

Presentation on SDGE Annual Electric Reliability Report

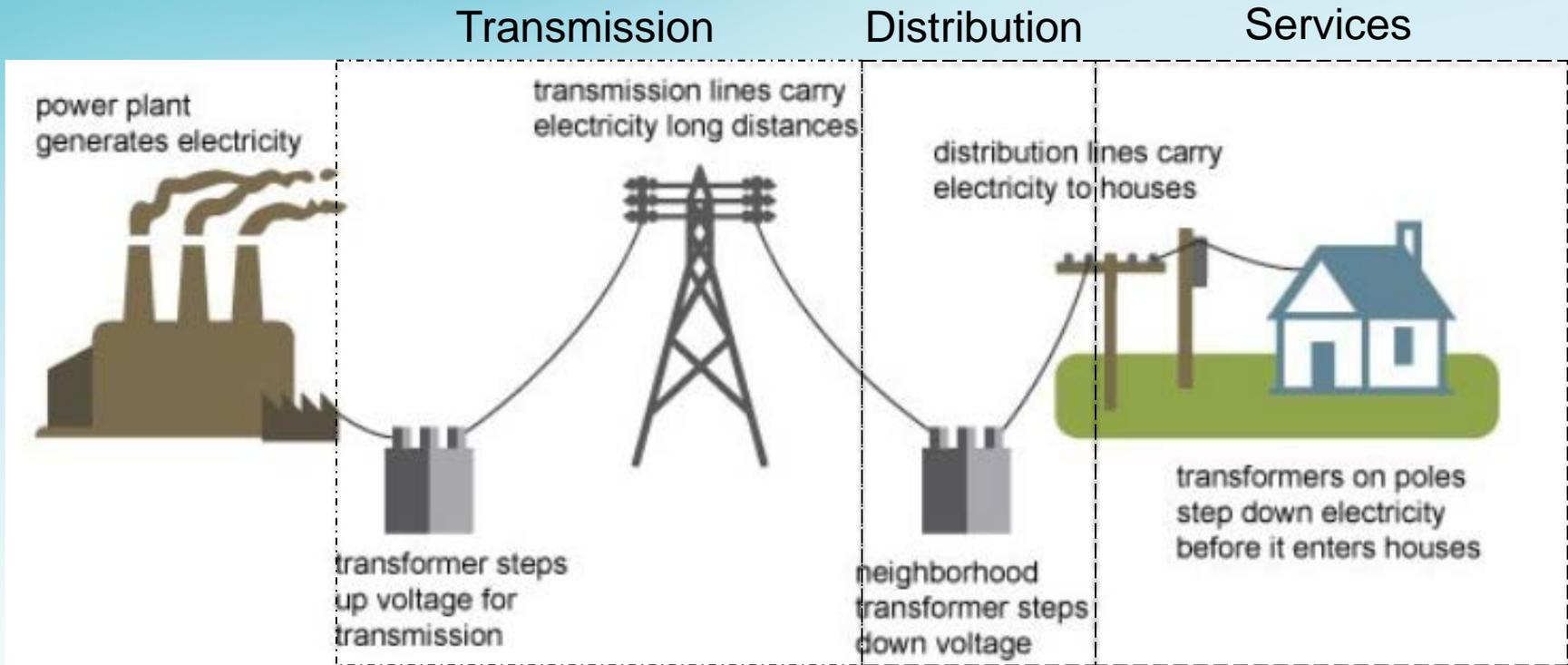
November 30, 2016



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Classifications of our Assets



Source: Adapted from National Energy Education Development Project (public domain)

Reliability statistics are broken down by Transmission, Substation, and distribution

- SDG&E's goal:
 - Provide our customers with safe and reliable power.
 - Improve reliability by reducing the number of outages, and their duration, experienced by our customers.

How is this done?

- We review all outages and what causes them, look for trends, and provide mitigation efforts for issues identified.
- The four metrics to measure performance:
 - **System Average Interruption Duration Index (SAIDI)**
 - SAIDI measures the average outage time experienced by customers.
 - **System Average Interruption Frequency Index (SAIFI)**
 - SAIFI is the average number of times a customer experienced a sustained outage in a given year.
 - **Customer Average Interruption Duration Index (CAIDI)**
 - CAIDI is the average time required to restore service to a customer.
 - **Momentary Average Interruption Frequency Index (MAIFI)**
 - MAIFI is the average number of momentary outages per customer per year.
 - **Threshold-Major Event Day (TMED)** : A day in which the daily system SAIDI exceeds a threshold value.

Our Reliability Efforts

- SDG&E's focus is to build a strategy around overall system-wide performance in both outage duration and frequency.

Programs:

- Fire Risk Mitigation (FiRM) - Fire prevention, safety, and reliability with a primary focus towards lowering public safety risk due to wildfires and to optimize reliability improvements.
- Vegetation Management - Systematic, schedule-based approach following a work plan to complete all activities annually; includes pre-inspection, tree pruning, brush clearing.

- Data Gathering/Circuit Analysis - Based on predictive analytics, we collect outage information for circuit analytics to determine what projects should be built proactively.
- Design, Engineering, Construction - Implement projects to reduce the number of outages and duration.
- Business Services Project Coordination - Customer outreach and outage notifications including restoration estimates.
- Meteorology - Forecasting weather and conditions for proactive preparations for adverse weather.

Accomplishments around Reliability

- Awards/Recognition

- PA Consulting - Leader in Energy and Utilities Consultation

- Best in the West in Reliability for 11 consecutive years
- 2015 Best in the Nation
- CPUC Report 2016- Best Investor Owned Utility in CA

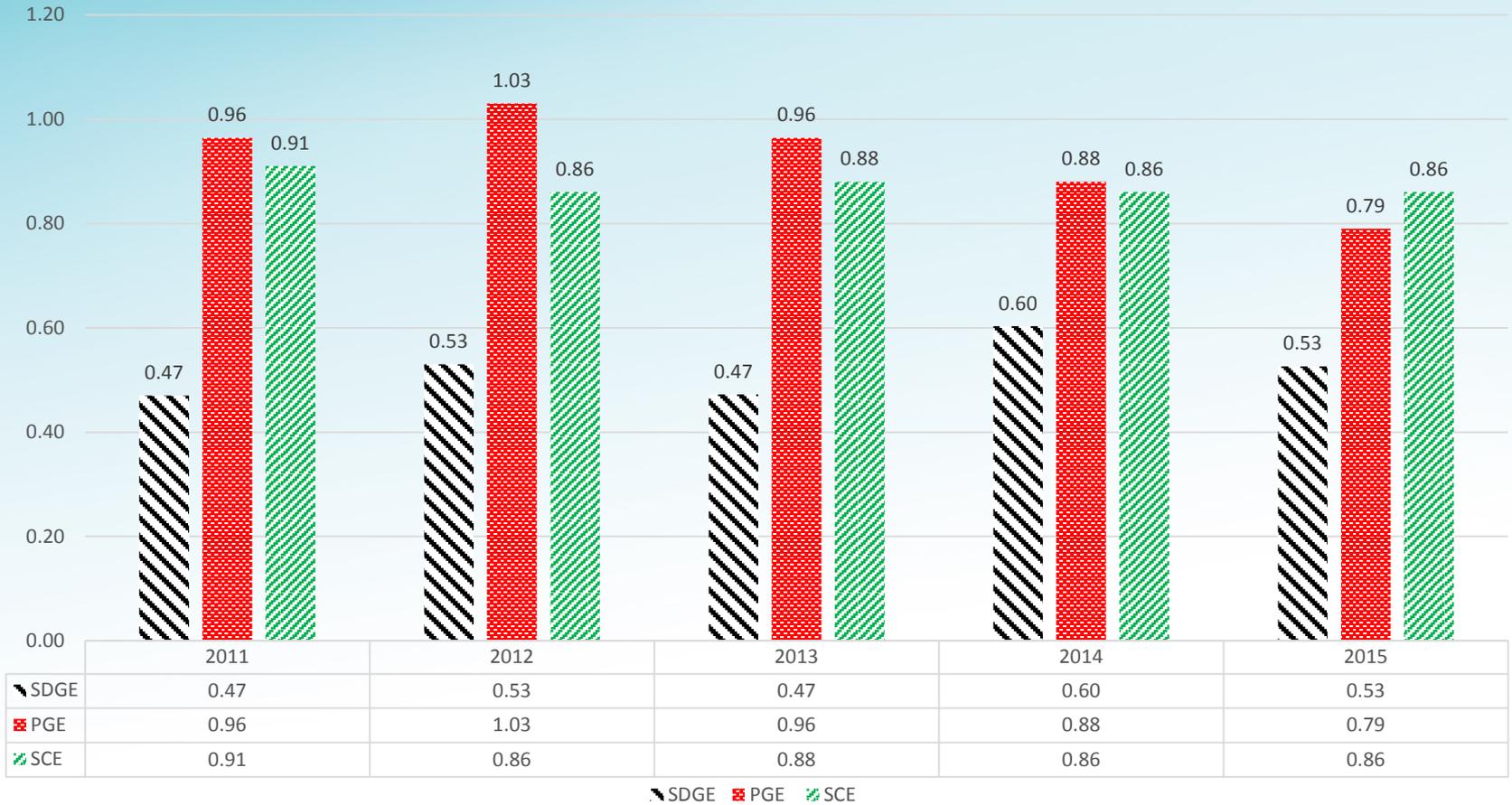
- Per reliability data for the years 2006-2015, San Diego reliability metrics demonstrated consistently superior reliability performance, with the lowest scores in the state for three of the four reliability metrics (SAIDI, SAIFI, and MAIFI).

How we compare with the other 3 large California utilities?

5-Year SAIDI Combined Reliability Indices (TMED Excluded)



5-Year SAIFI Combined Reliability Indices (TMED Excluded)



➤ How to better understand the annual report

- Section 1 – System Indices for the last 10 years
- Section 2 – District Reliability Indices for the past 10 years including and excluding TMED
- Section 3 – System and District Indices based on IEEE for past 10 years including planned outages and excluding TMED
- Section 4 – Service area map including divisions of district
- Section 5 – Top 1% of Worst Performing Circuits (WPC) excluding TMED
- Section 6 – Top 10 major unplanned power outages within reporting year
- Section 7 – Summary List of TMED per IEEE 1366
- Section 8 – Historical 10 largest unplanned outages for the past 10 years
- Section 9 – Number of customer inquiries on Reliability Data and the number of days per response

Section 1 - System Indices for the Last 10 Years

- Example
 - Tables of reliability indices for the past 10 years
 - Graphs depicting indices for the past 10 years

**Table 1.1: San Diego Gas & Electric
Distribution Historical System Reliability Data 2006 – 2015**

Year	TMED Included				TMED Excluded			
	SAIDI	SAIFI	CAIDI	MAIFI	SAIDI	SAIFI	CAIDI	MAIFI
2015	57.90	0.525	110.28	0.323	57.71	0.521	110.70	0.323
2014	74.73	0.613	121.86	0.255	63.52	0.584	108.82	0.237
2013	54.75	0.452	121.17	0.206	54.53	0.450	121.08	0.206
2012	63.32	0.510	124.20	0.289	63.32	0.510	124.20	0.289
2011	52.87	0.435	121.63	0.216	52.11	0.433	120.47	0.216
2010	84.49	0.638	132.50	0.468	62.65	0.512	122.25	0.403
2009	61.85	0.514	120.34	0.350	48.98	0.454	107.84	0.332
2008	58.28	0.506	115.24	0.368	58.28	0.506	115.24	0.368
2007	174.53	0.506	345.09	0.542	52.86	0.459	115.18	0.505
2006	52.19	0.533	97.88	0.454	52.19	0.533	97.88	0.454

Section – 2 District Reliability Indices for the Past 10 Years



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- SDG&E’s service area is broken out by District
 - Six Districts total
- Tables of reliability indices for the past 10 years
- Graphs depicting District indices for the past 10 years

San Diego Gas & Electric									
Beach Cities									
Historical System Reliability Data (2006-2015)									
Year	TMED Included					TMED Excluded			
	SAIDI	SAIFI	CAIDI	MAIFI		SAIDI	SAIFI	CAIDI	MAIFI
2015	62.79	0.514	122.17	0.343		62.76	0.513	122.27	0.343
2014	41.37	0.366	113.08	0.136		38.78	0.357	108.65	0.113
2013	34.08	0.244	139.40	0.122		34.08	0.244	139.40	0.122
2012	34.92	0.283	123.21	0.399		34.92	0.283	123.21	0.399
2011	51.13	0.361	141.68	0.197		51.13	0.361	141.68	0.197
2010	58.94	0.391	150.67	0.233		48.28	0.353	136.68	0.182
2009	44.30	0.357	123.96	0.149		32.94	0.310	106.14	0.139
2008	38.44	0.331	116.28	0.144		38.44	0.331	116.28	0.144
2007	29.47	0.265	111.04	0.411		29.46	0.265	111.09	0.410
2006	30.21	0.320	94.31	0.197		30.21	0.320	94.31	0.197

Section 3 - System and District Indices for the Past 10 Years Including Planned Outages

The data used to develop the planned outage indices in the report is from an outage management system database implemented in 2012 to begin tracking planned outage data.

- This is a new reporting requirement as of 2016
- Only three years of historical planned outage data is available
- 5,000 system upgrades every year to improve your service

Table 3.1: San Diego Gas & Electric

System

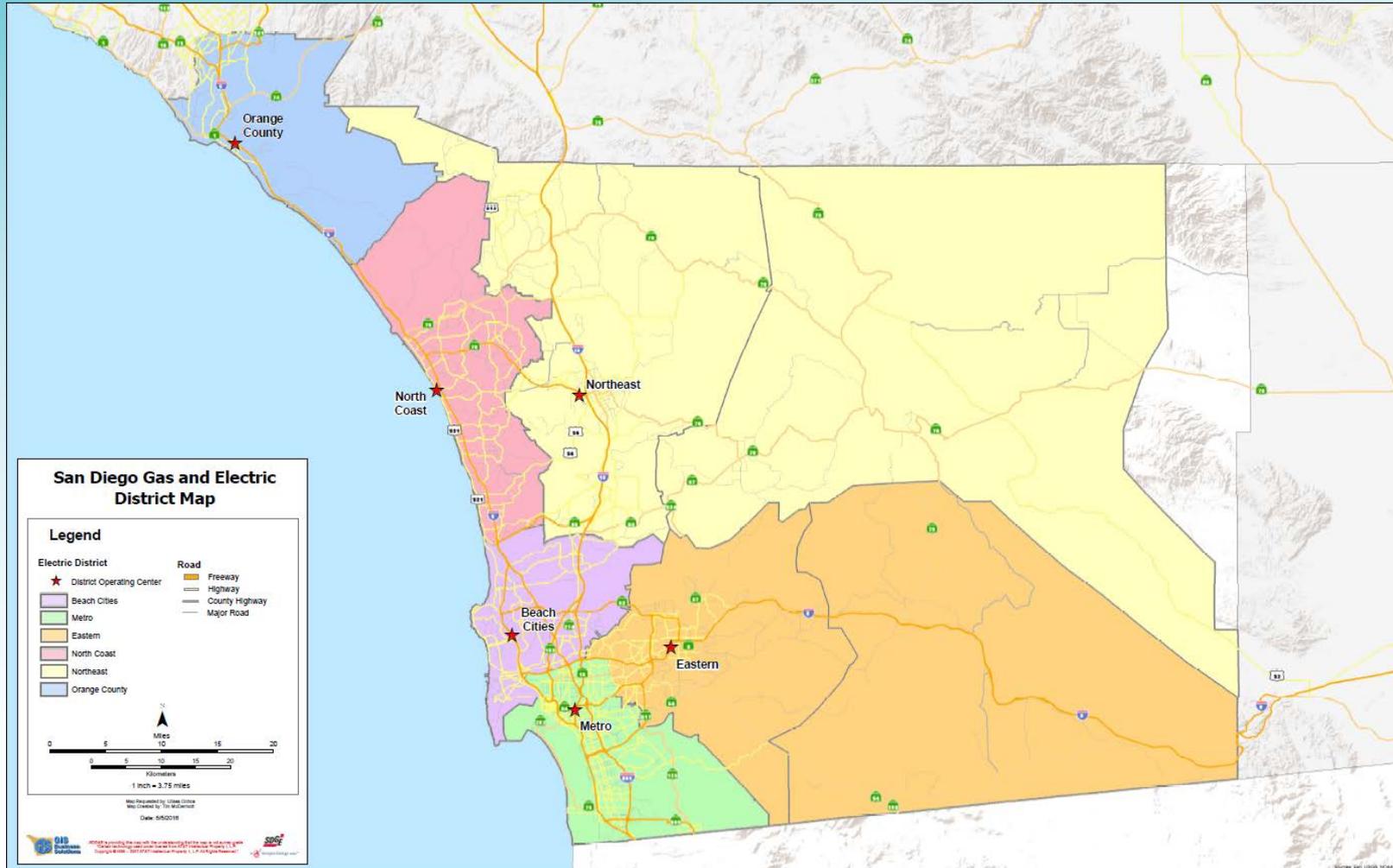
Historical Reliability Data (2013-2015)

Year	TMED Included					TMED Excluded			
	SAIDI	SAIFI	CAIDI	MAIFI		SAIDI	SAIFI	CAIDI	MAIFI
2015	315.07	1.4275	220.71	505.387		314.88	2.2919	137.388	505.387
2014	280.00	2.852	98.18	381.012		268.72	2.823	95.1895	397.994
2013	249.63	1.3687	182.38	378.221		234.36	1.2781	183.366	375.141

Section 4 - Service Area Map



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Section 5 - Top 1% of Worst Performing Circuits (WPC) excluding TMED

- Tables of Worst Performing Circuits
- Tables of deficient WPC
- Explanation of why it was ranked as a deficient WPC

Table 5.1: 2015 Worst Circuits List based on 2014-2015 data. (Excludes Planned and Tmed)

Circuit	District	Circuit Customers	Substation Name	Circuit Miles	% OH	% UG	Annualized Feeder Outage Count	Annualized Total Circuit SAIDI **
79	Eastern	860	DESCANSO	76.8	93%	7%	8	949
440	Eastern	262	GLENCLIFF	22.7	87%	13%	6	919
MF1	Metro	731	MANSFIELD	1.8	96%	4%	1	767
RE1	Metro	153	REO	0.6	100%	0%	1	723
CE3	Metro	146	CENTRAL	2.4	0%	100%	1	634
762	Beach Cities	282	MIRAMAR	6.8	0%	100%	2	616
442	Eastern	853	GLENCLIFF	32.7	87%	13%	5	599
78	Eastern	260	DESCANSO	14.0	87%	13%	4	585
587	North Coast	349	PALOMAR AIRPORT	9.1	0%	100%	3	546
CE1	Metro	148	CENTRAL	1.4	0%	100%	1	544

** Circuit SAIDI represents all outages: Mainline and Branch

Section 6 - Top 10 Major Unplanned Outages within Reporting Year



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- Outage events including the outage cause for 2015
 - Based on customer impact

Rank	Outage Date	Cause	Location**	Customer Impact	SAIDI	SAIFI
1	9/20/2015	ISO Load Curtailment	BC, CM, NC, NE, OC	126376	5.15	0.089
2	7/18/2015	July 18-20 Rain Storm	BC CM, EA, NC, NE	22465	2.26	0.016
3	11/25/2015	Wind Storm	CM	14694	1.75	0.010
4	7/3/2015	Cable Failure	CM	8560	1.00	0.006
5	9/15/2015	Vehicle Contact	CM, EA	7969	0.60	0.006
6	7/19/2015	Connector Failure	NC	6457	0.11	0.005
7	11/30/2015	Connector Failure	NE	5672	0.04	0.004
8	12/11/2015	Connector Failure	NC	5258	0.13	0.004
9	9/9/2015	Connector Failure	NC	5071	0.49	0.004
10	2/3/2015	Connector Failure	CM	4940	0.39	0.035

Section 7 - Summary List of 2015 TMED Exclusive Per IEEE 1366



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Date of Outage	Description of Outage	Location	Total Number of Customers Out of Service	Customers Interrupted - Hours Into the Event Day *																
				Time 0	0.5	1	1.5	2	2.5	3	3.5	4								
September 20	Load Curtailment	BC, CM, NC, NE, OC	131,622	Customers 0	0	99	99	99	99	0	0	0								
				Customers Interrupted - Hours Into the Event Day (continued)																
				Time 4.5	5	5.5	6	6.5	7	7.5	8	8.5								
				Customers 179	1	1	1	1	1	1	1	1								
				Customers Interrupted - Hours Into the Event Day (continued)																
				Time 9	9.5	10	10.5	11	11.5	12	12.5	13								
				Customers 0	0	0	0	0	0	0	0	0								
				Customers Interrupted - Hours Into the Event Day (continued)																
				Time 13.5	14	14.5	15	15.5	16	16.5	17	17.5								
				Customers 126306	78172	50125	0	0	0	0	0	0								
				Customers Interrupted - Hours Into the Event Day (continued)																
				Time 18	18.5	19	19.5	20	20.5	21	21.5	22								
				Customers 661	1010	1010	1010	678	678	678	831	651								
				Customers Interrupted - Hours Into the Event Day (continued)																
				Time 22.5	23	23.5	24													
				Customers 210	193	193	0													

Section 8 - Historical 10 Largest Unplanned Outages for (each of) the past 10 Years



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Tables capture the ten largest unplanned outage events for each of the years from 2015 through 2006.

2015

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	TL641 & TL642 - Montgomery Sub Outage
4	7/3/2015	1.00	0.006	C366 & CBRM1 Outage
5	8/13/2015	0.67	0.001	C438 - Faulted Tee
6	4/18/2015	0.64	0.002	C821 - Tee Failure
7	9/15/2015	0.60	0.006	Cir 1049/167 - Car contact w/ fuse cab
8	9/12/2015	0.59	0.003	C255 - Wire Down
9	9/9/2015	0.49	0.004	C287 - Blown tees
10	5/12/2015	0.47	0.003	C952 - Vehicle Contact

Section 9 - Website – Outage Inquiries



sdge.com/system-reliability

Social Media

Connect with us on our social media channels



Twitter.com/sdge



Facebook.com/SanDiegoGasandElectric



Pinterest.com/sdge



YouTube.com/SDGEWebmaster



LinkedIn.com/company/san-diego-gas-&-electric

Customer Engagement Channels



Contact Center



Direct Mail



Email



IVR



Live Chat



Mobile



Offline



Print



Public Relations



Search



SMS/Text



Social Media



Videos



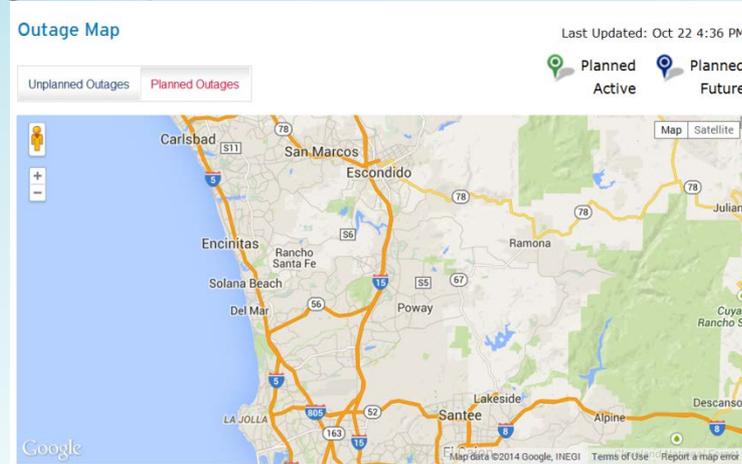
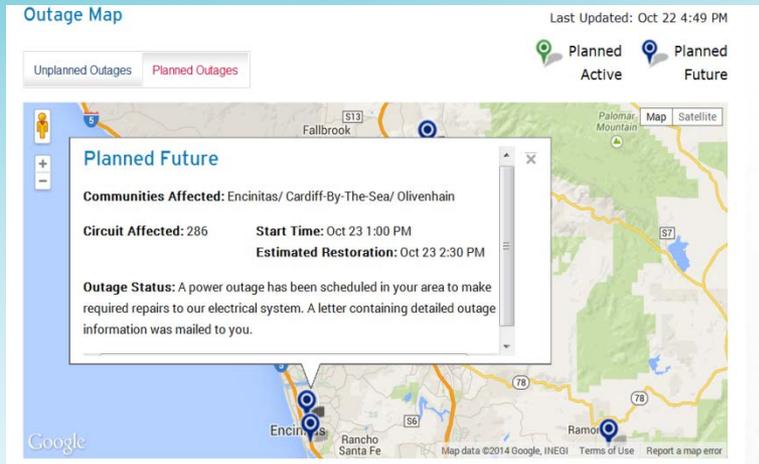
Website

Outage Tools for Customers

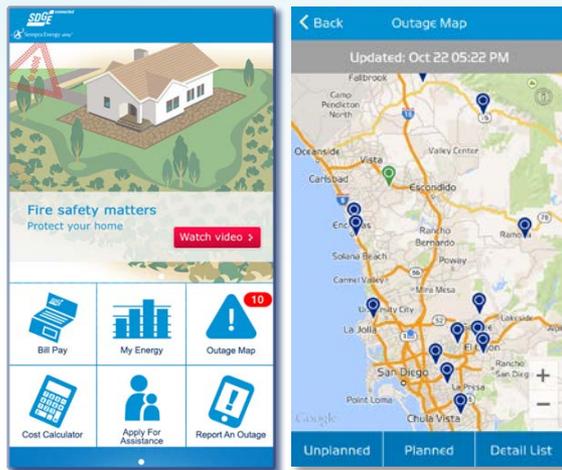


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Outage Map



Mobile App



Outage Video



Summary

- Classification of Assets
- Reliability
 - SAIDI
 - SAIFI
 - CAIDI
 - MAIFI
 - TMED
- SDG&E Reliability Efforts
 - FiRM
 - Vegetation Management
 - Data Gathering/Circuit Analysis
 - Business Services Project Coordination
 - Meteorology
- Comparison 3 Large IOUs in CA

Summary *Cont.*

- SDG&E 2015 Annual Report available on CPUC website
- Social Media
- Customer Service
- Customer Engagement Channels
- Outage Tools for Customers