

2017-2018 ISO Reliability Assessment - Preliminary Study Results

Study Area: **PG&E North Coast & North Bay**

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P1	N-1	103	93	90	57	57	57	37	25	100	96	96	66	<90	Short Term : Action Plan ; Long Term : Preferred resource
31392 LAKEVILLE 60.0 31394 LKVLE JT 60.0 1 1	P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350]	P1	N-1	94	92	89	123	123	129	43	49	100	95	95	64	<90	System upgrade or preferred resource
32568 IGNACIO 115 30445 IGNACIO 230 4 1	P1-3:A6:4:_IGNACIO 230/115KV TB 6	P1	N-1	70	73	74	95	97	104	31	38	77	74	78	57	<90	System upgrade or preferred resource
32568 IGNACIO 115 30445 IGNACIO 230 6 1	P1-3:A6:3:_IGNACIO 230/115KV TB 4	P1	N-1	71	73	74	95	97	104	31	38	77	74	78	57	<90	System upgrade or preferred resource
32664 IGNACO A 60.0 32666 IGNACO B 60.0 1 1	P1-3:A6:8:_IGNACIO 115/60KV TB 3	P1	N-1	61	65	64	112	115	125	30	35	70	66	69	49	<90	System upgrade or preferred resource
30435 LAKEVILLE 230 30460 VACA-DIX 230 1 1	P2-4:A2:3:_LAKEVILLE 230KV - SECTION 2E & 2D	P2	Bus-tie breaker	98	94	91	106	109	113	16	34	106	98	103	71	<90	Substation upgrade
30440 TULUCAY 230 30460 VACA-DIX 230 1 1	P2-4:A2:1:_LAKEVILLE 230KV - SECTION 1E & 2E	P2	Bus-tie breaker	100	95	93	98	101	103	20	43	106	99	104	77	<90	Substation upgrade
31224 INDIN VL 115 31215 LUCERNJ1 115 1 1	P2-3:A2:26:_EGLE RCK - MA 115KV & EAGLE ROCK-CORTINA LINE	P2	Non-bus-tie breaker	85	71	70	97	87	101	15	19	84	72	73	51	<90	System upgrade or preferred resource
31246 BELLVUE 115 31248 PENNGRVE 115 1 1	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	95	100	96	119	118	120	47	58	106	102	98	75	<90	Substation upgrade
31248 PENNGRVE 115 31254 CORONA 115 1 1	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	98	104	100	125	126	128	50	61	111	106	102	78	<90	Substation upgrade
31254 CORONA 115 31255 LAKEVILLE 115 1 1	P2-4:A2:7:_FULTON 115KV - SECTION 2D & 1D	P2	Bus-tie breaker	95	99	95	131	132	134	48	59	106	101	98	73	<90	Substation upgrade
31326 PHLO JCT 60.0 31336 HPLND JT 60.0 1 1	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	67	64	66	95	90	109	30	36	78	66	72	45	<90	Substation upgrade
31377 FCHMNT2P 60.0 31380 FTCH MTN 60.0 1 1	P2-1:A2:93:_FULTON-WINDSOR 60KV [0] NO FAULT	P2	Line section w/o fault	125	109	109	77	77	78	100	73	114	111	113	91	106	Short Term : Action Plan ; Long Term : Preferred resource
31377 FCHMNT2P 60.0 31380 FTCH MTN 60.0 1 1	P2-1:A2:94:_WINDSOR-FCHMNT2P 60KV [0] NO FAULT	P2	Line section w/o fault	114	98	97	68	67	68	92	63	103	100	101	80	92	Short Term : Action Plan ; Long Term : Preferred resource
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P2-3:A2:64:_LAKEVILLE - 2D 60KV & LAKEVILLE #1 LINE	P2	Non-bus-tie breaker	102	93	90	58	57	57	37	25	100	96	96	66	77	Short Term : Action Plan ; Long Term : Preferred resource
31390 PETLMA A 60.0 31394 LKVLE JT 60.0 1 1	P2-3:A2:65:_LAKEVILLE - 1D 60KV & LAKEVILLE-PETALUMA C LINE	P2	Non-bus-tie breaker	94	92	88	134	134	140	43	49	100	95	95	63	151	System upgrade or preferred resource
31392 LAKEVILLE 60.0 31394 LKVLE JT 60.0 1 1	P2-3:A2:65:_LAKEVILLE - 1D 60KV & LAKEVILLE-PETALUMA C LINE	P2	Non-bus-tie breaker	88	86	83	116	116	121	41	46	93	89	89	59	142	System upgrade or preferred resource
32568 IGNACIO 115 32574 SAN RAFL 115 1 1	P2-1:A6:5:_IGNACIO-SAN RAFAEL #3 115KV [1860] (IGNACIO-LS GLLNS)	P2	Line section w/o fault	92	98	100	129	132	142	36	49	102	98	106	73	142	System upgrade or preferred resource
32618 NTWRJCT1 115 32020 JMSN JCT 115 1 1	P2-2:A6:15:_NRTH TWR 115KV SECTION 1G	P2	Bus	102	84	80	78	76	69	25	58	87	95	91	86	92	Short Term : Action Plan ; Long Term : Preferred resource
32655 TULCAY1 60.0 32662 TULCY JT 60.0 1 1	P2-1:A2:88:_TULUCAY-NAPA #2 60KV [8190] (TULUCAY-BSLT TAP)	P2	Line section w/o fault	110	117	118	73	75	77	48	62	122	116	121	89	108	Short Term : Action Plan ; Long Term : Preferred resource
32655 TULCAY1 60.0 32662 TULCY JT 60.0 1 1	P2-1:A6:24:_TULUCAY-NAPA #2 60KV [8190] (TULUCAY-BSLT TAP)	P2	Line section w/o fault	110	117	118	73	75	77	48	62	122	116	121	89	108	Short Term : Action Plan ; Long Term : Preferred resource
32656 NAPA 60.0 32662 TULCY JT 60.0 1 1	P2-1:A2:88:_TULUCAY-NAPA #2 60KV [8190] (TULUCAY-BSLT TAP)	P2	Line section w/o fault	133	141	142	124	127	131	58	75	148	140	146	107	131	Short Term : Action Plan ; Long Term : Preferred resource
32656 NAPA 60.0 32662 TULCY JT 60.0 1 1	P2-1:A6:24:_TULUCAY-NAPA #2 60KV [8190] (TULUCAY-BSLT TAP)	P2	Line section w/o fault	133	141	142	124	127	131	58	75	148	140	146	107	131	Short Term : Action Plan ; Long Term : Preferred resource
32666 IGNACO B 60.0 32674 WOODACRE 60.0 1 1	P2-1:A6:30:_IGNACIO-BOLINAS #2 60KV [7180] (IGNACO B-STAF_JCT)	P2	Line section w/o fault	65	80	83	105	106	111	25	23	90	83	93	55	120	System upgrade or preferred resource

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				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
32669 STAF_JCT 60.0 32673 TOCA_JCT 60.0 1 1	P2-1:A6:30:_IGNACIO-BOLINAS #2 60KV [7180] (IGNACO B-STAF_JCT)	P2	Line section w/o fault	65	82	84	82	82	83	21	18	95	86	97	54	106	System upgrade or preferred resource
32671 BOLINAS 60.0 32674 WOODACRE 60.0 1 1	P2-1:A6:30:_IGNACIO-BOLINAS #2 60KV [7180] (IGNACO B-STAF_JCT)	P2	Line section w/o fault	85	107	110	126	126	130	31	29	122	111	125	72	155	System upgrade or preferred resource
32672 OLEMA 60.0 32671 BOLINAS 60.0 1 1	P2-1:A6:30:_IGNACIO-BOLINAS #2 60KV [7180] (IGNACO B-STAF_JCT)	P2	Line section w/o fault	158	201	206	232	233	237	56	51	232	210	237	134	295	Short Term : Action Plan ; Long Term : Preferred resource
32673 TOCA_JCT 60.0 32672 OLEMA 60.0 1 1	P2-1:A6:31:_IGNACIO-BOLINAS #1 60KV [7140] (IGNACO B-WOODACRE)	P2	Line section w/o fault	69	78	85	109	114	133	35	34	84	78	91	61	163	System upgrade or preferred resource
32678 SAN_RFLJ 60.0 32680 GREENBRE 60.0 1 1	P2-1:A6:29:_IGNACIO-ALTO-SAUSALITO #1 60KV [7160] (IGNACO A-TWR2_19)	P2	Line section w/o fault	52	54	52	90	93	102	27	29	58	55	58	42	121	System upgrade or preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-1:A2:9:_GEYSER11 13.80KV GEN UNIT 1 & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	100	103	100	<90	<90	<90	<90	<90	113	106	100	104	<90	Short Term : Action Plan ; Long Term : Preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-1:A6:1:_EXXON_BH 12.47KV GEN UNIT 1 & P1-2:A2:54:_KONOCI-T-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	100	104	100	<90	<90	<90	<90	<90	113	106	100	104	<90	Short Term : Action Plan ; Long Term : Preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-1:A6:1:_EXXON_BH 12.47KV GEN UNIT 1 & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	100	103	100	<90	<90	<90	<90	<90	113	106	100	104	<90	Short Term : Action Plan ; Long Term : Preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-1:A6:2:_MONTICLO 9.11KV GEN UNIT 3 & P1-2:A2:54:_KONOCI-T-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	100	104	100	<90	<90	<90	<90	<90	113	106	100	104	<90	Short Term : Action Plan ; Long Term : Preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-1:A6:2:_MONTICLO 9.11KV GEN UNIT 3 & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	100	103	100	<90	<90	<90	<90	<90	112	106	100	104	<90	Short Term : Action Plan ; Long Term : Preferred resource
31362 TRNTN JT 60.0 31378 FULTON 60.0 1 1	P1-1:A2:9:_GEYSER11 13.80KV GEN UNIT 1 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	119	<90	Sensitivity only
31362 TRNTN JT 60.0 31378 FULTON 60.0 1 1	P1-1:A6:1:_EXXON_BH 12.47KV GEN UNIT 1 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	119	<90	Sensitivity only
31362 TRNTN JT 60.0 31378 FULTON 60.0 1 1	P1-1:A6:2:_MONTICLO 9.11KV GEN UNIT 3 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	119	<90	Sensitivity only
31364 MOLINO 60.0 31363 TRNTN_JC 60.0 1 1	P1-1:A2:20:_POTTRVLY 2.40KV GEN UNIT 4 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	93	<90	<90	<90	<90	<90	127	<90	Sensitivity only
31364 MOLINO 60.0 31363 TRNTN_JC 60.0 1 1	P1-1:A2:21:_GEO.ENGY 9.11KV GEN UNIT 1 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	93	<90	<90	<90	<90	<90	127	<90	Sensitivity only
31364 MOLINO 60.0 31363 TRNTN_JC 60.0 1 1	P1-1:A2:23:_INDIAN V 9.11KV GEN UNIT 1 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	93	<90	<90	<90	<90	<90	127	<90	Sensitivity only
31364 MOLINO 60.0 31363 TRNTN_JC 60.0 1 1	P1-1:A2:24:_SONMA LF 9.11KV GEN UNIT 1 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	93	<90	<90	<90	<90	<90	127	<90	Sensitivity only

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31364 MOLINO 60.0 31363 TRNTN_JC 60.0 1 1	P1-1:A2:25:_Q1221 13.80KV GEN UNIT 1 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	93	<90	<90	<90	<90	<90	128	<90	Sensitivity only
31384 COTATI 60.0 31389 PETC_JCT 60.0 1 1	P1-1:A2:10:_GEYSER12 13.80KV GEN UNIT 1 & P1-2:A2:20:_EGLE RCK-FULTON-SILVERDO 115KV [0]	P3	G-1/N-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	101	<90	Sensitivity only
31392 LAKEVLL 60.0 31394 LKVLE JT 60.0 1 1	P1-1:A2:24:_SONMA LF 9.11KV GEN UNIT 1 & P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350]	P3	G-1/N-1	<90	<90	92	126	126	132	<90	<90	<90	<90	<90	154	<90	System upgrade or preferred resource
31392 LAKEVLL 60.0 31394 LKVLE JT 60.0 1 1	P1-1:A2:9:_GEYSER11 13.80KV GEN UNIT 1 & P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350]	P3	G-1/N-1	<90	<90	91	125	125	130	<90	<90	<90	<90	<90	152	<90	System upgrade or preferred resource
31397 WILLITSJ 60.0 31312 FRT BRGG 60.0 1 1	P1-1:A2:7:_GEYSER78 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	116	<90	Sensitivity only
32664 IGNACO A 60.0 32666 IGNACO B 60.0 1 1	P1-1:A2:5:_GEYSR5-6 13.80KV GEN UNIT 1 & P1-3:A6:8:_IGNACIO 115/60KV TB 3	P3	G-1/N-1	<90	<90	<90	112	115	125	<90	<90	<90	<90	<90	125	<90	System upgrade or preferred resource
32664 IGNACO A 60.0 32666 IGNACO B 60.0 1 1	P1-1:A6:1:_EXXON_BH 12.47KV GEN UNIT 1 & P1-3:A6:8:_IGNACIO 115/60KV TB 3	P3	G-1/N-1	<90	<90	<90	112	115	125	<90	<90	<90	<90	<90	125	<90	System upgrade or preferred resource
32664 IGNACO A 60.0 32666 IGNACO B 60.0 1 1	P1-1:A6:2:_MONTICLO 9.11KV GEN UNIT 3 & P1-3:A6:8:_IGNACIO 115/60KV TB 3	P3	G-1/N-1	<90	<90	<90	112	115	125	<90	<90	<90	<90	<90	125	<90	System upgrade or preferred resource
31246 BELLVUE 115 31248 PENNGRVE 115 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redndant relay (Bus)	78	85	81	100	97	102	30	33	92	88	86	58	<90	System upgrade or preferred resource
31248 PENNGRVE 115 31254 CORONA 115 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redndant relay (Bus)	82	89	85	106	104	110	33	35	97	92	90	61	<90	System upgrade or preferred resource
31254 CORONA 115 31255 LAKEVLL 115 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redndant relay (Bus)	80	86	83	112	110	116	32	37	94	89	87	59	<90	System upgrade or preferred resource
31366 MLNO JCT 60.0 31385 LAGUNATP 60.0 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redndant relay (Bus)	99	92	88	78	74	81	41	27	102	96	96	58	<90	Sensitivity only
31384 COTATI 60.0 31389 PETC_JCT 60.0 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redndant relay (Bus)	136	137	130	147	143	153	60	44	152	144	142	91	137	Short Term : Action Plan ; Long Term : Preferred resource
31389 PETC_JCT 60.0 31390 PETLMA A 60.0 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redndant relay (Bus)	91	92	88	98	95	101	41	30	103	97	96	61	<90	System upgrade or preferred resource
31391 SNMA TAP 60.0 31385 LAGUNATP 60.0 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redndant relay (Bus)	103	98	93	83	79	85	44	31	109	103	101	64	<90	Short Term : Action Plan ; Long Term : Preferred resource
31392 LAKEVLL 60.0 31394 LKVLE JT 60.0 1 1	P5-5:A2:1:_FULTON 230 KV BAAH BUS #1 (FAILURE OF NON-REDUNDENT RELAY)	P5	Non-redndant relay (Bus)	89	90	86	112	110	117	40	31	100	95	94	60	<90	System upgrade or preferred resource

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30435 LAKEVILLE 230 30460 VACA-DIX 230 1 1	P1-2:A2:3:_GEYSR18-LAKEVILLE-GEYSR20-SNTAFE-GEYSR13 230KV [0] & P1-2:A6:6:_TULUCAY-VACA 230KV [5800]	P6	N-1-1	100	97	95	101	102	105	<90	<90	103	100	100	<90	<90	System upgrade or preferred resource
30440 TULUCAY 230 30460 VACA-DIX 230 1 1	P1-2:A2:9:_VACA-LAKEVILLE #1 230KV [5840] & P1-2:A2:3:_GEYSR18-LAKEVILLE-GEYSR20-SNTAFE-GEYSR13 230KV [0]	P6	N-1-1	100	96	94	100	100	101	<90	<90	104	100	100	<90	<90	System upgrade or preferred resource
31200 MENDOCNO 115 31260 MNDCNO M 115 1 1	P1-2:A2:16:_UKIAH-HOPLAND-CLOVERDALE 115KV [4050] & P1-2:A2:15:_MENDOCINO-REDBUD 115KV [2410]	P6	N-1-1	<90	<90	<90	<90	<90	<90	103	<90	<90	<90	<90	<90	<90	System upgrade or preferred resource
31200 MENDOCNO 115 31260 MNDCNO M 115 1 1	P1-2:A2:19:_CORTINA-MENDOCINO #1 115KV [1330] & P1-2:A2:24:_REDBUD-HGHLNDJ1 115KV [0]	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	115	<90	Sensitivity only
31224 INDIN VL 115 31215 LUCERNJ1 115 1 1	P1-2:A2:13:_EAGLE ROCK-REDBUD 115KV [1480] & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	91	<90	<90	100	100	100	<90	<90	100	<90	<90	<90	<90	System upgrade or preferred resource
31224 INDIN VL 115 31215 LUCERNJ1 115 1 1	P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0] & P1-2:A2:13:_EAGLE ROCK-REDBUD 115KV [1480]	P6	N-1-1	88	<90	<90	97	99	101	<90	<90	94	<90	<90	<90	100	System upgrade or preferred resource
31224 INDIN VL 115 31215 LUCERNJ1 115 1 1	P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0] & P1-2:A2:24:_REDBUD-HGHLNDJ1 115KV [0]	P6	N-1-1	88	<90	<90	97	99	100	<90	<90	94	<90	<90	<90	100	System upgrade or preferred resource
31224 INDIN VL 115 31215 LUCERNJ1 115 1 1	P1-2:A2:24:_REDBUD-HGHLNDJ1 115KV [0] & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	91	<90	<90	100	100	100	<90	<90	100	<90	<90	<90	<90	System upgrade or preferred resource
31229 REDBUDJ2 115 31222 REDBUD 115 1 1	P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0] & P1-2:A2:22:_CORTINA-MENDOCINO #1 115KV [1330] (2)	P6	N-1-1	101	102	101	94	95	96	<90	<90	107	103	102	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31229 REDBUDJ2 115 31222 REDBUD 115 1 1	P1-2:A2:22:_CORTINA-MENDOCINO #1 115KV [1330] (2) & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	101	102	101	97	95	100	<90	<90	107	103	102	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31236 FULTON 115 31239 MONROE2 115 1 1	P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311] & P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620]	P6	N-1-1	101	107	103	125	126	129	<90	<90	114	109	106	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31236 FULTON 115 31239 MONROE2 115 1 1	P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311] & P1-2:A2:28:_FULTON-SANTA ROSA #1 115KV [1620] (2)	P6	N-1-1	92	97	94	115	116	119	<90	<90	104	99	96	<90	<90	System upgrade or preferred resource
31238 MONROE1 115 31240 SNTA RSA 115 1 1	P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630] & P1-2:A2:31:_SANTA ROSA-CORONA 115KV [4309] (2)	P6	N-1-1	<90	<90	<90	98	99	101	<90	<90	<90	<90	<90	<90	<90	System upgrade or preferred resource

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Study Area: PG&E North Coast & North Bay

Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
31239 MONROE2 115 31240 SNTA RSA 115 1 1	P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620] & P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311]	P6	N-1-1	<90	<90	<90	103	104	107	<90	<90	95	91	<90	<90	<90	System upgrade or preferred resource
31239 MONROE2 115 31240 SNTA RSA 115 1 1	P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311] & P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620]	P6	N-1-1	<90	<90	<90	103	104	106	<90	<90	95	91	<90	<90	<90	System upgrade or preferred resource
31246 BELLVUE 115 31248 PENNGRVE 115 1 1	P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620] & P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630]	P6	N-1-1	95	100	96	118	118	122	<90	<90	107	103	99	<90	<90	System upgrade or preferred resource
31248 PENNGRVE 115 31254 CORONA 115 1 1	P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630] & P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620]	P6	N-1-1	98	104	100	124	126	129	<90	<90	111	106	103	<90	<90	System upgrade or preferred resource
31248 PENNGRVE 115 31254 CORONA 115 1 1	P1-2:A2:28:_FULTON-SANTA ROSA #1 115KV [1620] (2) & P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630]	P6	N-1-1	<90	92	<90	112	113	116	<90	<90	98	94	91	<90	<90	System upgrade or preferred resource
31254 CORONA 115 31255 LAKEVLE 115 1 1	P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620] & P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630]	P6	N-1-1	95	100	96	130	131	135	<90	<90	107	102	99	<90	<90	System upgrade or preferred resource
31254 CORONA 115 31255 LAKEVLE 115 1 1	P1-2:A2:29:_FULTON-SANTA ROSA #2 115KV [1630] (2) & P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620]	P6	N-1-1	<90	<90	<90	102	103	105	<90	<90	<90	<90	<90	<90	<90	System upgrade or preferred resource
31254 CORONA 115 31255 LAKEVLE 115 1 1	P1-3:A2:18:_FULTON 230/115KV TB 9 & P1-3:A2:17:_FULTON 230/115KV TB 4	P6	N-1-1	<90	<90	<90	109	109	115	<90	<90	94	<90	<90	<90	<90	System upgrade or preferred resource
31262 CACHE J2 115 31229 REDBUDJ2 115 1 1	P1-2:A2:19:_CORTINA-MENDOCINO #1 115KV [1330] & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	95	95	95	100	98	100	<90	<90	100	96	95	<90	<90	System upgrade or preferred resource
31300 MENDOCNO 60.0 31330 UPPR LKE 60.0 1 1	P1-2:A2:50:_CLEAR LAKE-HOPLAND 60KV [6390] & P1-2:A2:54:_KONOCITI-EAGLE ROCK 60KV [6861]	P6	N-1-1	223	221	217	196	195	194	<90	<90	231	224	216	197	229	Short Term : Action Plan ; Long Term : Preferred resource
31300 MENDOCNO 60.0 31330 UPPR LKE 60.0 1 1	P1-2:A2:50:_CLEAR LAKE-HOPLAND 60KV [6390] & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P6	N-1-1	223	221	216	195	195	195	<90	<90	231	224	217	196	229	Short Term : Action Plan ; Long Term : Preferred resource
31300 MENDOCNO 60.0 31330 UPPR LKE 60.0 1 1	P1-2:A2:54:_KONOCITI-EAGLE ROCK 60KV [6861] & P1-2:A2:50:_CLEAR LAKE-HOPLAND 60KV [6390]	P6	N-1-1	224	220	217	195	194	194	<90	<90	230	224	217	196	229	Short Term : Action Plan ; Long Term : Preferred resource
31300 MENDOCNO 60.0 31330 UPPR LKE 60.0 1 1	P1-3:A2:27:_EGLE RCK 115/60KV TB 1 & P1-2:A2:50:_CLEAR LAKE-HOPLAND 60KV [6390]	P6	N-1-1	224	220	217	195	194	194	<90	<90	230	224	217	197	229	Short Term : Action Plan ; Long Term : Preferred resource
31334 CLER LKE 60.0 31338 KONOCITI6 60.0 1 1	P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0] & P1-2:A2:24:_REDBUD-HGHLNDJ1 115KV [0]	P6	N-1-1	116	121	121	100	100	101	98	100	124	121	122	100	126	Short Term : Action Plan ; Long Term : Preferred resource

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Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
31334 CLER LKE 60.0 31338 KONOCTI6 60.0 1 1	P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0] & P1-2:A6:13:_SILVERDO-FULTON-EGLE RCK 115KV [0]	P6	N-1-1	100	101	101	87	89	86	<90	86	102	100	102	88	106	System upgrade or preferred resource
31334 CLER LKE 60.0 31338 KONOCTI6 60.0 1 1	P1-2:A2:41:_MENDOCINO-HARTLEY 60KV [7510] & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	106	93	<90	<90	94	Sensitivity only
31334 CLER LKE 60.0 31338 KONOCTI6 60.0 1 1	P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861] & P1-2:A2:41:_MENDOCINO-HARTLEY 60KV [7510]	P6	N-1-1	<90	90	<90	<90	<90	<90	<90	<90	106	93	<90	<90	93	Sensitivity only
31334 CLER LKE 60.0 31338 KONOCTI6 60.0 1 1	P1-2:A6:13:_SILVERDO-FULTON-EGLE RCK 115KV [0] & P1-2:A2:16:_UKIAH-HOPLAND-CLOVERDALE 115KV [4050]	P6	N-1-1	98	98	99	86	87	88	82	91	101	98	100	90	<90	Sensitivity only
31334 CLER LKE 60.0 31338 KONOCTI6 60.0 1 1	P1-3:A2:27:_EGLE RCK 115/60KV TB 1 & P1-2:A2:41:_MENDOCINO-HARTLEY 60KV [7510]	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	106	92	<90	<90	<90	Sensitivity only
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-4:A2:6:_MENDOCNO SVD=V & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P6	N-1-1	99	103	99	<90	<90	<90	<90	<90	112	105	99	<90	<90	System upgrade or preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-4:A2:8:_FT_BRGD2 SVD=V & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P6	N-1-1	100	104	100	<90	<90	<90	<90	<90	113	106	100	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-4:A2:8:_FT_BRGD2 SVD=V & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P6	N-1-1	100	104	100	<90	<90	<90	<90	<90	113	106	100	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-4:A2:9:_ELK_D SVD=V & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P6	N-1-1	100	104	100	<90	<90	<90	<90	<90	113	106	100	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-4:A2:9:_ELK_D SVD=V & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P6	N-1-1	100	103	100	<90	<90	<90	<90	<90	113	106	100	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31335 GRANITE 60.0 31336 HPLND JT 60.0 1 1	P1-4:A6:1:_PUEBLO SVD=V & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P6	N-1-1	100	104	100	<90	<90	<90	<90	<90	113	106	100	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31338 KONOCTI6 60.0 31344 EGLE RCK 60.0 1 1	P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0] & P1-2:A2:24:_REDBUD-HGHLNDJ1 115KV [0]	P6	N-1-1	112	112	110	100	99	100	<90	<90	119	113	111	95	<90	Short Term : Action Plan ; Long Term : Preferred resource
31338 KONOCTI6 60.0 31344 EGLE RCK 60.0 1 1	P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0] & P1-2:A6:13:_SILVERDO-FULTON-EGLE RCK 115KV [0]	P6	N-1-1	102	100	98	92	92	89	<90	<90	105	101	99	89	<90	Short Term : Action Plan ; Long Term : Preferred resource
31338 KONOCTI6 60.0 31344 EGLE RCK 60.0 1 1	P1-2:A2:20:_EGLE RCK-FULTON-SILVERDO 115KV [0] & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	102	99	98	91	91	91	<90	<90	105	100	99	90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31338 KONOCTI6 60.0 31344 EGLE RCK 60.0 1 1	P1-2:A2:22:_CORTINA-MENDOCINO #1 115KV [1330] (2) & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	106	103	101	96	95	98	<90	<90	111	105	102	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource

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Thermal Overloads



Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
31338 KONOCTI6 60.0 31344 EGLE RCK 60.0 1 1	P1-2:A2:24:_REDBUD-HGHLNDJ1 115KV [0] & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	111	112	110	100	97	100	<90	<90	116	113	111	95	<90	Short Term : Action Plan ; Long Term : Preferred resource
31338 KONOCTI6 60.0 31344 EGLE RCK 60.0 1 1	P1-2:A6:13:_SILVERDO-FULTON-EGLE RCK 115KV [0] & P1-2:A2:16:_UKIAH-HOPLAND-CLOVERDALE 115KV [4050]	P6	N-1-1	101	99	97	92	91	91	<90	<90	104	100	98	90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31338 KONOCTI6 60.0 31344 EGLE RCK 60.0 1 1	P1-2:A6:13:_SILVERDO-FULTON-EGLE RCK 115KV [0] & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	102	99	98	91	91	91	<90	<90	105	100	99	90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31366 MLNO JCT 60.0 31385 LAGUNATP 60.0 1 1	P1-3:A2:21:_LAKEVILE 230/60KV TB 3 & P1-3:A2:22:_LAKEVILE 230/60KV TB 5	P6	N-1-1	299	304	297	272	273	277	113	141	317	311	308	204	379	Short Term : Action Plan ; Long Term : Preferred resource
31366 MLNO JCT 60.0 31385 LAGUNATP 60.0 1 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	296	274	273	213	214	216	197	119	282	278	278	235	297	Short Term : Action Plan ; Long Term : Preferred resource
31370 CLVRDLJT 60.0 31374 GYSRJCT1 60.0 1 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	202	187	185	149	149	149	152	100	191	189	190	170	203	Short Term : Action Plan ; Long Term : Preferred resource
31374 GYSRJCT1 60.0 31382 FTCHMTNP 60.0 1 1	P1-2:A2:20:_EGLE RCK-FULTON-SILVERDO 115KV [0] & P1-2:A2:12:_EAGLE ROCK-CORTINA 115KV [1470]	P6	N-1-1	96	93	92	<90	53	<90	101	101	89	92	91	99	85	System upgrade or preferred resource
31374 GYSRJCT1 60.0 31382 FTCHMTNP 60.0 1 1	P1-2:A6:13:_SILVERDO-FULTON-EGLE RCK 115KV [0] & P1-2:A2:12:_EAGLE ROCK-CORTINA 115KV [1470]	P6	N-1-1	96	93	92	<90	53	<90	101	101	89	92	91	99	85	System upgrade or preferred resource
31377 FCHMNTP2 60.0 31380 FTCH MTN 60.0 1 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	136	124	124	92	92	91	123	<90	125	125	126	116	124	Short Term : Action Plan ; Long Term : Preferred resource
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0] & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P6	N-1-1	<90	93	<90	<90	<90	<90	<90	<90	101	98	96	<90	<90	Sensitivity only
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P1-2:A2:20:_EGLE RCK-FULTON-SILVERDO 115KV [0] & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P6	N-1-1	<90	93	<90	<90	<90	<90	<90	<90	101	98	96	<90	<90	Sensitivity only
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P1-2:A2:21:_GEYSERS #11-EAGLE ROCK 115KV [4391] & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	100	97	96	<90	<90	Sensitivity only
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P1-2:A2:23:_LOWER LAKE-HOMESTAKE 115KV [1481] & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	100	<90	<90	<90	<90	Sensitivity only
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P1-2:A2:24:_REDBUD-HGHLNDJ1 115KV [0] & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	101	<90	<90	<90	<90	Sensitivity only
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620] & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	100	<90	<90	<90	<90	Sensitivity only
31378 FULTON 60.0 32650 ST.HELNA 60.0 1 1	P1-3:A2:16:_GEYSR17 230/13.8KV TB 1 & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P6	N-1-1	<90	<90	<90	<90	<90	<90	<90	<90	101	97	97	<90	<90	Sensitivity only

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Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
31384 COTATI 60.0 31389 PETC_JCT 60.0 1 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	372	345	342	314	315	320	245	151	360	353	351	293	435	Short Term : Action Plan ; Long Term : Preferred resource
31384 COTATI 60.0 31391 SNMA TAP 60.0 1 1	P1-3:A2:22:_LAKEVILLE 230/60KV TB 5 & P1-3:A2:21:_LAKEVILLE 230/60KV TB 3	P6	N-1-1	301	306	301	275	276	281	116	143	318	313	312	206	385	Short Term : Action Plan ; Long Term : Preferred resource
31386 MCDWLLSW 60.0 31392 LAKEVLE 60.0 1 1	P1-3:A2:22:_LAKEVILLE 230/60KV TB 5 & P1-3:A2:21:_LAKEVILLE 230/60KV TB 3	P6	N-1-1	94	97	95	106	106	106	<90	<90	100	99	98	<90	<90	System upgrade or preferred resource
31390 PETLMA A 60.0 31394 LKVL JT 60.0 1 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	256	238	235	272	273	277	168	<100	248	243	242	201	300	Expand scope of Lakeville #2 Upgrade (formerly known as Fulton 230/115 kV Transformer project)
31392 LAKEVLE 60.0 31394 LKVL JT 60.0 1 1	P1-2:A2:2:_FULTON-BEARCNYN-WSFRDLT-GEYSR16-GEYSR12-GEYSR14 230KV [0] & P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350]	P6	N-1-1	103	101	97	131	132	137	<90	<90	109	105	104	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31392 LAKEVLE 60.0 31394 LKVL JT 60.0 1 1	P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350] & P1-2:A2:32:_CORONA-LAKEVILLE 115KV [4311]	P6	N-1-1	99	98	94	129	130	135	<90	<90	107	101	101	<90	<90	System upgrade or preferred resource
31392 LAKEVLE 60.0 31394 LKVL JT 60.0 1 1	P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350] & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P6	N-1-1	105	105	102	144	146	152	<90	<90	112	110	107	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31392 LAKEVLE 60.0 31394 LKVL JT 60.0 1 1	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350]	P6	N-1-1	99	97	94	129	130	134	<90	<90	105	100	100	<90	<90	System upgrade or preferred resource
31392 LAKEVLE 60.0 31394 LKVL JT 60.0 1 1	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	240	222	220	235	236	240	157	99	232	228	226	188	281	Short Term : Action Plan ; Long Term : Preferred resource
31392 LAKEVLE 60.0 31394 LKVL JT 60.0 1 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350]	P6	N-1-1	99	97	94	129	130	134	<90	<90	105	100	100	<90	<90	System upgrade or preferred resource
31392 LAKEVLE 60.0 31394 LKVL JT 60.0 1 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	240	222	220	235	236	240	157	99	232	228	226	188	281	Short Term : Action Plan ; Long Term : Preferred resource
31392 LAKEVLE 60.0 31394 LKVL JT 60.0 1 1	P1-3:A2:32:_GYSR78TP 115/13.8KV TB 1 & P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350]	P6	N-1-1	<90	<90	91	125	125	131	<90	<90	<90	<90	<90	<90	<90	System upgrade or preferred resource
32570 LS GLLNS 115 32574 SAN RAFL 115 3 1	P1-2:A6:17:_IGNACIO-SAN RAFAEL #1 115KV [1850] & P1-3:A6:4:_IGNACIO 230/115KV TB 6	P6	N-1-1	<90	<90	<90	90	93	101	<90	<90	<90	<90	<90	<90	<90	System upgrade or preferred resource
32650 ST.HELNA 60.0 32652 CALISTGA 60.0 1 1	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	105	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	Short Term : Action Plan ; Long Term : Preferred resource
31246 BELLVUE 115 31248 PENNGRVE 115 1 1	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	95	100	96	118	118	121	47	58	107	103	98	74	<90	System upgrade or preferred resource
31248 PENNGRVE 115 31254 CORONA 115 1 1	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	98	103	100	124	125	129	50	60	111	106	102	78	100	System upgrade or preferred resource
31254 CORONA 115 31255 LAKEVLE 115 1 1	P7-1:A2:15:_FULTON-SANTA ROSA #1 & FULTON-SANTA ROSA #2 LINES	P7	DCTL	95	99	96	130	131	134	48	59	107	102	98	73	<90	System upgrade or preferred resource
31336 HPLND JT 60.0 31206 HPLND JT 115 2 1	P7-1:A2:5:_GEYSERS #17-FULTON & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	85	82	81	96	102	95	65	61	86	83	81	75	<90	System upgrade or preferred resource

Overloaded Facility	Contingency (All and Worst P6)	Category	Category Description	Loading % (Baseline Scenarios)								Loading % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
31336 HPLND JT 60.0 31206 HPLND JT 115 2 1	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	88	85	85	99	105	99	68	64	89	86	84	78	<90	System upgrade or preferred resource
31336 HPLND JT 60.0 31206 HPLND JT 115 2 1	P7-1:A2:7:_GEYSERS #3-EAGLE ROCK & GEYSERS #7-EAGLE ROCK LINES	P7	DCTL	85	94	93	97	111	96	96	88	95	95	93	81	<90	System upgrade or preferred resource
31336 HPLND JT 60.0 31370 CLVRDLJT 60.0 1 1	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	104	100	99	77	90	78	90	91	99	99	99	94	<90	Short Term : Action Plan ; Long Term : Preferred resource
31370 CLVRDLJT 60.0 31374 GYSRJCT1 60.0 1 1	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	104	99	99	77	89	78	90	91	99	99	98	93	<90	Short Term : Action Plan ; Long Term : Preferred resource
31374 GYSRJCT1 60.0 31382 FTCHMTNP 60.0 1 1	P7-1:A2:6:_GEYSERS #9-LAKEVILLE & EAGLE ROCK-FULTON-SILVERADO LINES	P7	DCTL	104	99	99	77	89	77	90	91	99	98	98	93	<90	Short Term : Action Plan ; Long Term : Preferred resource



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
ALTO 60 kV	Base Case	P0	N-0	1.03	0.98	0.98	0.93	0.93	0.91	1.06	1.03	0.98	0.99	0.98	1.00	0.91	Load power factor correction and voltage support if needed
ANNAPOLS 60 kV	Base Case	P0	N-0	1.01	1.01	1.01	0.93	0.93	0.92	1.00	1.02	1.00	1.01	1.00	1.01	0.92	Load power factor correction and voltage support if needed
BELLVUE 115 kV	Base Case	P0	N-0	1.03	1.01	1.02	1.00	1.00	0.99	1.05	1.03	1.01	1.01	1.01	1.02	0.99	Load power factor correction and voltage support if needed
BOLINAS 60 kV	Base Case	P0	N-0	1.05	1.00	1.00	0.97	0.97	0.96	1.07	1.04	1.00	1.00	1.00	1.01	0.96	Load power factor correction and voltage support if needed
CALISTGA 60 kV	Base Case	P0	N-0	1.05	0.97	0.97	0.98	0.99	0.99	1.05	1.03	0.96	0.97	0.96	0.99	0.99	Load power factor correction and voltage support if needed
CALPELLA 115 kV	Base Case	P0	N-0	1.05	1.03	1.04	1.04	1.04	1.03	1.05	1.04	1.03	1.03	1.03	1.05	1.03	Load power factor correction and voltage support if needed
CARQUINZ 115 kV	Base Case	P0	N-0	1.08	1.00	1.01	0.99	0.99	0.98	1.09	1.04	1.00	1.01	1.00	1.01	0.98	Load power factor correction and voltage support if needed
CH.STN 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.03	1.03	1.03	1.05	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
CROWCREEK SS60 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.04	1.04	1.04	1.05	1.05	1.04	1.03	1.04	1.04	1.04	Load power factor correction and voltage support if needed
EGLERCK 60 kV	Base Case	P0	N-0	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.04	1.05	1.06	1.05	Load power factor correction and voltage support if needed
FORT RSS 60 kV	Base Case	P0	N-0	1.01	1.01	1.01	0.94	0.94	0.94	1.01	1.02	1.01	1.01	1.01	1.02	0.94	Load power factor correction and voltage support if needed
FRONTIERPV 60 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.04	1.04	1.04	1.05	1.05	1.04	1.03	1.04	1.04	1.04	Load power factor correction and voltage support if needed
FULTON 60 kV	Base Case	P0	N-0	1.04	1.05	1.05	1.04	1.04	1.04	1.04	1.05	1.05	1.05	1.05	1.05	1.04	Load power factor correction and voltage support if needed
FULTON 115 kV	Base Case	P0	N-0	1.06	1.03	1.03	1.02	1.02	1.02	1.07	1.05	1.03	1.03	1.03	1.04	1.02	Load power factor correction and voltage support if needed
GEYSR11 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.03	1.03	1.03	1.05	1.04	1.03	1.03	1.03	1.04	1.03	Load power factor correction and voltage support if needed
GREENBRE 60 kV	Base Case	P0	N-0	1.02	0.98	0.98	0.93	0.93	0.91	1.06	1.03	0.98	0.98	0.98	1.00	0.91	Load power factor correction and voltage support if needed
GUALALA 60 kV	Base Case	P0	N-0	1.00	1.00	1.00	0.90	0.90	0.89	0.99	1.01	0.99	1.00	0.99	1.00	0.89	Voltage support
GUSTINE 60 kV	Base Case	P0	N-0	1.01	1.01	1.00	1.03	1.03	1.02	1.03	1.04	1.01	1.01	1.01	1.03	1.02	Load power factor correction and voltage support if needed
HIGHLAND 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.04	1.04	1.04	1.06	1.06	1.04	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
HOMEGRND 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.04	1.04	1.04	1.06	1.06	1.04	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
IGNACIO 115 kV	Base Case	P0	N-0	1.06	1.02	1.02	1.01	1.00	1.00	1.08	1.05	1.02	1.02	1.02	1.03	1.00	Load power factor correction and voltage support if needed

Study Area: PG&E North Coast & North Bay

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
INDIN VL 115 kV	Base Case	P0	N-0	1.07	1.05	1.05	1.06	1.06	1.06	1.07	1.07	1.05	1.05	1.05	1.05	1.06	Load power factor correction and voltage support if needed
INGRM C. 115 kV	Base Case	P0	N-0	1.03	1.02	1.02	1.03	1.03	1.03	1.05	1.04	1.02	1.03	1.02	1.02	1.03	Load power factor correction and voltage support if needed
JMSCNPMP 115 kV	Base Case	P0	N-0	1.07	1.01	1.01	1.00	0.99	0.99	1.08	1.04	1.00	1.01	1.01	1.02	0.99	Load power factor correction and voltage support if needed
LS GLLNS 115 kV	Base Case	P0	N-0	1.05	1.01	1.01	1.00	0.99	0.99	1.08	1.05	1.01	1.02	1.01	1.02	0.99	Load power factor correction and voltage support if needed
LUCERNE 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.05	1.05	1.04	1.06	1.06	1.04	1.04	1.04	1.05	1.04	Load power factor correction and voltage support if needed
MDSTO CN 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.04	1.04	1.03	1.06	1.04	1.03	1.04	1.03	1.03	1.03	Load power factor correction and voltage support if needed
MELONES 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.03	1.03	1.03	1.05	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
MENDOCNO 115 kV	Base Case	P0	N-0	1.05	1.04	1.04	1.04	1.04	1.04	1.05	1.04	1.03	1.04	1.04	1.05	1.04	Load power factor correction and voltage support if needed
MEYERS 115 kV	Base Case	P0	N-0	1.08	1.00	1.01	0.99	0.99	0.98	1.09	1.04	1.00	1.01	1.00	1.01	0.98	Load power factor correction and voltage support if needed
MILLER 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.04	1.04	1.04	1.06	1.04	1.03	1.04	1.03	1.03	1.04	Load power factor correction and voltage support if needed
MNTCLOPH 115 kV	Base Case	P0	N-0	1.05	1.01	1.02	1.01	1.01	1.01	1.07	1.05	1.01	1.01	1.01	1.03	1.01	Load power factor correction and voltage support if needed
MONTCLLO 115 kV	Base Case	P0	N-0	1.05	1.01	1.02	1.01	1.01	1.01	1.07	1.05	1.01	1.01	1.01	1.03	1.01	Load power factor correction and voltage support if needed
NEWMAN 60 kV	Base Case	P0	N-0	1.03	1.01	1.01	1.03	1.03	1.03	1.04	1.05	1.02	1.02	1.02	1.03	1.03	Load power factor correction and voltage support if needed
NOVATO 60 kV	Base Case	P0	N-0	1.06	1.01	1.01	1.00	0.99	0.98	1.08	1.05	1.01	1.02	1.01	1.02	0.98	Load power factor correction and voltage support if needed
NRTH TWR 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.02	1.03	1.03	1.07	1.04	1.03	1.02	1.03	1.04	1.03	Load power factor correction and voltage support if needed
NTWR ALT 115 kV	Base Case	P0	N-0	1.02	0.98	0.98	0.97	0.97	0.96	1.05	1.03	0.98	0.98	0.98	0.99	0.96	Load power factor correction and voltage support if needed
NVTO JCT 60 kV	Base Case	P0	N-0	1.06	1.01	1.01	1.00	0.99	0.98	1.08	1.05	1.01	1.02	1.01	1.02	0.98	Load power factor correction and voltage support if needed
OLEMA 60 kV	Base Case	P0	N-0	1.05	0.99	0.99	0.96	0.95	0.94	1.07	1.04	0.99	0.99	0.99	1.00	0.94	Load power factor correction and voltage support if needed
PATTERSN 60 kV	Base Case	P0	N-0	1.03	1.02	1.02	1.03	1.03	1.03	1.04	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed
PEORIA 115 kV	Base Case	P0	N-0	1.04	1.03	1.02	1.03	1.03	1.03	1.05	1.04	1.02	1.03	1.02	1.03	1.03	Load power factor correction and voltage support if needed
R.TRACK 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.03	1.03	1.03	1.06	1.04	1.03	1.03	1.03	1.03	1.03	Load power factor correction and voltage support if needed

Study Area: PG&E North Coast & North Bay

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
REDBUD 115 kV	Base Case	P0	N-0	1.04	1.03	1.04	1.03	1.03	1.03	1.04	1.05	1.03	1.03	1.03	1.04	1.03	Load power factor correction and voltage support if needed
RINCON 115 kV	Base Case	P0	N-0	1.05	1.03	1.03	1.02	1.02	1.02	1.07	1.05	1.02	1.03	1.03	1.03	1.02	Load power factor correction and voltage support if needed
RVRBK TP 115 kV	Base Case	P0	N-0	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	Load power factor correction and voltage support if needed
SALADO 115 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.04	1.04	1.04	1.06	1.05	1.03	1.04	1.03	1.03	1.04	Load power factor correction and voltage support if needed
SAN RAFL 115 kV	Base Case	P0	N-0	1.05	1.01	1.01	0.99	0.99	0.98	1.07	1.04	1.01	1.01	1.01	1.02	0.98	Load power factor correction and voltage support if needed
SAUSALTO 60 kV	Base Case	P0	N-0	1.02	0.98	0.98	0.92	0.91	0.89	1.06	1.02	0.97	0.98	0.97	0.99	0.89	Load power factor correction and voltage support if needed
SILVERDO 115 kV	Base Case	P0	N-0	1.04	1.01	1.02	1.01	1.01	1.01	1.06	1.05	1.01	1.01	1.01	1.03	1.01	Load power factor correction and voltage support if needed
SKAGGS 115 kV	Base Case	P0	N-0	1.06	1.02	1.02	1.00	1.00	0.99	1.08	1.05	1.01	1.02	1.01	1.02	0.99	Load power factor correction and voltage support if needed
SLMN CRK 60 kV	Base Case	P0	N-0	1.01	1.01	1.01	0.95	0.95	0.94	1.00	1.02	1.01	1.01	1.01	1.02	0.94	Load power factor correction and voltage support if needed
SNTA RSA 115 kV	Base Case	P0	N-0	1.04	1.02	1.02	1.00	1.00	1.00	1.06	1.04	1.01	1.01	1.01	1.02	1.00	Load power factor correction and voltage support if needed
STAFFORD 60 kV	Base Case	P0	N-0	1.05	0.99	0.99	0.96	0.96	0.95	1.08	1.04	0.99	1.00	0.99	1.01	0.95	Load power factor correction and voltage support if needed
STNSLSRP 60 kV	Base Case	P0	N-0	1.04	1.03	1.03	1.04	1.04	1.04	1.05	1.05	1.04	1.03	1.04	1.04	1.04	Load power factor correction and voltage support if needed
STONY PT 115 kV	Base Case	P0	N-0	1.04	1.01	1.02	1.00	1.00	1.00	1.05	1.03	1.01	1.01	1.01	1.02	1.00	Load power factor correction and voltage support if needed
TOCALOMA 60 kV	Base Case	P0	N-0	1.05	0.99	0.99	0.96	0.96	0.94	1.07	1.04	0.99	0.99	0.99	1.00	0.94	Load power factor correction and voltage support if needed
TULLOCH 115 kV	Base Case	P0	N-0	1.04	1.04	1.03	1.04	1.04	1.04	1.05	1.04	1.04	1.04	1.03	1.03	1.04	Load power factor correction and voltage support if needed
WOODACRE 60 kV	Base Case	P0	N-0	1.05	1.01	1.01	0.98	0.98	0.97	1.07	1.04	1.00	1.01	1.00	1.01	0.97	Load power factor correction and voltage support if needed
PHLO JCT 60kV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	0.68	0.54	0.55	0.45	0.45	0.43	>0.9	0.84	0.52	0.53	0.53	0.73	0.43	Voltage support
WILLITS 60 KV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	0.51	0.49	0.49	0.38	0.37	0.37	0.63	0.79	0.47	0.48	0.48	0.54	0.37	Voltage support
KEKAWAKA 60 KV	P2-4:A2:5:_MENDOCNO 115KV - SECTION 1D & 2D	P2	Bus-tie breaker	0.59	0.56	0.57	0.48	0.48	0.47	0.71	0.83	0.54	0.56	0.55	0.62	0.47	Voltage support
HPLND JT 60 KV	P2-3:A2:27:_EGLE RCK - MA 115KV & EAGLE ROCK-REDBUD LINE	P2	Non-bus-tie breaker	0.52	0.52	0.53	0.45	0.45	0.45	0.66	0.81	0.51	0.52	0.52	0.58	0.45	Voltage support

Study Area: PG&E North Coast & North Bay

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
PETC_JCT 60 kV	P2-3:A2:65:_LAKEVILLE - 1D 60KV & LAKEVILLE-PETALUMA C LINE	P2	Non-bus-tie breaker	0.54	0.52	0.52	0.43	0.43	0.42	0.67	0.81	0.50	0.51	0.51	0.57	0.42	Voltage support
ANNAPOLS 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P3	G-1/N-1	>0.9	>0.9	>0.9	0.90	0.89	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
BIG RIVR 60 kV	P1-1:A2:13:_GEYSER16 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.56	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
CALISTGA 60 kV	P1-1:A2:10:_GEYSER12 13.80KV GEN UNIT 1 & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	0.89	0.89	>0.9	>0.9	Sensitivity only
CLER LKE 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	Sensitivity only
DUNBAR 60 kV	P1-1:A2:13:_GEYSER16 13.80KV GEN UNIT 1 & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	Sensitivity only
EGLE RCK 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	0.86	>0.9	0.84	>0.9	>0.9	>0.9	0.83	0.85	>0.9	>0.9	>0.9	Voltage support
EGLE RCK 60 kV	P1-1:A2:9:_GEYSER11 13.80KV GEN UNIT 1 & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	>0.9	0.85	>0.9	>0.9	0.85	0.85	>0.9	>0.9	0.83	0.85	0.86	0.88	>0.9	Voltage support
ELK 60 kV	P1-1:A2:12:_GEYSER14 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.52	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and voltage support if needed
FORT RSS 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
FRT BRGG 60 kV	P1-1:A2:12:_GEYSER14 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.59	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
GARCIA 60 kV	P1-1:A2:12:_GEYSER14 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.51	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
GREENBRE 60 kV	P1-1:A2:10:_GEYSER12 13.80KV GEN UNIT 1 & P1-2:A2:3:_GEYSR18-LAKEVILE-GEYSR20-SNTAFE-GEYSR13 230KV [0]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.90	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Load power factor correction and voltage support if needed

Study Area: PG&E North Coast & North Bay

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
GREENBRE 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P3	G-1/N-1	>0.9	>0.9	>0.9	0.89	0.88	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
GUALALA 60 kV	P1-1:A2:10:_GEYSER12 13.80KV GEN UNIT 1 & P1-2:A2:58:_FULTON-LAGUNA-COTATI-SNMALDFL 60KV [0]	P3	G-1/N-1	>0.9	>0.9	>0.9	0.87	0.87	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
HARTLEY 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	Sensitivity only
KONOCTI6 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-3:A2:27:_EGLE RCK 115/60KV TB 1	P3	G-1/N-1	>0.9	>0.9	0.86	>0.9	0.84	>0.9	>0.9	>0.9	0.83	0.85	>0.9	>0.9	>0.9	Voltage support
KONOCTI6 60 kV	P1-1:A2:6:_GEYSR5-6 13.80KV GEN UNIT 2 & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.83	0.85	>0.9	>0.9	>0.9	Sensitivity only
KONOCTI6 60 kV	P1-1:A2:9:_GEYSER11 13.80KV GEN UNIT 1 & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	>0.9	0.85	>0.9	>0.9	0.84	0.84	>0.9	>0.9	0.83	0.85	0.86	0.88	>0.9	Voltage support
LOWR LKE 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	>0.9	>0.9	0.84	>0.9	0.82		>0.9	>0.9	0.81	0.83	>0.9	>0.9	>0.9	Voltage support
LOWR LKE 60 kV	P1-1:A2:9:_GEYSER11 13.80KV GEN UNIT 1 & P1-2:A2:54:_KONOCTI-EAGLE ROCK 60KV [6861]	P3	G-1/N-1	>0.9	0.83		>0.9	0.82	0.82	>0.9	>0.9	0.81	0.82	0.84	0.86	>0.9	Voltage support
OLEMA 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
PHILO 60 kV	P1-1:A2:12:_GEYSER14 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.49	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
PNT ARNA 60 kV	P1-1:A2:12:_GEYSER14 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.51	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
PNT ARNA 60 kV	P1-1:A2:13:_GEYSER16 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.51	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
PNT ARNA 60 kV	P1-1:A2:16:_GEYSER20 13.80KV GEN UNIT 1 & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.52	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support

Study Area: PG&E North Coast & North Bay

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
SAN_RFLJ 60 kV	P1-1:A2:13:_GEYSER16 13.80KV GEN UNIT 1 & P1-2:A6:23:_IGNACIO-ALTO-SAUSALITO #2 60KV [7170]	P3	G-1/N-1	>0.9	>0.9	>0.9	>0.9	0.89	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
SAUSALTO 60 kV	P1-1:A2:10:_GEYSER12 13.80KV GEN UNIT 1 & P1-2:A2:3:_GEYSR18-LAKEVILLE-GEYSR20-SNTAFE-GEYSR13 230KV [0]	P3	G-1/N-1	>0.9	>0.9	>0.9	0.89	0.88	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
SAUSALTO 60 kV	P1-1:A2:12:_GEYSER14 13.80KV GEN UNIT 1 & P1-2:A6:5:_IGNACIO-SOBRANTE 230KV [4920]	P3	G-1/N-1	>0.9	>0.9	>0.9	0.90	0.89	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support
ANNAPOLS 60 kV	P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0] & P1-2:A2:20:_EGLE RCK-FULTON-SILVERDO 115KV [0]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.89	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
ANNAPOLS 60 kV	P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0] & P1-2:A2:31:_SANTA ROSA-CORONA 115KV [4309] (2)	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
BIG RIVR 60 kV	P1-2:A2:18:_GEYSERS #3-EAGLE ROCK 115KV [1660] & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P6	N-1-1	>0.9	>0.9	>0.9	0.88	>0.9	0.55	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
BIG RIVR 60 kV	P1-2:A2:9:_VACA-LAKEVILLE #1 230KV [5840] & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P6	N-1-1	>0.9	>0.9	>0.9	0.88	0.56	0.54	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
BOLINAS 60 kV	P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0] & P1-2:A6:5:_IGNACIO-SOBRANTE 230KV [4920]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
BOLINAS 60 kV	P1-3:A6:4:_IGNACIO 230/115KV TB 6 & P1-2:A6:26:_IGNACIO-BOLINAS #1 60KV [7140]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.90	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
CALISTGA 60 kV	P1-2:A2:62:_LAKEVILLE-PETALUMA C 60KV [7350] & P1-2:A2:63:_LAKEVILLE #1 60KV [7360]	P6	N-1-1	>0.9	0.89	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	0.89	0.89	>0.9	>0.9	Voltage support, UVLS and/ or SPS
CALISTGA 60 kV	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	0.53	0.43	0.44	0.39	0.39	0.38	0.69	0.80	0.41	0.42	0.42	0.50	0.38	Voltage support, UVLS and/ or SPS



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
CLOVRDLE 115 kV	P1-2:A2:14: _MENDOCINO-UKIAH 115KV [2420] & P1-2:A2:17: _CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	0.83	0.83	0.84	0.86	0.87	0.87	>0.9	>0.9	0.82	0.83	0.83	0.90	0.87	Voltage support, UVLS and/ or SPS
CLOVRDLE 115 kV	P1-2:A2:17: _CLOVRDLE-MPE-GEYSERS34 115KV [0] & P1-2:A2:14: _MENDOCINO-UKIAH 115KV [2420]	P6	N-1-1	0.82	0.83	0.83	0.87	0.87	0.86	>0.9	>0.9	0.82	0.83	0.83	0.89	0.86	Voltage support, UVLS and/ or SPS
COTATI 60 kV	P1-3:A2:21: _LAKEVILE 230/60KV TB 3 & P1-3:A2:22: _LAKEVILE 230/60KV TB 5	P6	N-1-1	0.80	0.74	0.75	0.65	0.65	0.64	>0.9	>0.9	0.73	0.74	0.74	0.86	0.64	Voltage support, UVLS and/ or SPS
COTATI 60 kV	P1-3:A2:31: _FULTON 115/60KV TB 2 & P1-3:A2:30: _FULTON 115/60KV TB 1	P6	N-1-1	0.75	0.74	0.75	0.68	0.68	0.67	0.83	>0.9	0.73	0.74	0.74	0.78	0.67	Voltage support, UVLS and/ or SPS
DUNBAR 60 kV	P1-1:A2:13: _GEYSER16 13.80KV GEN UNIT 1 & P1-2:A2:63: _LAKEVILLE #1 60KV [7360]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	Sensitivity only
DUNBAR 60 kV	P1-3:A2:21: _LAKEVILE 230/60KV TB 3 & P1-3:A2:22: _LAKEVILE 230/60KV TB 5	P6	N-1-1	0.68	0.54	0.55	0.45	0.45	0.43	>0.9	0.84	0.52	0.53	0.53	0.73	0.43	Voltage support, UVLS and/ or SPS
EGLE RCK 60 kV	P1-2:A2:11: _GEYSERS #5-GEYSERS #3 115KV [1670] & P1-3:A2:27: _EGLE RCK 115/60KV TB 1	P6	N-1-1	>0.9	0.85	0.86	0.84	0.84	0.85	>0.9	>0.9	>0.9	0.85	0.86	0.88	>0.9	Voltage support, UVLS and/ or SPS
EGLE RCK 60 kV	P1-2:A2:12: _EAGLE ROCK-CORTINA 115KV [1470] & P1-3:A2:27: _EGLE RCK 115/60KV TB 1	P6	N-1-1	0.89	0.85	0.86	0.84	0.84	0.84	>0.9	>0.9	0.83	>0.9	>0.9	0.88	0.84	Voltage support, UVLS and/ or SPS
EGLE RCK 60 kV	P1-2:A2:41: _MENDOCINO-HARTLEY 60KV [7510] & P1-3:A2:27: _EGLE RCK 115/60KV TB 1	P6	N-1-1	0.82	0.73	0.75	0.70	0.70	0.70	>0.9	>0.9	0.67	0.72	0.75	0.81	0.70	Voltage support, UVLS and/ or SPS
ELK 60 kV	P1-1:A2:12: _GEYSER14 13.80KV GEN UNIT 1 & P1-2:A2:40: _MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.52	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
ELK 60 kV	P1-2:A2:18: _GEYSERS #3-EAGLE ROCK 115KV [1660] & P1-2:A2:40: _MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P6	N-1-1	>0.9	>0.9	>0.9	0.87	>0.9	0.51	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
ELK 60 kV	P1-2:A2:48: _PHILO JCT-ELK 60KV [7780] & P1-2:A2:55: _GUALALA-MONTE RIO 60KV [6980]	P6	N-1-1	>0.9	>0.9	>0.9	0.55	0.55	0.51	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
FCHMNTP2 60 kV	P1-3:A2:30: _FULTON 115/60KV TB 1 & P1-3:A2:31: _FULTON 115/60KV TB 2	P6	N-1-1	0.51	0.52	0.53	0.45	0.45	0.45	0.65	0.81	0.50	0.51	0.51	0.58	0.45	Voltage support, UVLS and/ or SPS

Study Area: PG&E North Coast & North Bay

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
FORT RSS 60 kV	P1-3:A2:18:_FULTON 230/115KV TB 9 & P1-3:A2:17:_FULTON 230/115KV TB 4	P6	N-1-1	>0.9	>0.9	>0.9	0.79	0.79	0.78	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
FORT RSS 60 kV	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	0.49	0.47	0.48	0.35	0.35	0.34	0.61	0.78	0.45	0.47	0.46	0.53	0.34	Voltage support, UVLS and/ or SPS
FTCH MTN 60 kV	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	0.51	0.52	0.53	0.45	0.45	0.45	0.65	0.81	0.50	0.51	0.51	0.58	0.45	Voltage support
GARCIA 60 kV	P1-2:A2:18:_GEYSERS #3-EAGLE ROCK 115KV [1660] & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P6	N-1-1	>0.9	>0.9	>0.9	0.87	>0.9	0.50	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
GARCIA 60 kV	P1-2:A2:48:_PHILO JCT-ELK 60KV [7780] & P1-2:A2:55:_GUALALA-MONTE RIO 60KV [6980]	P6	N-1-1	>0.9	>0.9	>0.9	0.53	0.53	0.49	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
GREENBRE 60 kV	P1-1:A2:10:_GEYSER12 13.80KV GEN UNIT 1 & P1-3:A6:4:_IGNACIO 230/115KV TB 6	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.90	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
GREENBRE 60 kV	P1-2:A2:1:_LAKEVILLE-IGNACIO #2 230KV [3745] & P1-2:A2:8:_LAKEVILLE-IGNACIO #1 230KV [4940]	P6	N-1-1	>0.9	>0.9	>0.9	0.89	0.88	0.86	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
MIRABEL 60 kV	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	0.53	0.51	0.52	0.42	0.42	0.41	0.66	0.81	0.49	0.51	0.50	0.57	0.41	Voltage support, UVLS and/ or SPS
MOLINO 60 kV	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	0.59	0.56	0.57	0.48	0.48	0.47	0.71	0.83	0.54	0.56	0.55	0.62	0.47	Voltage support, UVLS and/ or SPS
MONROE1 115 kV	P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620] & P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630]	P6	N-1-1	>0.9	0.89	0.89	0.86	0.86	0.84	>0.9	>0.9	0.88	0.89	0.89	>0.9	>0.9	Voltage support, UVLS and/ or SPS
MONTCLLO 115 kV	P1-3:A2:17:_FULTON 230/115KV TB 4 & P1-3:A2:18:_FULTON 230/115KV TB 9	P6	N-1-1	>0.9	>0.9	>0.9	0.89	0.89	0.88	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
MONTE RO 60 kV	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	0.51	0.49	0.49	0.38	0.37	0.37	0.63	0.79	0.47	0.48	0.48	0.54	0.37	Voltage support, UVLS and/ or SPS
NTWR ALT 115 kV	P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0] & P1-2:A2:3:_GEYSR18-LAKEVILE-GEYSR20-SNTAFE-GEYSR13 230KV [0]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
OLEMA 60 kV	P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0] & P1-2:A2:3:_GEYSR18-LAKEVILE-GEYSR20-SNTAFE-GEYSR13 230KV [0]	P6	N-1-1	>0.9	>0.9	>0.9	0.89	0.88	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
PETLMA A 60 kV	P1-3:A2:21:_LAKEVILLE 230/60KV TB 3 & P1-3:A2:22:_LAKEVILLE 230/60KV TB 5	P6	N-1-1	0.72	0.63	0.63	0.53	0.53	0.51	0.50	0.87	0.61	0.62	0.62	0.79	0.51	Expand scope of Lakeville #2 Upgrade (formerly known as Fulton 230/115 kV Transformer project)
PHILO 60 kV	P1-2:A2:9:_VACA-LAKEVILLE #1 230KV [5840] & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P6	N-1-1	>0.9	>0.9	>0.9	0.86	0.49	0.46	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
PNT ARNA 60 kV	P1-2:A2:1:_LAKEVILLE-IGNACIO #2 230KV [3745] & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.52	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
PNT ARNA 60 kV	P1-2:A2:18:_GEYSERS #3-EAGLE ROCK 115KV [1660] & P1-2:A2:40:_MENDOCINO-PHILO JCT-HOPLAND 60KV [7520]	P6	N-1-1	>0.9	>0.9	>0.9	0.87	>0.9	0.50	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
PUEBLO 115 kV	P1-2:A2:33:_LAKEVILLE-SONOMA #1 115KV [2063] & P1-2:A2:34:_LAKEVILLE-SONOMA #2 115KV [2070]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	0.90	0.90	>0.9	>0.9	Voltage support, UVLS and/ or SPS
RINCON 115 kV	P1-3:A2:18:_FULTON 230/115KV TB 9 & P1-3:A2:17:_FULTON 230/115KV TB 4	P6	N-1-1	>0.9	>0.9	>0.9	0.88	0.88	0.88	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
SAUSALTO 60 kV	P1-1:A2:10:_GEYSER12 13.80KV GEN UNIT 1 & P1-2:A2:3:_GEYSR18-LAKEVILLE-GEYSR20-SNTAFE-GEYSR13 230KV [0]	P6	N-1-1	>0.9	>0.9	>0.9	0.89	0.88	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
SAUSALTO 60 kV	P1-1:A2:10:_GEYSER12 13.80KV GEN UNIT 1 & P1-2:A6:5:_IGNACIO-SOBRANTE 230KV [4920]	P6	N-1-1	>0.9	>0.9	>0.9	0.90	0.89	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
SILVERDO 115 kV	P1-3:A2:17:_FULTON 230/115KV TB 4 & P1-3:A2:18:_FULTON 230/115KV TB 9	P6	N-1-1	>0.9	>0.9	>0.9	0.89	0.89	0.88	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
SLMN CRK 60 kV	P1-1:A2:14:_GEYSER17 13.80KV GEN UNIT 1 & P1-2:A2:2:_FULTON-BEARCNYN-WSFRDLT-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
SLMN CRK 60 kV	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	0.49	0.47	0.48	0.36	0.35	0.35	0.61	0.78	0.45	0.47	0.46	0.53	0.35	Voltage support, UVLS and/ or SPS
SLMN CRK 60 kV	P1-3:A2:31:_FULTON 115/60KV TB 2 & P1-3:A2:30:_FULTON 115/60KV TB 1	P6	N-1-1	0.49	0.47	0.48	0.36	0.35	0.35	0.61	0.78	0.45	0.47	0.46	0.53	0.35	Voltage support, UVLS and/ or SPS
SNMALDFL 60 kV	P1-3:A2:21:_LAKEVILLE 230/60KV TB 3 & P1-3:A2:22:_LAKEVILLE 230/60KV TB 5	P6	N-1-1	0.80	0.75	0.75	0.66	0.66	0.65	>0.9	>0.9	0.74	0.75	0.75	0.86	0.65	Voltage support, UVLS and/ or SPS

Study Area: PG&E North Coast & North Bay

High/Low Voltages



Substation	Contingency (All and Worst P6)	Category	Category Description	Voltage PU (Baseline Scenarios)								Voltage PU (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
SNTA RSA 115 kV	P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620] & P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630]	P6	N-1-1	>0.9	0.89	0.90	0.86	0.86	0.85	>0.9	>0.9	0.88	0.89	0.89	>0.9	>0.9	Voltage support, UVLS and/ or SPS
SNTA RSA 115 kV	P1-3:A2:18:_FULTON 230/115KV TB 9 & P1-3:A2:17:_FULTON 230/115KV TB 4	P6	N-1-1	>0.9	>0.9	>0.9	0.87	0.87	0.87	>0.9	>0.9	0.89	0.90	0.90	>0.9	>0.9	Voltage support, UVLS and/ or SPS
SONOMA 115 kV	P1-2:A2:33:_LAKEVILLE-SONOMA #1 115KV [2063] & P1-2:A2:34:_LAKEVILLE-SONOMA #2 115KV [2070]	P6	N-1-1	>0.9	0.88	0.89	0.90	0.89	0.89	>0.9	>0.9	0.87	0.88	0.87	>0.9	>0.9	Voltage support, UVLS and/ or SPS
ST.HELNA 60 kV	P1-3:A2:30:_FULTON 115/60KV TB 1 & P1-3:A2:31:_FULTON 115/60KV TB 2	P6	N-1-1	0.51	0.48	0.48	0.42	0.42	0.41	0.68	0.81	0.46	0.47	0.47	0.54	0.41	Voltage support, UVLS and/ or SPS
STAFFORD 60 kV	P1-2:A2:3:_GEYSR18-LAKEVILE-GEYSR20-SNTAFE-GEYSR13 230KV [0] & P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	0.89	0.88	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Voltage support, UVLS and/ or SPS
STAFFORD 60 kV	P1-2:A2:3:_GEYSR18-LAKEVILE-GEYSR20-SNTAFE-GEYSR13 230KV [0] & P1-2:A6:5:_IGNACIO-SOBRANTE 230KV [4920]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	Voltage support, UVLS and/ or SPS
STAFFORD 60 kV	P1-2:A6:5:_IGNACIO-SOBRANTE 230KV [4920] & P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Voltage support, UVLS and/ or SPS
STAFFORD 60 kV	P1-3:A6:4:_IGNACIO 230/115KV TB 6 & P1-3:A6:9:_IGNACIO 115/60KV TB 1	P6	N-1-1	>0.9	>0.9	>0.9	>0.9	>0.9	0.90	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.89	Voltage support, UVLS and/ or SPS
STNY PTP 115 kV	P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630] & P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620]	P6	N-1-1	>0.9	>0.9	>0.9	0.87	0.87	0.86	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	0.87	Voltage support, UVLS and/ or SPS
STONY PT 115 kV	P1-2:A2:26:_FULTON-SANTA ROSA #2 115KV [1630] & P1-2:A2:25:_FULTON-SANTA ROSA #1 115KV [1620]	P6	N-1-1	>0.9	>0.9	>0.9	0.87	0.87	0.86	>0.9	>0.9	0.89	>0.9	>0.9	>0.9	0.87	Voltage support, UVLS and/ or SPS
TOCALOMA 60 kV	P1-2:A2:3:_GEYSR18-LAKEVILE-GEYSR20-SNTAFE-GEYSR13 230KV [0] & P1-2:A2:2:_FULTON-BEARCNYN-WSFRDFLT-GEYSR16-GEYSR12-GEYSR14 230KV [0]	P6	N-1-1	>0.9	>0.9	>0.9	0.90	0.89	0.87	>0.9	>0.9	>0.9	>0.9	>0.9	>0.9	0.88	Voltage support, UVLS and/ or SPS
UKIAH 115 kV	P1-2:A2:14:_MENDOCINO-UKIAH 115KV [2420] & P1-2:A2:17:_CLOVRDLE-MPE-GEYSERS34 115KV [0]	P6	N-1-1	0.83	0.82	0.82	0.85	0.86	0.86	>0.9	0.90	0.81	0.82	0.82	0.89	0.86	Voltage support, UVLS and/ or SPS

Study Area: PG&E North Coast & North Bay

Voltage Deviation



Substation	Contingency (All and Worst P6)	Category	Category Description	Post Cont. Voltage Deviation % (Baseline Scenarios)								Post Cont. Voltage Deviation % (Sensitivity Scenarios)					Project & Potential Mitigation Solutions
				2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Winter Peak	2022 Winter Peak	2027 Winter Peak	2019 Spring Light Load	2022 Spring Off-Peak	2022 SP High CEC Forecast	2019 SP Peak-Shift	2027 SP Peak-Shift	2022 SP Heavy Renewable & Min Gas Gen	2027 Retirement of QF Generations	
None																	

Study Area: PG&E North Coast & North Bay

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
			2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	Select..	Select..	Select..	Select..	Select..	
IGNACIO/IGNACIO 230/115 kV No.6 Transformer	P1-3		0	0	0	0	0						No violation
GEYSER11 Unit 1	P1-1		0	0	0	0	0						No violation
PUEBLO 115kV ID. v SVD	P1-4		0	0	0	0	0						No violation
Bus fault at LAKEVILE 230kV	P2-2		0	0	0	0	0						No violation
Internal fault at Non-bus-tie-breaker #222 at LAKEVILE 230kV	P2-3		0	0	0	0	0						No violation
Internal fault at Bus-tie-breaker #422 at LAKEVILE 230kV	P2-4		0	0	0	0	0						No violation
GEYSER11 Unit 1 and LAKEVILE - CR2T3_18 230kV No.1 Line	P3-2		0	0	0	0	0						No violation
LP SAMOA Unit 1 and HUMB_BS1/HUMB_G1 115/13.8 kV No.1 Transformer	P3-3		0	0	0	0	0						No violation
GEYSER11 Unit 1 and PUEBLO 115 kV ID v SVD	P3-4		0	0	0	0	0						No violation
GEYSER11 Unit 1 and GEYSER13 Unit 1	P3-1		0	0	0	0	0						No violation
Breaker stuck for CB #182 protecting GEYSER78 Unit 1	P4-1		0	0	0	0	0						No violation
Breaker stuck for CB #212 protecting LAKEVILE-CR2T3_18 230kV #1 Line	P4-2		0	0	0	0	0						No violation
Breaker stuck for CB #282 protecting LAKEVILE/230kV No.2 Transformer	P4-3		0	0	0	0	0						No violation
Breaker stuck for CB #366 protecting MENDOCNO 115 kV ID v SVD	P4-4		0	0	0	0	0						No violation

Study Area: PG&E North Coast & North Bay

Transient Stability



Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
			2019 Summer Peak	2022 Summer Peak	2027 Summer Peak	2019 Spring Light Load	2022 Spring Off-Peak	Select..	Select..	Select..	Select..	Select..	
Breaker stuck for CB #202 protecting LAKEVILE 230 kV Bus #2 SEC E	P4-5		0	0	0	0	0						No violation
Breaker stuck for CB #422 protecting LAKEVILE 230kV Bus #2 SEC E	P4-6		0	0	0	0	0						No violation
GEYSER78 Unit 1	P5-1		0	0	0	0	0						No violation
LAKEVILE -CR2T3_18 230kV No.1 Line	P5-2		0	0	0	0	0						No violation
LAKEVILE/LAKEVILLE 230/115 kV No.1 Transformer	P5-3		0	0	0	0	0						No violation
MENDOCNO 115 kV ID v SVD	P5-4		0	0	0	0	0						No violation
LAKEVILE 230kV SEC E	P5-5		0	0	0	0	0						No violation
LAKEVILE -CR2T3_18 230kV No.1 Line and TULUCAY-VACA-DIX 230kV No.1 Line	P6-1		0	0	0	0	0						No violation
LAKEVILE -CR2T3_18 230kV No.1 Line and IGNACIO/IGNACIO 230/115 kV No.6 Transformer	P6-2		0	0	0	0	0						No violation
PUEBLO 115 kV ID v SVD and BIG RIVR 60 kV ID v SVD	P6-3		0	0	0	0	0						No violation
Fulton - Lakeville 230kV Line [Tower 37/161] (30435 - 30432), Geysers 9 - Lakeville 230kV Line (30397 - 30435)	P7-1		0	0	0	0	0						No violation

Study Area: PG&E North Coast & North Bay



Single Contingency Load Drop

Worst Contingency	Category	Category Description	Amount of Load Drop (MW)										Potential Mitigation Solutions
			Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	

No single contingency resulted in total load drop of more than 250 MW.

Study Area: PG&E North Coast & North Bay



Single Source Substation with more than 100 MW Load

Substation	Load Served (MW)										Potential Mitigation Solutions
	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
											Under review with PTO