

Bear Valley
Electric Service, Inc.
A Subsidiary of American States Water Company

BVES, Inc. Annual Reliability Public Presentation for Calendar Year 2020 Performance

Agenda

- Overview
- What is Electric Utility Reliability?
- Requirements & Definitions
- Reliability Indices
- 2018 Reliability Results
- Questions

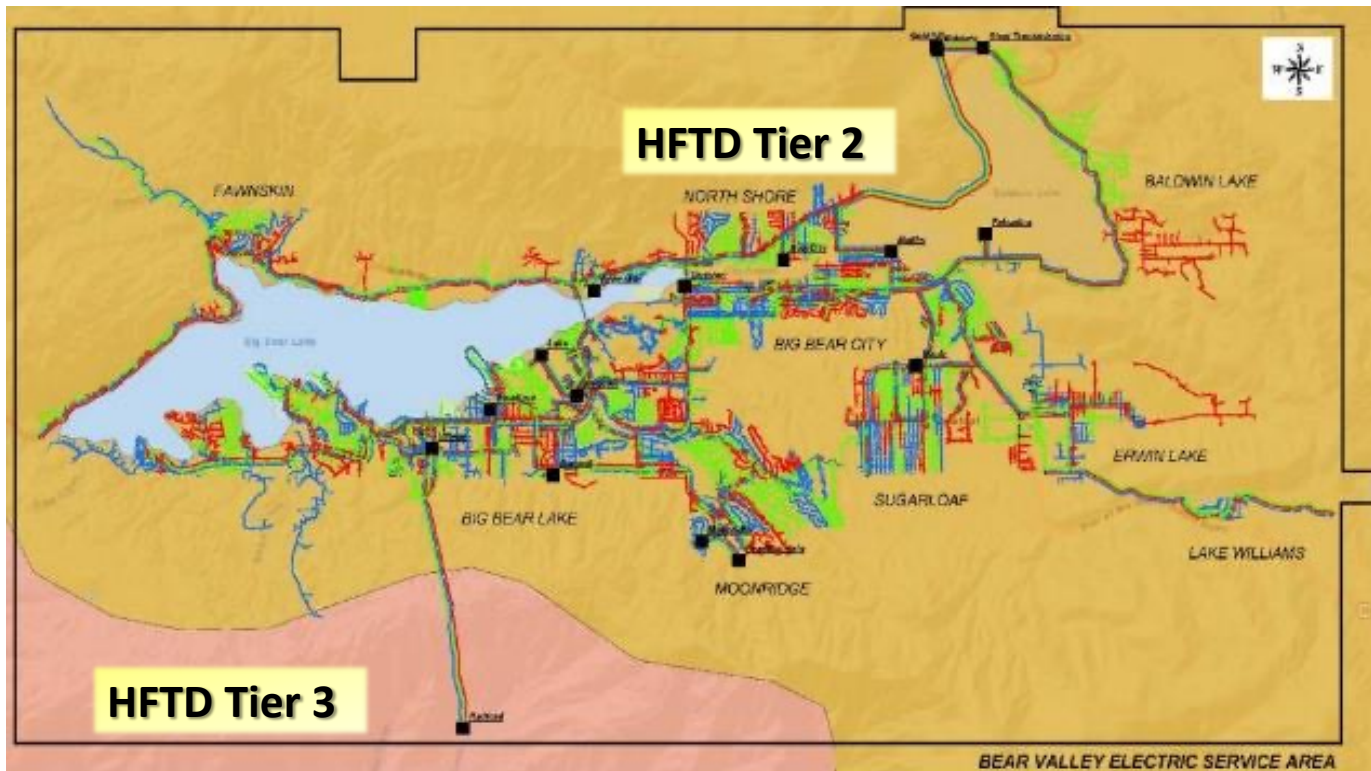


As of January 25, 2022, BVES's safety record:

- **Accident/injury free for 979 days.**
- **No fatalities in over 10 years.**
- **No employee contact with High Voltage in over 10 years.**
- **No ignitions in over 10 years.**

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:** 24,632 total [23,119 residential and 1,513 commercial]

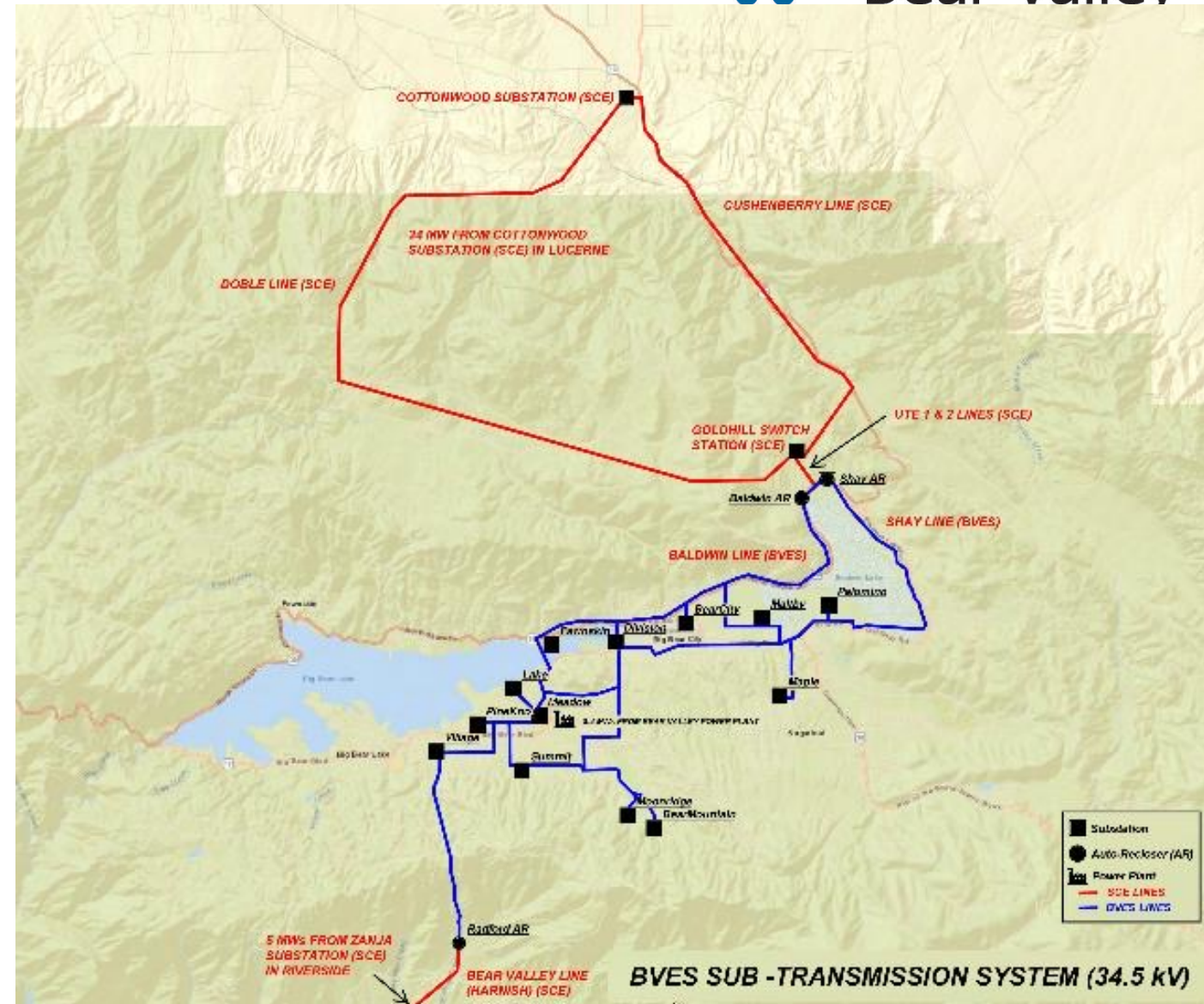


• Electrical System:

- Sub-transmission (34.5 kV)
 - 20.5 circuit miles bare overhead conductor
 - 8.4 circuit miles covered overhead conductor
 - 0.9 circuit miles underground
- Distribution (4 kV)
 - 170.4 circuit miles bare overhead conductor
 - 11.6 circuit miles covered overhead conductor
 - 53.2 circuit miles underground
- Substations: 13
- Bear Valley Power Plant: 8.4 MW
- 446 NEM customers: 3.39 MW
- 21 DG customers: 0.13 MW
- Supply Lines: 39 MW total
- Load delivered (2020): 133,269 MWh (33% RPS)
- Load is winter & evening peaking
 - Historical peak: 47 MW (2018)

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
 - Annual base load
 - Hourly shaped product
 - 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/industries-and-topics/electrical-energy/infrastructure/electric-reliability/electric-system-reliability-annual-reports>

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

Key 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

$$\text{SAIDI} = \frac{\text{Sum of all "sustained" customer interruption durations}}{\text{Total number of customers served}}$$

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)
 - Measured in interruptions per customer over the course of a year

$$\text{SAIFI} = \frac{\text{Sum of total quantity of "sustained" customer interruptions}}{\text{Total number of customers served}}$$

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

$$\text{MAIFI} = \frac{\text{Sum of total quantity of "momentary" customer interruptions}}{\text{Total number of customers served}}$$

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

$$\text{CAIDI} = \frac{\text{SAIDI}}{\text{SAIFI}}$$

Unplanned Outages (MED Excluded)



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Year	SAIDI (Minutes)	SAIFI	MAIFI	CAIDI (Minutes)
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
2020	55.3	0.6	0.0	94.5
Ave	53.5	0.8	0.4	85.6

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)
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
2020	425.4	4.6	0.0	94.5
Ave	185.5	2.1	0.9	97.0

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?



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2020 Unplanned Outages MED Excluded				
	SAIDI	SAIFI	MAIFI	CAIDI
SoCal Edison	91.4	0.9	1.3	105.5
San Diego Gas and Electric Company	69.0	0.6	0.3	109.9
Pacific Gas & Electric	125.8	1.1	1.5	117.8
PacifiCorp	87.5	0.6	0.6	144.0
Liberty (CalPeco)	181.6	1.6	0.3	115.2
Bear Valley Electric Service	55.3	0.6	0.0	94.5

2020 Unplanned Outages MED Included				
	SAIDI	SAIFI	MAIFI	CAIDI
SoCal Edison	201.3	1.1	1.4	190.5
San Diego Gas and Electric Company	198.6	0.7	0.3	266.5
Pacific Gas & Electric	450.6	1.4	1.5	312.2
PacifiCorp	251.5	0.7	0.6	343.0
Liberty (CalPeco)	181.6	1.57	0.3	115.2
Bear Valley Electric Service	425.4	4.6	0.0	94.5

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 Ten Major Outages

Date	Affected Circuit	Location	Number of Customers	Outage Duration (minutes)	Customer Minutes Out (minutes)	Event SAIDI (minutes)	Cause
11/9/20	Baldwin	BVES System	20932	117	2449044	116.3	Contact: Remote Control Plane was caught in 34 kV Lines on Cougar Rd. 34 kV Baldwin AR tripped.
9/14/20	Baldwin	BVES System	9512	33	313896	103.0	Equipment Failure: 34 kV Line riser connector failed.
11/4/20	Baldwin	BVES System	24335	96	2336160	95.4	Unknown: No cause found. 34 kV Baldwin AR tripped. Patrolled twice and found no apparent cause.
12/27/20	Shay	Fox Farm Road & Big Bear Boulevard, Big Bear Lake, CA	11420	115	1313300	53.6	Equipment Failure: UG to OH connector failed.
5/25/20	Paradise	520 East Big Bear Boulevard, Big Bear city, CA	1085	85	92225	5.2	Third Party: Car hit pole damaged pole and caused wires to slap, which resulted in AR@Maltby Substation to trip.
10/24/20	Lagonita	39582 Forest Road, Big Bear Lake, Ca	1000	59	59000	3.5	Animal: An owl flew into the 4 kV making phase to phase contact causing AR145 to open.
9/26/20	Boulder	714 Talmage Road, Big Bear Lake, Ca	2000	28	56000	2.3	Contact: Primary phase to phase was was made - cause unknown.
11/16/20	Country Club	West Country Club Boulevard, Big Bear City, CA	825	41	33825	2.2	Unknown: Unknown cause. Country Club OCB at Division Substation tripped. Flashing fault indicator at P.S.923 one Ø only. Panel indicated phase to ground fault. Patrolled circuit and found no cause. Re-energized OCB and it held on test.
9/8/20	Clubview	562 South Lucerne Drive & Villa Grove Avenue, Big Bear Lake, CA	1140	46	52440	2.1	Third Party: Mylar Balloons in Primary Wire
12/5/20	Pioneer	Boron Lane & Baldwin Lake Road, Big Bear Lake, CA	400	126	50400	2.1	Overload: Overloaded fuse TripSaver.

Worst Performing Circuit



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Reporting Year	Circuit	Customer Count	Substation	Circuit-miles	% UG	% OH	Number of Mainline Outages		Preferred Reliability Metrics			
							Sustained	Momentary	SAIDI-3YR Period	SAIDI 1YR Period	SAIFI-3YR Period	SAIFI-1YR Period
2020	Shay	9627	SCE Goldhill Ute Lines	17.6	2.2	97.8	2	0	526.7	856.3	6.5	9.2

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: CustomerService@bvesinc.com





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Questions