7	2.0	1.0	
3rd Party																8%	52%	1%	
Equipment Failure										100%	100%	1%	0%	0%	0%	92%	48%	0%	
Operation										0%	0%	0%	0%	0%	0%	0%	0%	0%	
Other										0%	0%	0%	0%	0%	0%	0%	0%	0%	
Vegetation/Animal										0%	0%	0%	0%	0%	0%	0%	0%	99%	
Weather/Fire/Earthquake										0%	0%	0%	0%	0%	0%	0%	0%	0%	

## Reliability Histories for Individual Circuits Serving Manhattan Beach

	2010		2011		2012		1st Qtr 2013		2nd Qtr 2013		3rd Qtr 2013		4th Qtr 2013		2013						
	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI			
<b>PISTON(16KV) - Customers: 4,032</b>	<b>310.7</b>	<b>2.6</b>	<b>1.9</b>	<b>80.2</b>	<b>1.1</b>	<b>1.1</b>	<b>1.1</b>	<b>0.0</b>	<b>0.0</b>	<b>261.7</b>	<b>2.0</b>	<b>1.0</b>	<b>10.8</b>	<b>0.0</b>	<b>0.0</b>	<b>33.2</b>	<b>0.8</b>	<b>1.1</b>	<b>302.0</b>	<b>2.9</b>	<b>2.1</b>
3rd Party	10%	34%	0%	0%	0%	0%	0%	0%	0%	60%	49%	0%	100%	100%	0%	0%	0%	0%	54%	35%	0%
Equipment Failure	54%	47%	66%	7%	0%	36%	18%	29%	39%	50%	100%	0%	0%	0%	0%	46%	9%	81%	38%	38%	90%
Operation	36%	40%	0%	89%	98%	0%	82%	71%	1%	0%	0%	0%	0%	0%	54%	91%	19%	7%	7%	27%	10%
Other	0%	0%	0%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>SALMON(16KV) - Customers: 2,246</b>	<b>55.1</b>	<b>0.7</b>	<b>0.0</b>	<b>0.6</b>	<b>0.0</b>	<b>438.4</b>	<b>1.9</b>	<b>2.8</b>	<b>73.0</b>	<b>0.9</b>	<b>0.2</b>	<b>1.9</b>	<b>0.0</b>	<b>0.0</b>	<b>2.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>74.6</b>	<b>0.9</b>	<b>2.2</b>
3rd Party	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	46%
Equipment Failure	27%	4%	100%	100%	100%	88%	49%	8%	100%	100%	100%	100%	100%	100%	0%	0%	0%	100%	100%	100%	8%
Operation	73%	96%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	46%
Vegetation/Animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	11%	50%	92%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>SANDPIPER(4KV) - Customers: 968</b>	<b>6.6</b>	<b>0.0</b>	<b>1.0</b>	<b>15.6</b>	<b>0.1</b>	<b>179.7</b>	<b>1.1</b>	<b>4.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>0.0</b>	<b>0.0</b>	<b>2.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>34.6</b>	<b>0.1</b>	<b>2.9</b>
3rd Party	0%	0%	100%	7%	17%	0%	0%	0%	0%	0%	0%	0%	0%	0%	34%	0%	0%	0%	0%	0%	34%
Equipment Failure	0%	0%	0%	73%	59%	100%	100%	25%	0%	0%	0%	0%	100%	100%	32%	0%	0%	90%	92%	32%	32%
Operation	100%	100%	0%	20%	24%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	10%	8%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	34%	0%	0%	0%	0%	0%	34%
Vegetation/Animal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	0%	75%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>SO STRAND(4KV) - Customers: 615</b>	<b>0.0</b>	<b>0.0</b>	<b>1.0</b>	<b>256.4</b>	<b>3.1</b>	<b>48.5</b>	<b>0.1</b>	<b>0.0</b>	<b>9.6</b>	<b>0.0</b>	<b>0.0</b>	<b>2.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>21.5</b>	<b>0.1</b>	<b>0.0</b>	<b>33.7</b>	<b>0.1</b>	<b>0.0</b>
3rd Party	0%	0%	0%	68%	66%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Equipment Failure	0%	0%	0%	29%	1%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Operation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal	100%	100%	0%	3%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



## Reliability Histories for Individual Circuits Serving Manhattan Beach

	2010			2011			2012			1st Qtr 2013			2nd Qtr 2013			3rd Qtr 2013			4th Qtr 2013			2013					
	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI	SAIDI	SAIFI	MAIFI			
<b>VALVE(16KV) - Customers: 3,125</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>41.1</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.9</b>	<b>3.2</b>	<b>0.0</b>	<b>0.0</b>	<b>44.4</b>	<b>1.1</b>	<b>0.0</b>	<b>15.3</b>	<b>0.0</b>	<b>0.0</b>	<b>65.0</b>	<b>1.2</b>	<b>0.8</b>	
3rd Party				0%	0%	0%				100%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%	0%	0%	71%	96%	100%
Equipment Failure				72%	96%	100%				0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	24%	3%	0%	
Operation				28%	4%	0%				0%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	1%	0%
Other				0%	0%	0%				0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vegetation/Animal				0%	0%	0%				0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Weather/Fire/Earthquake				0%	0%	0%				0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%