

Annual Reliability Public Presentation Calendar Year 2019 Performance December 2020

Paul Marconi, President, BVES, Inc.

Summary

- Overview
- What is Electric Utility Reliability?
- Requirements & Definitions
- Reliability Indices
- 2019 Reliability Results
- Questions
- As of November 30, 2020 BVES has been accident and injury free for <u>558</u> days.
- No employee contact with High Voltage systems in over 5 years.
- No ignitions in over 10 years.
- No PSPS ever.









Overview

- Location: 32 square miles of rural and mountainous terrain at approximately 7,000 ft. in San Bernardino Mountains (80 miles East of Los Angeles). Heavy tree and vegetation density and mostly dry environment (80.5%)
- Key jurisdictions: County of San Bernardino, City of Big Bear Lake, US Forest Service
- Customers: 24,484 total [22,970 residential (2,111 CARE) and 1,514 commercial]
- Electrical System:
 - Sub-transmission (34.5 kV)
 - 28.6 circuit miles bare overhead conductor
 - 0.33 circuit miles covered overhead conductor
 - 0.91 circuit miles underground
 - Distribution (4 kV)
 - 180.96 circuit miles bare overhead conductor
 - 1.01 circuit miles covered overhead conductor
 - 53.77 circuit miles underground
 - \circ Substations: 13
 - Bear Valley Power Plant: 8.4 MW
 - o 448 NEM customers: 3.39 MW
 - $\circ~$ Supply Lines: 39 MW total
 - $\circ~$ Load is winter & evening peaking
 - Historical peak: 47 MW (2018)
 - Load delivered: 131,372 MWh (2019)

33% qualified to Renewable Portfolio Standards





Power Supplies

- BVES system is located entirely within the balancing area under the control of the California Independent System Operator (CAISO).
- Supply lines to BVES are owned and operated by Southern California Edison.
- •BVES procures power via mix of Power Purchase Agreements
 - o Annual base load
 - Hourly shaped product
 - o Seasonal load
 - Monthly variable product (November to February)
 - Transmission fee to SCE





What is Reliability?

- Safety & Reliability is job No. 1 for electric utilities
- In an age of advanced grid technologies and cyber threats, the challenge is greater than ever
- BVES has a strong safety & reliability record
- Electric service reliability means the safe continuity of electric service experienced by retail customers



Reliability Reporting

- In California, electric utilities evaluate reliability performance using four basic industry reliability indices calculated over a period of one calendar year
- Mandated by California Public Utilities Commission Decision 16-01-008, Updating the Annual Electric Reliability Reporting Requirements for California Electric Utilities, of January 14, 2016
- Institute of Electrical and Electronics Engineers (IEEE) 1366 standard is used in calculating the indices
- Reports issued each year in July for previous year. Reports for past years available at: https://www.cpuc.ca.gov/general.aspx?id=4529.



Measuring Reliability

• To measure reliability, utilities consider:

Number of service interruptions
Type of service interruption (momentary or sustained)
Number of customers affected
Length of interruptions
Average restoration time
Unplanned & planned outages

 We also consider "Major Event Days" such as major storms, earthquakes, wild fires, etc. in the analysis



Reliability Definitions

- Interruption: A single operation of an interrupting device (switch, breaker, fuse, etc.) that results in a voltage of zero
- Momentary Interruption: Outage lasting five minutes or less
- Sustained Interruption: Outage lasting longer than five minutes
- Major Event Day: A day in which the daily system outage exceeds a statistically derived threshold value (would only occur for major storms, earthquakes or other significant external events resulting in major outages)



Reliability Indices - SAIDI

 System Average Interruption Duration Index (SAIDI) is the amount of time on average a customer was without power in a year due to sustained interruptions

• Measured in units of time (minutes) over the course of a year





Reliability Indices - SAIFI

• System Average Interruption Frequency Index (SAIFI) is the number of times an average customer was without power in a year due to service interruptions lasting more than five minutes (sustained outage)

 $_{\odot}$ Measured in interruptions per customer over the course of a year





Reliability Indices - MAIFI

 Momentary Average Interruption Frequency Index (MAIFI) is the number of times an average customer was without power in a year due to service interruptions lasting five minutes or less

Measured in interruptions per customer over the course of a year





Reliability Indices - CAIDI

- Customer Average Interruption Duration Index (CAIDI) represents the average outage duration that any given customer would experience
- CAIDI may also be viewed as the average restoration time
 - $_{\odot}$ Measured in units of time (minutes) over the course of a year





Unplanned Outages (MED Excluded)

Year	SAIDI (Minutes)	SAIFI	MAIFI	CAIDI (Minutes)
2010	47.6	0.6	1.1	81.4
2011	23.9	0.3	2.1	78.7
2012	29.8	0.2	1.0	182.2
2013	63.1	1.6	0.4	38.7
2014	47.6	1.3	0.0	36.1
2015	48.4	0.8	0.3	61.2
2016	72.4	0.8	0.0	91.7
2017	34.7	0.6	0.1	57.9
2018	74.4	0.8	0.1	87.9
2019	85.0	0.7	0.0	127.4
Ave	52.7	0.8	0.5	84.3

MED: Major Event Day - A day in which the daily system outage exceeds a statistically derived threshold value (occurs for major storms, earthquakes or other significant external events)



Unplanned Outages (MED Included)

Year	SAIDI (Minutes)	SAIFI	MAIFI	CAIDI (Minutes)
2010	118.6	0.6	1.1	194.4
2011	190.0	1.5	2.1	126.3
2012	29.8	0.2	1.0	182.2
2013	95.2	2.1	0.4	46.3
2014	71.6	2.1	0.0	33.8
2015	198.2	2.8	0.3	71.6
2016	323.6	2.5	1.3	129.0
2017	80.1	1.1	2.7	73.7
2018	181.8	2.1	1.1	84.9
2019	258.8	1.9	0.0	127.4
Ave	154.8	1.7	1.0	107.0

MED: Major Event Day - A day in which the daily system outage exceeds a statistically derived threshold value (occurs for major storms, earthquakes or other significant external events)



How Do We Compare?

2019 Unplanned Outages MED Excluded]	SAIDI	SAIFI	MAIFI	CAIDI
SoCal Edison	90.8	0.9	1.2	104.8
San Diego Gas and Electric Company	68.6	0.6	0.3	115.2
Pacific Gas & Electric	117.7	1.0	1.3	116.5
PacifiCorp	106.3	0.8	2.5	126.9
Liberty (CalPeco)	416.5	3.0	0.3	140.7
Bear Valley Electric Service	85.0	0.7	0.0	127.4

2019 Unplanned Outages MED Included	SAIDI	SAIFI	MAIFI	CAIDI
SoCal Edison	178.0	1.0	1.4	171.2
San Diego Gas and Electric Company	123.0	0.6	0.3	192.4
Pacific Gas & Electric	1365.1	1.9	1.8	728.5
PacifiCorp	589.7	3.1	2.5	193.5
Liberty (CalPeco)	416.5	3.0	0.3	140.7
Bear Valley Electric Service	258.8	1.9	0.0	127.4

For all indices (SAIDI, SAIFI, MAIFI & CAIDI) lower is better



MED: Major Event Day - A day in which the daily system outage exceeds a statistically derived threshold value (occurs for major storms, earthquakes or other significant external events)



Top 10 Major Outages

Date	Affected Circuit	Event SAIDI (minutes)	Cause
2/14/19	SCE Bear Valley Line, Clubview, North Shore, Paradise, & Garstin	109.08	Weather: Major snow storm caused multiple outages.
6/28/19	Shay, Boulder, Lagonita, & Harnish	81.12	Equipment Failure: Failure connection at riser (OH to UG)
12/17/2019	North Shore, Garstin, Castle Glen, Erwin Lake, Holcomb, and Paradise	20.62	Equipment Failure: Baldwin AR tripped due to failed UG cable feeding Division Substation.
2/4/2019	Boulder	19.00	Weather: Major snow storm caused tree to fall across span causing a large outage.
10/29/19	Erwin Lake	18.71	Unknown: No cause found after two thorough patrols
11/27/19	SCE Bear Valley Line	17.18	Loss of Supply: Damage to SCE lines due to snow storm
1/19/2019	Boulder	14.04	Equipment Failure: Failed voltage regulator
9/20/19	Sunrise	11.13	Equipment Failure: Failed underground transformer
11/14/2019	Interlaken & Baldwin	7.46	Animal: Crow contacted 34 kv outside of Fawnskin substation
2/2/2019	Holcomb	3.91	Weather: Primary wire wrapped together due to storm



Worst Performing Circuit

Top 1% of Worst Performing Circuits (WPC)												
							Number of Mainline Outages					
									Prefered Reliability Metrics			
									SAIDI-	SAIDI	SAIFI-	SAIFI-
Reporting		Customer	Sub-	Circuit-					3YR	1YR	3YR	1YR
Year	Circuit	Count	station	miles	% UG	% OH	Sustained	Momentary	Period	Period	Period	Period
20189	Boulder	2,046	Village	19.5	90.8	9.2	6	0	436.7	394.5	3.0	2.2

The Boulder Circuit (4.160 kV) made the WPC list due to it having the highest 3-year SAIDI, which is the preferred metric for evaluating circuit reliability. The high circuit SAIDI was driven primarily by a major snow storm and an equipment failure at the Village Substation. In one case, during a major winter storm with high winds, a tree fell across a span on the Boulder Circuit causing a large outage. The equipment failure at Village Substation was a voltage regulator failure.

BVES Engineering uses this data to develop measures to improve circuit reliability.



Requesting a Report

- Customers have the opportunity to request a circuit-level reliability report for their home or business
- Upon request, BVES will mail the report to the mailing address on file
- To request a report, contact BVES at (800) 808-2837 or email: <u>customerservice@bves.com</u>









Questions?

Our Values

In pursuing our mission, the board of directors, management and the company's employees are guided by the shared Values presented below:

Integrity - Building trust through honest communications and doing what is right
 Teamwork - Maximizing efficiency through collaboration and individual strengths
 Respect - Valuing diversity and treating all stakeholders with fairness
 Excellence in Service - Striving for excellence and quality in everything we do
 Accountability - Taking ownership of one's actions

