



ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-T-1	Oleum-Christie 115kV Line	CHRISTIE-SOBRANTE 115kV [1260]	P1	N-1	109	107	54	110	110	107	58	74			Short Term : Action Plan ; Long Term : North Tower 115 kV Looping Project
GBA-T-2	Newark-Dixon Landing 115kV Line	PIERCY-METCALF 115kV [4318]	P1	N-1	112	105	NA	117	110	105	NA	NA			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-3	Monta Vista-Wolfe 115 kV Line	STELLING-MONTA VISTA 115kV [1000]	P1	N-1	93	86	91	98	91	86	101	91			Monitor BTM-PV development in the area.
GBA-T-4	Piercy-Metcalf 115 kV Line	NEWARK-DIXON LANDING 115kV [2990]	P1	N-1	103	98	63	109	103	98	70	63			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-5	Evergreen 115/60 kV Transformer No. 1	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	95	87	77	102	89	87	88	77			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-6	Evergreen-Almaden 60 kV Line	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	124	113	88	134	117	113	101	88			Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-7	Contra Costa-Brentwood 230kV Line	C.COSTA 230kV - Section 2F & 2E	P2	Bus-tie breaker	68	75	65	68	66	104	60	65			Contra Costa area generation redispatch
GBA-T-8	Newark-Applied Materials 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	155	135	141	164	150	135	163	140			Short Term : Action Plan; Long Term : Monta Vista 230 kV Bus Upgrade Project
GBA-T-9	North Dublin-Cayetano 230kV Cable	C.COSTA 230kV - Section 2F & 1F	P2	Bus-tie breaker	79	81	86	81	91	103	89	88			Contra Costa area generation redispatch
GBA-T-10	Las Positas-Newark 230kV Line	C.COSTA 230kV - Section 2F & 2E	P2	Bus-tie breaker	87	96	99	89	108	117	98	101			Contra Costa area generation redispatch
GBA-T-11	Cayetano-Lone Tree (USWP-Cayetano) 230kV Line	C.COSTA 230kV - Section 2F & 1F	P2	Bus-tie breaker	83	86	92	86	96	108	96	94			Contra Costa area generation redispatch
GBA-T-12	Oleum-Christie 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	110	108	53	112	111	108	56	82			Short Term : Action Plan ; Long Term : North Tower 115 kV Looping Project
GBA-T-13	Oakland D - Oakland L 115kV Cable	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	113	107	104	100	101	93	110	90			Increase generation in the Oakland Area
GBA-T-14	Oakland C - Oakland L #1 115kV Cable	CLARMNT - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #2 line	P2	Non-bus-tie breaker	100	92	91	103	98	91	98	91			Short Term : Action Plan ; Long Term : Preferred resource

Study Area: PG&E Greater Bay Area_Sensitivity

Thermal Overloads



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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-T-15	Oakland C - Oakland X #2 115kV Cable	CLARMNT - 1D 115kV & SOBRANTE-GRIZZLY-CLAREMONT #2 line	P2	Non-bus-tie breaker	101	95	93	91	90	83	100	82			Increase generation in the Oakland Area
GBA-T-16	Grant-Oakland J 115 kV Line	MORAGA 115kV - Section 1E & 2E	P2	Bus-tie breaker	NA	98	98	NA	106	98	106	98			Upgrade conductor : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-17	Pittsburg 230/115kV Transformer #13	PITSBG D - 2D 230kV & PITSBG D-TBC_PT1 #1 line	P2	Non-bus-tie breaker	103	106	57	112	96	101	59	57			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-18	Martinez-Sobrante 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	105	95	<90	104	107	96	0	0			Increase generation in Pittsburg 115 kV
GBA-T-19	Sobrante-Grizzly-Claremont #2 115kV Line (Hillside-Grizzly JCT)	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	106	78	77	103	75	70	83	74			Increase generation in the Oakland Area
GBA-T-20	Oleum-Martinez 115kV Line	SOBRANTE 115kV - Section 1D & 1E	P2	Bus-tie breaker	238	222	179	247	239	222	197	255			SPS or system upgrade
GBA-T-21	Moraga-Claremont #1 115kV Line	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	114	104	109	103	106	99	117	112			Increase generation in the Oakland Area
GBA-T-22	Moraga-Claremont #2 115kV Line	STATIN X 115kV - Section 2D & 1D	P2	Bus-tie breaker	114	104	109	103	106	99	118	110			Increase generation in the Oakland Area
GBA-T-23	Moraga-Oakland X #1 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	103	95	99	95	92	85	107	94			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-24	Moraga-Oakland X #2 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	109	101	105	95	97	89	114	95			Increase generation in the Oakland Area
GBA-T-25	Moraga-Oakland X #3 115kV Line	MORAGA 115kV - Section 1D & 2D	P2	Bus-tie breaker	133	129	138	113	130	119	151	138			Increase generation in the Oakland Area
GBA-T-26	Moraga-Oakland X #4 115kV Line	MORAGA 115kV - Section 1D & 2D	P2	Bus-tie breaker	133	129	138	113	130	119	151	138			Increase generation in the Oakland Area
GBA-T-27	Moraga-Oakland J 115kV Line	SN LNDRO 115kV - Section 1E & 2E	P2	Bus-tie breaker	101	78	78	105	87	83	82	79			Short Term: Action plan - Open Grant-J line at Oakland J following RCEC outage Long Term: Reconductor Moraga-Oakland J 115 kV Line
GBA-T-28	Sobrante-Moraga 115kV Line	MORAGA 230kV - Section 2D & 1D	P2	Bus-tie breaker	132	86	87	129	93	84	97	104			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project



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GBA-T-29	Moraga-San Leandro #1 115kV Line	MORAGA 115kV - Section 2D & 2E	P2	Bus-tie breaker	111	64	57	115	70	67	60	57			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-30	Moraga-San Leandro #2 115kV Line	MORAGA 115kV - Section 1D & 1E	P2	Bus-tie breaker	129	85	84	134	93	88	89	84			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-31	Potrero-Larkin #1 (AY-1) 115kV Cable	LARKIN E Section 1E & LARKIN F Section 1F 115kV	P2	Bus-tie breaker	147	144	146	150	148	144	152	145			Larkin bus upgrade
GBA-T-32	San Mateo-Belmont 115kV Line	RVNSWD D 115kV - Section 1D & 2D	P2	Bus-tie breaker	101	96	97	104	102	96	103	97			Short Term: Action Plan Long Term: South of San Mateo Capacity Increase Project
GBA-T-33	Ravenswood-Palo Alto #2 115kV Line	RVNSWD E Section 1E & RVNSWD D Section 1D 115kV	P2	Non-bus-tie breaker	104	100	105	105	103	100	108	105			Palo Alto interim SPS
GBA-T-34	Cooley Landing-Palo Alto 115kV Line	RVNSWD E 115kV - Section 1E & 2E	P2	Bus-tie breaker	113	110	115	114	111	111	116	115			Palo Alto interim SPS
GBA-T-35	Ravenswood-Cooley Landing #1 115kV Line	RVNSWD E 115kV - Section 1E & 2E	P2	Bus-tie breaker	161	117	124	165	122	117	130	124			Palo Alto interim SPS
GBA-T-36	San Mateo-Bair 60kV Line	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	127	117	54	133	127	117	60	55			Short Term: Action Plan Long Term: San Mateo-Bair 60 kV Line Reconductor Project
GBA-T-37	Bair 115/60kV Transformer #1	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	147	137	149	155	147	137	166	151			Review Stanford 60 kV system configuration
GBA-T-38	Bair-Cooley Landing #2 60kV Line	CLY LNDG 60kV - Section 1D & 2D	P2	Bus-tie breaker	140	131	141	149	142	131	158	144			Review Stanford 60 kV system configuration
GBA-T-39	Eastshore 230/115kV Transformer #1	E. SHORE 230kV - Middle Breaker Bay 3	P2	Non-bus-tie breaker	84	103	103	89	110	109	111	102			Replace transformer
GBA-T-40	Newark-Lawerence 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	250	220	227	263	244	220	260	227			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-T-41	Newark-Applied Materials 115kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	197	172	180	207	192	173	207	179			Short Term : Action Plan; Long Term : Monta Vista 230 kV Bus Upgrade Project
GBA-T-42	Newark-Dixon Landing 115kV Line	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	113	106	72	118	111	106	80	72			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-43	Newark-Kifer 115kV Line	BUS-TIE BREAKER 392 FAULT AT NRS 115.00	P2	Bus-tie breaker	122	129	142	129	133	132	145	144			Reconductor



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GBA-T-44	Monta Vista-Wolfe 115 kV Line	MNTA VSA 115kV - Middle Breaker Bay 4	P2	Non-bus-tie breaker	93	86	91	98	91	86	101	91			Monitor BTM-PV development in the area.
GBA-T-45	Lawrence - Monta Vista 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	177	154	163	189	172	154	190	163			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-T-46	Britton-Monta Vista 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	110	95	100	118	106	96	117	100			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-T-47	Applied Materials-Britton 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	152	133	139	161	148	133	161	139			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-T-48	Trimble-San Jose 'B' 115 kV Line	BUS-TIE BREAKER 392 FAULT AT NRS 115.00	P2	Bus-tie breaker	110	135	144	130	140	142	144	145			Reconductor
GBA-T-49	El Patio-San Jose Sta. 'A' 115 kV Line	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	93	84	92	99	86	80	104	94			Preferred resource
GBA-T-50	San Jose Sta 'A'-'B' 115 kV Line	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	92	83	91	99	85	78	104	94			Preferred resource
GBA-T-51	Markham No. 1 115 kV Tap	MTCALF E 115kV - Section 1E & 2E	P2	Bus-tie breaker	62	87	101	98	90	87	111	101			Reconductor
GBA-T-52	Swift-Metcalf 115 kV Line	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	103	95	77	105	100	95	86	77			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-53	Metcalf 230/115 kV Trans No. 1	METCALF 230kV - Section 2D & 2E	P2	Bus-tie breaker	113	64	NA	123	67	63	NA	NA			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-54	Metcalf 230/115 kV Trans No. 4	METCALF 230kV - Section 1D & 1E	P2	Bus-tie breaker	101	63	NA	112	66	62	NA	NA			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-55	Metcalf 230/115 kV Trans No. 2	METCALF 230kV - Section 1D & 2D	P2	Bus-tie breaker	117	91	99	127	94	88	108	100			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-56	Metcalf 230/115 kV Trans No. 3	METCALF 230kV - Section 1D & 2D	P2	Bus-tie breaker	113	90	97	123	93	87	107	99			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-57	Piercy-Metcalf 115 kV Line	NEWARK F 115kV - Section 1F & 2F	P2	Bus-tie breaker	107	99	70	110	104	99	78	71			Action Plan before Evergreen-Mabury Voltage Conversion
GBA-T-58	Evergreen 115/60 kV Transformer No. 1	LOS GATS 60kV Section 1A	P2	Bus	95	87	77	102	89	87	88	77			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project



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GBA-T-59	Evergreen-Almaden 60 kV Line	LOS GATS 60kV Section 1A	P2	Bus	124	113	88	134	117	113	101	88			Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-60	Oleum-Christie 115kV Line	UNION CH 9kV Gen Unit 1 & CHRISTIE-SOBRANTE 115kV [1260]	P3	G-1/N-1	129	128	<90	131	131	128	<90	<90			Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-61	Pittsburg 230/115kV Transformer #12	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 13	P3	G-1/N-1	111	100	<90	111	105	97	<90	<90			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-62	Pittsburg 230/115kV Transformer #13	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 12	P3	G-1/N-1	129	116	<90	129	121	112	<90	<90			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-63	Moraga-Claremont #1 115kV Line	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & MORAGA-CLAREMONT #2 115kV [2710]	P3	G-1/N-1	105	98	100	97	99	96	100	100			Increase generation in the Oakland Area
GBA-T-64	Moraga-Claremont #2 115kV Line	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & MORAGA-CLAREMONT #1 115kV [2700]	P3	G-1/N-1	105	98	100	98	99	96	100	100			Increase generation in the Oakland Area
GBA-T-65	Newark-Dixon Landing 115kV Line	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & PIERCY-METCALF 115kV [4318]	P3	G-1/N-1	<90	106	<90	117	111	106	<90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-66	Piercy-Metcalf 115 kV Line	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & NEWARK-DIXON LANDING 115kV [2990]	P3	G-1/N-1	104	98	<90	109	103	98	<90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-67	Evergreen 115/60 kV Transformer No. 1	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & MONTA VISTA-LOS GATOS 60kV [7610]	P3	G-1/N-1	<90	<90	<90	102	<90	<90	<90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-68	Evergreen-Almaden 60 kV Line	DEC STG1 24kV & DEC CTG1 18kV & DEC CTG2 18kV & DEC CTG3 18kV Gen Units & MONTA VISTA-LOS GATOS 60kV [7610]	P3	G-1/N-1	<90	<90	<90	134	<90	<90	<90	<90			Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-69	San Mateo-Belmont 115kV Line	Ravenswood 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	99	97	99	104	105	99	106	100			Redundant bus relay
GBA-T-70	San Mateo 115/60kV Transformer #8	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	99	93	102	106	97	93	117	102			Redundant bus relay



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GBA-T-71	San Mateo-Hillsdale JCT 60kV Line	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	186	174	194	202	179	173	227	194			Redundant bus relay
GBA-T-72	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	212	199	221	229	204	198	258	220			Redundant bus relay
GBA-T-73	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	202	190	210	219	195	189	245	210			Redundant bus relay
GBA-T-74	Jefferson-Hillsdale JCT 60kV Line	Jefferson 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	156	148	161	168	152	147	185	161			Redundant bus relay
GBA-T-75	Los Altos-Loyola 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	117	diverge			Redundant bus relay
GBA-T-76	Loyola-Monta Vista 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	232	diverge			Redundant bus relay
GBA-T-77	Monta Vista 230/60 kV Trans No. 5	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	483	diverge			Redundant bus relay
GBA-T-78	Monta Vista 115/60 kV Trans No. 6	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	76	diverge			Redundant bus relay
GBA-T-79	Monta Vista-Permanente 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	111	diverge			Redundant bus relay
GBA-T-80	Monta Vista-Los Gatos 60 kV Line	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	diverge	diverge	diverge	diverge	diverge	diverge	102	diverge			Redundant bus relay
GBA-T-81	Oleum-Christie 115kV Line	CHRISTIE-SOBRAANTE 115kV [1260] & UNION CH 9kV Gen Unit 1	P6	N-1/N-1	130	128	93	132	131	128	102	100			Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-82	Christie-Sobrante (Oleum-Sobrante) 115kV Line	SOBRANTE-G #1 115kV [3720] & SOBRANTE-G #2 115kV [3730]	P6	N-1/N-1	134	124	102	136	136	125	113	132			SPS or system upgrade
GBA-T-83	Sobrante-El Cerrito STA G #1 115kV Lin	SOBRANTE-G #2 115kV [3730] & CHRISTIE-SOBRAANTE 115kV [1260]	P6	N-1/N-1	100	95	<90	105	102	95	91	101			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-84	Sobrante-El Cerrito STA G #2 115kV Line	SOBRANTE-G #1 115kV [3720] & CHRISTIE-SOBRAANTE 115kV [1260]	P6	N-1/N-1	103	95	<90	105	104	95	91	102			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-85	Oakland D - Oakland L 115kV Cable	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	114	107	104	94	96	0	110	0			Increase generation in the Oakland Area
GBA-T-86	Oakland C - Oakland L #1 115kV Cable	K-D #1 115kV [9966] & PITTSBURG-LOS MEDANOS #2 115kV [9993]	P6	N-1/N-1	100	92	91	103	98	91	98	91			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-87	Oakland C - Oakland X #2 115kV Cable	C-X #3 115kV [9925] & D-L #1 115kV [9963]	P6	N-1/N-1	114	107	104	94	96	<90	110	<90			Increase generation in the Oakland Area



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GBA-T-88	Pittsburg 230/115kV Transformer #12	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 13	P6	N-1/N-1	111	100	<90	111	105	100	<90	<90			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-89	Pittsburg 230/115kV Transformer #13	LMECCT2 18kV & LMECCT1 18kV & LMECST1 18kV Gen Units & PITSBG D 230/115kV TB 12	P6	N-1/N-1	129	116	<90	129	121	112	<90	<90			Short Term: Action plan Long Term: Pittsburg 230/115 kV Transformer Addition project
GBA-T-90	Martinez-Oleum 115kV Line	SOBRANTE-G #2 115kV [3730] & SOBRANTE-G #1 115kV [3720]	P6	N-1/N-1	117	108	<90	119	114	107	96	120			Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-91	Moraga-Claremont #1 115kV Line	C-X #3 115kV [9925] & C-X #2 115kV [9962]	P6	N-1/N-1	111	104	106	102	102	101	114	109			Increase generation in the Oakland Area
GBA-T-92	Moraga-Claremont #2 115kV Line	C-X #2 115kV [9962] & C-X #3 115kV [9925]	P6	N-1/N-1	111	104	106	102	102	101	114	109			Increase generation in the Oakland Area
GBA-T-93	Moraga-Oakland X #1 115kV Line	MORAGA-OAKLAND #2 115kV [2730] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	95	93	<90	106	<90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-94	Moraga-Oakland X #2 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	95	93	<90	106	<90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-95	Moraga-Oakland X #3 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	95	93	<90	106	<90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-96	Moraga-Oakland X #4 115kV Line	MORAGA-OAKLAND #1 115kV [2720] & D-L #1 115kV [9963]	P6	N-1/N-1	106	100	99	95	93	<90	106	<90			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-97	Moraga-San Leandro #1 115kV Line	MORAGA-SAN LEANDRO #2 115kV [2780] & MORAGA-SAN LEANDRO #3 115kV [2790]	P6	N-1/N-1	128	<90	<90	133	93	<90	<90	<90			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-98	Moraga-San Leandro #2 115kV Line	MORAGA-SAN LEANDRO #1 115kV [2770] & MORAGA-SAN LEANDRO #3 115kV [2790]	P6	N-1/N-1	129	<90	<90	133	93	<90	<90	<90			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-99	Moraga-San Leandro #3 115kV Line	MORAGA-SAN LEANDRO #1 115kV [2770] & MORAGA-SAN LEANDRO #2 115kV [2780]	P6	N-1/N-1	103	<90	<90	107	<90	<90	<90	<90			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-100	Potrero-Mission (AX) 115kV Cable	A-Y #1 (UNDERGROUND IDLE) 115kV [9952] & A-Y #2 115kV [9953]	P6	N-1/N-1	113	108	111	113	110	108	115	111			TBC runback scheme modification



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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-T-101	Martin-Sneath Lane 60kV Line	MILLBRAE-SANMATEO #1 115kV [0] & MARTIN-MILLBRAE #1 115kV [2230]	P6	N-1/N-1	123	114	119	129	124	114	133	119			Review Stanford 60 kV system configuration
GBA-T-102	San Mateo-Belmont 115kV Line	RAVENSWD 230/115kV TB 2 & RAVENSWD 230/115kV TB 1	P6	N-1/N-1	102	100	101	105	104	100	105	101			Action plan or explore potential mitigation
GBA-T-103	Ravenswood-Palo Alto #1 115kV Line	RVNSWD E-PLO ALTO #2 115kV [0] & RVNSWD D-CLY LND #1 115kV [0]	P6	N-1/N-1	105	102	107	107	104	102	110	107			Palo Alto interim SPS
GBA-T-104	Ravenswood-Palo Alto #2 115kV Line	RVNSWD E-PLO ALTO #1 115kV [0] & RVNSWD D-CLY LND #1 115kV [0]	P6	N-1/N-1	105	102	106	107	104	102	110	107			Palo Alto interim SPS
GBA-T-105	Cooley Landing-Palo Alto 115kV Line	RVNSWD E-PLO ALTO #2 115kV [0] & RVNSWD E-PLO ALTO #1 115kV [0]	P6	N-1/N-1	112	109	113	112	109	109	114	113			Palo Alto interim SPS
GBA-T-106	Ravenswood-Cooley Landing #1 115kV Line	RVNSWD E-PLO ALTO #1 115kV [0] & RVNSWD E-PLO ALTO #2 115kV [0]	P6	N-1/N-1	130	94	98	132	96	93	101	98			Short Term : Action Plan ; Long Term : Ravenswood – Cooley Landing 115 kV Line Reconductor Project
GBA-T-107	Millbrae-Sneath Lane 60kV Line	MARTIN-SNEATH LANE 60kV [7210] & HLLSDLJT-HLF MNBY 60kV [0]	P6	N-1/N-1	90	<90	91	93	93	<90	105	91			Action plan or explore potential mitigation
GBA-T-108	San Mateo 115/60kV Transformer #8	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	99	93	102	106	97	93	117	102			Review Stanford 60 kV system configuration
GBA-T-109	San Mateo-Hillsdale JCT 60kV Line	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	186	174	194	200	178	173	225	194			Review Stanford 60 kV system configuration
GBA-T-110	San Mateo-Bair 60kV Line	RVNSWD E-CLY LND2 #2 115kV [0] & CLY LND 115/60kV TB 1	P6	N-1/N-1	126	116	<90	133	126	116	<90	<90			San Mateo-Bair 60 kV Line Reconductor Project
GBA-T-111	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	212	198	221	227	203	198	255	220			Review Stanford 60 kV system configuration
GBA-T-112	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	202	189	210	217	194	189	243	210			Review Stanford 60 kV system configuration
GBA-T-113	Jefferson-Hillsdale JCT 60kV Line	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	156	148	161	166	150	147	183	161			Review Stanford 60 kV system configuration
GBA-T-114	Bair 115/60kV Transformer #1	CLY LND 115/60kV TB 1 & RVNSWD E-CLY LND2 #2 115kV [0]	P6	N-1/N-1	147	137	149	155	147	137	165	151			Review Stanford 60 kV system configuration
GBA-T-115	Bair-Cooley Landing #1 60kV Line	RVNSWD E-CLY LND2 #2 115kV [0] & CLY LND 115/60kV TB 1	P6	N-1/N-1	126	114	123	134	122	114	138	125			Review Stanford 60 kV system configuration
GBA-T-116	Bair-Cooley Landing #2 60kV Line	CLY LND 115/60kV TB 1 & RVNSWD E-CLY LND2 #2 115kV [0]	P6	N-1/N-1	115	110	116	121	119	110	128	118			Review Stanford 60 kV system configuration
GBA-T-117	Eastshore 230/115kV Transformer #1	EASTSHORE-SAN MATEO 230kV [4650] & E. SHORE 230/115kV TB 2	P6	N-1/N-1	<90	100	100	<90	100	100	100	100			Replace transformer
GBA-T-118	Eastshore 230/115kV Transformer #2	EASTSHORE-SAN MATEO 230kV [4650] & E. SHORE 230/115kV TB 1	P6	N-1/N-1	<90	100	100	<90	100	100	100	100			Replace transformer
GBA-T-119	Dumbarton-Newark 115kV Line	EASTSHORE-SAN MATEO 230kV [4650] & PITTSBURG-EASTSHORE 230kV [5462]	P6	N-1/N-1	100	<90	<90	100	<90	<90	<90	<90			Short Term : Action Plan ; Long Term : Preferred resource



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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-T-120	Newark-Dixon Landing 115kV Line	METCALF SVD=v & PIERCY-METCALF 115kV [4318]	P6	N-1/N-1	<90	106	<90	118	111	106	90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-121	Newark-Milpitas #2 115kV Line	NEWARK-MILPITAS #1 115kV [3080] & SWIFT-METCALF 115kV [3900]	P6	N-1/N-1	112	106	114	117	112	106	126	114			Action plan or rerate
GBA-T-122	Newark-Milpitas #1 115kV Line	NEWARK-MILPITAS #2 115kV [3080] & SWIFT-METCALF 115kV [3900]	P6	N-1/N-1	135	127	137	141	134	127	152	137			Action plan or rerate
GBA-T-123	Monta Vista-Wolfe 115 kV Line	MONTAVIS SVD=v & STELLING-MONTA VISTA 115kV [1000]	P6	N-1/N-1	95	<90	93	100	92	<90	103	93			Monitor BTM-PV development in the area.
GBA-T-124	Trimble-San Jose 'B' 115 kV Line	LOS ESTEROS-NORTECH 115kV [4032] & EL PATIO-SAN JOSE A 115kV [1520]	P6	N-1/N-1	93	100	100	100	100	101	100	101			Reconductor
GBA-T-125	Swift-Metcalf 115 kV Line	NEWARK-MILPITAS #1 115kV [3070] MOAS OPENED on NEWARK F_BARTRC_J & NEWARK-MILPITAS #2 115kV [3080]	P6	N-1/N-1	99	94	<90	103	99	94	<90	<90			Preferred resource
GBA-T-126	Mckee-Piercy 115 kV Line	EVRGRN 2-MABURY 115kV [6840] & NEWARK-DIXON LANDING 115kV [2990]	P6	N-1/N-1	<90	<90	91	<90	<90	<90	101	91			Preferred resource
GBA-T-127	Dixon Landing-McKee 115 kV Line	PIERCY-METCALF 115kV [4318] & NEWARK-DIXON LANDING 115kV [2990]	P6	N-1/N-1	<90	<90	113	<90	<90	<90	128	113			Action plan or rerate
GBA-T-128	Mabury-Jennings J. 115 kV Line	NEWARK-DIXON LANDING 115kV [2990] & PIERCY-METCALF 115kV [4318]	P6	N-1/N-1	<90	<90	137	<90	<90	<90	153	137			Action plan or rerate
GBA-T-129	Markham No. 2 115 kV Tap	SAN JOSE B-STONE-EVERGREEN 115kV [1550] & METCALF-EVERGREEN #1 115kV [2520]	P6	N-1/N-1	90	<90	<90	103	<90	<90	<90	<90			Preferred resource
GBA-T-130	Metcalf-Morgan Hill 115 kV Line	LLAGAS-GILROY-GILROY F-GILROYPK 115kV [2151] & MTCALF D-LLAGAS 115kV [0]	P6	N-1/N-1	94	<90	<90	102	<90	<90	<90	<90			Preferred resource
GBA-T-131	Metcalf-Llagas 115 kV Line	METCALF-MORGAN HILL 115kV [2570] & LLAGAS-GILROY-GILROY F-GILROYPK 115kV [2151]	P6	N-1/N-1	109	<90	<90	118	<90	<90	<90	<90			Short Term: Action Plan Long Term: Morgan Hill Area Reinforcement Project
GBA-T-132	Piercy-Metcalf 115 kV Line	METCALF SVD=v & NEWARK-DIXON LANDING 115kV [2990]	P6	N-1/N-1	105	100	<90	110	104	100	90	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project



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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-T-133	Evergreen 115/60 kV Transformer No. 1	ALMADEN SVD=v & MONTA VISTA-LOS GATOS 60kV [7610]	P6	N-1/N-1	101	91	<90	107	94	91	93	<90			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-134	Evergreen-Almaden 60 kV Line	ALMADEN SVD=v & MONTA VISTA-LOS GATOS 60kV [7610]	P6	N-1/N-1	132	120	93	142	124	120	107	93			Short Term : Action Plan; Long Term : Monta Vista-Los Gatos-Evergreen 60 kV Project
GBA-T-135	Oleum-Christie 115kV Line	Christie-Sobrante 115 kV and Martinez-Sobrante 115 kV lines	P7	DCTL	109	107	93	110	110	107	102	100			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-136	Christie-Sobrante (Oleum-Sobrante) 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	134	123	102	137	136	125	113	132			SPS or system upgrade
GBA-T-137	Martinez-Oleum 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	112	108	90	118	111	107	96	119			Short Term: Action Plan; Long Term :North Tower 115 kV Looping Project
GBA-T-138	Oleum-Martinez 115kV Line	Sobrante-G Nos. 1 & 2 115 kV lines	P7	DCTL	104	100	83	109	103	99	89	110			Short Term : Action Plan ; Long Term : Preferred resource
GBA-T-139	Moraga-San Leandro #1 115kV Line	Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	115	69	69	119	76	72	73	69			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-140	Moraga-San Leandro #2 115kV Line	Moraga-Oakland J 115 kV and Moraga-San Leandro No. 3 115 kV lines	P7	DCTL	117	70	70	120	77	73	74	70			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-141	Moraga-San Leandro #3 115kV Line	Moraga-San Leandro Nos. 1 & 2 115 kV lines	P7	DCTL	103	69	69	107	76	72	73	69			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-T-142	Cooley Landing-Palo Alto 115kV Line	Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	112	109	113	112	109	109	114	113			Palo Alto interim SPS
GBA-T-143	Ravenswood-Cooley Landing #1 115kV Line	Ravenswood-Palo Alto Nos. 1 & 2 115 kV lines	P7	DCTL	130	94	98	132	96	93	101	98			Short Term : Action Plan ; Long Term : Ravenswood – Cooley Landing 115 kV Line Reconductor Project
GBA-T-144	San Mateo 115/60kV Transformer #8	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	97	91	100	104	95	92	116	101			Review Stanford 60 kV system configuration
GBA-T-145	San Mateo-Hillsdale JCT 60kV Line	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	187	176	194	203	181	176	230	197			Review Stanford 60 kV system configuration



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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-T-146	San Mateo-Hillsdale JCT 60kV Line (Beresford-Hillsdale)	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	213	201	221	231	206	202	261	225			Review Stanford 60 kV system configuration
GBA-T-147	San Mateo-Hillsdale JCT 60kV Line (Hillsdale-Hillsdale JCT)	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	203	192	211	221	197	192	249	214			Review Stanford 60 kV system configuration
GBA-T-148	Jefferson-Hillsdale JCT 60kV Line	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	157	150	162	169	153	150	188	165			Review Stanford 60 kV system configuration
GBA-T-149	Jefferson-Stanford #1 60kV Line	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	93	92	94	96	93	93	101	96			Review Stanford 60 kV system configuration
GBA-T-150	Newark-Dixon Landing 115kV Line	Swift - Metcalf & Piercy - Metcalf 115 kV Lines	P7	DCTL	113	106	43	118	111	106	49	43			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project
GBA-T-151	Piercy-Metcalf 115 kV Line	Newark - Dixon Landing & Newark - Milpitas #1 115 kV Lines	P7	DCTL	104	98	63	109	103	98	70	63			Short Term : Action Plan; Long Term : Evergreen-Mabury Voltage Conversion Project



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generation s			
GBA-VD-1	EMBRCDRD 230 kV	H-Z #2 230kV [9982]	P1	N-1	4.1	5.1	4.3	4.1	4.1	5.1	4.2	5.3			Short Term : Action Plan ; Long Term : Martin 230 kV Bus Extension Project
GBA-VD-2	LOS GATS 60 kV	MONTA VISTA-LOS GATOS 60kV [7610]	P1	N-1	4.6	5.1	3.5	5.7	5.3	5.1	4.2	3.5			Short Term : Action Plan; Long Term : Monta Vista – Los Gatos – Evergreen 60 kV Project
GBA-VD-3	ALHAMBRA 115 kV	MARTINEZ-SOBRANTE 115kV [2270] (MARTNZ D-ALHAMTP1)	P2-1	Line section w/o fault	4.2	4.0	5.8	4.3	4.1	4.1	6.0	5.8			Transfer trip to open other end
GBA-VD-4	EMBRCDRD 230 kV	H-Z #2 230kV [9982] (MARTIN C-EMBRCDRD)	P2-1	Line section w/o fault	4.1	5.1	<5.0	4.1	4.1	5.1	0.0	0.0			Short Term : Action Plan ; Long Term : Martin 230 kV Bus Extension Project
GBA-VD-5	APP MAT 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	16.3	12.8	13.9	17.0	15.3	13.0	17.0	13.8			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-6	BRITTN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	16.8	13.2	14.4	17.6	15.8	13.5	17.6	14.3			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-7	LAWRENCE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	14.6	11.4	12.5	15.2	13.7	11.7	15.2	12.3			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-8	LOCKHD 1 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	11.6	8.8	9.7	11.9	10.7	9.1	11.9	9.6			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-9	LOCKHD 2 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	12.6	9.7	10.6	13.0	11.7	9.9	13.0	10.5			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-10	LOS ALTS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.2	20.1	21.8	26.6	23.8	20.4	26.7	21.7			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-11	LOS GATS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.8	20.4	21.9	27.4	24.3	20.8	26.8	21.7			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-12	LOYOLA 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	25.0	19.9	21.6	26.4	23.5	20.2	26.4	21.5			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-13	MOFT.FLD 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	11.5	8.8	9.7	11.9	10.7	9.1	11.9	9.6			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-14	MT EDEN 115 kV	EASTSHRE 115kV - Section 1D & 1E	P2	Bus-tie breaker	10.0	8.4	8.5	10.1	9.0	8.6	9.3	8.5			Short Term : Action Plan ; Long Term : East Shore-Oakland J 115 kV Reconductoring Project
GBA-VD-15	MT VIEW 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.1	19.6	23.7	21.4	18.4	23.7	19.5			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-16	PERMNTE 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	24.5	19.6	21.2	25.8	23.1	19.9	25.7	21.0			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd



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					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generation s			
GBA-VD-17	PHILLIPS 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	15.6	12.2	13.3	16.2	14.6	12.4	16.2	13.2			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-18	STELLING 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.0	19.5	23.6	21.3	18.3	23.6	19.4			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-19	WHISMAN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.1	19.6	23.7	21.3	18.4	23.7	19.4			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-20	WOLFE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	22.6	18.0	19.5	23.7	21.3	18.3	23.7	19.4			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-VD-21	CAROLNDS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	10.7	9.9	11.5	11.4	10.0	9.9	13.8	11.5			Redundant bus relay
GBA-VD-22	CRYSTLSG 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	17.8	16.9	19.1	19.4	17.3	16.7	23.0	19.1			Redundant bus relay
GBA-VD-23	EMRLD LE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	17.7	16.9	19.0	19.3	17.3	16.6	22.9	19.0			Redundant bus relay
GBA-VD-24	GRANT 115 kV	East Shore 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	10.0	7.6	7.7	10.1	8.2	7.9	8.4	7.7			Redundant bus relay
GBA-VD-25	HLF MNBY 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	9.5	8.7	10.3	10.3	8.8	8.7	12.8	10.3			Redundant bus relay
GBA-VD-26	LAS PLGS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	17.9	17.1	19.3	19.6	17.5	16.8	23.2	19.3			Redundant bus relay
GBA-VD-27	LOS ALTS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	76.7	75.3	76.5	77.1	75.7	75.2	77.5	76.6			Redundant bus relay
GBA-VD-28	LOS GATS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	78.3	77.0	77.9	78.5	77.3	76.9	79.0	77.9			Redundant bus relay
GBA-VD-29	LOYOLA 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	75.2	73.8	75.0	75.6	74.1	73.6	76.0	75.0			Redundant bus relay



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generation s			
GBA-VD-30	MT EDEN 115 kV	East Shore 230 kV BAAH Bus #2 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	10.0	8.4	8.5	10.1	9.1	8.7	9.3	8.5			Redundant bus relay
GBA-VD-31	MT VIEW 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	85.2	84.1	85.0	85.5	84.7	84.0	85.9	85.0			Redundant bus relay
GBA-VD-32	PERMNTE 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	71.1	69.6	70.3	71.2	70.3	69.5	70.9	70.3			Redundant bus relay
GBA-VD-33	RALSTON 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	17.8	16.9	19.1	19.4	17.3	16.7	23.0	19.1			Redundant bus relay
GBA-VD-34	STANFORD 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	18.4	17.4	19.7	20.0	17.9	17.2	23.8	19.7			Redundant bus relay
GBA-VD-35	STELLING 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	84.9	83.7	84.6	85.2	84.3	83.6	85.6	84.6			Redundant bus relay
GBA-VD-36	WATRSLED 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	14.8	13.8	15.8	16.0	14.2	13.8	19.0	15.8			Redundant bus relay
GBA-VD-37	WHISMAN 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	85.2	84.0	85.0	85.5	84.7	84.0	85.9	85.0			Redundant bus relay
GBA-VD-38	WOLFE 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	84.9	83.7	84.6	85.2	84.4	83.7	85.6	84.7			Redundant bus relay
GBA-VD-39	WOODSIDE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	17.9	17.0	19.3	19.5	17.4	16.8	23.2	19.2			Redundant bus relay
GBA-VD-40	CAROLNDS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	10.7	10.6	11.3	12.1	10.7	10.8	14.6	12.6			Review Stanford 60 kV system configuration
GBA-VD-41	CRYSTLSG 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.2	17.9	19.3	20.2	18.2	18.1	24.0	20.7			Review Stanford 60 kV system configuration
GBA-VD-42	EMRLD LE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.1	17.8	19.2	20.1	18.1	18.1	23.9	20.7			Review Stanford 60 kV system configuration

Study Area: PG&E Greater Bay Area_Sensitivity

Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generation s			
GBA-VD-43	HILLSDLE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	7.7	7.8	8.2	8.8	7.8	8.0	10.8	9.3			Review Stanford 60 kV system configuration
GBA-VD-44	HLF MNBY 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	9.5	9.4	10.2	11.1	9.6	9.6	13.6	11.4			Review Stanford 60 kV system configuration
GBA-VD-45	LAS PLGS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.3	18.0	19.4	20.4	18.3	18.3	24.3	20.9			Review Stanford 60 kV system configuration
GBA-VD-46	RALSTON 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.1	17.9	19.2	20.2	18.2	18.1	24.0	20.7			Review Stanford 60 kV system configuration
GBA-VD-47	STANFORD 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.7	18.5	19.9	20.9	18.8	18.7	24.9	21.4			Review Stanford 60 kV system configuration
GBA-VD-48	WATRSHED 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	14.9	14.8	15.8	16.8	15.0	15.0	20.0	17.2			Review Stanford 60 kV system configuration
GBA-VD-49	WOODSIDE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	18.3	18.0	19.4	20.4	18.3	18.2	24.3	20.9			Review Stanford 60 kV system configuration



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-V-1	MARTIN 60 kV	SN BRNOT-SNTH LNE 60kV [0] No Fault	P2-1	Line section w/o fault	1.05	1.06	1.05	1.05	1.05	1.06	1.05	1.06			Transfer trip to open other end
GBA-V-2	APP MAT 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.85	0.88	0.87	0.84	0.85	0.88	0.84	0.87			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-3	BRITTN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.84	0.88	0.87	0.83	0.85	0.88	0.83	0.87			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-4	LAWRENCE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.86	0.90	0.89	0.85	0.87	0.90	0.86	0.89			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-5	LOS ALTS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.76	0.82	0.80	0.74	0.78	0.82	0.74	0.80			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-6	LOS GATS 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.74	0.80	0.80	0.72	0.76	0.80	0.74	0.80			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-7	LOYOLA 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.77	0.83	0.81	0.75	0.79	0.82	0.75	0.81			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-8	MT VIEW 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.81	0.76	0.79	0.82	0.77	0.82			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-9	PERMNNTE 60 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.79	0.84	0.83	0.77	0.80	0.84	0.78	0.83			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-10	PHILLIPS 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.85	0.89	0.88	0.84	0.86	0.89	0.85	0.88			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-11	STELLING 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.82	0.77	0.79	0.83	0.77	0.82			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-12	WHISMAN 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.81	0.76	0.79	0.82	0.77	0.82			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd
GBA-V-13	WOLFE 115 kV	MONTAVIS 230kV - Section 1D & 2D	P2	Bus-tie breaker	0.78	0.83	0.82	0.77	0.79	0.83	0.77	0.82			Action Plan before Monta Vista 230 kV Bus Upgrade Project is completetd



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-V-14	CRYSTLSG 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.84	0.85	0.83	0.82	0.85	0.86	0.79	0.83			Redundant bus relay
GBA-V-15	EMRLD LE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.85	0.86	0.84	0.83	0.85	0.86	0.79	0.84			Redundant bus relay
GBA-V-16	LAS PLGS 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.84	0.85	0.82	0.81	0.84	0.85	0.78	0.83			Redundant bus relay
GBA-V-17	LOS ALTS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.25	0.27	0.25	0.24	0.26	0.27	0.23	0.25			Redundant bus relay
GBA-V-18	LOS GATS 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.22	0.24	0.24	0.21	0.23	0.24	0.22	0.24			Redundant bus relay
GBA-V-19	LOYOLA 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.27	0.29	0.28	0.26	0.28	0.29	0.26	0.28			Redundant bus relay
GBA-V-20	MT VIEW 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.15	0.17	0.16	0.15	0.16	0.17	0.14	0.16			Redundant bus relay
GBA-V-21	PERMNNTE 60 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.32	0.34	0.34	0.32	0.33	0.34	0.33	0.34			Redundant bus relay
GBA-V-22	RALSTON 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.84	0.86	0.83	0.82	0.85	0.86	0.79	0.83			Redundant bus relay
GBA-V-23	STANFORD 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.82	0.84	0.81	0.80	0.83	0.84	0.77	0.82			Redundant bus relay
GBA-V-24	STELLING 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.16	0.17	0.17	0.15	0.16	0.17	0.15	0.17			Redundant bus relay
GBA-V-25	WATRSBED 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.88	0.89	0.87	0.86	0.88	0.89	0.83	0.87			Redundant bus relay



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-V-26	WHISMAN 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.15	0.17	0.16	0.15	0.16	0.17	0.15	0.16			Redundant bus relay
GBA-V-27	WOLFE 115 kV	Monta Vista 115kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.16	0.17	0.16	0.15	0.16	0.17	0.15	0.16			Redundant bus relay
GBA-V-28	WOODSIDE 60 kV	Jefferson 230 kV BAAH Bus #1 (failure of non-redundent relay)	P5-5	Non-redndant relay (bus)	0.84	0.85	0.83	0.82	0.84	0.85	0.78	0.83			Redundant bus relay
GBA-V-29	CRYSTLSG 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.86	0.83	0.83	0.85	0.86	0.80	0.83			Review Stanford 60 kV system configuration
GBA-V-30	EMRLD LE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.85	0.86	0.84	0.83	0.86	0.86	0.80	0.84			Review Stanford 60 kV system configuration
GBA-V-31	LAS PLGS 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.85	0.82	0.82	0.84	0.85	0.79	0.83			Review Stanford 60 kV system configuration
GBA-V-32	RALSTON 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.86	0.83	0.83	0.85	0.86	0.80	0.83			Review Stanford 60 kV system configuration
GBA-V-33	SNANDRES 60 kV	MARTIN-MILLBRAE #1 115kV [2230] & MILLBRAE-SANMATEO #1 115kV [0]	P6	N-1/N-1	>0.9	>0.9	>0.9	0.00	0.00	0.00	0.00	0.00			Review Stanford 60 kV system configuration
GBA-V-34	STANFORD 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.82	0.84	0.81	0.81	0.83	0.84	0.78	0.82			Review Stanford 60 kV system configuration
GBA-V-35	WATRSLED 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.88	0.89	0.87	0.87	0.89	0.89	0.84	0.87			Review Stanford 60 kV system configuration
GBA-V-36	WOODSIDE 60 kV	JEFFERSN 230/60kV TB 1 & JEFFERSN 230/60kV TB 2	P6	N-1/N-1	0.84	0.85	0.83	0.82	0.85	0.85	0.79	0.83			Review Stanford 60 kV system configuration
GBA-V-37	CAROLNDS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.92	0.92	0.91	0.90	0.92	0.92	0.88	0.90			Review Stanford 60 kV system configuration
GBA-V-38	CRYSTLSG 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.83	0.81	0.84	0.84	0.78	0.82			Review Stanford 60 kV system configuration
GBA-V-39	EMRLD LE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.84	0.82	0.84	0.85	0.78	0.82			Review Stanford 60 kV system configuration
GBA-V-40	LAS PLGS 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.83	0.84	0.82	0.81	0.83	0.83	0.77	0.81			Review Stanford 60 kV system configuration
GBA-V-41	RALSTON 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.84	0.85	0.83	0.81	0.84	0.84	0.78	0.82			Review Stanford 60 kV system configuration
GBA-V-42	STANFORD 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.82	0.83	0.81	0.80	0.82	0.82	0.76	0.80			Review Stanford 60 kV system configuration



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)										Potential Mitigation Solutions
					2018 Summer Peak	2021 Summer Peak	2026 Summer Peak	2018 SP No BTM-PV	2021 SP No AAEE	2021 SP Heavy Renewable & Min Gas Gen	2026 SP No BTM-PV	2026 Retirement of QF Generations			
GBA-V-43	WATRSHED 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.88	0.88	0.87	0.86	0.88	0.88	0.82	0.86			Review Stanford 60 kV system configuration
GBA-V-44	WOODSIDE 60 kV	Monta Vista-Jefferson Nos. 1 & 2 230 kV lines	P7	DCTL	0.83	0.84	0.82	0.81	0.83	0.84	0.77	0.81			Review Stanford 60 kV system configuration

Study Area: PG&E Greater Bay Area_Sensitivity

Transient Stability



ID	Contingency	Category	Category Description	Transient Stability Performance (Number of voltage and frequency violations)										Potential Mitigation Solutions
				Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	
	Included in baseline result.													

Study Area: PG&E Greater Bay Area_Sensitivity



Single Contingency Load Drop

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

Included in baseline result.

Study Area: **PG&E Greater Bay Area_Sensitivity**



Single Source Substation with more than 100 MW Load

ID	Substation	Load Served (MW)										Potential Mitigation Solutions
		Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	Select..	

Included in baseline result.