

APPENDIX D: Identified Congestion Study Results



ISO 2011/2012 Transmission Plan - Economic Planning Study

**Congestion Identification in the ISO Controlled Grid
Simulation Results**

Congestion Overview

ID	Name	Description	2016			2021		
			Database	Cost (\$M)	Duration (hours)	Database	Cost (\$M)	Duration (hours)
BS	Base case	Modified cost-constrained case	ISO-B2016_120120	4.242	1,114	ISO-B2021_120120	5.189	1,160
CC	Cost-constrained case	Selection of renewable resources with lowest costs	ISO-B2016_120120_R_CC	4.090	1,087	ISO-B2021_120120_R_CC	5.192	1,163
EC	Environmentally-constrained case	High in-state distributed renewable generation	ISO-B2016_120120_R_EC	5.282	1,153	ISO-B2021_120120_R_EC	8.524	1,820
TC	Time-constrained case	Higher out-of-state renewable import	ISO-B2016_120120_R_TC	4.465	1,126	ISO-B2021_120120_R_TC	4.662	990
TR	Trajectory case	Pattern of utility-contracted renewables	ISO-B2016_120120_R_TR	8.256	1,468	ISO-B2021_120120_R_TR	13.015	2,883

Simulation tool:

ABB GridView Version 8.0 released on 24-Oct-2011

Database model:

- Database reference: WECC TEPPC "2020 PC0" dataset released on 11-Nov-2010
- Database updates: CAISO modeling additions
- Database established: CAISO production simulation platform

➤ Database version:



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BS Base case		Database: ISO-B2016_120120 and ISO-B2021_120120			2016		2021		2016		2021		Average Congestion	
#	Utilities	Area	Congested Transmission Facilities	Rating (MVA)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (\$M)	% of total
1	PG&E - SCE	Path 26 (Northern-Southern California)	Midway - Vincent 500 kV line #2, subject to loss of Midway - Vincent #1	2468	0.273	38	0.516	46	1.880	183	1.636	141	1.758	37%
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Vincent #2	2468	0.073	13	0.079	11						
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Whirlwind 500 kV line	2468	0.327	31	0.058	11						
			Midway - Vincent 500 kV line #2, subject to loss of Midway - Whirlwind 500 kV line	2468	1.084	71	0.969	69						
			Path 26 (Northern - Southern California) - path ratings	4000	0.123	30	0.015	4						
2	PG&E	Greater Fresno Area (GFA)	Warnerville - Wilson 230 kV line	269	0.695	248	0.786	211	1.092	384	1.713	354	1.402	30%
			Warnerville - Wilson 230 kV line, subject to loss of Melones - Wilson 230 kV line	316	0.099	39	0.166	46						
			Warnerville - Wilson 230 kV line, subject to loss of Gates - Henrietta Tap 230 kV line	316	0.243	47	0.444	74						
			Gregg - Borden 230 kV line	269 → 329	0.056	50	0.313	22						
			Gates - Henrietta Tap 230 kV line, subject to loss of Panoche - McMullin 230 kV line	754			0.004	1						
3	PG&E	Greater Bay Area (GBA)	Contra Costa Sub - Contra Costa PP 230 kV line #1	637	0.234	151	0.626	276	0.234	151	0.626	276	0.430	9%
4	PG&E - TID	Los Banos North (LBN)	Los Banos - Westley 230 kV line	591			0.275	9	0.017	3	0.529	27	0.273	6%
			Los Banos - Westley 230 kV line, subject to loss of Los Banos - Tesla 500 kV line	677	0.017	3	0.254	18						
5	PG&E - SPP	Path 24 (PG&E - Sierra)	Path 24 (PG&E - Sierra)	160	0.138	90	0.331	140	0.138	90	0.331	140	0.234	5%
6	LADWP - SCE	Path 61 (Victorville-Lugo 500 kV line)	Victorville - Lugo 500 kV line	2598	0.000		0.001	1	0.324	25	0.077	12	0.200	4%
			Victorville - Lugo 500 kV line, subject to loss of Eldorado - Lugo 500 kV line	2598	0.324	25	0.076	11						
7	SCE	Lugo area	Kramer - Lugo 230 KV line #1	494	0.196	40			0.298	60	0.000	0	0.149	3%
			Kramer - Lugo 230 KV line #2	494	0.102	20								
8	LADWP - SCE	Path 60 (Inyo-Control 115 kV tie)	Inyo 115 kV phase shifter	56	0.110	205	0.113	192	0.110	205	0.113	192	0.112	2%
9	LADWP - SCE	Path 41 (Sylmar to SCE)	P41 Sylmar to SCE	1600	0.078	4	0.058	4	0.078	4	0.058	4	0.068	1%
10	PG&E	Central Valley Area (CVA)	Tesla - Weber 230 kV line, subject to loss of Bellota - Tesla E 230 kV line	354	0.005	1	0.045	4	0.009	4	0.045	4	0.027	1%
			Bellota - Weber E 230 kV line, subject to loss of Bellota - Tesla E 230 kV line	353	0.004	3								
11	SDG&E - CFE	Path 45 (SDG&E - CFE)	Imperial Valley - La Rosita interface	408			0.053	9	0.000	0	0.053	9	0.027	1%
12	SCE	LA metro area	Hinson - La Fresa 230 kV line, subject to the loss of La Fresa - Redondo 230 kV line	876	0.032	2			0.055	4	0.000	0	0.027	1%
			Barre - Lewis 230 kV line, subject to loss of Villa Park - Barre 230 kV line	1494	0.003	1								
			Devers - San Bernardino 230 kV line, subject to loss of Alberhill - Serrano 500 kV line	1135	0.019	1								
13	APS - IID - SDG&E	AZ-CA	North Gila - Imperial Valley 500 kV line	1905	0.009	1			0.009	1	0.000	0	0.004	0%
14	SDG&E	San Diego area	Miguel 500/230 kV #1 transformer, subject to loss of Miguel 500/230 kV #2	1329			0.006	1	0.000	0	0.006	1	0.003	0%
Total:					4.242	1,114	5.189	1,160					4.715	100%



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CC Cost-constrained case			Database: ISO-B2016_120120_R_CC and ISO-B2021_120120_R_CC		2016		2021		2016		2021		Average Congestion	
#	Utilities	Area	Congested Transmission Facilities	Rating (MVA)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	% of total
1	PG&E - SCE	Path 26 (Northern-Southern California)	Midway - Vincent 500 kV line #2, subject to loss of Midway - Vincent #1	2468	0.269	38	0.512	44	1.993	189	1.744	153	1.869	40%
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Vincent #2	2468	0.074	15	0.097	17						
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Whirlwind 500 kV line	2468	0.316	32	0.087	15						
			Midway - Vincent 500 kV line #2, subject to loss of Midway - Whirlwind 500 kV line	2468	1.195	73	1.021	68						
			Path 26 (Northern - Southern California) - path ratings	4000	0.139	31	0.028	9						
2	PG&E	Greater Fresno Area (GFA)	Warnerville - Wilson 230 kV line	269	0.667	242	0.683	216	1.030	374	1.644	355	1.337	29%
			Warnerville - Wilson 230 kV line, subject to loss of Melones - Wilson 230 kV line	316	0.078	33	0.148	40						
			Warnerville - Wilson 230 kV line, subject to loss of Gates - Henrietta Tap 230 kV line	316	0.229	46	0.451	73						
			Gregg - Borden 230 kV line	269 → 329	0.055	52	0.359	25						
			Gates - Henrietta Tap 230 kV line, subject to loss of Panoche - McMullin 230 kV line	754			0.004	1						
			Bellota - Cottle B 230 kV line	269	0.001	1								
3	PG&E	Greater Bay Area (GBA)	Contra Costa PP - Contra Costa Sub kV line #1	637	0.245	155	0.601	268	0.245	155	0.601	268	0.423	9%
4	PG&E - SPP	Path 24 (PG&E - Sierra)	Path 24 (PG&E - Sierra)	160	0.113	76	0.412	184	0.113	76	0.412	184	0.262	6%
5	LADWP - SCE	Path 61 (Victorville-Lugo 500 kV line)	Victorville - Lugo 500 kV line, subject to loss of Eldorado - Lugo 500 kV line	2598	0.382	30	0.103	12	0.382	30	0.103	12	0.243	5%
6	PG&E - TID	Los Banos North (LBN)	Los Banos - Westley 230 kV line	591			0.241	8	0.013	2	0.410	22	0.212	5%
			Los Banos - Westley 230 kV line, subject to loss of Los Banos - Tesla 500 kV line	677	0.013	2	0.170	14						
7	LADWP - SCE	Path 60 (Inyo-Control 115 kV tie)	Inyo 115 kV phase shifter	56	0.118	228	0.093	147	0.118	228	0.093	147	0.106	2%
8	LADWP - SCE	Path 41 (Sylmar to SCE)	P41 Sylmar to SCE	1600	0.064	5	0.062	5	0.064	5	0.062	5	0.063	1%
9	PG&E	Central Valley Area (CVA)	Tesla - Weber 230 kV line, subject to loss of Bellota - Tesla E 230 kV line	354	0.008	2	0.052	5	0.022	6	0.052	6	0.037	1%
			Bellota - Weber E 230 kV line, subject to loss of Bellota - Tesla E 230 kV line	353	0.014	4	0.000							
			Lockford - Bellota 230 kV line	296			0.000	1						
10	SDG&E - CFE	Path 45 (SDG&E - CFE)	Imperial Valley - La Rosita 230 kV line	408			0.057	9	0.000	0	0.057	9	0.028	1%
11	SCE	Lugo area	Kramer - Lugo 230 KV line #1	494	0.032	12			0.041	16	0.000	0	0.021	0%
			Kramer - Lugo 230 KV line #2	494	0.010	4								
12	SCE	LA metro area	Hinson - La Fresa 230 kV line, subject to the loss of La Fresa - Redondo 230 kV line	876	0.036	2			0.041	3	0.000	0	0.020	0%
			Lewis - Barre 230 kV line, subject to loss of Villa Park - Barre 230 kV line	1494	0.005	1								
13	SDG&E	Miguel Transformers	Miguel 500/230 kV #1 transformer, subject to loss of Miguel 500/230 kV #2	1329	0.015	1	0.009	1	0.015	1	0.009	1	0.012	0%
14	APS - IID - SDG&E	AZ-CA	North Gila - Imperial Valley 500 kV line	1905	0.011	2			0.011	2	0.000	0	0.006	0%
15	SCE - SDG&E	Path 43 (North of San Onofre)	Path 43 (North of San Onofre)	2440			0.004	1	0.000	0	0.004	1	0.002	0%
				Total:	4.090	1,087	5.192	1,163					4.641	100%



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EC Environmentally-constrained case			Database: ISO-B2016_120120_R_EC and ISO-B2021_120120_R_EC		2016		2021		2016		2021		Average Congestion	
#	Utilities	Area	Congested Transmission Facilities	Rating (MVA)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (\$M)	% of total
1	PG&E - SCE	Path 26 (Northern-Southern California)	Midway - Vincent 500 kV line #2, subject to loss of Midway - Vincent #1	2468	0.597	76	1.023	60	3.433	327	5.056	400	4.245	61%
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Vincent #2	2468	0.212	34	0.529	68						
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Whirlwind 500 kV line	2468	0.369	39	0.293	31						
			Midway - Vincent 500 kV line #2, subject to loss of Midway - Whirlwind 500 kV line	2468	1.495	84	1.822	95						
			Path 26 (Northern - Southern California) - path ratings	4000	0.759	94	1.389	146						
2	PG&E - SPP	Path 24 (PG&E - Sierra)	Path 24 (PG&E - Sierra)	160	0.234	123	1.260	434	0.234	123	1.260	434	0.747	11%
3	PG&E	Greater Fresno Area (GFA)	Warnerville - Wilson 230 kV line	269	0.559	216	0.457	165	0.736	291	0.742	253	0.739	11%
			Warnerville - Wilson 230 kV line, subject to loss of Melones - Wilson 230 kV line	316	0.142	48	0.271	80						
			Gregg - Borden 230 kV line	269 → 329	0.034	27	0.011	4						
			Bellota-Cottle B 230 kV line	269			0.003	4						
4	PG&E	Greater Bay Area (GBA)	Contra Costa PP - Contra Costa Sub kV line #1	637	0.215	157	0.563	277	0.215	157	0.563	277	0.389	6%
5	LADWP - SCE	Path 61 (Victorville-Lugo 500 kV line)	Victorville - Lugo 500 kV line	2598			0.092	21	0.323	26	0.190	31	0.256	4%
			Victorville - Lugo 500 kV line, subject to loss of Eldorado - Lugo 500 kV line	2598	0.323	26	0.098	10						
6	LADWP - SCE	Path 60 (Inyo-Control 115 kV tie)	Inyo 115 kV phase shifter	56	0.117	195	0.266	390	0.117	195	0.266	390	0.192	3%
7	PG&E - TID	Los Banos North (LBN)	Los Banos - Westley 230 kV line	591			0.167	11	0.001	1	0.320	22	0.160	2%
			Los Banos - Westley 230 kV line, subject to loss of Los Banos - Tesla 500 kV line	677	0.001	1	0.153	11						
8	LADWP - SCE	Path 41 (Sylmar to SCE)	P41 Sylmar to SCE	1600	0.127	6	0.066	8	0.127	6	0.066	8	0.097	1%
9	APS - IID - SDG&E	AZ-CA	North Gila - Imperial Valley 500 kV line	1905	0.019	3	0.061	2	0.019	3	0.061	2	0.040	1%
10	SCE	Lugo area	Kramer - Lugo 230 KV line #1	494	0.028	12			0.054	22	0.000	0	0.027	0%
			Kramer - Lugo 230 KV line #2	494	0.026	10								
11	SCE	LA metro area	Devers - San Bernardino 230 kV line, subject to loss of Alberhill - Serrano 500 kV line	1135	0.016	1			0.022	2	0.000	0	0.011	0%
			Lewis - Barre 230 kV line, subject to loss of Villa Park - Barre 230 kV line	1494	0.007	1								
12	PG&E	Central Valley Area (CVA)	Weber - Tesla 230 kV line, subject to loss of Bellota - Tesla E 230 kV line	354			0.000	1	0.000	0	0.000	1	0.000	0%
13	SCE	Magunden-Pastoria 230 kV line	Magunden - Pastoria 230 kV line, subject to loss of Magunden - Pastoria 230 kV #1	373			0.001	2	0.000	0	0.001	2	0.000	0%
Total:					5.282	1,153	8.524	1,820					6.903	100%



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TC Time-constrained case			Database: ISO-B2016_120120_R_TC and ISO-B2021_120120_R_TC		2016		2021		2016		2021		Average Congestion	
#	Utilities	Area	Congested Transmission Facilities	Rating (MVA)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (\$M)	% of total
1	PG&E - SCE	Path 26 (Northern-Southern California)	Midway - Vincent 500 kV line #2, subject to loss of Midway - Vincent #1	2468	0.282	53	0.468	45	2.049	195	1.730	156	1.889	41%
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Vincent #2	2468	0.065	14	0.075	12						
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Whirlwind 500 kV line	2468	0.344	30	0.117	24						
			Midway - Vincent 500 kV line #2, subject to loss of Midway - Whirlwind 500 kV line	2468	1.291	79	1.069	75						
			Path 26 (Northern - Southern California) - path ratings	4000	0.067	19								
2	PG&E	Greater Fresno Area (GFA)	Warnerville - Wilson 230 kV line	269	0.721	247	0.766	230	1.126	374	1.612	379	1.369	30%
			Warnerville - Wilson 230 kV line, subject to loss of Melones - Wilson 230 kV line	316	0.132	49	0.217	56						
			Warnerville - Wilson 230 kV line, subject to loss of Gates - Henrietta Tap 230 kV line	316	0.230	45	0.401	73						
			Bellota - Cottle B 230 kV line	269			0.007	4						
			Gregg - Borden 230 kV line	269 → 329	0.043	33	0.219	15						
			Gates - Henrietta Tap 230 kV line, subject to loss of Panoche - McMullin 230 kV line	754	0.000		0.002	1						
3	LADWP - SCE	Path 61 (Victorville-Lugo 500 kV line)	Victorville - Lugo 500 kV line, subject to loss of Eldorado - Lugo 500 kV line	2598	0.397	37	0.163	14	0.397	37	0.163	14	0.280	6%
4	PG&E - SPP	Path 24 (PG&E - Sierra)	Path 24 (PG&E - Sierra)	160	0.156	85	0.380	148	0.156	85	0.380	148	0.268	6%
5	PG&E - TID	Los Banos North (LBN)	Los Banos - Westley 230 kV line	591	0.000		0.212	8	0.012	3	0.372	18	0.192	4%
			Los Banos - Westley 230 kV line, subject to loss of Los Banos - Tesla 500 kV line	677	0.012	3	0.160	10						
6	APS - IID - SDG&E	AZ-CA	North Gila - Imperial Valley 500 kV line	1905	0.301	12	0.032	2	0.301	12	0.032	2	0.166	4%
7	PG&E	Greater Bay Area (GBA)	Contra Costa PP - Contra Costa Sub kV line #1	637	0.122	80	0.197	86	0.122	80	0.197	86	0.160	3%
8	LADWP - SCE	Path 60 (Inyo-Control 115 kV tie)	Inyo 115 kV phase shifter	56	0.162	314	0.112	182	0.162	314	0.112	182	0.137	
9	LADWP - SCE	Path 41 (Sylmar to SCE)	P41 Sylmar to SCE	1600	0.042	6	0.064	4	0.042	6	0.064	4	0.053	1%
10	SCE	La Fresno-Hinson 230 kV line	Hinson - La Fresa 230 kV line, subject to the loss of La Fresa - Redondo 230 kV line	876	0.046	3			0.046	3	0.000	0	0.023	0%
11	SCE	Lugo area	Kramer - Lugo 230 KV line #1	494	0.022	9			0.030	13	0.000	0	0.015	0%
			Kramer - Lugo 230 KV line #2	494	0.008	4								
12	PG&E	Central Valley Area (CVA)	Bellota - Weber E 230 kV line, subject to loss of Bellota - Tesla E 230 kV line	353	0.006	1			0.006	1	0.000	1	0.003	0%
			Lockford - Bellota 230 kV line	296	0.000		0.000	1						
13	SCE	LA metro area	Devers - San Bernardino 230 kV line, subject to loss of Alberhill - Serrano 500 kV line	1135	0.010	1			0.014	3	0.000	0	0.007	0%
			Lewis - Barre 230 kV line, subject to loss of Villa Park - Barre 230 kV line	1494	0.003	1								
			Villa Park - Lewis 230 kV line, subject to loss of Serrano - Lewis 230 kV line	1012	0.001	1								
Total:					4.465	1,126	4.662	990					4.563	100%



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TR	Trajectory case	Database: ISO-B2016_120120_R_TR and ISO-B2021_120120_R_TR	Congested Transmission Facilities	Rating (MVA)	2016		2021		2016		2021		Average Congestion	
					Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (M\$)	Hours (Hrs)	Cost (\$M)	% of total
1	PG&E	Greater Bay Area (GBA)	Contra Costa PP - Contra Costa Sub kV line #1	637	1.279	604	8.160	1,891	1.279	604	8.556	1,916	4.918	46%
			Birds Landing - CoCo 230 kV line, subject to loss of CoCo - C.Costa PP 230 kV line	777			0.240	3						
			C. Costa - Brentwood 230 kV line #1	329			0.156	22						
2	SCE	Lugo area	KRAMER-LUGO 230 KV line #1	494	0.034	12			3.414	123	0.000	0	1.707	16%
			KRAMER-LUGO 230 KV line #2	494	0.018	6								
			Pisgah-Lugo 230 kV line #1	289	3.362	105								
3	PG&E	Greater Fresno Area (GFA)	Warnerville - Wilson 230 kV line	269	0.660	240	0.829	239	1.123	388	1.990	435	1.557	15%
			Warnerville - Wilson 230 kV line, subject to loss of Melones - Wilson 230 kV line	316	0.164	56	0.335	81						
			Warnerville - Wilson 230 kV line, subject to loss of Gates - Henrietta Tap 230 kV line	316	0.238	48	0.572	91						
			Gregg - Borden 230 kV line	269 → 329	0.061	43	0.252	22						
			Gates - Henrietta Tap 230 kV line, subject to loss of Panoche - McMullin 230 kV line	754			0.001	1						
			Bellota - Cottle B 230 kV line	269	0.000	1	0.000	1						
4	PG&E - SCE	Path 26 (Northern-Southern California)	Midway - Vincent 500 kV line #2, subject to loss of Midway - Vincent #1	2468	0.170	34	0.281	36	1.598	153	1.111	134	1.355	13%
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Vincent #2	2468	0.057	10	0.016	6						
			Midway - Vincent 500 kV line #1, subject to loss of Midway - Whirlwind 500 kV line	2468	0.169	24	0.101	26						
			Midway - Vincent 500 kV line #2, subject to loss of Midway - Whirlwind 500 kV line	2468	1.157	73	0.713	66						
			Path 26 (Northern - Southern California) - path ratings	4000	0.045	12								
5	PG&E - TID	Los Banos North (LBN)	Los Banos - Westley 230 kV line	591	0.000		0.392	7	0.015	3	0.619	29	0.317	3%
			Los Banos - Westley 230 kV line, subject to loss of Los Banos - Tesla 500 kV line	677	0.015	3	0.227	22						
6	PG&E - SPP	Path 24 (PG&E - Sierra)	Path 24 (PG&E - Sierra)	160	0.124	63	0.389	177	0.124	63	0.389	177	0.257	2%
7	LADWP - SCE	Path 61 (Victorville-Lugo 500 kV line)	Victorville - Lugo 500 kV line	2598			0.022	7	0.316	24	0.121	17	0.218	2%
			Victorville - Lugo 500 kV line, subject to loss of Eldorado - Lugo 500 kV line	2598	0.316	24	0.099	10						
8	LADWP - SCE	Path 60 (Inyo-Control 115 kV tie)	Inyo 115 kV phase shifter	56	0.064	89	0.103	163	0.064	89	0.103	163	0.083	1%
9	LADWP - SCE	Path 41 (Sylmar to SCE)	P41 Sylmar to SCE	1600	0.080	6	0.082	8	0.080	6	0.082	8	0.081	1%
10	SCE	LA metro area	Hinson - La Fresa 230 kV line, subject to the loss of La Fresa - Redondo 230 kV line	876	0.043	2			0.129	9	0.000	0	0.064	1%
			Barre - Lewis 230 kV line, subject to loss of Villa Park - Barre 230 kV line	1494	0.003	1								
			Devers - San Bernardino 230 kV line, subject to loss of Alberhill - Serrano 500 kV line	1135	0.083	6								
11	APS - IID - SDG&E	AZ-CA	North Gila - Imperial Valley 500 kV line	1905	0.101	5	0.017	1	0.101	5	0.017	1	0.059	1%
12	SCE	Big Creek area	Vincent - Pardee 230 kV line #2	494			0.021	2	0.000	0	0.021	2	0.011	0%
13	PG&E	Central Valley Area (CVA)	Tesla - Weber 230 kV line, subject to loss of Bellota - Tesla E 230 kV line	354	0.013	1			0.013	1	0.000	0	0.007	0%
14	SDG&E - CFE	Path 45 (SDG&E - CFE)	Imperial Valley - La Rosita 230 kV line	408			0.006	1	0.000	0	0.006	1	0.003	0%
Total:					8.256	1,468	13.015	2,883					10.636	100%