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Provide a Document Summary that explains why this report is being filed with the Energy Division. This information is often contained in the cover letter, introduction, or executive summary, so you may want copy it from there and paste it here. This report has been prepared in response to CPUC Decision 16-01-008, which was approved January 20, 2016. Decision 16-01-008 established reliability recording, calculation, and reporting requirements for SDG&E.
E. Sender Contact Information
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***ELECTRIC SYSTEM RELIABILITY
ANNUAL REPORT 2016***

**Prepared for
California Public Utilities Commission
(Per Decision 16-01-008)**

July 17, 2017

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EXECUTIVE SUMMARY

Background:

The Electric System Reliability Annual Report for 2016 has been prepared in response to California Public Utility Commission (CPUC) Decision 16-01-008 (Decision). This Decision, which is effective January 14, 2016, established reliability recording, calculation, and reporting requirements for San Diego Gas & Electric (SDG&E).

The data in this report is primarily presented in tabular and graphical form. All statistics and calculations include unplanned transmission, substation, and distribution outages, and exclude planned outages and California Independent System Operator (CAISO) mandated load curtailment outages unless otherwise specified. Unplanned outages are those that are not prearranged. For the purposes of this report, sustained outages are outages that lasted more than five minutes in duration, while momentary outages are outages that lasted five minutes or less in duration.

2016 Reliability Indices

Overview:

SDG&E's 2016 SAIDI and SAIFI numbers were significantly higher than in the past 12 years, with the final indices values representing a 10% increase from 2015 values. The last time SDG&E experienced reliability indices as high as in 2016 was in 2004, and these results were mostly attributed to fires that were not excludable. The following is a high level summary of the major contributors to the increased number and duration of outages in 2016:

1st Quarter:

Outages attributed to El Niño related storms and to cable connector failures contributed approximately 5.0 additional SAIDI minutes compared to Q1 2015.

2nd Quarter:

An increased number of equipment failures contributed an additional 1.7 SAIDI minutes compared to Q2 2015.

3rd Quarter

An increase in the frequency of equipment failure related outages that were larger in nature and affected more customers, contributed an additional 3.0 SAIDI minutes compared to Q3 2015.

4th Quarter

An increase in the frequency of equipment related outages that were larger than normal, an increase in the number of winter weather related outages, and an outage caused by an aircraft contacting electrical equipment combined to contribute an additional 6.8 SAIDI minutes compared to Q4 2015.

Identified Mitigation/Efforts to Improve System Reliability

Similar to SDG&E identifying and implementing lessons learned from the outages in 2004 to help mitigate issues and to address reliability concerns on a going forward basis, so too has SDG&E reviewed the cause of the outages in 2016 to identify applicable next steps. SDG&E has identified and already begun implementing a two-pronged approach that it believes is the most efficient way to limit effects on customers during the types of unplanned outages that occurred in 2016. Both of these changes to the design and operation of the distribution system will enable quicker restoration to at least some of the impacted customers:

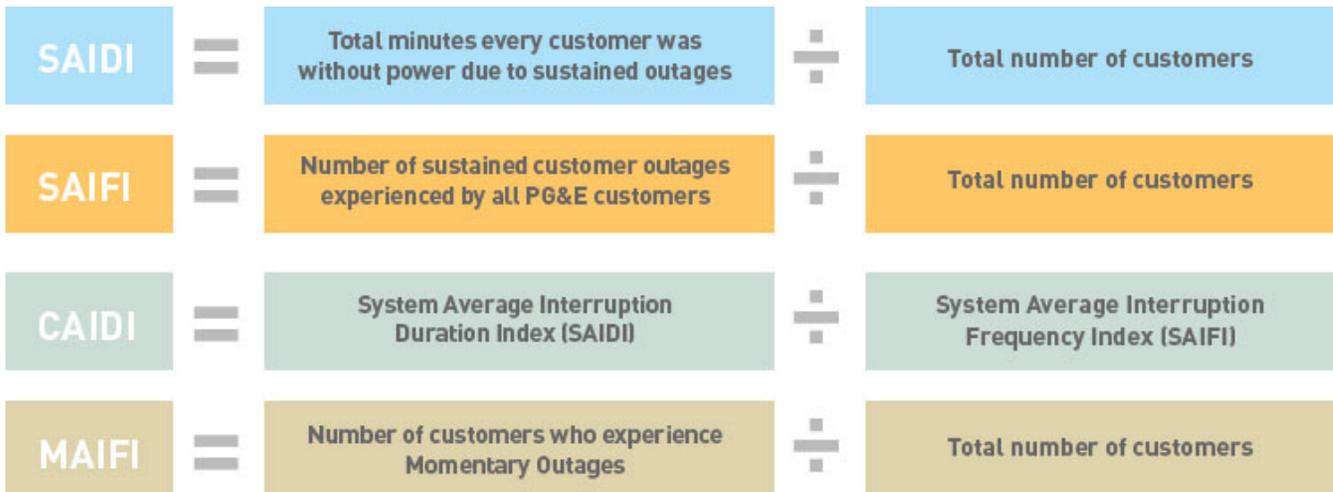
- Expand the number of sectionalizing locations of the circuits via the installation of additional tie-points and remotely operated switches. Initial results of reliability based capital improvement projects implemented with this focus already indicate an improvement in the number customers impacted per outage.
- Expand and enable more Fault Location, Isolation, and Service Restoration (FLISR) on the distribution system. The technology associated with FLISR enables a fault to be autonomously identified and isolated, thus restoring service to our customer quicker than would occur with human intervention.

How SDG&E Measures Reliability

SDG&E uses four metrics commonly used in the electric utility industry to measure reliability.

The reliability indicators that are tracked are as follows:

1. **SAIDI (System Average Interruption Duration Index)** - minutes of sustained outages per customer per year.
2. **SAIFI (System Average Interruption Frequency Index)** - number of sustained outages per customer per year.
3. **CAIDI (Customer Average Interruption Duration Index)** – is the average time required to restore service to a utility customer.
4. **MAIFI (Momentary Average Interruption Frequency Index)** - number of momentary outages per customer per year.



Prior to 2013, the measurement of each reliability performance indicator excluded CPUC Major Event and events that are the direct result of failures in the CAISO-controlled bulk power market, or non-SDG&E owned transmission and distribution facilities. A CPUC Major Event is defined in CPUC Decision 96-09-045 as an event that meets at least one of the following criteria:

- (a) The event is caused by earthquake, fire, or storms of sufficient intensity to give rise to a state of emergency being declared by the government, or
- (b) Any other disaster not in (a) that affects more than 15% of the system facilities or 10% of the utility's customers, whichever is less for each event.

Outages involving restricted access by a governmental agency that precluded or otherwise delayed outage restoration times were also considered CPUC Major Events and excluded from reliability results.

Beginning in 2013, the measurement of each reliability performance indicator excludes Major Event Days (MED) as defined in The Institute for Electrical and Electronic Engineers (IEEE) Guide for Electric Power Distribution Reliability Indices, aka IEEE Std 1366, instead of CPUC Major Events. A Major Event Day is defined in IEEE Std 1366 - 2012, Section 2 as a day in which the daily system SAIDI exceeds a threshold value. These threshold major event days are referred to as "TMED". Thus, any day in which the total system SAIDI exceeds TMED is excluded from SDG&E's reliability results. The applicable TMED value is calculated at the end of each year using SDG&E's daily SAIDI values for the prior five years. SDG&E's TMED value for 2016 was 4.36 minutes of daily system SAIDI. Other reliability indices in this report are not calculated using methodologies or formulas exactly as described in the IEEE Std 1366.

For purposes in understanding this report, the division between Distribution equipment and Transmission equipment is at the distribution substation power transformer high-side bus disconnect. Transmission equipment is defined as all assets rated 69kV and above. The substation power transformer high-side bus disconnect and all equipment on the load-side of the substation power transformer high-side bus disconnect are defined as Distribution equipment.

SECTION 1 - SYSTEM INDICES FOR THE LAST 10 YEARS

SEPARATE TABLES WITH SAIDI, SAIFI, MAIFI AND CAIDI.

MAJOR EVENT DAY'S (MED) INCLUDED AND EXCLUDED

Table 1-1: System Indices (MED included and excluded)

San Diego Gas & Electric System Reliability Data 2007 - 2016								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2007	180.99	0.539	335.75	0.572	54.89	0.477	115.11	0.530
2008	59.17	0.517	114.56	0.380	59.17	0.517	114.56	0.380
2009	67.06	0.542	123.74	0.380	49.71	0.466	106.60	0.362
2010	85.37	0.652	130.99	0.510	63.36	0.520	121.80	0.444
2011	567.59	1.472	385.63	0.239	53.43	0.471	113.44	0.239
2012	64.36	0.533	120.78	0.301	64.36	0.533	120.78	0.301
2013	75.03	0.561	133.84	0.211	59.96	0.472	127.03	0.211
2014	75.81	0.632	119.88	0.262	64.60	0.603	107.16	0.244
2015	58.11	0.530	109.68	0.347	57.92	0.526	110.09	0.347
2016	86.01	0.677	126.99	0.443	72.75	0.620	117.43	0.386

Table 1-2: Distribution System Indices (MED included and Excluded)

San Diego Gas & Electric Distribution System Reliability Data 2007 - 2016								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2007	174.53	0.506	345.09	0.542	52.86	0.459	115.18	0.505
2008	58.28	0.506	115.24	0.368	58.28	0.506	115.24	0.368
2009	61.85	0.514	120.34	0.350	48.98	0.454	107.84	0.332
2010	84.49	0.638	132.50	0.468	62.65	0.512	122.25	0.403
2011	52.87	0.435	121.63	0.216	52.11	0.433	120.47	0.216
2012	63.32	0.510	124.20	0.289	63.32	0.510	124.20	0.289
2013	54.75	0.452	121.17	0.206	54.53	0.450	121.08	0.206
2014	74.73	0.613	121.86	0.255	63.52	0.584	108.82	0.237
2015	57.90	0.525	110.28	0.323	57.71	0.521	110.70	0.323
2016	83.93	0.647	129.67	0.438	70.67	0.590	119.88	0.380

Note: Distribution System Indices includes substation distribution.

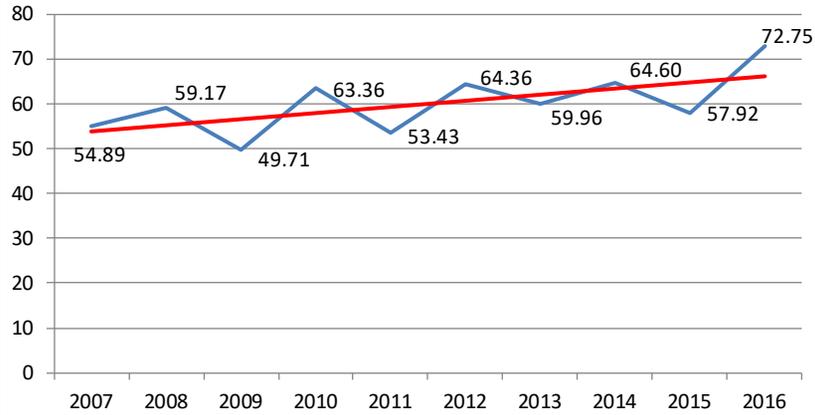
Table 1-3: Transmission System Indices (MED included and excluded)

San Diego Gas & Electric Transmission System Reliability Data 2007 - 2016								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2007	6.47	0.033	194.01	0.030	2.02	0.018	113.44	0.025
2008	0.89	0.011	82.84	0.013	0.89	0.011	82.84	0.013
2009	5.22	0.028	185.99	0.030	0.73	0.012	60.18	0.030
2010	0.88	0.014	62.63	0.042	0.71	0.008	92.30	0.041
2011	514.72	1.037	496.29	0.022	1.32	0.038	34.26	0.022
2012	1.04	0.023	45.11	0.012	1.04	0.023	45.11	0.012
2013	20.28	0.109	186.51	0.005	5.43	0.022	250.61	0.005
2014	1.07	0.019	56.30	0.007	1.07	0.019	56.27	0.007
2015	0.21	0.005	44.08	0.024	0.21	0.005	44.08	0.024
2016	2.08	0.030	69.15	0.006	2.07	0.030	69.09	0.005

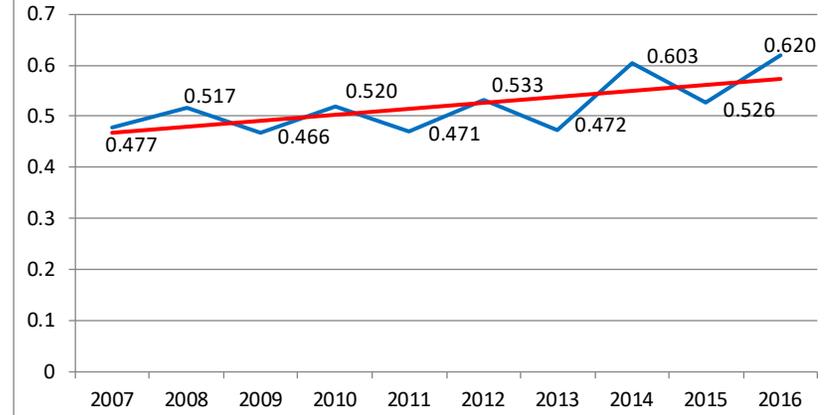
Note: Transmission System Indices includes substation transmission.

System Indices (Excludes Planned, ISO and MED)

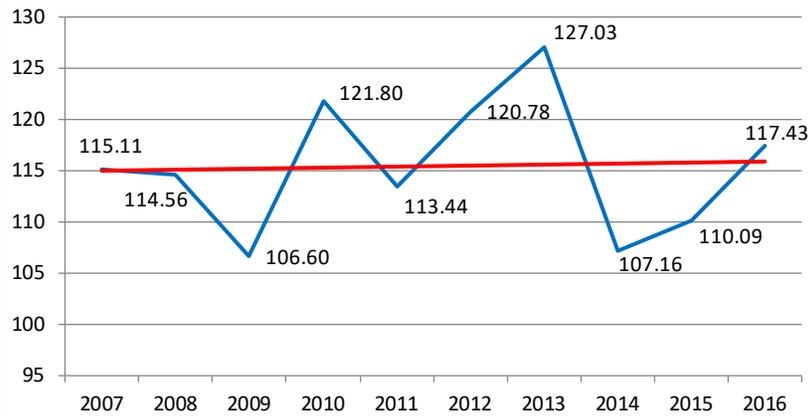
System - SAIDI



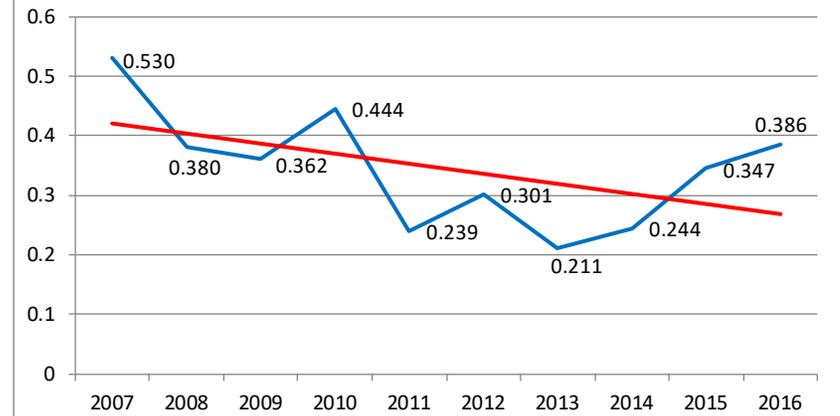
System - SAIFI



System - CAIDI

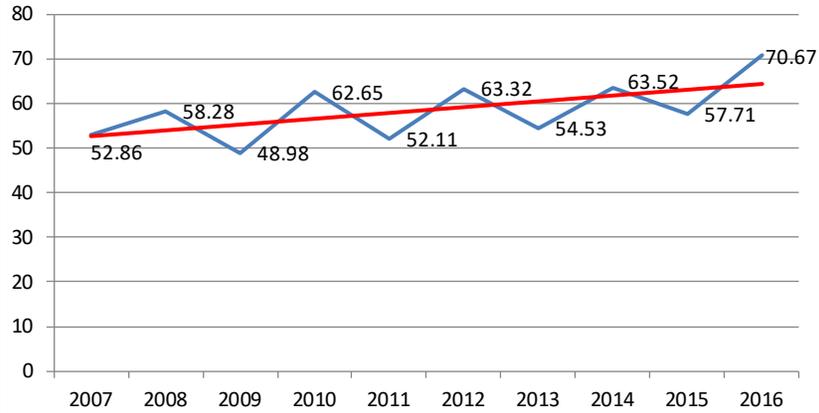


System - MAIFI

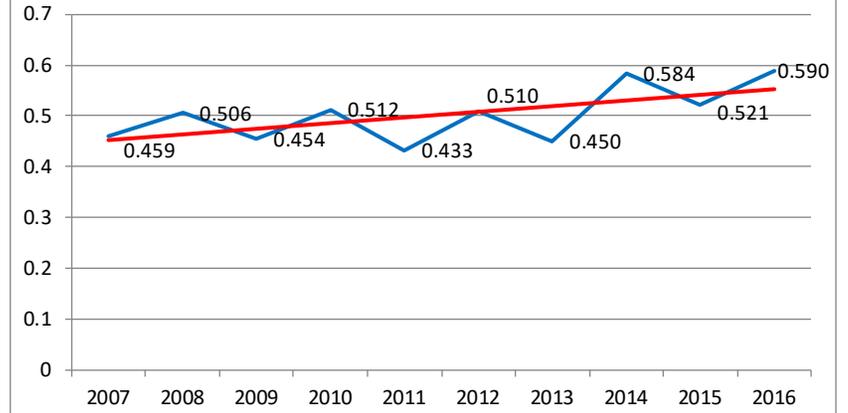


Distribution System Indices (Excludes Planned, ISO and MED)

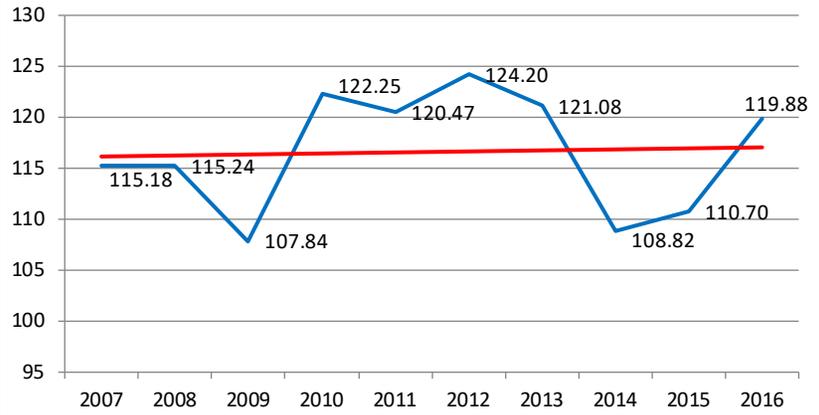
Distribution - SAIDI



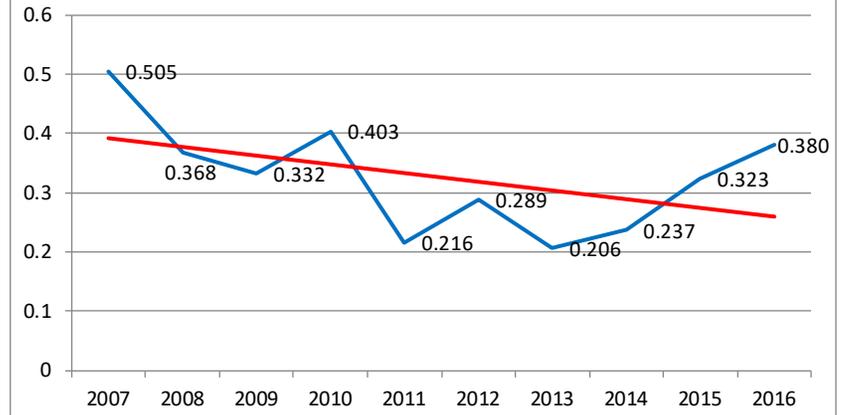
Distribution - SAIFI



Distribution - CAIDI

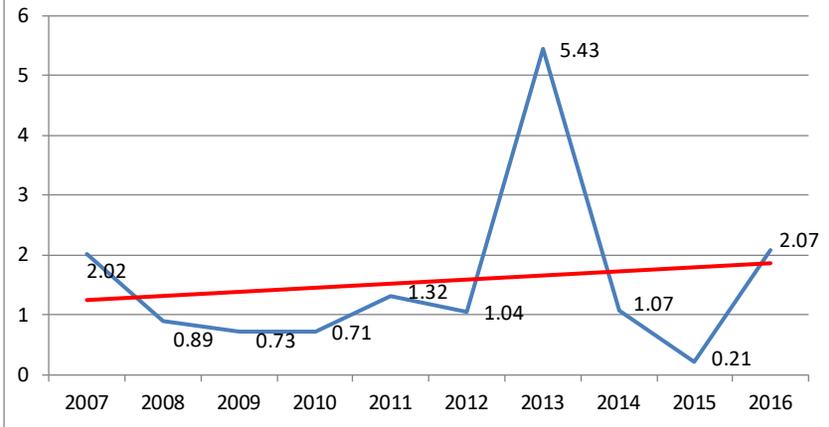


Distribution - MAIFI

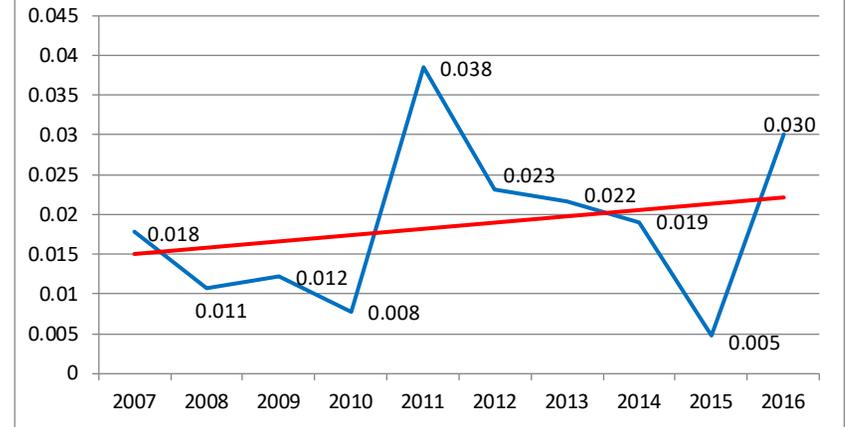


Transmission System Indices (Excludes Planned, ISO and MED)

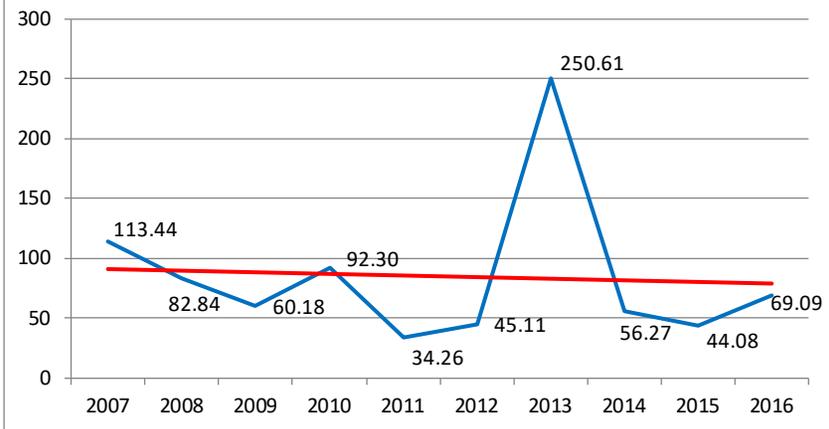
Transmission - SAIDI



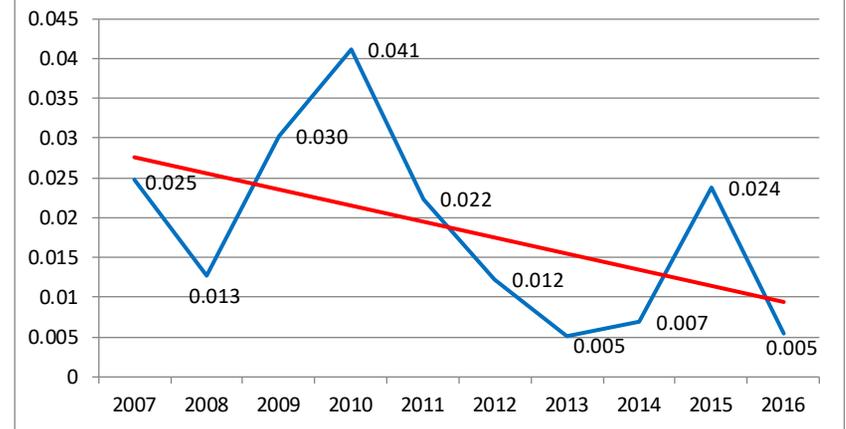
Transmission - SAIFI



Transmission - CAIDI



Transmission - MAIFI



Note: The spike in 2013 is due to the Borrego Outage events caused by extreme weather

Note: The spike in 2011 is due to the Pacific Southwest Electric Outage (PSEO)

SECTION 2 – DISTRICT RELIABILITY INDICES FOR THE PAST 10 YEARS INCLUDING AND EXCLUDING MED

A. SUMMARY OF ELECTRIC SYSTEM RELIABILITY FOR EACH OF SDG&E’S SIX DISTRICTS (EXCLUDES PLANNED AND ISO OUTAGES)

- INDICES REPRESENT THE COMBINED TRANSMISSION, SUBSTATION AND DISTRIBUTION OUTAGE IMPACTS AT THE DISTRICT LEVEL

Table 2-1: Beach Cities – District Reliability Indices (2007 – 2016)

MED Included					MED Excluded				
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI	
2007	31.86	0.300	106.12	0.424	31.85	0.300	106.16	0.423	
2008	38.67	0.334	115.85	0.144	38.67	0.334	115.85	0.144	
2009	46.96	0.406	115.64	0.184	33.19	0.319	103.96	0.174	
2010	59.00	0.392	150.53	0.233	48.34	0.354	136.56	0.182	
2011	617.86	1.396	442.58	0.243	52.01	0.396	131.17	0.243	
2012	39.54	0.338	116.80	0.401	39.54	0.338	116.80	0.401	
2013	34.08	0.244	139.40	0.122	34.08	0.244	139.40	0.122	
2014	41.37	0.366	113.09	0.136	38.78	0.357	108.66	0.113	
2015	62.80	0.514	122.18	0.349	62.76	0.513	122.28	0.349	
2016	90.55	0.699	129.48	0.385	77.04	0.651	118.31	0.385	

Table 2-2: Eastern - District Reliability Indices (2007 – 2016)

MED Included					MED Excluded				
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI	
2007	199.66	0.521	383.50	0.688	57.18	0.418	136.95	0.539	
2008	54.52	0.523	104.16	0.498	54.52	0.523	104.16	0.498	
2009	86.05	0.679	126.66	0.389	60.85	0.596	102.05	0.389	
2010	90.81	0.629	144.41	0.562	54.24	0.443	122.41	0.400	
2011	588.29	1.506	390.55	0.193	65.26	0.507	128.79	0.193	
2012	87.40	0.688	127.07	0.339	87.40	0.688	127.07	0.339	
2013	78.39	0.643	121.93	0.223	77.04	0.634	121.58	0.223	
2014	91.73	0.574	159.75	0.243	77.80	0.528	147.39	0.238	
2015	50.17	0.461	108.79	0.263	50.17	0.461	108.79	0.263	
2016	108.24	0.820	132.06	0.326	84.93	0.705	120.41	0.292	

Table 2-3: Metro - District Reliability Indices (2007 – 2016)

MED Included					MED Excluded				
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI	
2007	44.37	0.498	89.10	0.596	41.30	0.451	91.65	0.596	
2008	43.81	0.429	102.03	0.399	43.81	0.429	102.03	0.399	
2009	51.07	0.419	121.80	0.254	38.18	0.357	107.03	0.211	
2010	64.45	0.506	127.29	0.503	44.03	0.397	111.05	0.440	
2011	519.36	1.320	393.52	0.244	36.63	0.314	116.69	0.244	
2012	46.88	0.376	124.63	0.336	46.88	0.376	124.63	0.336	
2013	44.75	0.401	111.46	0.294	44.75	0.401	111.46	0.294	
2014	72.41	0.654	110.74	0.371	62.03	0.625	99.19	0.326	
2015	68.48	0.546	125.41	0.489	68.26	0.538	126.83	0.489	
2016	70.79	0.628	112.67	0.615	64.39	0.595	108.26	0.573	

Table 2-4: North Coast - District Reliability Indices (2007 – 2016)

MED Included					MED Excluded				
Year	SAIDI	SAIFI	CAIDI	MAIFI		SAIDI	SAIFI	CAIDI	MAIFI
2007	95.54	0.552	172.95	0.342		59.85	0.503	118.90	0.324
2008	77.01	0.599	128.61	0.436		77.01	0.599	128.61	0.436
2009	75.76	0.495	153.02	0.652		41.79	0.380	109.85	0.631
2010	117.12	0.771	151.87	0.789		93.47	0.656	142.51	0.738
2011	565.06	1.515	372.88	0.292		66.49	0.516	128.89	0.292
2012	75.68	0.602	125.67	0.215		75.68	0.602	125.67	0.215
2013	60.17	0.509	118.27	0.181		59.50	0.507	117.25	0.181
2014	76.33	0.606	125.92	0.294		59.96	0.590	101.59	0.282
2015	49.79	0.439	113.49	0.275		49.78	0.438	113.78	0.275
2016	78.82	0.501	157.21	0.558		61.31	0.411	149.09	0.412

Table 2-5: Northeast - District Reliability Indices (2007 – 2016)

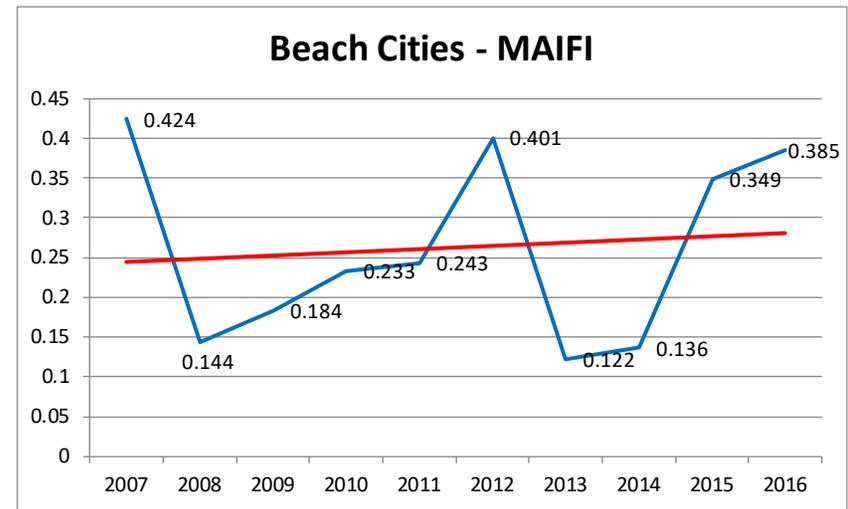
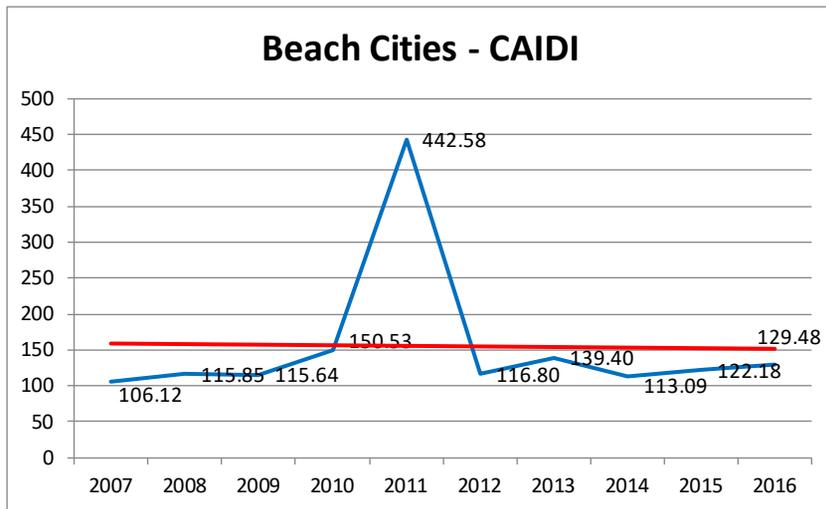
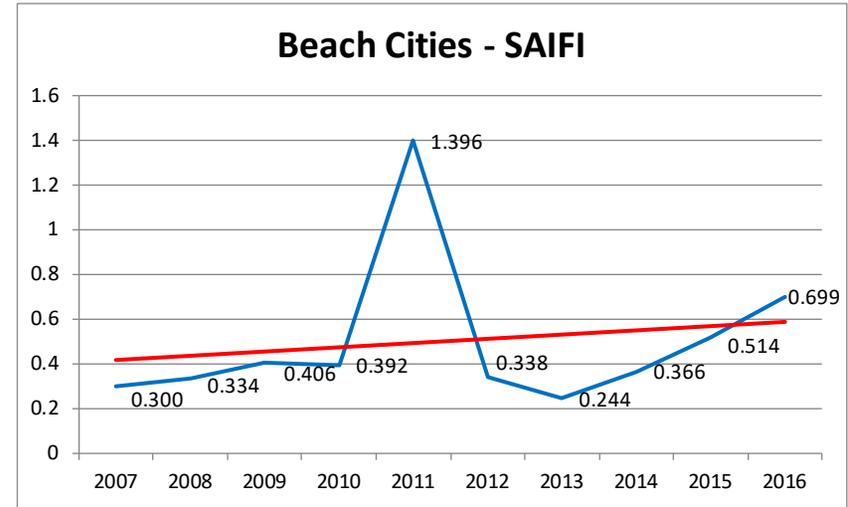
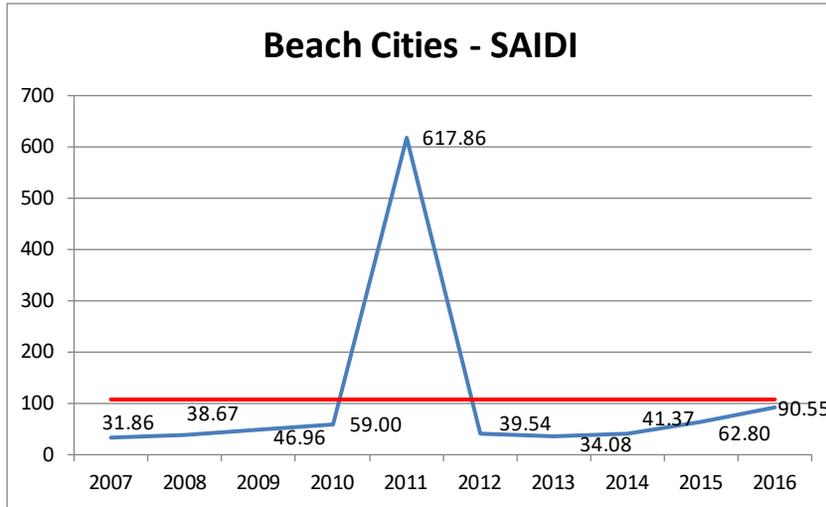
MED Included					MED Excluded				
Year	SAIDI	SAIFI	CAIDI	MAIFI		SAIDI	SAIFI	CAIDI	MAIFI
2007	688.30	0.760	905.24	0.970		82.76	0.598	138.33	0.868
2008	82.22	0.677	121.49	0.544		82.22	0.677	121.49	0.544
2009	102.02	0.851	119.85	0.583		90.74	0.800	113.50	0.569
2010	101.96	0.948	107.55	0.544		77.47	0.707	109.64	0.497
2011	612.05	1.694	361.24	0.268		59.18	0.696	84.97	0.268
2012	78.46	0.626	125.32	0.272		78.46	0.626	125.32	0.272
2013	102.07	0.708	144.08	0.213		102.06	0.708	144.09	0.213
2014	95.74	0.899	106.48	0.174		75.92	0.832	91.22	0.173
2015	63.02	0.764	82.49	0.359		62.25	0.755	82.40	0.359
2016	93.94	0.815	115.27	0.323		82.15	0.779	105.39	0.270

Table 2-6: Orange County - District Reliability Indices (2007 – 2016)

MED Included					MED Excluded				
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI	
2007	75.27	0.733	102.66	0.316	74.94	0.733	102.25	0.316	
2008	75.48	0.664	113.71	0.183	75.48	0.664	113.71	0.183	
2009	38.76	0.444	87.32	0.227	35.81	0.397	90.26	0.227	
2010	97.15	0.852	114.00	0.395	81.24	0.738	110.05	0.395	
2011	494.15	1.506	328.14	0.140	48.39	0.507	95.53	0.140	
2012	75.86	0.794	95.52	0.156	75.86	0.794	95.52	0.156	
2013	216.07	1.328	162.74	0.183	47.75	0.336	142.19	0.183	
2014	87.79	0.752	116.68	0.334	87.74	0.752	116.63	0.334	
2015	39.43	0.372	105.95	0.195	39.43	0.372	105.95	0.195	
2016	80.99	0.608	133.21	0.277	71.29	0.579	123.13	0.179	

B. CHARTS FOR EACH OF SDG&E'S SIX DISTRICTS WITH LINEAR TREND LINE (EXCLUDES PLANNED AND ISO OUTAGES; INCLUDES MED)

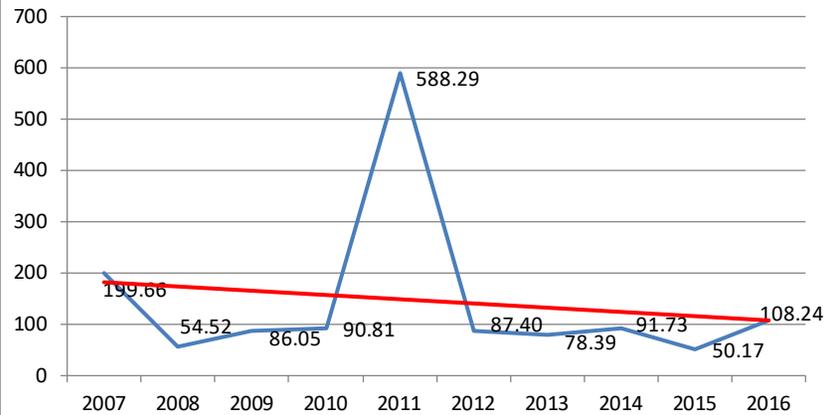
District Reliability Indices (Excludes Planned and ISO; Includes MED)



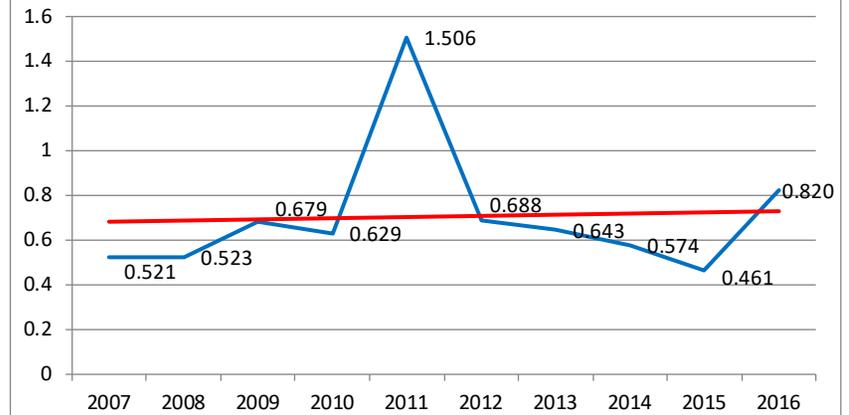
Note: The spike in 2011 is due to the Pacific Southwest Electric Outage (PSEO)

District Reliability Indices (Excludes Planned and ISO; Includes MED)

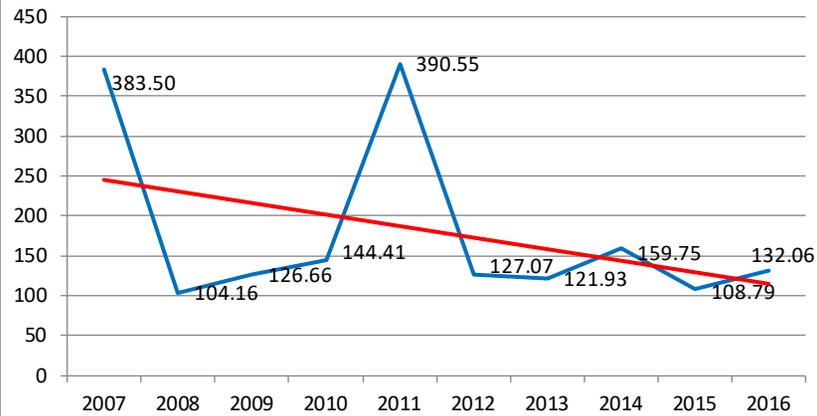
Eastern - SAIDI



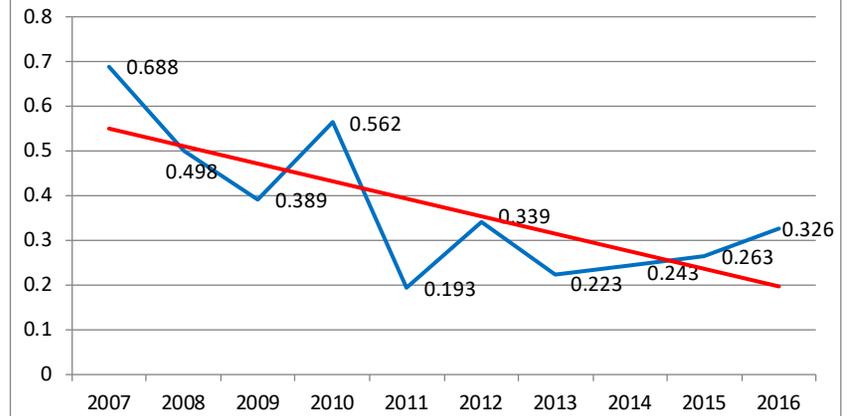
Eastern - SAIFI



Eastern - CAIDI



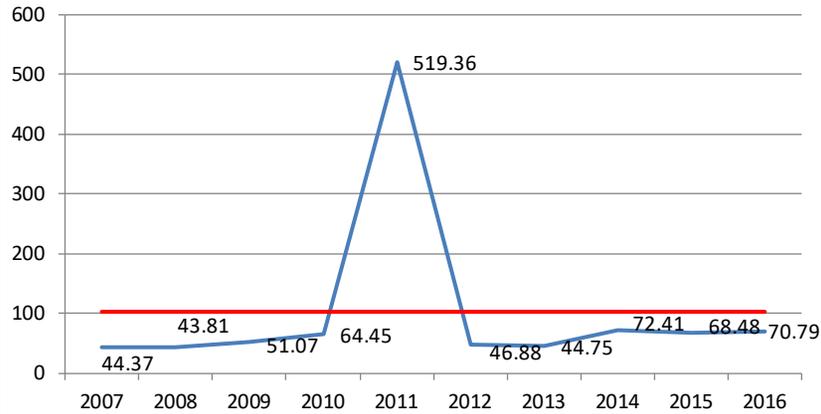
Eastern - MAIFI



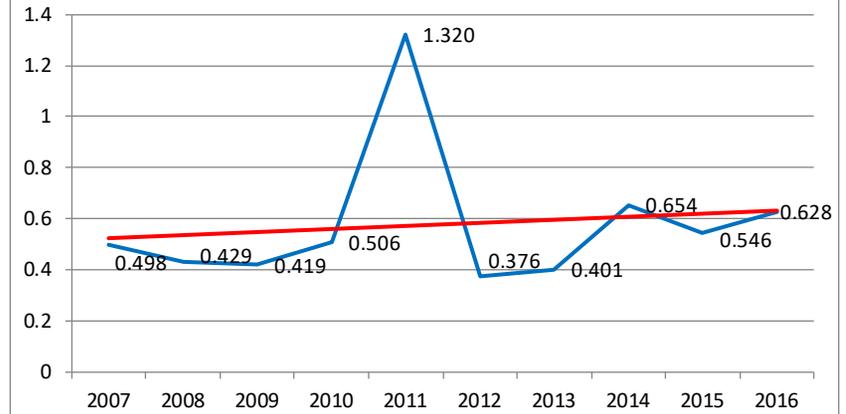
Note: The spike in 2011 is due to the Pacific Southwest Electric Outage (PSEO)

District Reliability Indices (Excludes Planned and ISO; Includes MED)

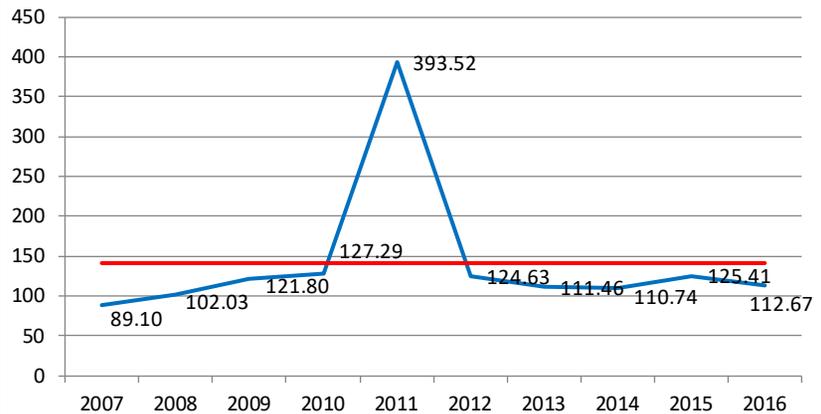
Metro - SAIDI



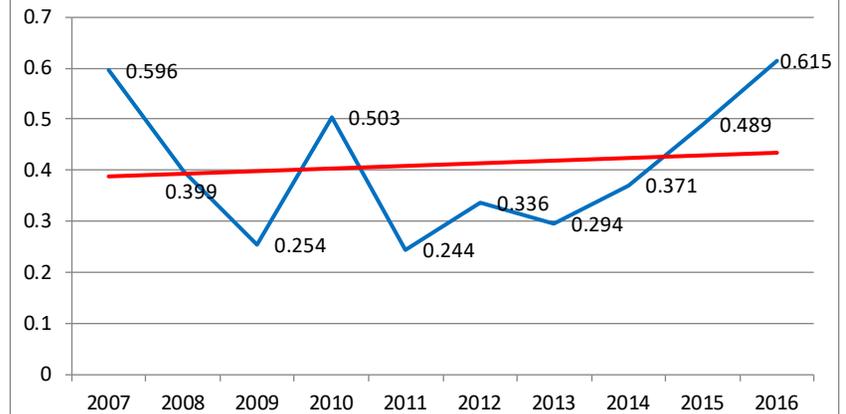
Metro - SAIFI



Metro - CAIDI



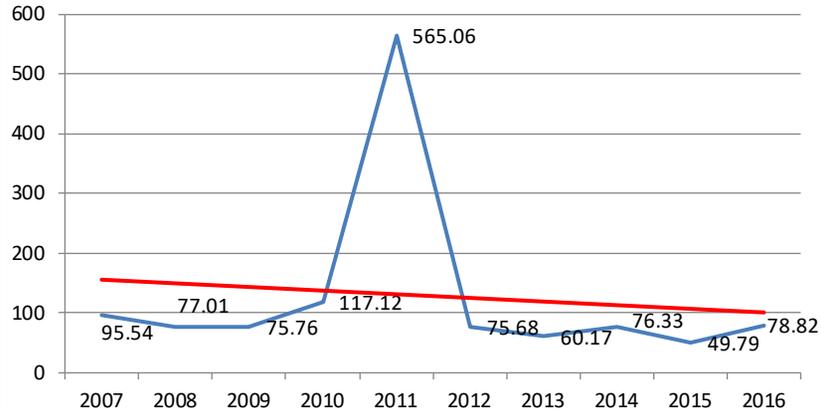
Metro - MAIFI



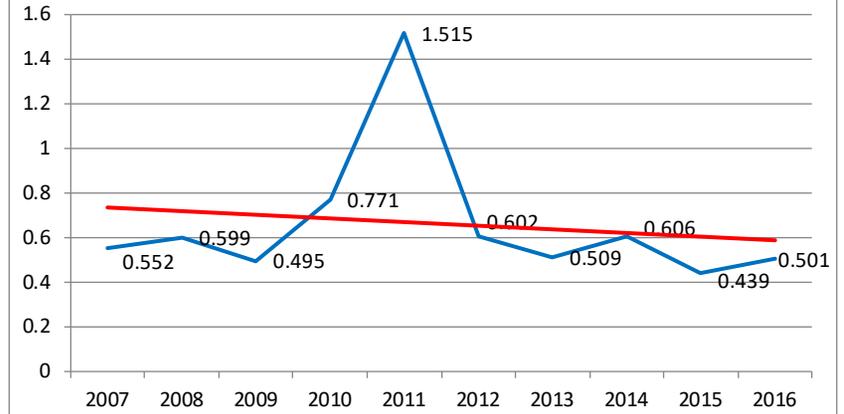
Note: The spike in 2011 is due to the Pacific Southwest Electric Outage (PSEO)

District Reliability Indices (Excludes Planned and ISO; Includes MED)

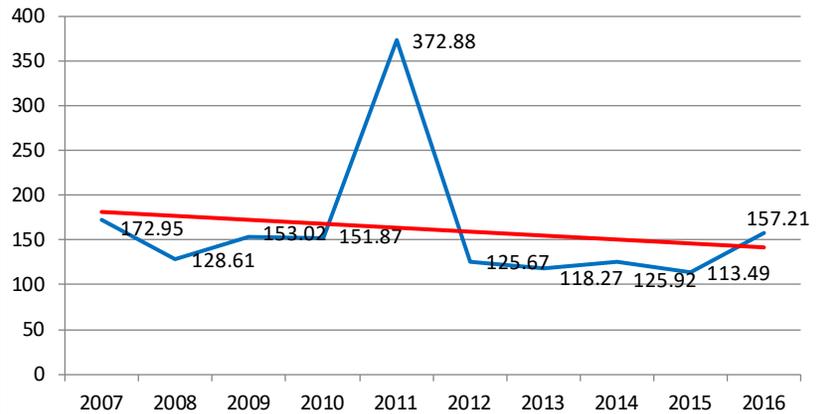
North Coast - SAIDI



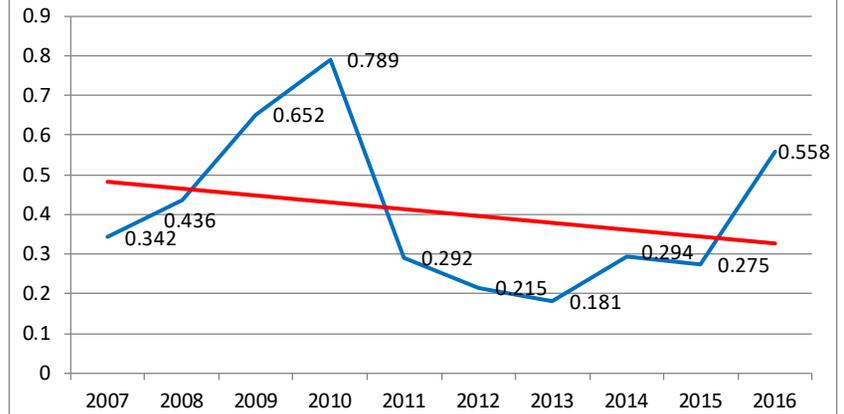
North Coast - SAIFI



North Coast - CAIDI



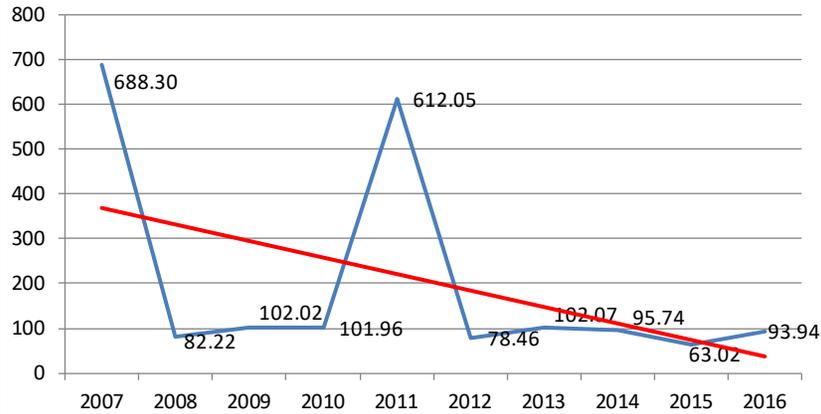
North Coast - MAIFI



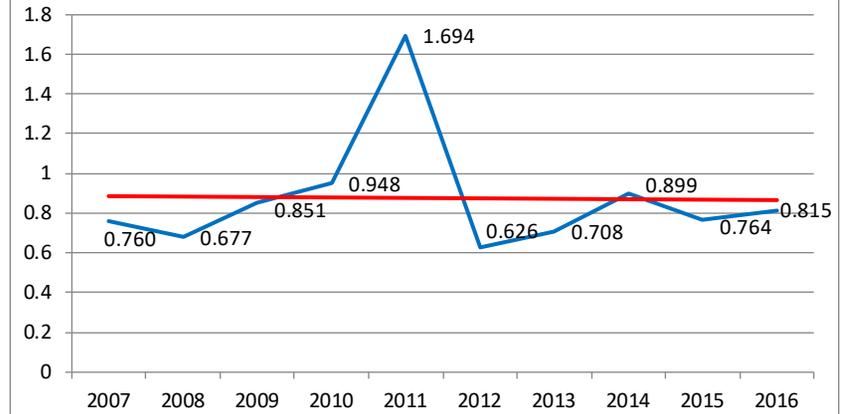
Note: The spike in 2011 is due to the Pacific Southwest Electric Outage (PSEO)

District Reliability Indices (Excludes Planned and ISO; Includes MED)

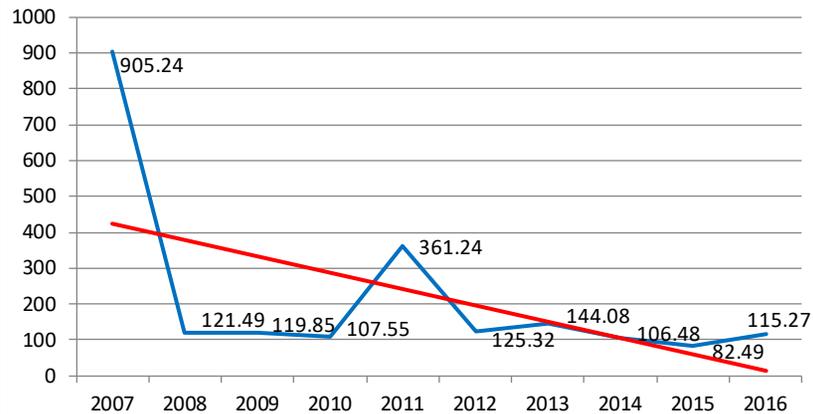
Northeast - SAIDI



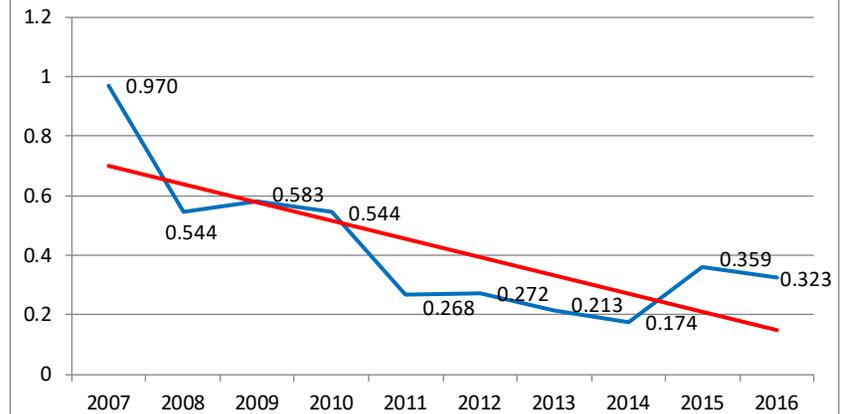
Northeast - SAIFI



Northeast - CAIDI

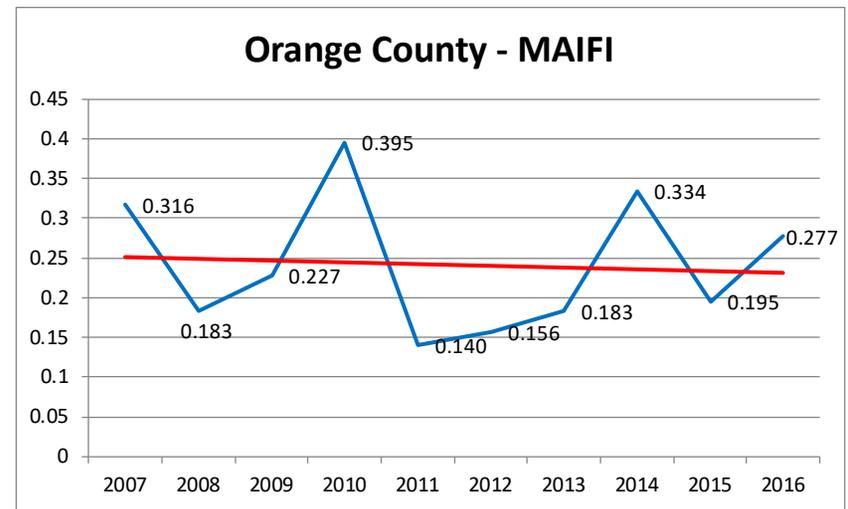
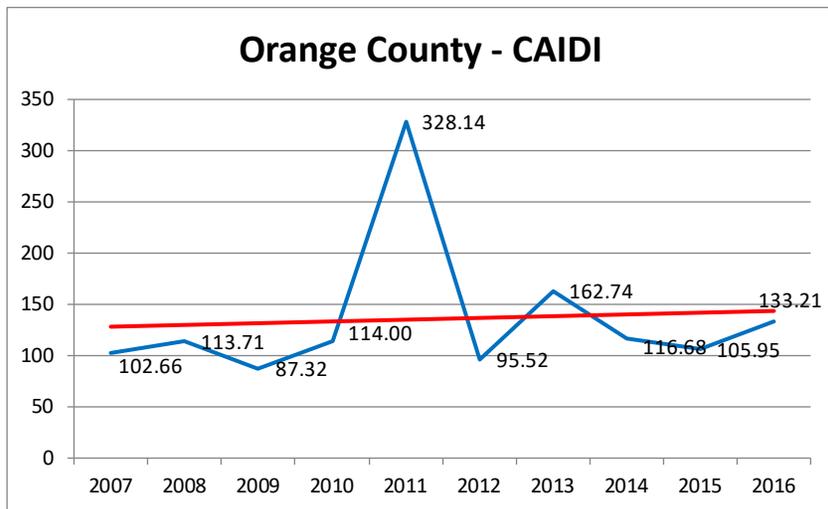
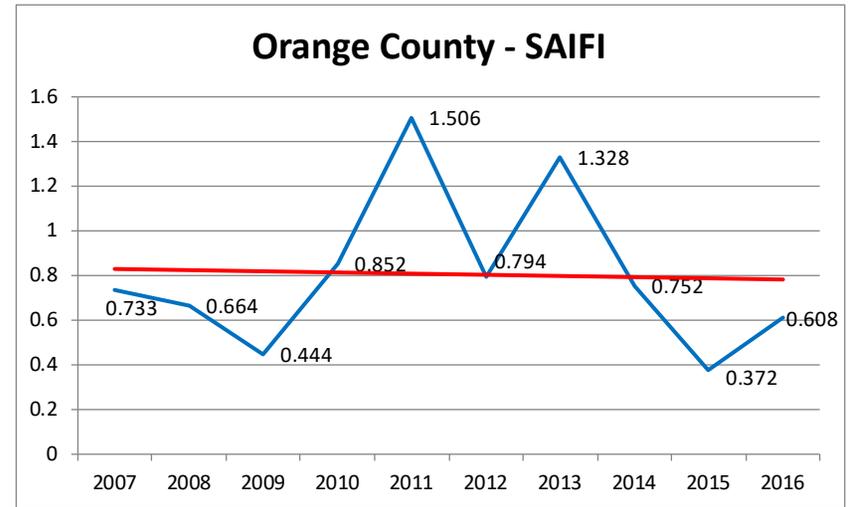
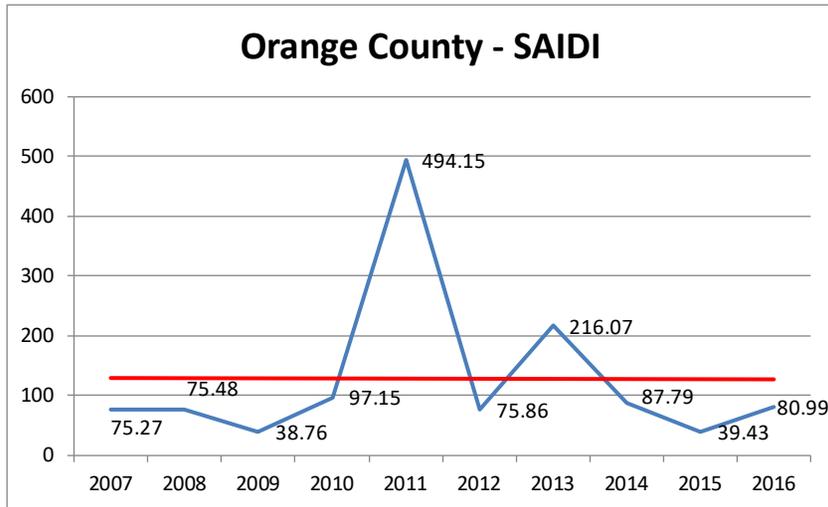


Northeast - MAIFI



Note: The spike in 2011 is due to the Pacific Southwest Electric Outage (PSEO)

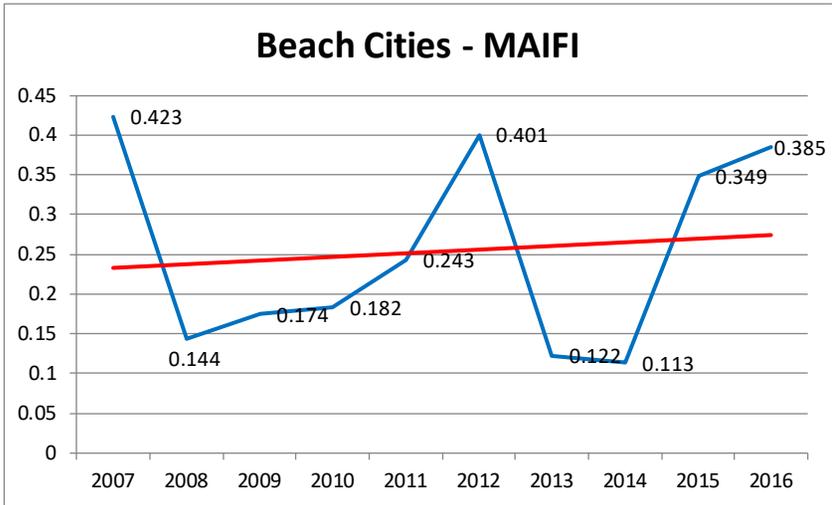
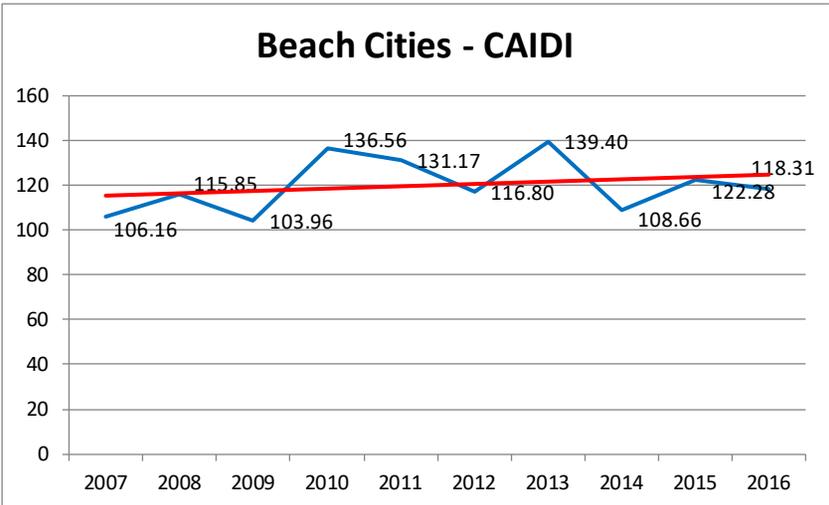
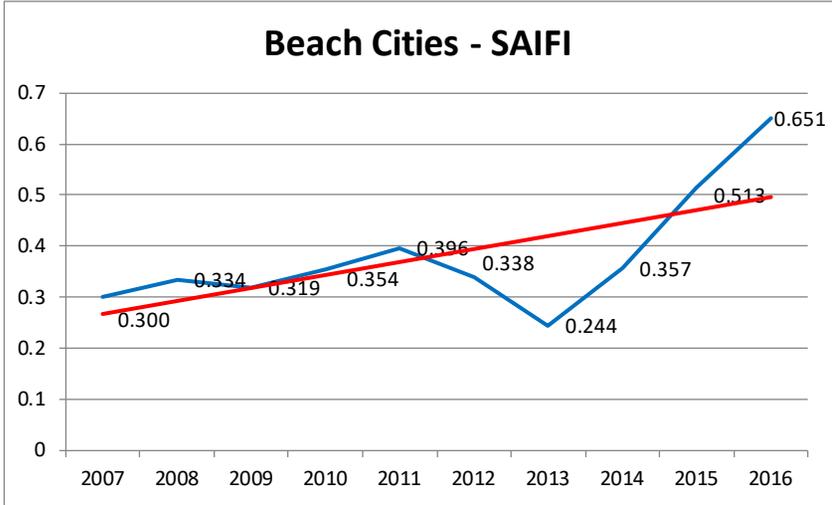
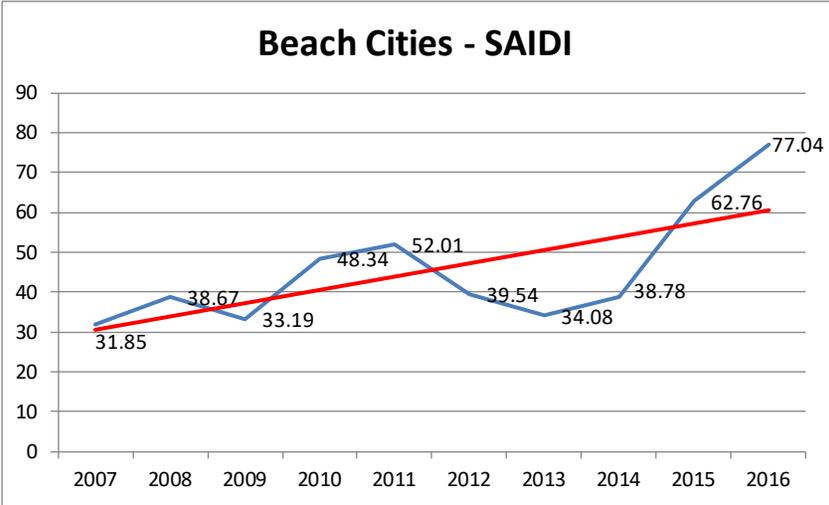
District Reliability Indices (Excludes Planned and ISO; Includes MED)



Note: The spike in 2011 is due to the Pacific Southwest Electric Outage (PSEO)

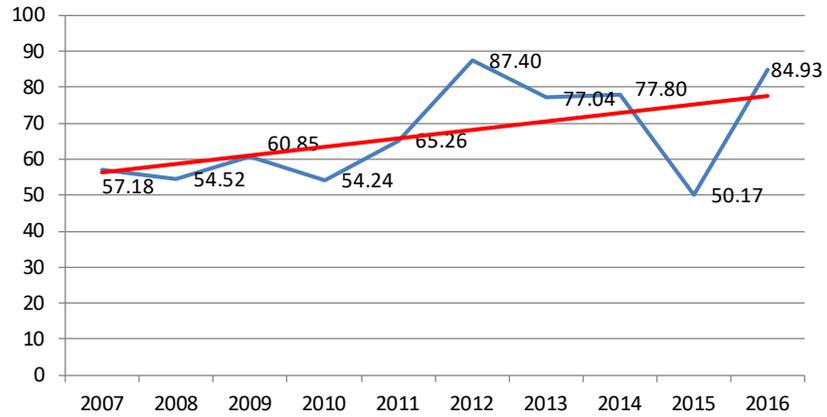
C. CHARTS FOR EACH OF SDG&E'S SIX DISTRICTS WITH LINEAR TREND LINE (EXCLUDES PLANNED, ISO AND MED)

District Reliability Indices (Excludes Planned, ISO and MED)

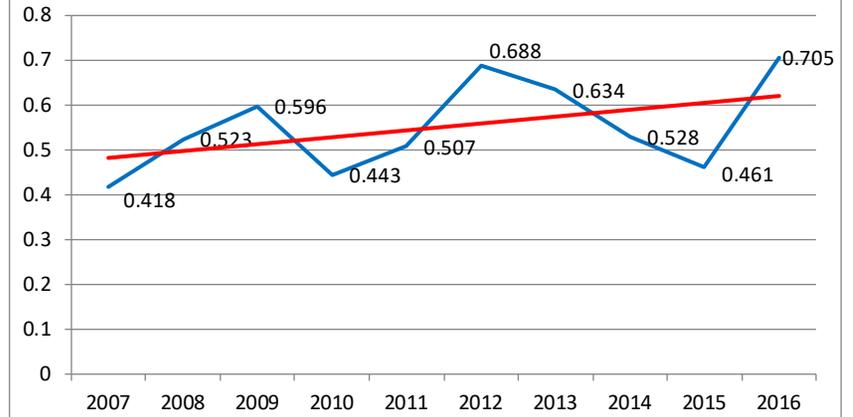


District Reliability Indices (Excludes Planned, ISO and MED)

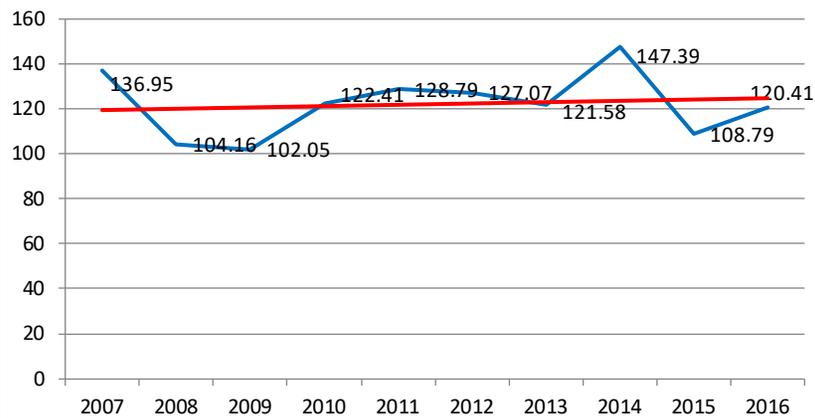
Eastern - SAIDI



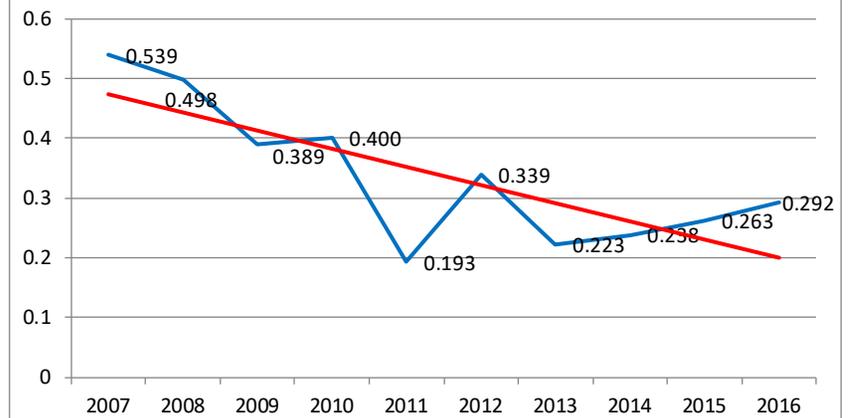
Eastern - SAIFI



Eastern - CAIDI

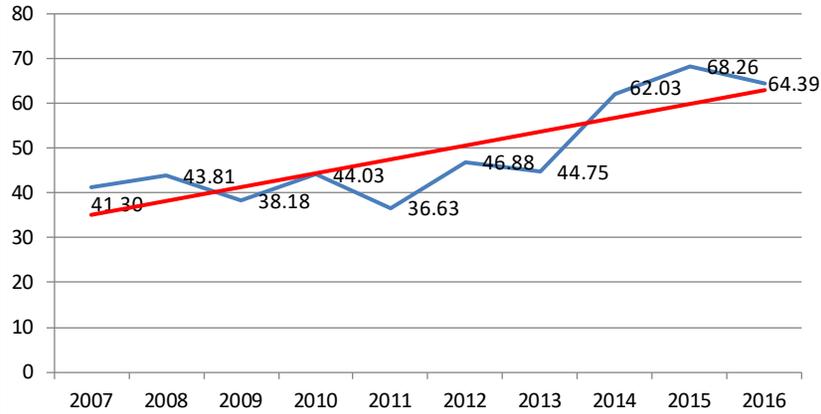


Eastern - MAIFI

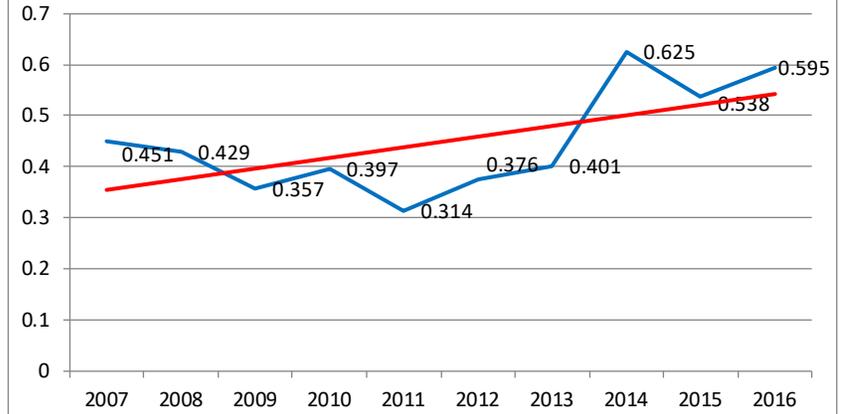


District Reliability Indices (Excludes Planned, ISO and MED)

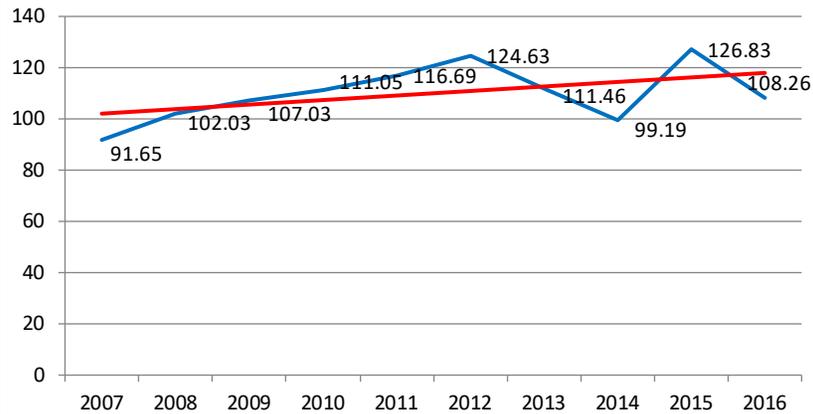
Metro - SAIDI



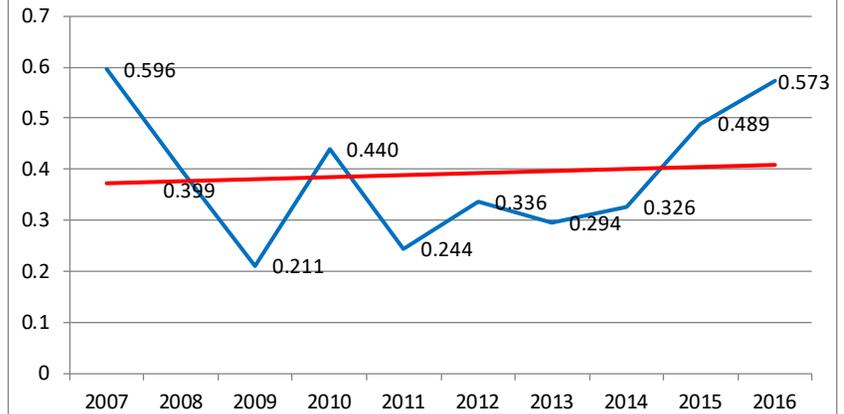
Metro - SAIFI



Metro - CAIDI

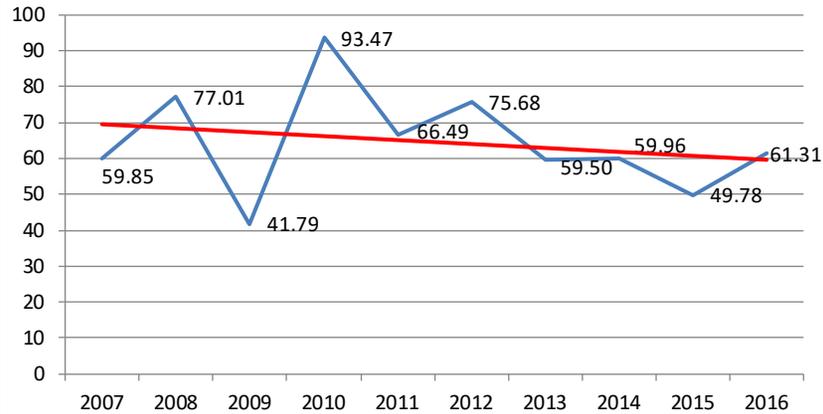


Metro - MAIFI

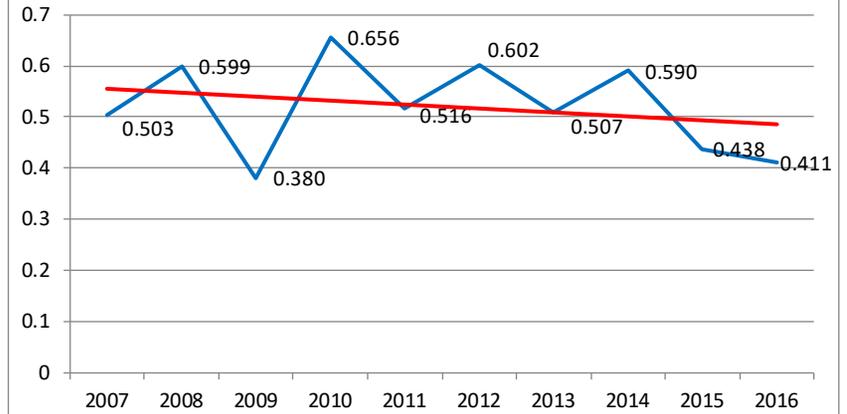


District Reliability Indices (Excludes Planned, ISO and MED)

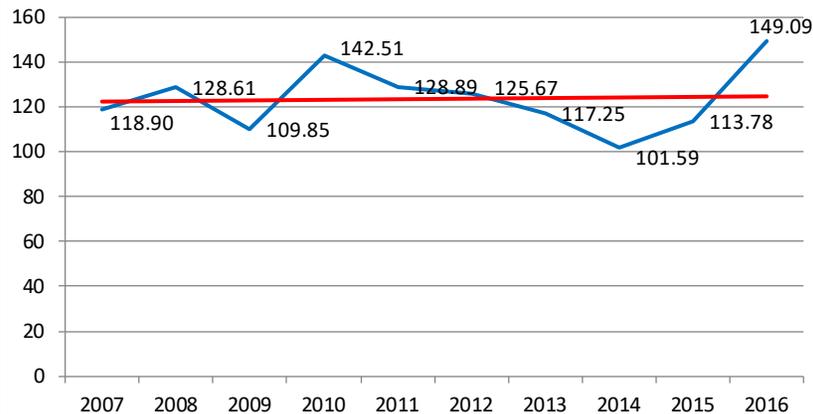
North Coast - SAIDI



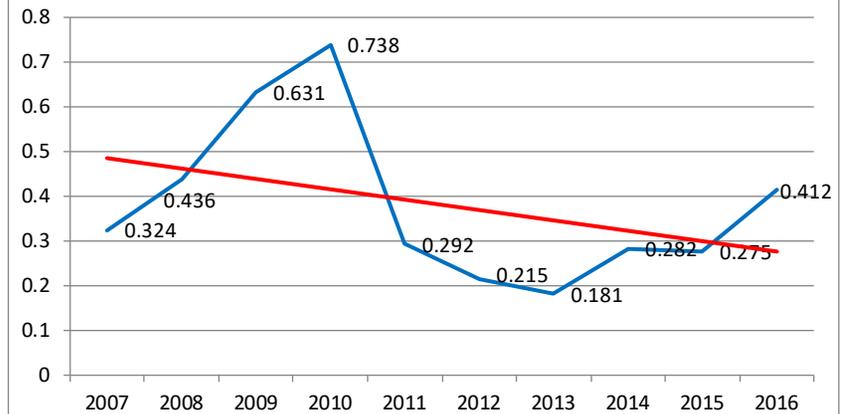
North Coast - SAIFI



North Coast - CAIDI

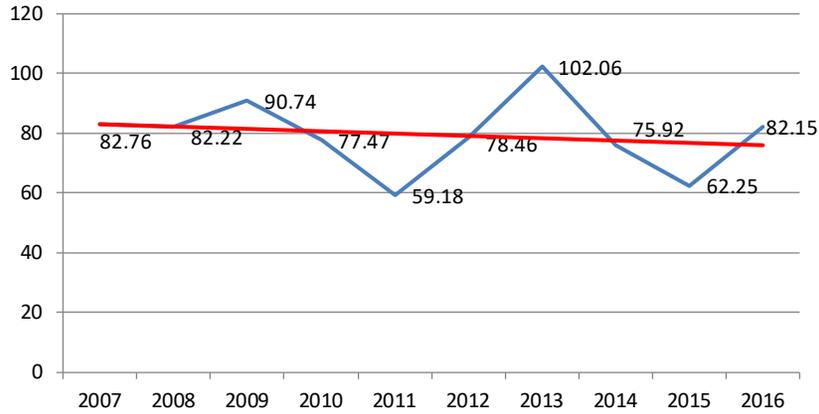


North Coast - MAIFI

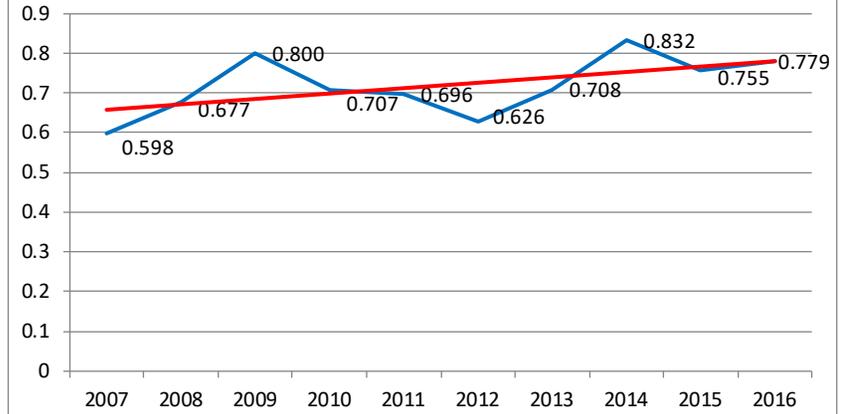


District Reliability Indices (Excludes Planned, ISO and MED)

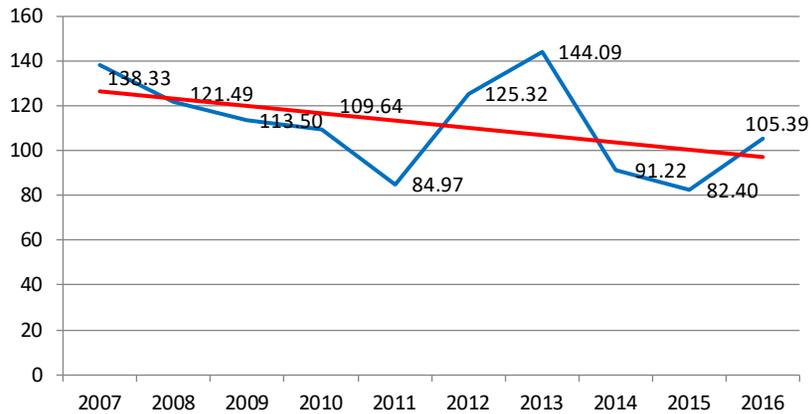
Northeast - SAIDI



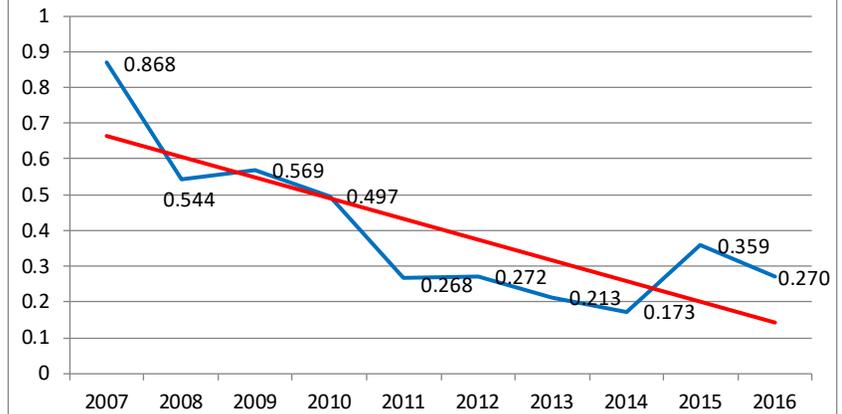
Northeast - SAIFI



Northeast - CAIDI

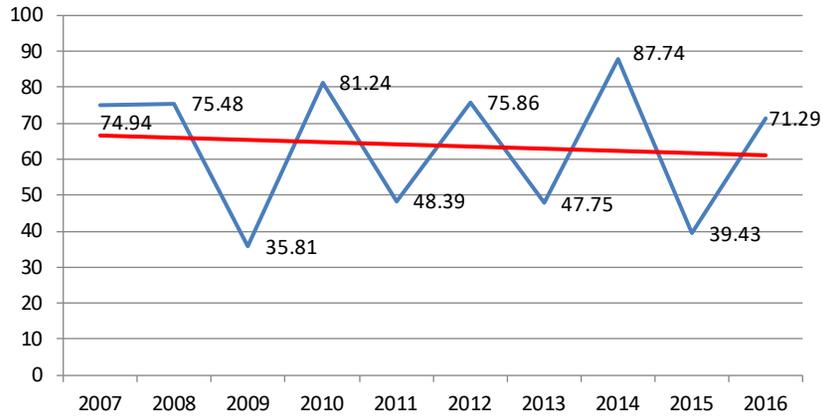


Northeast - MAIFI

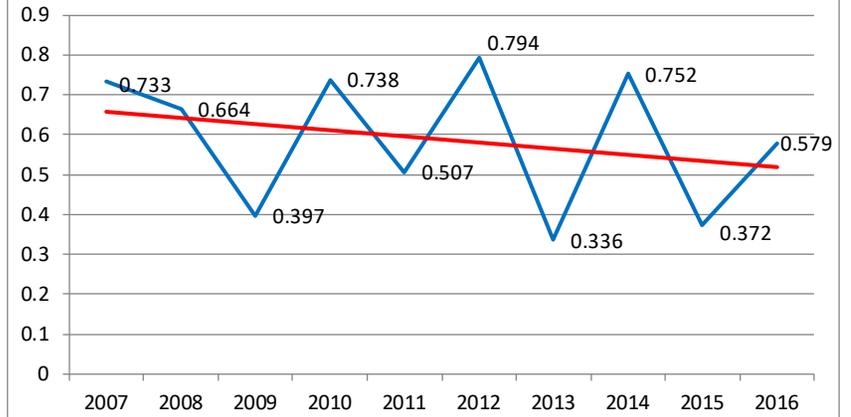


District Reliability Indices (Excludes Planned, ISO and MED)

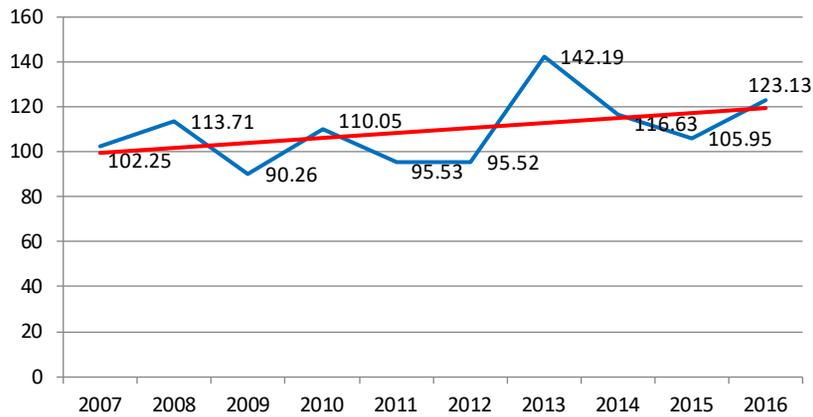
Orange County - SAIDI



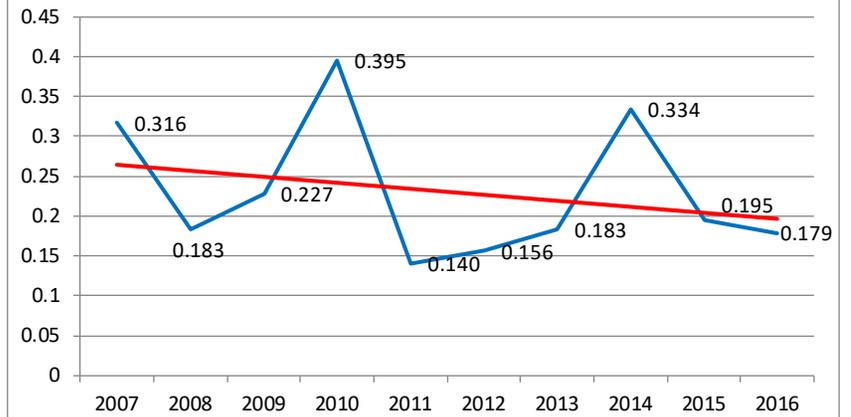
Orange County - SAIFI



Orange County - CAIDI



Orange County - MAIFI



SECTION 3 – SYSTEM AND DISTRICT INDICES BASED ON IEEE 1366 FOR THE PAST 10 YEARS INCLUDING PLANNED OUTAGES AND INCLUDING AND EXCLUDING MED

The Decision requires SDG&E to track and report planned outages on a historic running 10-year period. However, prior to the Decision, SDG&E kept and tracked planned outage data on a running three-year period, and because SDG&E started using a newly implemented outage management system in September, 2012, SDG&E has recorded planned outage data from only 2013 onward. Since the data for 2013-2015 was recorded for purposes other than as required per the Decision, the extracted data for those three years has not been reviewed and has not gone through a formal quality control process to assure accuracy of the indices in this Reliability Report.

The indices for years 2016 onward reflect an improved level of accuracy associated with using data that was recorded subject to a quality control program that was designed and implemented in 2016 to meet the Decision's reporting requirements. Moving forward, SDG&E will maintain 10 years' worth of planned outage data as directed per the Decision. Each year SDG&E will provide an additional years' worth of data and in 2022 will report a running 10 years' worth of planned outage data.

INDICES BELOW REPRESENT THE COMBINED TRANSMISSION, SUBSTATION AND DISTRIBUTION OUTAGE IMPACTS AT THE SYSTEM AND DISTRICT LEVELS.

System Indices (2013 – 2016) Planned and Unplanned								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2013	109.16	0.682	160.07	0.231	94.05	0.593	158.58	0.231
2014	109.22	0.763	143.18	0.278	97.99	0.733	133.66	0.259
2015	103.86	0.682	152.30	0.367	103.68	0.678	152.84	0.367
2016	125.26	0.822	152.38	0.467	111.98	0.764	146.57	0.410

Beach Cites - District Indices (2013 – 2016)								
Planned and Unplanned								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2013	82.51	0.387	213.27	0.126	82.49	0.387	213.36	0.126
2014	77.23	0.488	158.25	0.143	74.62	0.479	155.80	0.121
2015	89.53	0.610	146.85	0.358	89.49	0.609	146.96	0.358
2016	114.15	0.792	144.17	0.401	100.64	0.744	135.34	0.401

Eastern - District Indices (2013 – 2016)								
Planned and Unplanned								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2013	125.64	0.797	157.72	0.240	124.23	0.787	157.81	0.240
2014	124.98	0.691	180.91	0.247	111.00	0.644	172.36	0.241
2015	84.40	0.570	148.10	0.271	84.40	0.570	148.10	0.271
2016	137.71	0.922	149.33	0.332	114.40	0.808	141.60	0.298

Metro - District Indices (2013 – 2016)								
Planned and Unplanned								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2013	70.37	0.491	143.27	0.297	70.30	0.491	143.31	0.296
2014	109.61	0.769	142.46	0.374	99.23	0.741	133.92	0.329
2015	146.88	0.748	196.38	0.492	146.66	0.740	198.16	0.492
2016	119.47	0.785	152.15	0.617	113.01	0.751	150.52	0.575

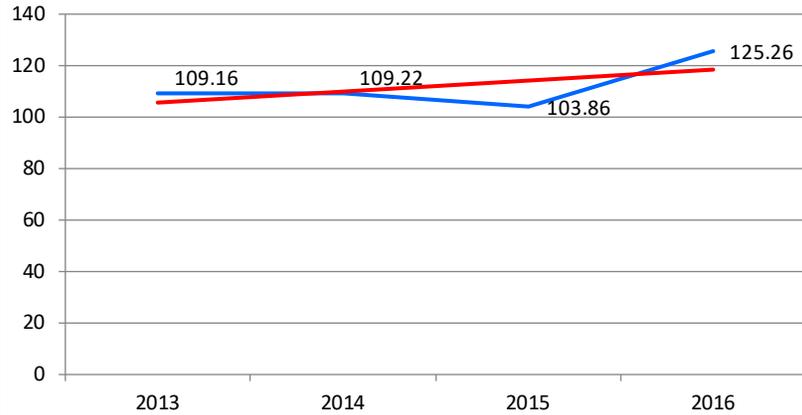
North Coast - District Indices (2013 – 2016) Planned and Unplanned								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2013	92.48	0.635	145.66	0.192	91.80	0.634	144.90	0.192
2014	106.50	0.764	139.43	0.322	90.13	0.748	120.52	0.310
2015	90.58	0.608	148.86	0.299	90.57	0.607	149.14	0.299
2016	117.94	0.686	171.98	0.584	100.43	0.596	168.62	0.438

Northeast - District Indices (2013 – 2016) Planned and Unplanned								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2013	132.14	0.827	159.79	0.265	132.12	0.827	159.80	0.265
2014	122.75	1.028	119.36	0.217	102.93	0.961	107.05	0.216
2015	96.85	0.926	104.59	0.431	96.08	0.917	104.71	0.431
2016	155.61	1.023	152.17	0.410	143.82	0.987	145.71	0.357

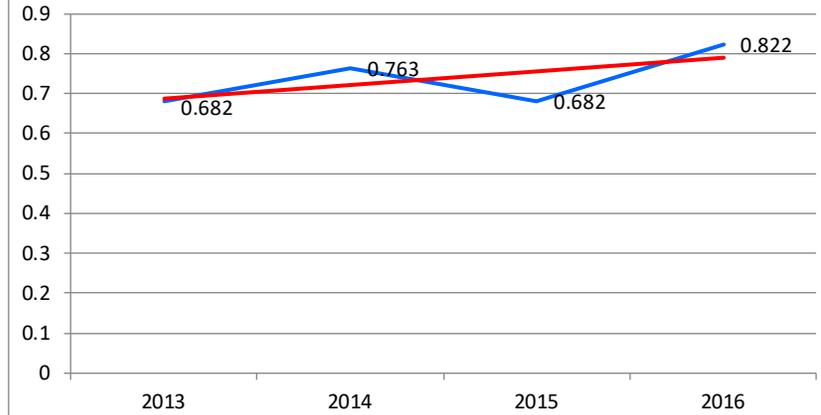
Orange County - District Indices (2013 – 2016) Planned and Unplanned								
MED Included					MED Excluded			
Year	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2013	234.55	1.439	163.02	0.246	66.21	0.447	148.28	0.246
2014	123.79	0.917	135.02	0.349	123.74	0.917	134.98	0.349
2015	82.07	0.521	157.56	0.211	82.07	0.521	157.56	0.211
2016	100.61	0.704	142.86	0.288	90.91	0.675	134.63	0.190

System Indices - Planned and Unplanned (Excludes ISO; Includes MED)

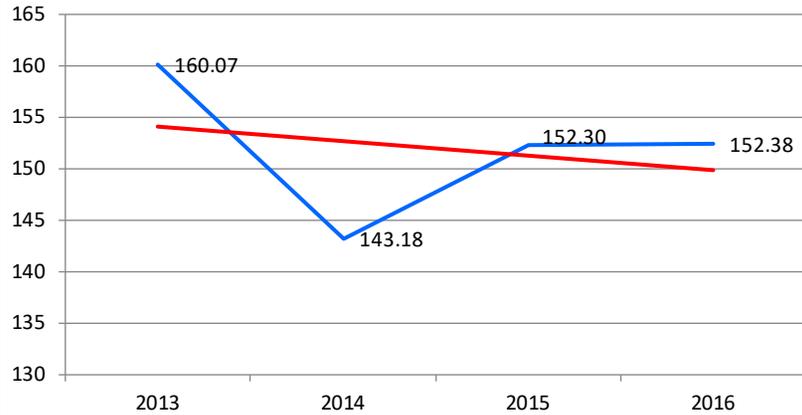
System - SAIDI



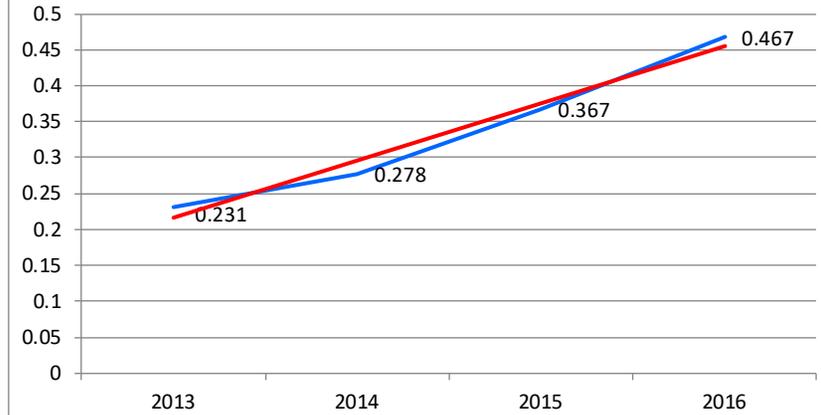
System - SAIFI



System - CAIDI

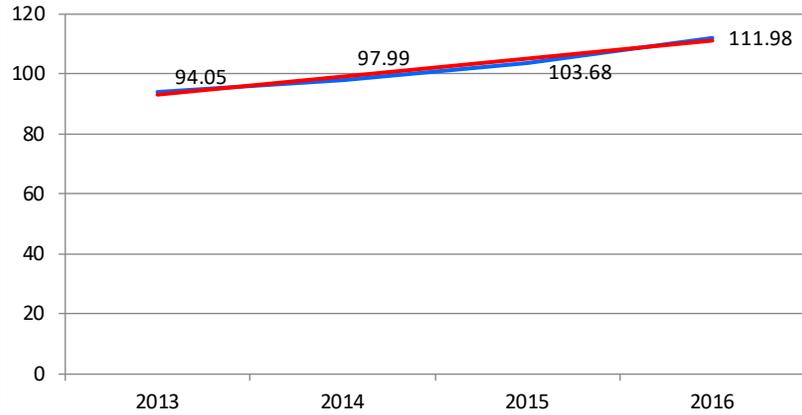


System - MAIFI

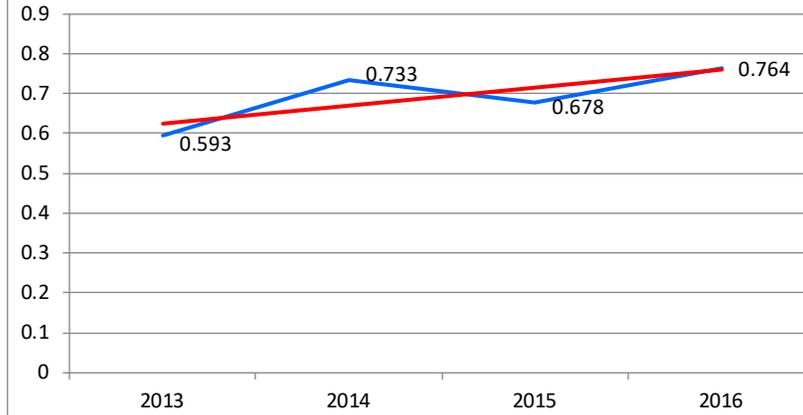


System Indices - Planned and Unplanned (Excludes ISO and MED)

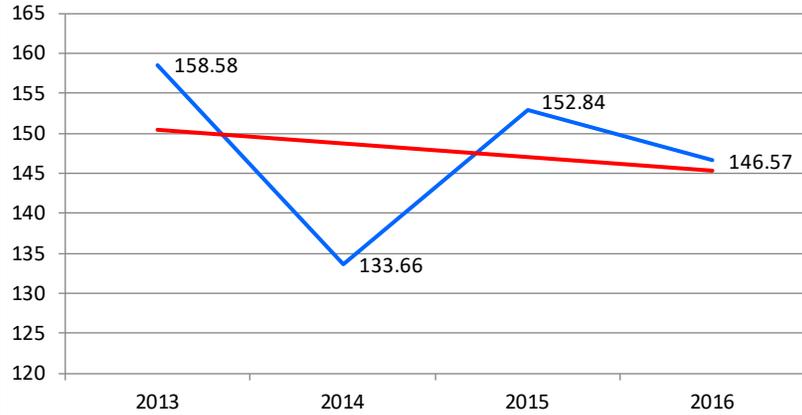
System - SAIDI



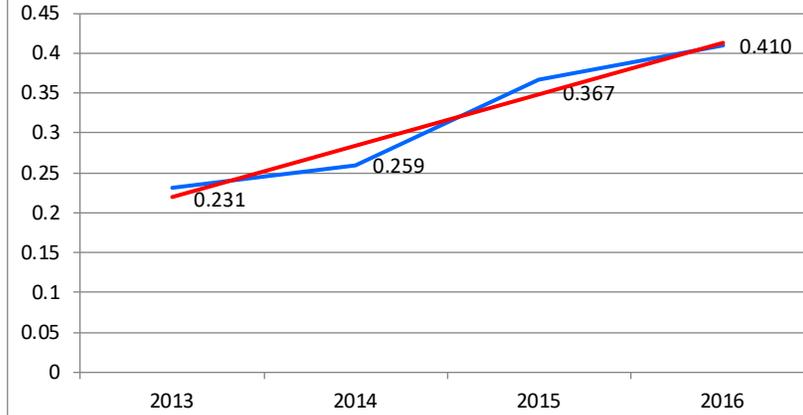
System - SAIFI



System - CAIDI

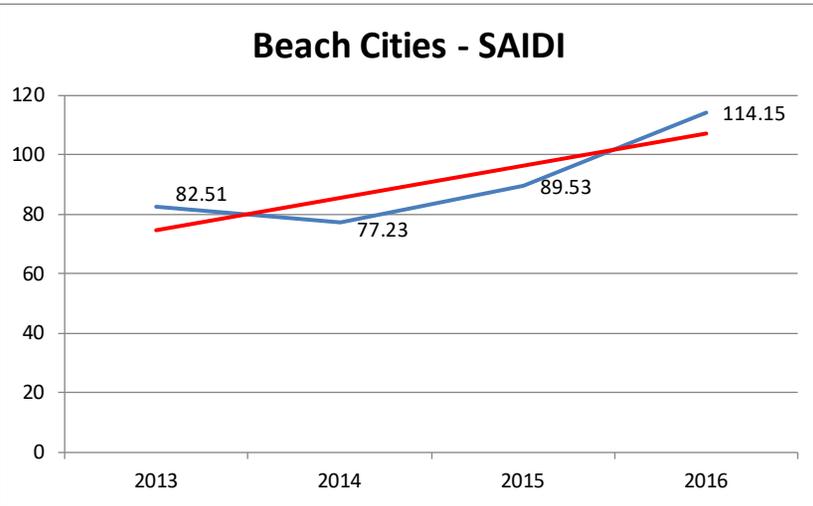


System - MAIFI

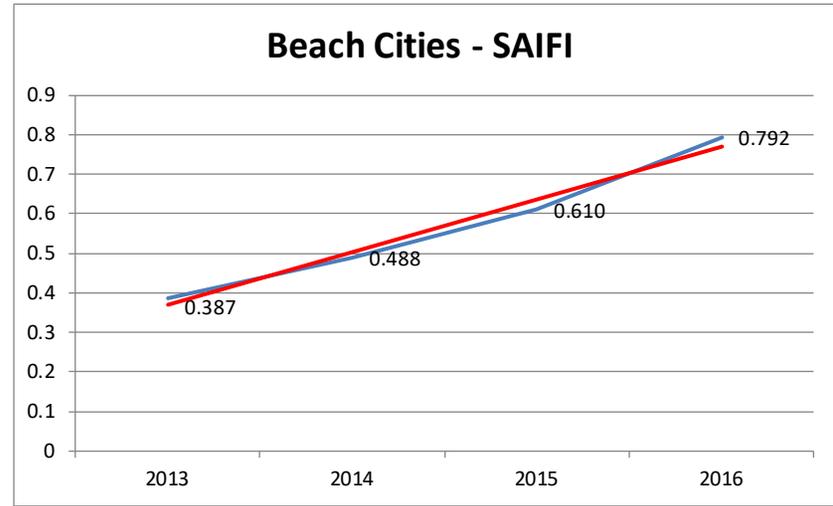


District Indices - Planned and Unplanned (Excludes ISO; Includes MED)

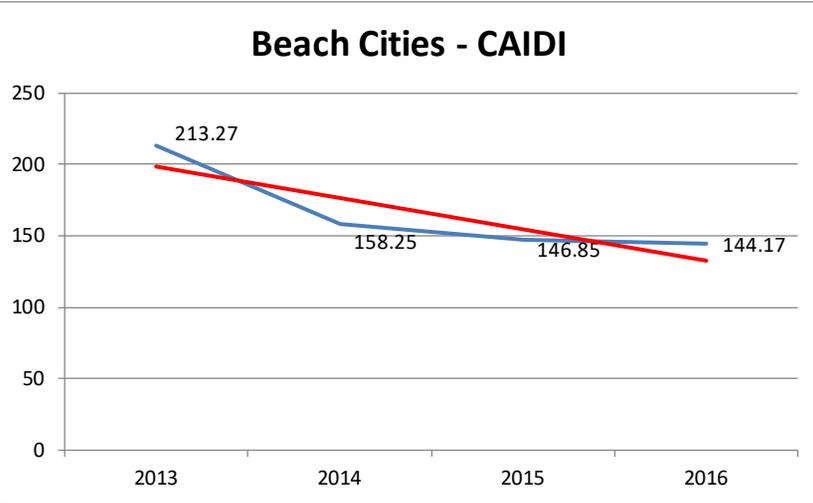
Beach Cities - SAIDI



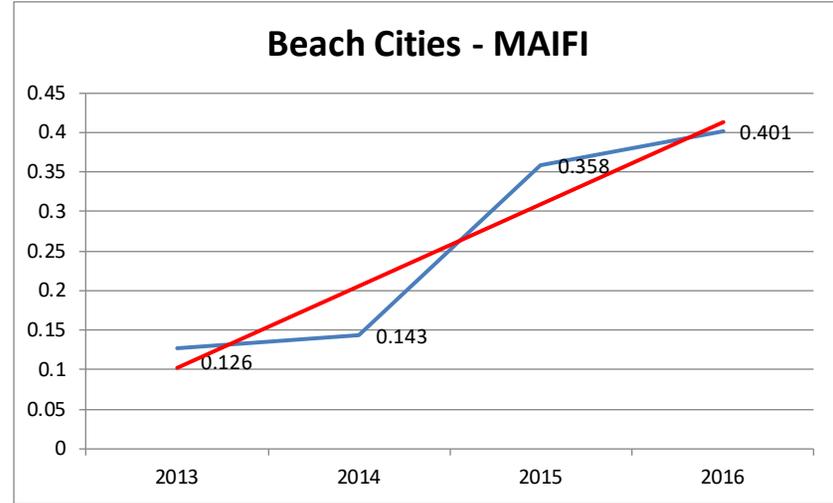
Beach Cities - SAIFI



Beach Cities - CAIDI

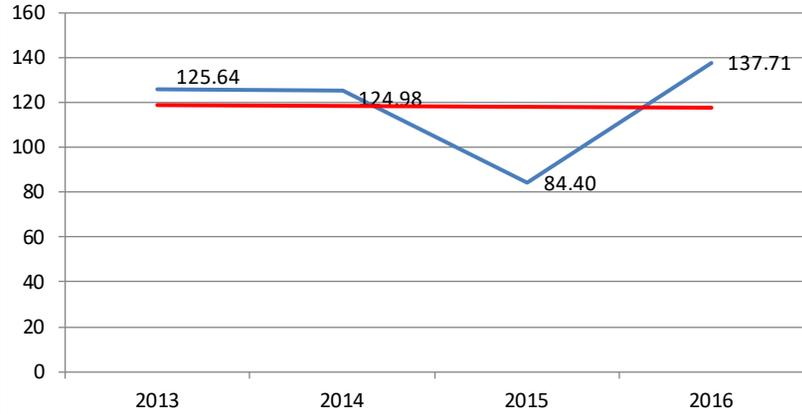


Beach Cities - MAIFI

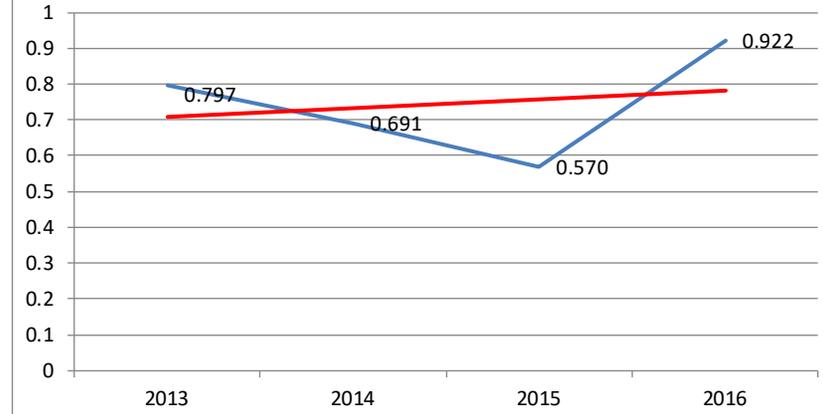


District Indices - Planned and Unplanned (Excludes ISO; Includes MED)

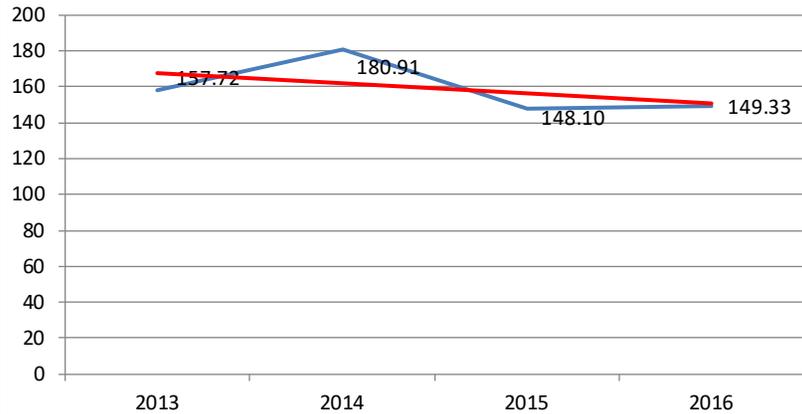
Eastern - SAIDI



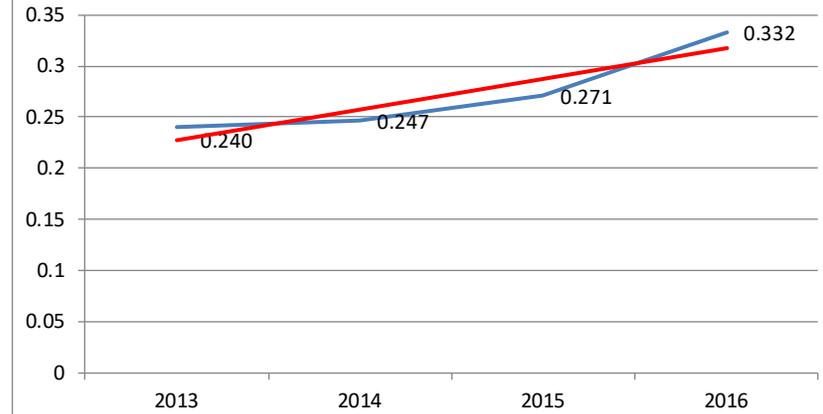
Eastern - SAIFI



Eastern - CAIDI

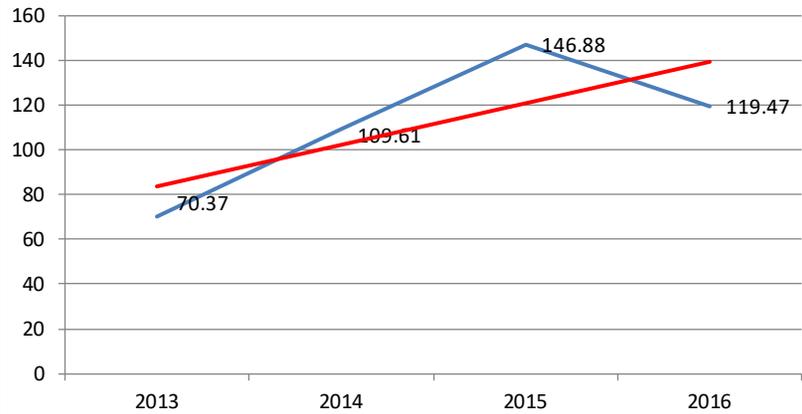


Eastern - MAIFI

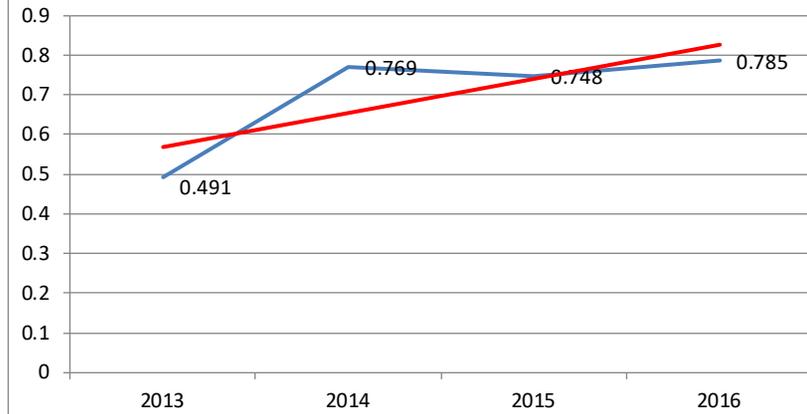


District Indices - Planned and Unplanned (Excludes ISO; Includes MED)

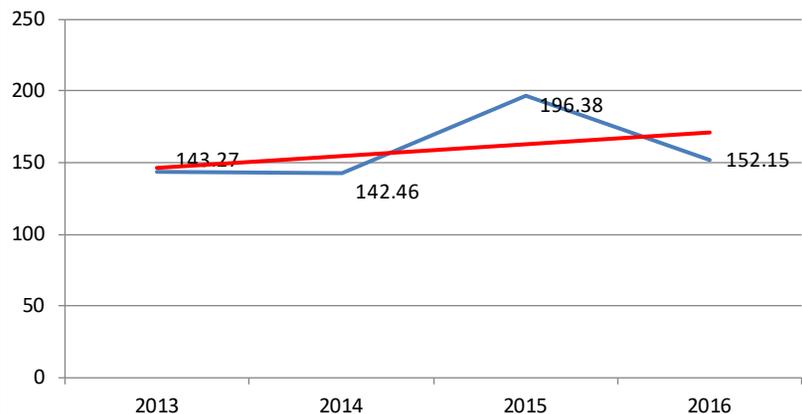
Metro - SAIDI



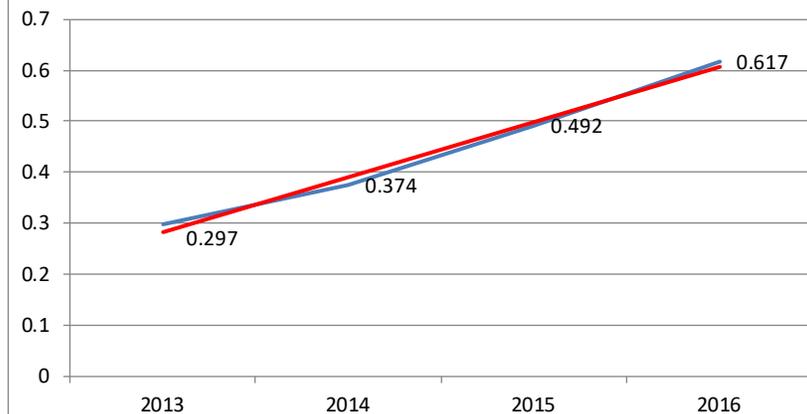
Metro - SAIFI



Metro - CAIDI

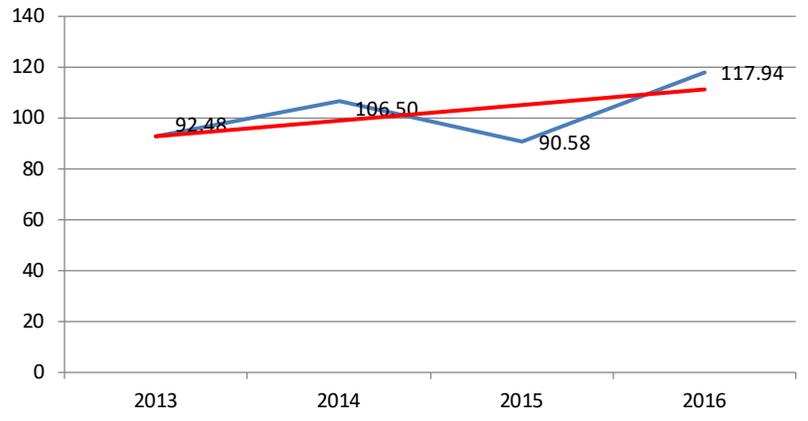


Metro - MAIFI

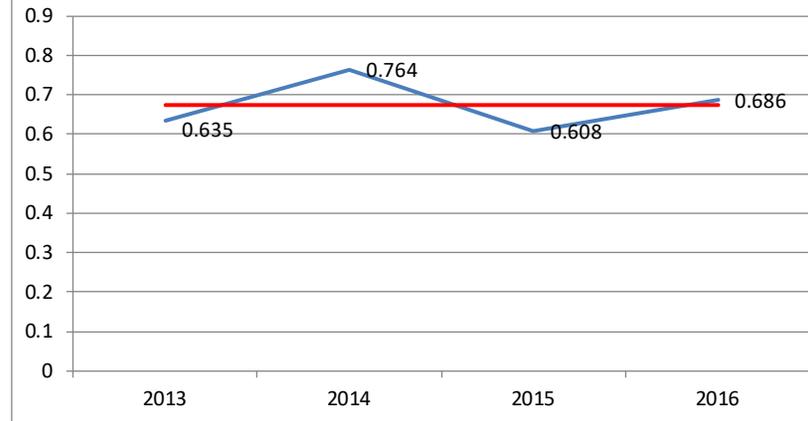


District Indices - Planned and Unplanned (Excludes ISO; Includes MED)

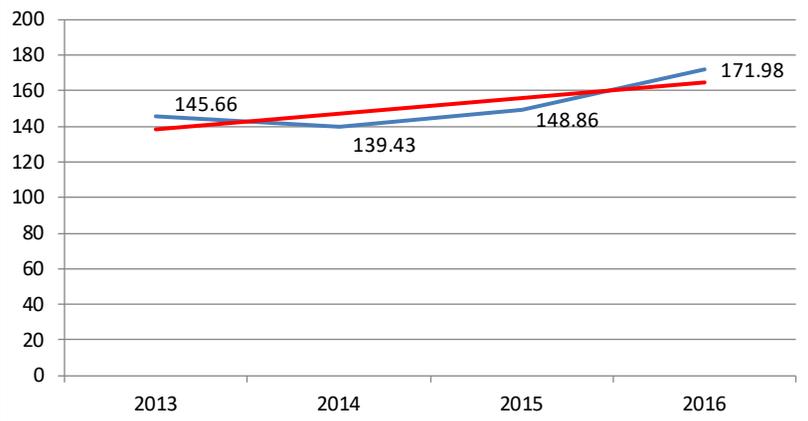
North Coast - SAIDI



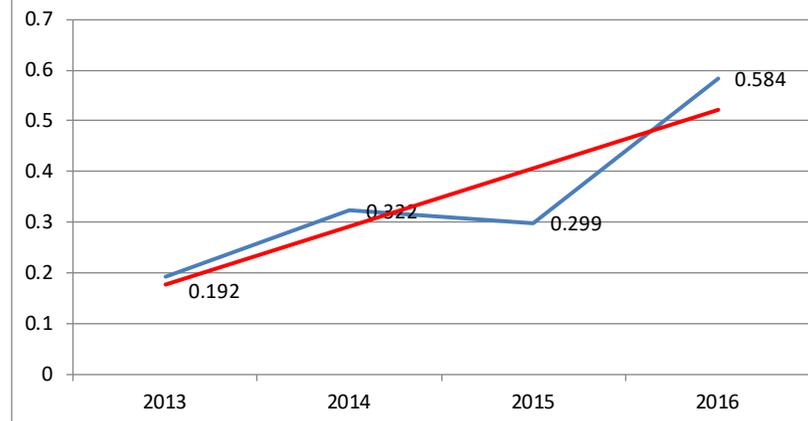
North Coast - SAIFI



North Coast - CAIDI

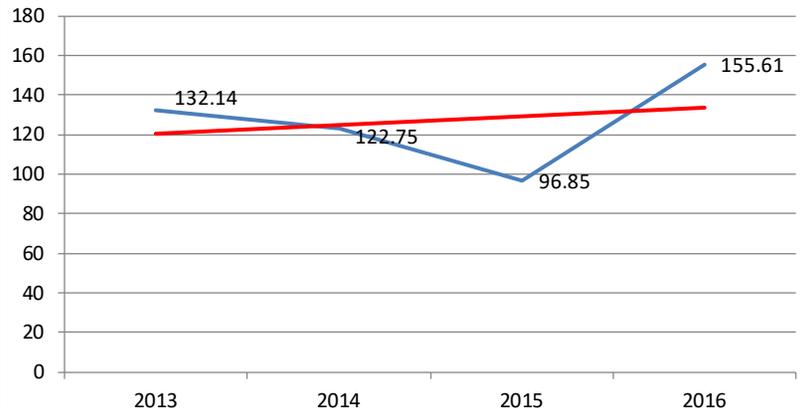


North Coast - MAIFI

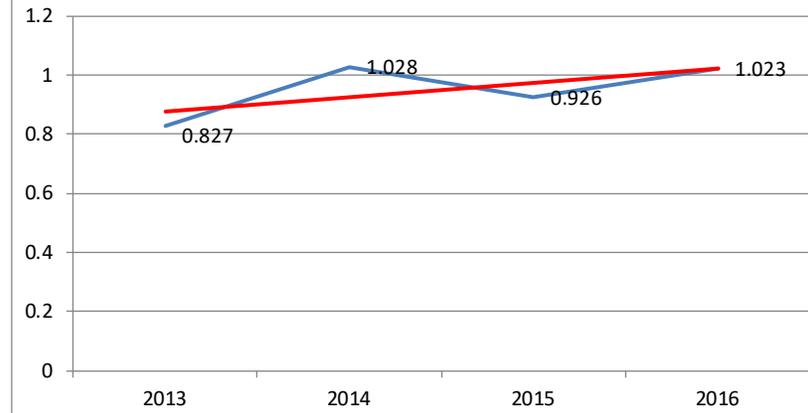


District Indices - Planned and Unplanned (Excludes ISO; Includes MED)

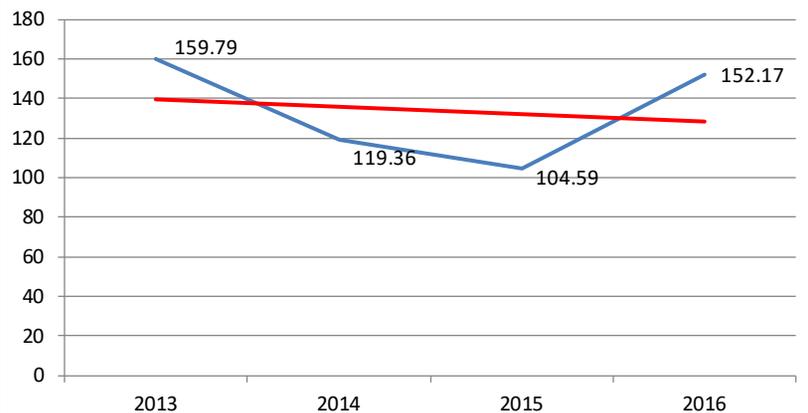
Northeast - SAIDI



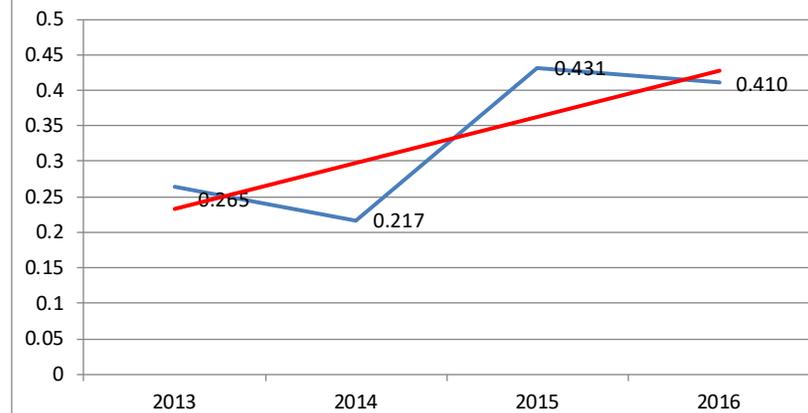
Northeast - SAIFI



Northeast - CAIDI

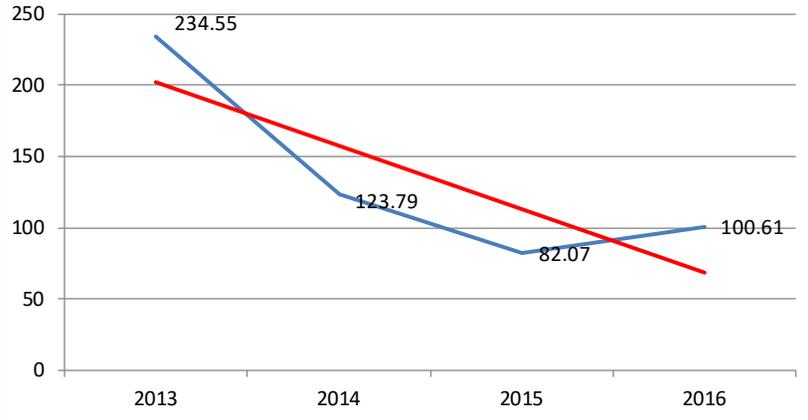


Northeast - MAIFI

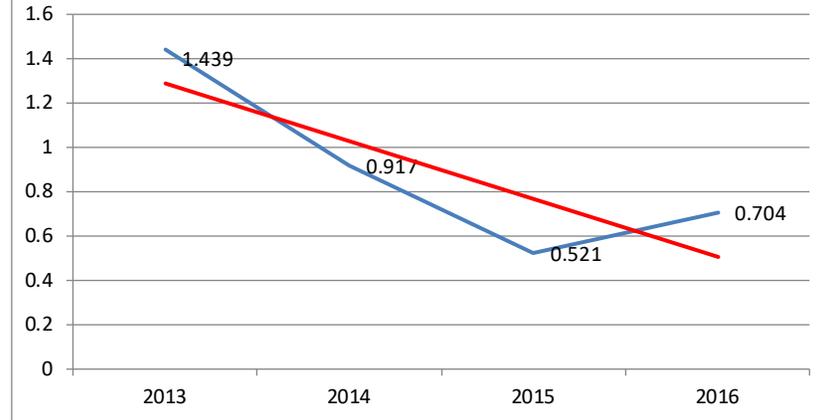


District Indices - Planned and Unplanned (Excludes ISO; Includes MED)

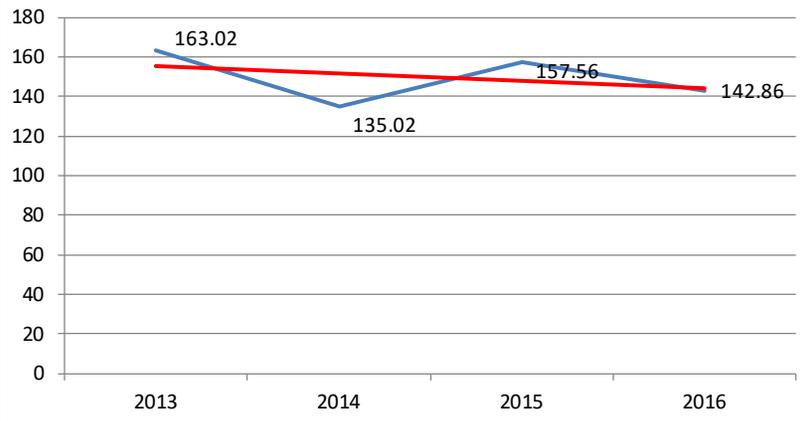
Orange County - SAIDI



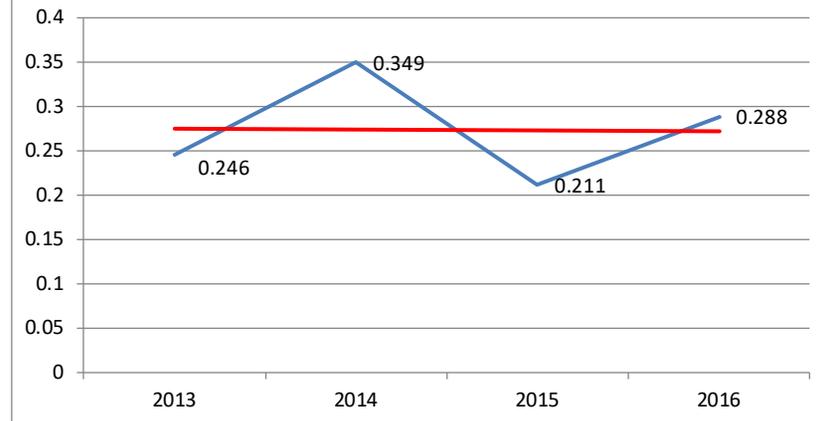
Orange County - SAIFI



Orange County - CAIDI

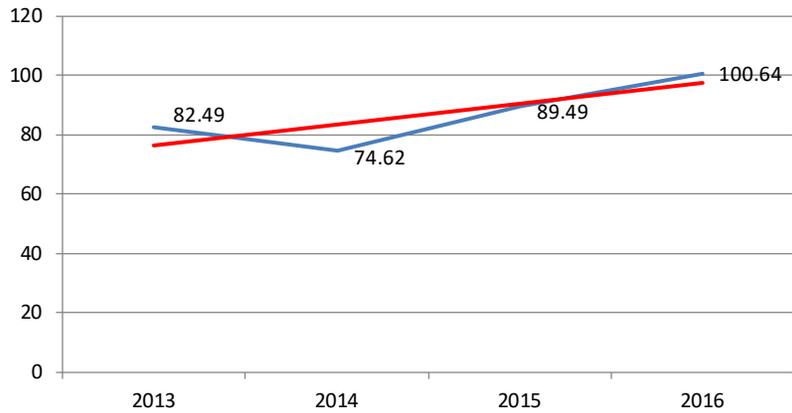


Orange County - MAIFI

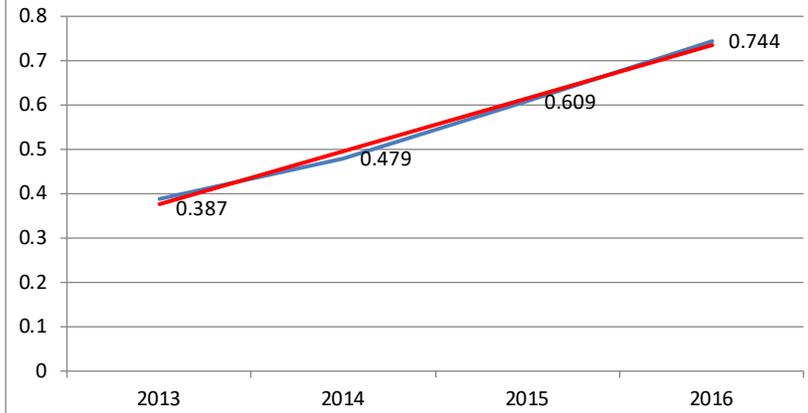


District Indices - Planned and Unplanned (Excludes ISO and MED)

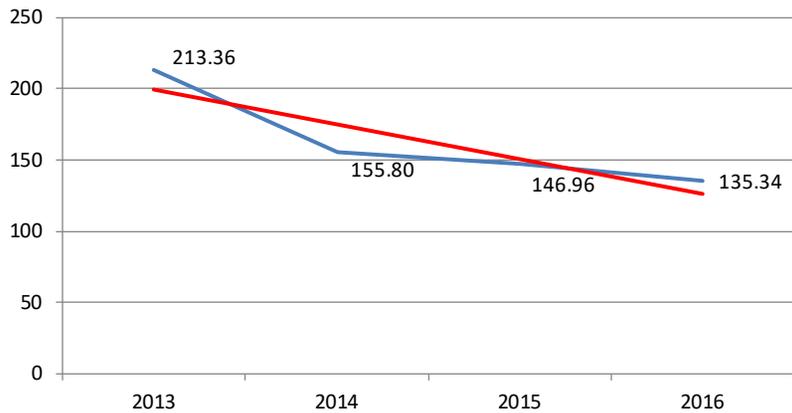
Beach Cities - SAIDI



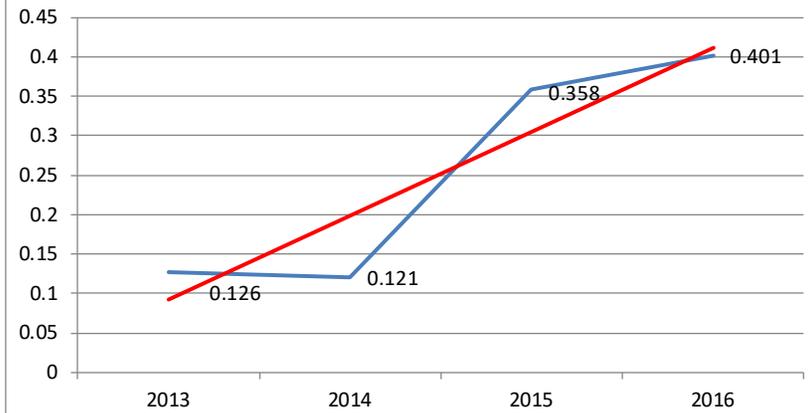
Beach Cities - SAIFI



Beach Cities - CAIDI

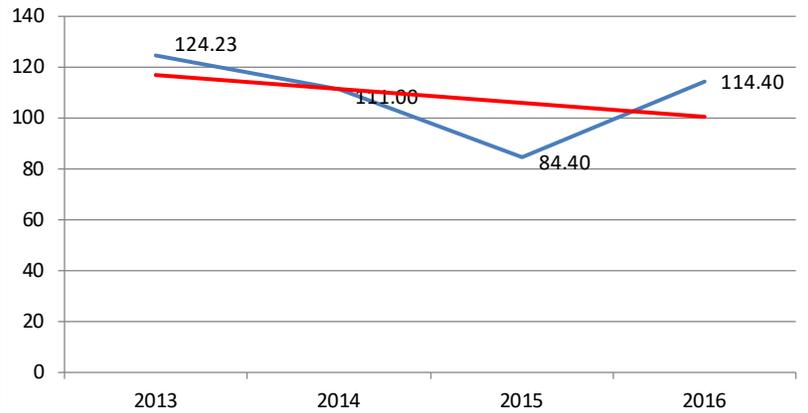


Beach Cities - MAIFI

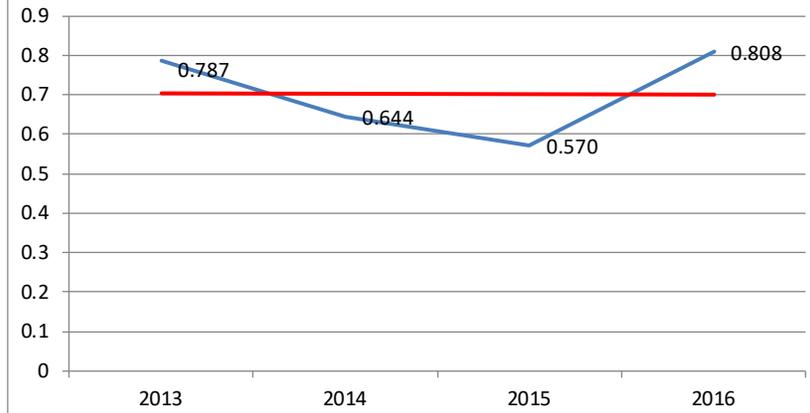


District Indices - Planned and Unplanned (Excludes ISO and MED)

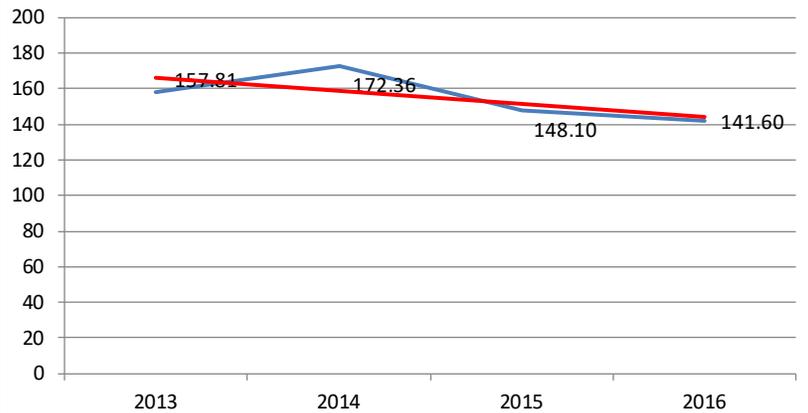
Eastern - SAIDI



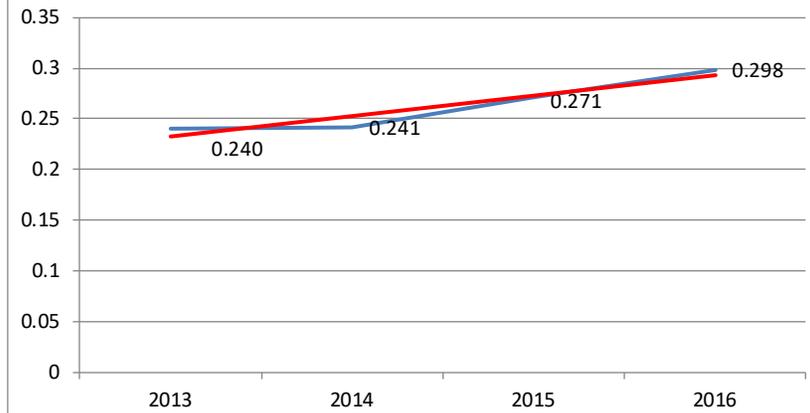
Eastern - SAIFI



Eastern - CAIDI

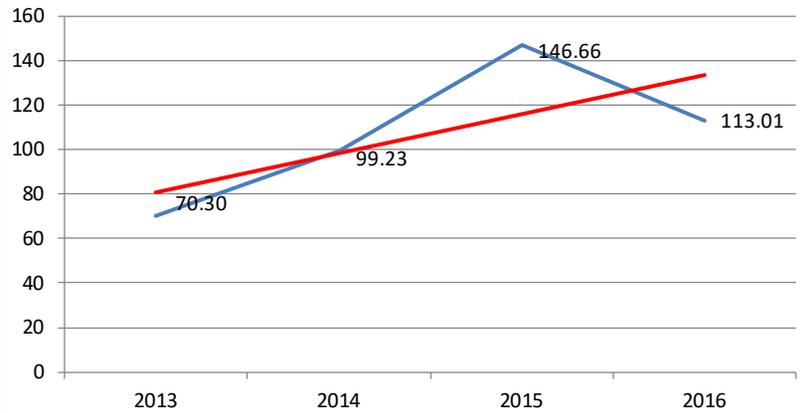


Eastern - MAIFI

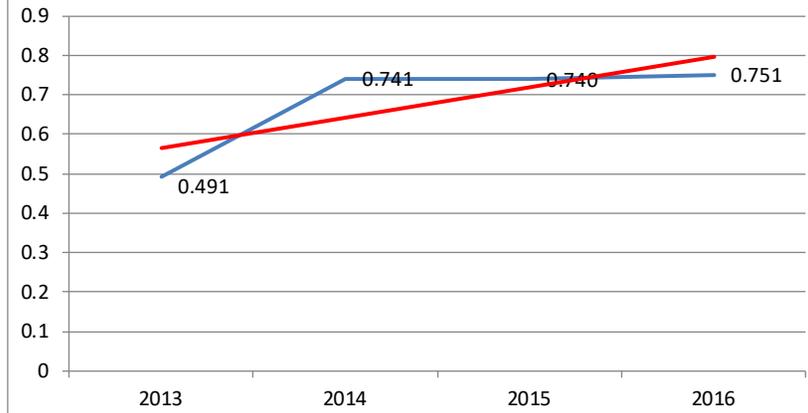


District Indices - Planned and Unplanned (Excludes ISO and MED)

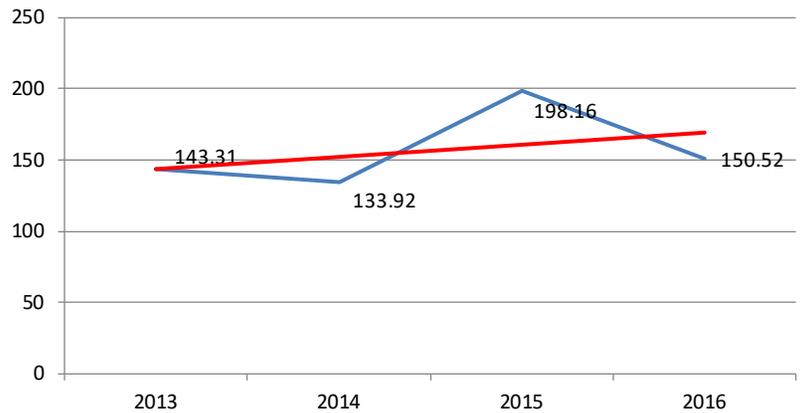
Metro - SAIDI



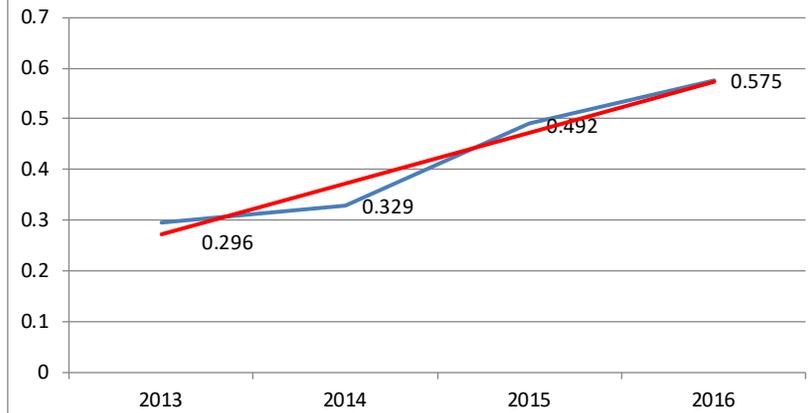
Metro - SAIFI



Metro - CAIDI

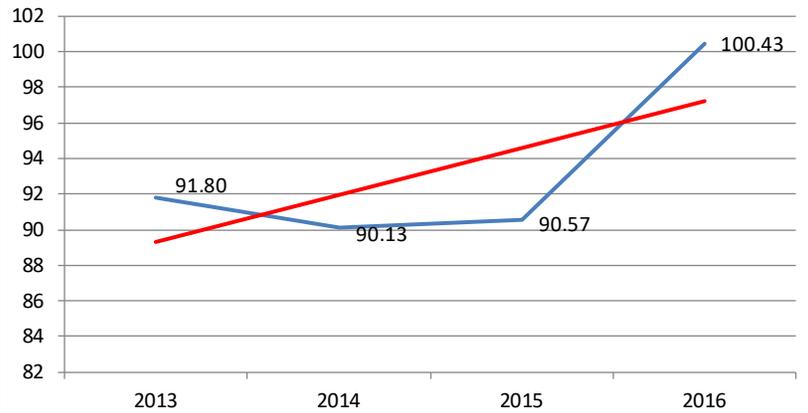


Metro - MAIFI

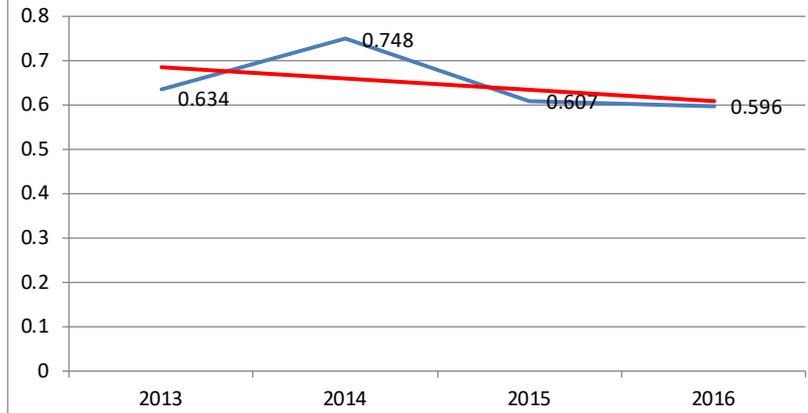


District Indices - Planned and Unplanned (Excludes ISO and MED)

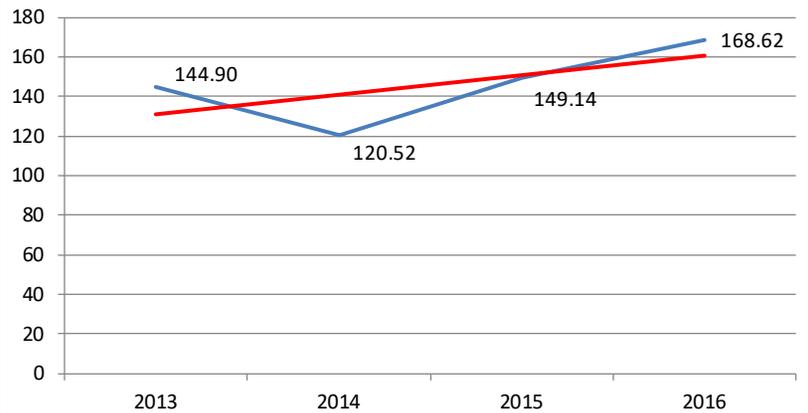
North Coast - SAIDI



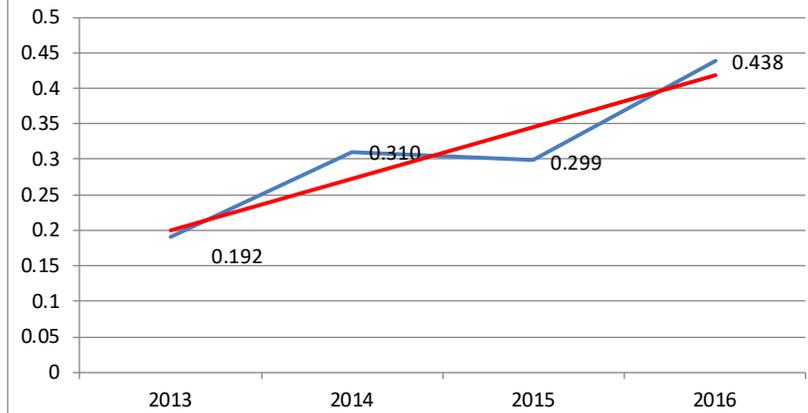
North Coast - SAIFI



North Coast - CAIDI

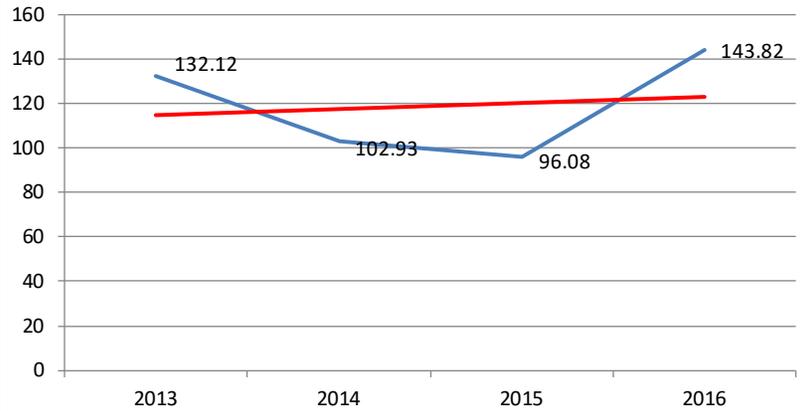


North Coast - MAIFI

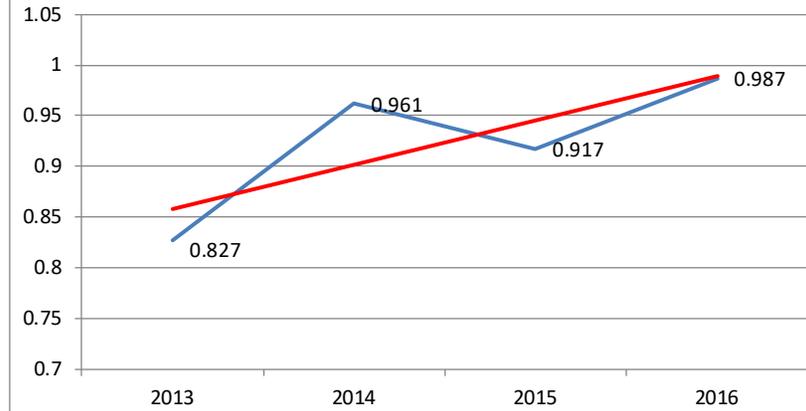


District Indices - Planned and Unplanned (Excludes ISO and MED)

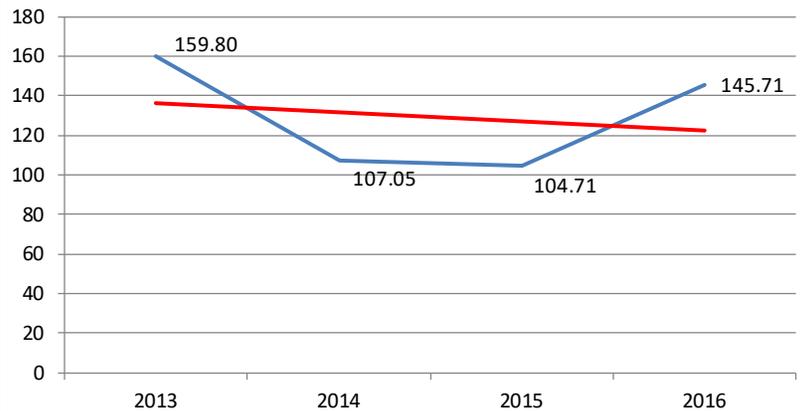
Northeast - SAIDI



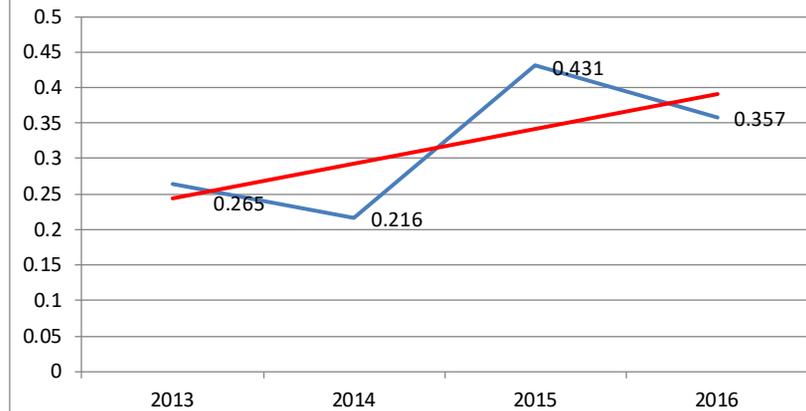
Northeast - SAIFI



Northeast - CAIDI

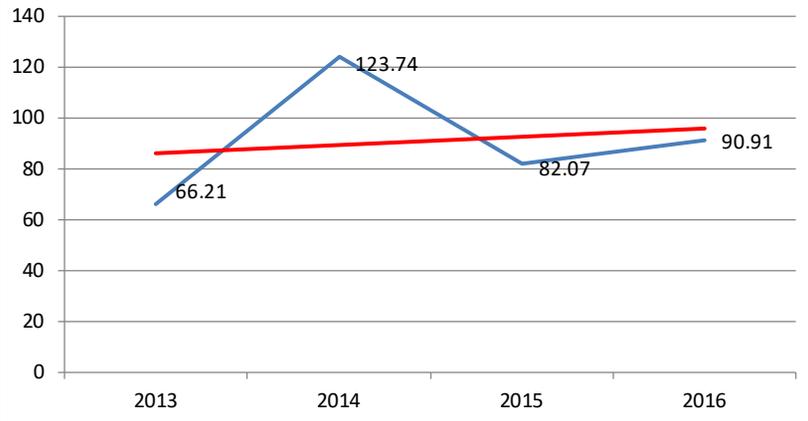


Northeast - MAIFI

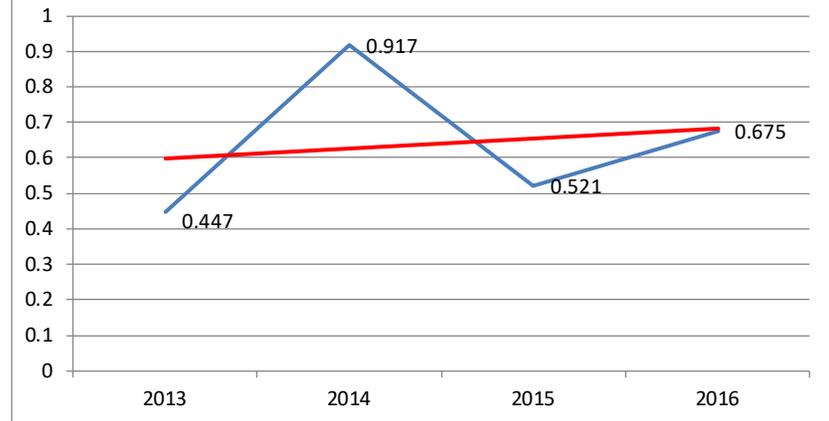


District Indices - Planned and Unplanned (Excludes ISO and MED)

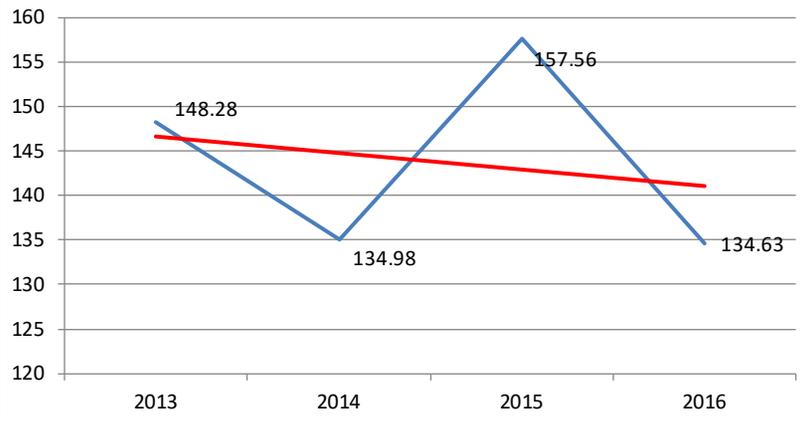
Orange County - SAIDI



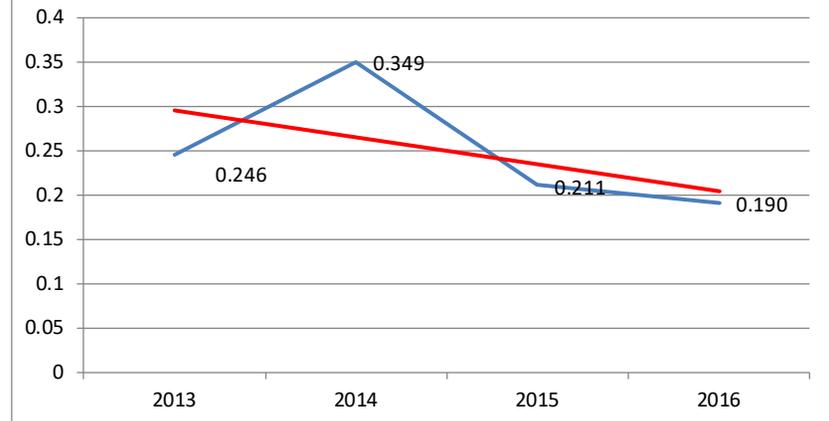
Orange County - SAIFI



Orange County - CAIDI



Orange County - MAIFI



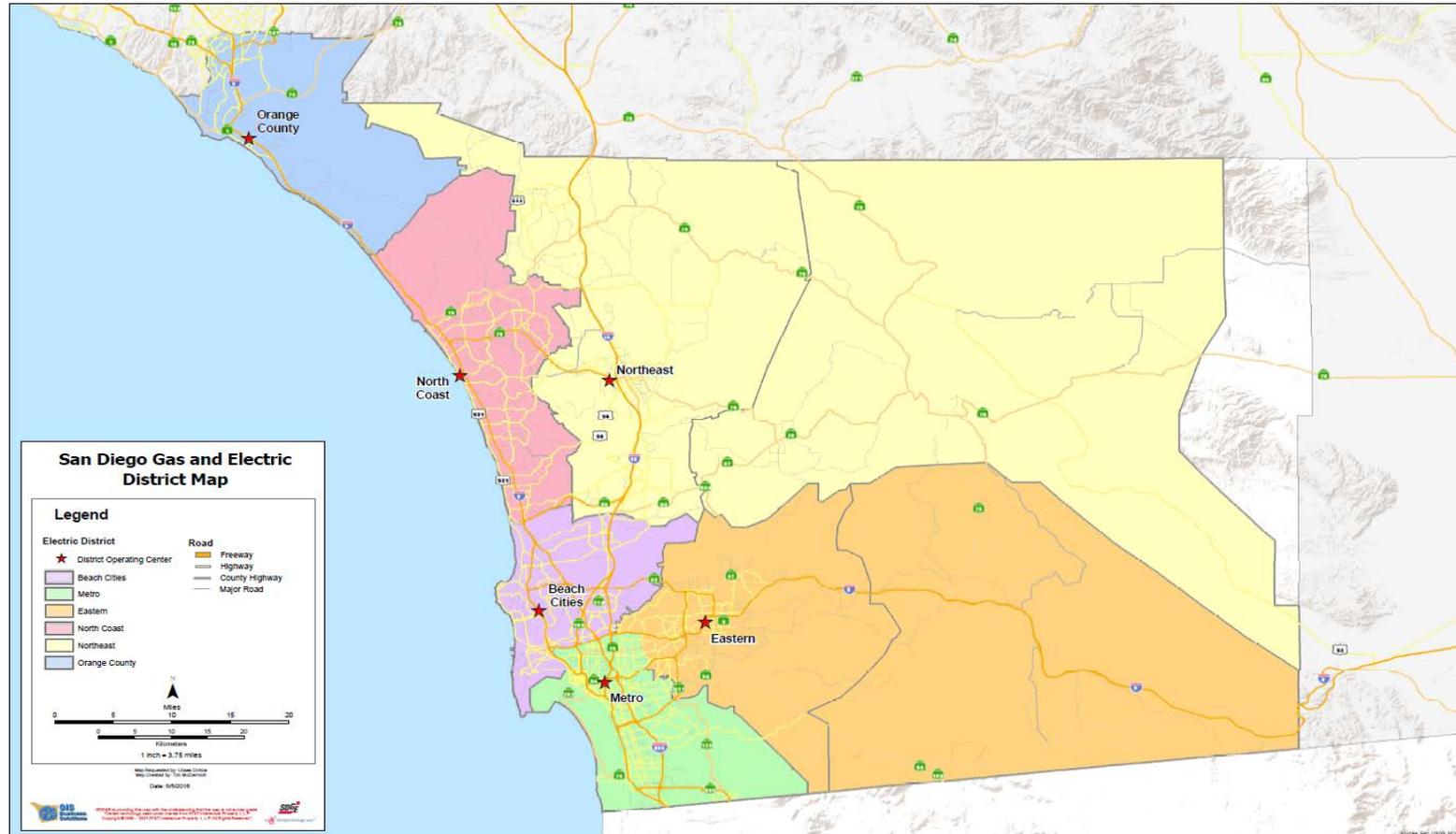
NUMBER, DATE AND LOCATION OF PLANNED OUTAGES IN EACH DISTRICT (2016)

Planned Outages – 2016						
Month	Beach Cities	Eastern	Metro	North Coast	Northeast	Orange County
January	32	67	72	53	127	21
February	42	88	89	53	107	15
March	61	77	86	89	149	27
April	61	58	83	97	161	44
May	68	78	85	98	135	33
June	50	46	93	134	175	37
July	42	38	73	101	116	51
August	53	32	60	104	127	41
September	34	39	84	63	118	32
October	60	46	64	53	122	19
November	55	43	66	54	122	28
December	24	33	65	68	121	17
Totals	582	645	920	967	1580	365

For 2016 there was a total of 5059 planned outages.

SECTION 4 – SERVICE TERRITORY MAP INCLUDING DIVISIONS OF DISTRICTS

MAP OF SERVICE TERRITORY WITH DIVISIONS OF DISTRICTS



SDG&E is providing this map with the understanding that the map is not survey grade.
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SECTION 5 – TOP 1% OF WORST PERFORMING CIRCUITS (WPC) EXCLUDING MED

TOP 1% OF WORST PERFORMING CIRCUITS (2007-2016)

- a. Per the Decision, each utility shall include the following information in its annual report for each WPC: 1) Circuit Name; 2) District/Division; 3) Customer Count; 4) Substation name; 5) Circuit-miles; 6) Percentage underground, or “% UG”; 7) Percentage overhead or “% OH”; 8) Number of mainline/feeder/backbone outages resulting in the operation of either a circuit breaker (“CB”) or automatic re-closer (“AR”); and, 9) its preferred reliability metric.

As required per the Decision, SDG&E is providing a table of WPCs based on the Circuit SAIDI indices (Table 5.1) and based upon the Circuit SAIFI indices (Table 5.2). Each of these indices is based on a two-year historical period¹.

Preferred Metric is Circuit SAIDI

¹ As stated in Section 3.2 of D.16-01-008, each utility shall use two or three years of data, at its discretion, to flag a grouping of worst performing circuits.

Table 5.1:

2016 Worst SAIDI Circuits List based upon 2015-2016 data (Excludes Planned and MED)

Circuit	District	Circuit Customers	Substation Name	Circuit Miles	% OH	% UG	Annualized Feeder Outage Count	Annualized Total Circuit SAIDI **
157	Eastern	1,008	Barrett	114.15	97%	3%	3	779
762	Beach Cities	284	Miramar	7	0%	100%	3	689
*CE3	Metro	110	Central	2.29	0%	100%	1	634
*CE1	Metro	140	Central	1.39	0%	100%	1	544
RD2	Eastern	1,164	Rolando	8.05	0%	100%	1	500
*440	Eastern	262	Glenclyff	23.34	85%	15%	5	483
448	Eastern	982	Cameron	86.37	94%	6%	2	479
CD1	North Coast	409	Carlsbad 1	2.88	32%	68%	0	476
SL1	Northeast	227	Salton	5.05	98%	2%	4	467
EV1	Metro	196	El Rancho Vista	1.83	96%	4%	2	443

* Circuit appeared on the previous worst performance list

** Circuit SAIDI represents all outages: Mainline, Feeder, Backbone, and Branch

Preferred Metric is Circuit SAIDI. Based upon 2 Years data annualized.

Table 5.2:

2016 Worst SAIFI Circuits List based upon 2015-2016 data (Excludes Planned and MED)

Circuit	District	Circuit Customers	Substation Name	Circuit Miles	% OH	% UG	Annualized Feeder Outage Count	Annualized Total Circuit SAIFI **
440	Eastern	262	GLENCLIFF	23.34	85%	15%	5	4.5
MAN1	Northeast	104	MANZANITA	3.98	100%	0%	4	4.5
SL1	Northeast	227	SALTON	5.05	98%	2%	4	4.3
442	Eastern	856	GLENCLIFF	33.05	86%	14%	5	4.2
221	Northeast	1,113	SANTA YSABEL	93.29	94%	6%	5	4.0
OK1	Northeast	152	OAKS 1	8.60	98%	2%	4	3.9
172	Northeast	987	BORREGO	58.40	67%	33%	4	3.8
449	Eastern	621	CAMERON	32.44	96%	4%	5	3.8
170	Northeast	626	BORREGO	52.02	69%	31%	4	3.7
MOR1	Northeast	100	MOORE	4.38	66%	34%	3	3.5

** Circuit SAIFI represents all outages: Mainline, Feeder, Backbone, and Branch

Preferred Metric is Circuit SAIDI. Based upon 2 Years data annualized.

- b. Any circuit appearing on this list of “deficient” WPC circuits that also appeared on the previous year's list would be marked by an asterisk. For each asterisked circuit, each utility shall provide the following information:

Circuit CE1

- i. An explanation of why it was ranked as a "deficient" circuit, i.e., the value of the metric used to indicate its performance;

CE1 was listed as a worst circuit due to circuit SAIDI performance.

- ii. A historical record of the metric;

CE1: 2 Year Circuit SAIDI Data

Year	2015	2016
Circuit SAIDI	1089	0

Note: See methodology in section 5d

- iii. An explanation of why it was on the deficiency list again;

Circuit CE1 is identified as a WPC in the 2016 Electric Reliability Report primarily due to having experienced two related outages in 2015², both of which are under the same outage cause description (see table below). The outages were caused by a fault on an underground cable section of this circuit and restoration of service was delayed due to SDG&E personnel requiring special protocols to access “Do Not Operate Energized” classified equipment.

Outage ID	Cause Description	Cause Category	Start Date	Start Time	Affected Device Type	Sustained Customer Impact	Circuit SAIDI	Circuit SAIFI	System SAIDI	System SAIFI
150605E70807	Faulted cable	Equipment	6/5/2015	17:10	UG CABLE	145	1082	0.9797	0.112	0.0001
150605E70807	Faulted cable	Equipment	6/6/2015	17:42	UG CABLE	145	7	0.9797	0.001	0.0001

- iv. An explanation of what is being done to improve the circuit's future performance and the anticipated timeline for completing those activities (or an explanation why remediation is not being planned); and

² Because WPCs are determined based on a SAIDI value that is calculated using two cumulative years of outage data, outages that may have been the primary reason for a circuit being classified as a WPC in the previous year's Reliability Report may continue to be the primary reason for that same circuit being classified as a WPC in the current year's Reliability Report.

SDG&E has identified a solution to improve the performance of circuit CE1; however, that solution involves replacing/repairing equipment that is classified as “Do Not Operate Energized.” Replacing this switch restores sectionalizing capability on this circuit and will minimize customer impact should further equipment failures occur. The replacement identified, requires special modifications to existing manhole infrastructure due to the vintage of the underground facilities on this circuit. SDG&E’s personnel are coordinating efforts to perform this enhancements and project completion is scheduled by Q1 2018.

- v. A quantitative description of the utility's expectation for that circuit's future performance.

Based on calculations performed on the reliability enhancements, the customers would see a circuit SAIDI enhancement of approximately 7.3 minutes and a circuit SAIFI benefit of 0.0810 per year.

Circuit CE3

- i. An explanation of why it was ranked as a "deficient" circuit, i.e., the value of the metric used to indicate its performance;

CE3 was listed as a worst circuit due to circuit SAIDI performance.

- ii. A historical record of the metric;

CE3: 2 Year Circuit SAIDI Data

Year	2015	2016
Circuit SAIDI	1269	0

Note: See methodology in section 5d

- iii. An explanation of why it was on the deficiency list again;

Circuit CE3 is identified as a WPC in the 2016 Electric Reliability Report primarily due to two significant outages that occurred in 2015³.

Outage ID	Cause Description	Cause Category	Start Date	Start Time	Affected Device Type	Sustained Customer Impact	Circuit SAIDI	Circuit SAIFI	System SAIDI	System SAIFI
15060E70807	Faulted cable	Equipment	6/5/2015	11:14	UG CABLE	135	1263	0.9247	0.129	0.0001
150608E70959	Transformer	Equipment	6/8/2015	16:59	Transformer	3	6	0.0205	0.001	0.0000

- iv. An explanation of what is being done to improve the circuit's future performance and the anticipated timeline for completing those activities (or an explanation why remediation is not being planned); and

SDG&E has identified a solution to improve the performance of circuit CE3; however, that solution involves replacing/repairing equipment classified as Do Not Operate Energized. SDG&E personnel are coordinating efforts to schedule this project in conjunction with the switch replacement project related to circuit CE1.

The solution also involves replacing leaking and unjacketed cable.

- v. A quantitative description of the utility's expectation for that circuit's future performance.

Based on calculations performed on the reliability enhancements, the customers would see a circuit SAIDI enhancement of approximately 66.51 minutes and a circuit SAIFI benefit of 0.6784 per year.

³ See footnote 2.

Circuit 440

- i. An explanation of why it was ranked as a "deficient" circuit, i.e., the value of the metric used to indicate its performance;

C440 was listed as a worst circuit due to circuit SAIDI performance.

- ii. A historical record of the metric;

C440: 2 Year Circuit SAIDI Data

Year	2015	2016
Circuit SAIDI	318	648

Note: See methodology in section 5d

- iii. An explanation of why it was on the deficiency list again;

Circuit 440 is identified as a WPC in the 2016 Electric Reliability Report primarily due to several large sustained outages caused during severe weather events in 2016. The outages were related to the operation of field switches and a flashover at the substation caused by severe weather.

- iv. An explanation of what is being done to improve the circuit's future performance and the anticipated timeline for completing those activities (or an explanation why remediation is not being planned); and

As mentioned in the 2015 Reliability Report, circuit 440 is located in the Cleveland National Forrest (CNF) in San Diego County. SDG&E received approval from CPUC in 2015 to proceed with CNF Master Special Use Project. As part of this project, circuit 440 will undergo hardening in the next several years including undergrounding a portion of this circuit.

- v. A quantitative description of the utility's expectation for that circuit's future performance.

Based on calculations performed on the reliability enhancements, the customers would see a circuit SAIDI enhancement of approximately 190 minutes and a circuit SAIFI benefit of 1.34 per year.

c. Language to explain how the IOUs' include a cost effectiveness review as part of their respective internal review processes for circuit remediation projects.

i. Definitions of terms, acronyms, limitations, and assumptions;

Definitions:

RAT - Reliability Assessment Team

WPC- Worst Performing Circuits

Assumptions

Our analysis excludes planned outages, TMED outages, and circuits with less than 100 customers for WPC calculation.

ii. A clear explanation of the utility's process to determine the worst performing circuits:

Methodology used in the Annual Reliability Report

The Worst Performing Circuits identified in this Report are determined by first calculating the SAIDI for each circuit based upon the previous two years of unplanned outage data, ranking those circuits highest to lowest based upon the SAIDI value, and then selecting the 1% of the circuits with the highest SAIDI value. Planned and TMED events are excluded, and circuits with less than 100 customers are also excluded. SDG&E had 1032 circuits in 2016, so this report reflects the ten WPCs.

- iii. A clear explanation of the utility's process to determine cost-effective remediation projects. This shall include why the utility may decide to implement a project to address one worst performing circuit issue while deciding to not implement a project to address a different worst performing circuit.

SDG&E established an internal Reliability Assessment Team (RAT) in 1997 with the charge to identify ways to improve the service reliability of our distribution system. This team is comprised of technical leaders from Distribution Operations, Engineering Standards, Regional Operations, System Protection, and Distribution Asset Management. The Reliability Assessment Team meets regularly to evaluate and authorize reliability improvement projects for areas with low circuit reliability and where customer satisfaction issues arise. The team provides strategy and guidance for continuous improvements to system reliability, integrated planning support, and budget management.

District engineers present proposals for reliability improvement projects along with a circuit analysis, cost-benefit analysis, and details on customer impact. SDG&E has implemented a practice to identify projects to be reviewed and approved by an engineering committee, and then prioritized based on the largest benefit to cost ratio to ensure the projects that create the largest proportional system benefit are realized first.

In 2016, the Reliability Assessment Team approved a number of circuit improvement projects in addition to monitoring budgets, reviewing new equipment and assisting various work groups with operational issues. Ongoing RAT initiatives include:

- Improvements to worst performing circuits
- Reduction in the number of customers between sectionalizing devices
- SCADA Initiative for 12 kV circuits
- Utilization of Branch Analysis Model and Circuit Reliability Analysis Model

The Reliability Assessment Team continues to coordinate activities with the Electric Risk Analysis team, a cross-functional team responsible for reducing risk and improving reliability in the service territory's rural areas.

SECTION 6 – TOP 10 MAJOR UNPLANNED POWER OUTAGE EVENTS WITHIN A REPORTING YEAR

TOP 10 MAJOR UNPLANNED OUTAGE EVENTS (2016)

The table below captures the top 10 major unplanned outage events for 2016 including the cause and the location of the outage.

Top 10 Major Unplanned Power Outage Events						
Rank	Outage Date	Cause	Location	Customer Impact	SAIDI	SAIFI
1	1/31/2016	1/31 - 2/1 El Nino Storm	BC, CM, EA, NC, NE, OC	86963	13.35	0.061
2	7/21/2016	Mylar Balloon	CM	17896	1.15	0.012
3	1/5/2016	1/5 - 1/7 El Nino Storm	BC, CM, EA, NC, NE, OC	16236	0.80	0.011
4	4/3/2016	Foreign object in line	EA	14630	0.61	0.010
5	3/28/2016	Crew error	EA	12702	0.10	0.009
6	8/31/2016	Faulted portable cables	EA	12170	0.37	0.008
7	9/21/2016	Damaged capacitor bank	CM	11274	0.50	0.008
8	5/13/2016	Faulted disconnect	BC	10568	0.23	0.007
9	7/9/2016	Circuit Failure	EA	8645	0.40	0.006
10	11/15/2016	Tee Failure	CM	7253	0.37	0.005

Based on customer impact

SECTION 7 – SUMMARY LIST OF MED PER IEEE 1366

2016 SUMMARY LIST OF MED (2016)

The table below captures all MED occurring in 2016. The information includes the number of customers without services at periodic intervals, the cause and the location of the Major Event.

Table 8-1 2016 Summary List of MED

Date of Outage	Description of Outage	Location	Total Number of Customers Out of Service	Customers Interrupted - Hours Into the Event Day *									
				0	1	2	3	4	5	6	7	8	
January 31	El Nino Rain Storm	All Districts	82,989	0	0	0	0	0	0	0	0	0	0
				Customers Interrupted - Hours Into the Event Day (continued)									
				9	10	11	12	13	14	15	16	17	
				662	766	120	48	160	809	20127	39738	39582	
				Customers Interrupted - Hours Into the Event Day (continued)									
				18	19	20	21	22	23	24	25	26	
				20411	20441	23132	21564	25286	22756	20686	13083	9905	
				Customers Interrupted - Hours Into the Event Day (continued)									
				27	28	29	30	31	32	33	34	35	
				5705	4669	4635	4223	3557	2665	2582	2339	2287	
				Customers Interrupted - Hours Into the Event Day (continued)									
				36	37	38	39	40	41	42	43	44	
				1941	1941	1421	882	875	599	427	364	364	
				Customers Interrupted - Hours Into the Event Day (continued)									
				45	46	47	48	49	50	51	52		
				9	9	9	9	9	9	9	0		

Customers reflected in the time increments include all customers experiencing outages at that point in time. The event day begins at midnight.

SECTION 8 – HISTORICAL 10 LARGEST UNPLANNED OUTAGES EVENTS FOR THE PAST 10 YEARS

HISTORICAL LARGEST UNPLANNED OUTAGE EVENTS (2007-2016)

The tables below capture the ten largest unplanned outage events for each of the years from 2016 – 2007

2016

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	1/31/2016	13.35	0.061	1/31-2/1 El Niño Storm
2	7/21/2016	1.15	0.012	Station F – Mylar Balloon on Circuit 366
3	1/31/2016	0.99	0.003	Circuit 486 – Tree in primary
4	8/9/2016	0.93	0.002	Genesee Sub – Circuits 268 & 65
5	7/26/2016	0.88	0.002	Circuit 582 – Wire Down, faulted cable, blown switch
6	6/19/2016	0.87	0.001	Border Fire – Circuits 448 & 157
7	8/23/2016	0.84	0.003	Transmission Lines 6926 & 681 – car contact
8	11/12/2016	0.83	0.001	Circuit 198 – Pendleton Aircraft Contact
9	1/5/2016	0.80	0.011	El Niño Storm – 1/5-1/7
10	6/26/2016	0.77	0.001	Circuit RD@ - Vehicle contact w/ Trayer switch

2015

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	9/20/2015	5.15	0.089	9/20 Load Curtailment
2	7/18/2015	2.26	0.016	July 18-20 Rain Storm
3	11/25/2015	1.75	0.010	Transmission Lines 641 & 642 - Montgomery Sub Outage
4	7/3/2015	1.00	0.006	Circuits 366 & BRM1 Outage
5	8/13/2015	0.67	0.001	Circuit 438 - Faulted Tee
6	4/18/2015	0.64	0.002	Circuit 821 - Tee Failure
7	9/15/2015	0.60	0.006	Circuits 1049 & 167 - Car contact w/ fuse cab
8	9/12/2015	0.59	0.003	Circuit 255 - Wire Down
9	9/9/2015	0.49	0.004	Circuit 287 - Blowing tees
10	5/12/2015	0.47	0.003	Circuit 952 - Vehicle Contact

2014

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	5/13/2014	9.73	0.036	May 13 through May 18 Wind and Fire Storm
2	9/14/2014	5.30	0.018	September 14 through September 17 Heat/Rain Storm
3	4/29/2014	3.59	0.014	April 29 through May 1 Wind Storm
4	11/15/2014	2.16	0.033	Station F Substation Outage - Bank 30, 31 & 32
5	2/28/2014	1.23	0.008	February 28, 2014 Rain Storm
6	5/31/2014	0.95	0.004	Circuits 792 & 795 Exceeding 500,000 Customer Minutes
7	6/15/2014	0.90	0.004	Circuits 545 and BP1 Exceeding 500,000 Customer Minutes
8	3/9/2014	0.80	0.004	Circuit 460 Exceeding 500,000 Customer Minutes
9	11/22/2014	0.68	0.003	Circuits 362 - Cable Failure
10	1/12/2014	0.66	0.003	Circuit 163 - Exceeding 500,000 Customer Minutes

2013

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	7/18/2013	14.85	0.087	Orange County Transmission Outage
2	9/3/2013	3.26	0.018	Heat and Rain Storm - Sept 3 through Sept 8
3	4/8/2013	1.76	0.002	Transmission Line 687 - De-energized for safety, poles down
4	12/26/2013	1.11	0.006	Circuits 1435, 363, & GH2 - Contractor Error/Label Error
5	6/4/2013	0.78	0.002	Transmission Line 687 Borrego Substation Outage
6	12/3/2013	0.69	0.003	Circuit 166 - Exceeding 500,000 Customer Minutes
7	11/7/2013	0.60	0.005	Circuits 209 & 205 - Exceeding 500,000 Customer Minutes
8	1/7/2013	0.57	0.001	Circuits 368 & 431 - Exceeding 500,000 Customer Minutes
9	1/10/2013	0.56	0.003	Circuits 792 & SE4- Exceeding 500,000 Customer Minutes
10	3/12/2013	0.51	0.001	Circuits 715 & 706 - Damaged Tee's and Low Gas

2012

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	9/9/2012	1.64	0.019	September 9th - Storm
2	6/23/2012	1.48	0.003	Circuits 166 & 397 Exceeding 500,000 Customer Minutes
3	7/12/2012	1.45	0.014	Circuit 329 - San Mateo Substation Outage
4	5/28/2012	1.27	0.002	Circuit 166 - Outage Exceeding 500,000 Customer Minutes
5	5/6/2012	0.79	0.003	Circuit 323 - Outage Exceeding 500,000 customer minutes
6	2/27/2012	0.76	0.004	February 27 - Storm
7	4/28/2012	0.67	0.002	Circuit 582 - Outage Exceeding 500,000 customer minutes
8	3/26/2012	0.64	0.003	Point Loma Substation Bank 10 Outage
9	8/12/2012	0.63	0.003	Circuit 57 - Outage Exceeding 500,000 customer minutes
10	3/17/2012	0.62	0.004	March 17 - Storm

2011

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	9/8/2011	513.4	0.999	Pacific Southwest Electrical Outage
2	6/28/2011	1.52	0.004	Circuits 486 & 487 - Multiple 12kV Outage
3	10/16/2011	0.68	0.002	Circuit 81 - Outage Exceeding 500,000 customer minutes
4	3/15/2011	0.64	0.004	Circuit 497 - Outage Exceeding 500,000 customer minutes
5	8/4/2011	0.57	0.004	Circuit 497 - Outage Exceeding 500,000 customer minutes
6	8/28/2011	0.51	0.003	August 28 - Storm
7	10/22/2011	0.48	0.004	Circuit 152 - Outage Exceeding 500,000 customer minutes
8	12/23/2011	0.45	0.001	Circuit 243 - Outage Exceeding 500,000 customer minutes
9	6/29/2011	0.44	0.002	Circuit 38 - Outage Exceeding 500,000 customer minutes
10	11/4/2011	0.43	0.006	Capistrano Substation Outage

2010

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	1/18/2010	12.61	0.085	January 18 - Heavy Rain Storm - CPUC Event
2	12/20/2010	4.93	0.023	December 20 - Heavy Rain Storm - CPUC Event
3	4/1/2010	4.40	0.211	Load Curtailment
4	9/30/2010	2.88	0.036	September 30 - Heavy Rain Storm
5	1/5/2010	1.57	0.004	Circuits 703 & 1297 - Multiple 12kV Outage
6	9/26/2010	1.42	0.010	September 26 - Heat Storm
7	9/30/2010	1.34	0.004	Circuits 900 & 904 - Multiple 12kV Outage
8	10/21/2010	1.33	0.002	Circuits 222, 221 & 79 - Outage over 500,000 customer min
9	4/4/2010	1.22	0.003	Circuits 794, 170 & SW2 - Earthquake w/over customer 500,000 Min
10	10/19/2010	1.12	0.014	October 19 - Heavy Rain and Lightning Storm

2009

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	12/7/2009	11.11	0.045	December 7 - Heavy Rain Storm
2	12/13/2009	4.49	0.016	Transmission Lines 13802 & 13802 - Broken Insulator/Relay
3	12/7/2009	1.17	0.003	Circuits 362 - Tee caused Failure w/over 500,000 Customer Min
4	8/20/2009	1.05	0.004	Circuit 152 - Vehicle Contact
5	6/3/2009	0.97	0.006	June 3 - Lightning Storm
6	2/9/2009	0.86	0.009	February 9 - Heavy Rain and Snow Storm
7	11/18/2009	0.53	0.003	Circuit 365 - Faulted Cable
8	11/28/2009	0.50	0.006	November 28 - Heavy Rain Storm
9	11/23/2009	0.48	0.003	Circuits 936 & 178 Tie Switch closed into a fault
10	11/9/2009	0.47	0.005	Circuits 268 & 269 - Dig-in w/over 500,000 Customer Min

2008

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	12/17/2008	3.51	0.010	December 17 - Heavy Rain and Snow Storm Part II
2	1/5/2008	1.33	0.011	January '08 Rain & Lightning Storm -Multiple Areas
3	12/15/2008	1.02	0.006	December 15 - Heavy Rain and Snow Storm
4	5/31/2008	0.92	0.003	Circuits 138 & HC3 Tree Contact (also affecting Circuit 139 & 4kVs)
5	10/19/2008	0.91	0.001	Circuit 213 - Damaged UG Cable
6	6/22/2008	0.67	0.002	Circuit 990 - Faulted Terminator
7	4/8/2008	0.61	0.003	Circuit 486 - Motor Vehicle Contact, Terminator, Cable Repair
8	12/25/2008	0.58	0.004	Circuits 286 & EN2- Multiple Circuits affected during Restoration
9	5/23/2008	0.56	0.002	Circuit 159 - Pothead Failure
10	9/24/2008	0.56	0.004	Bank 20 WA3, WA4, WA5 and WA6 - Bad Relay

2007

Historical 10 Largest Unplanned Outage Events				
Rank	Date	SAIDI	SAIFI	Description
1	10/21/2007	128.42	0.055	Firestorm 2007 - October - CPUC Event
2	9/1/2007	1.59	0.01	HEATWAVE 2007 (Labor Day Weekend)
3	10/22/2007	1.18	0.051	Load Curtailment during Firestorm'07
4	6/4/2007	1.15	0.016	Laguna Niguel Outages - Faulted Circuit Breaker impacted Bus
5	8/30/2007	1.09	0.003	Transmission Lines 629 & 6946 Lightning Contact on Switch 629-8
6	7/28/2007	1.01	0.002	Circuit 582 Cable Failure
7	10/11/2007	0.8	0.017	Bank 42 Paradise Substation
8	9/15/2007	0.77	0.000	Circuit 221 Pine Valley Fire - Red Flag - In Progress
9	1/12/2007	0.66	0.003	Circuits WA3, WA4, and UP1 Wire Down
10	12/25/2007	0.57	0.001	Circuit EOS2 Outage - Connector Failure

SECTION 9 – NUMBER OF CUSTOMER INQUIRIES ON RELIABILITY DATA AND THE NUMBER OF DAYS PER RESPONSE

CUSTOMER INQUIRIES ON RELIABILITY DATA (2016)

The table below contains SDG&E’s response time for each customer reliability inquiry received in 2016.

2016 Customer Reliability Inquiry Responses			
Date of Request	Customer	Customer Type	Date Fulfilled
10/26/2016	Rady Children’s Hospital	Commercial	11/10/2016