California ISO
Shaping a Renewed Future

2013
LOCAL CAPACITY TECHNICAL ANALYSIS

ADDENDUM TO THE FINAL REPORT AND STUDY RESULTS

Absence of San Onofre Nuclear Generating Station (SONGS)

August 20, 2012

Local Capacity Technical Study
Overview and Results

I. Executive Summary

This Addendum to the 2013 Local Capacity Technical Analysis, dated April 30, 2012 includes the results and recommendations of the 2013 Local Capacity Technical (LCT) Study in the absence of the San Onofre Nuclear Generating Station (SONGS). The results and recommendations affect the LA Basin and San Diego-Imperial Valley local areas.

This Addendum does not change the 2013 LCR allocations already provided to Load Serving Entities (LSEs) based on the 2013 Local Capacity Technical (LCT) Study report dated April 30, 2012. Instead, the ISO issues these results and recommendations to provide Load Serving Entities (LSEs) with advance notice of LCR needs in the absence of SONGS in order to facilitate a more informed 2013 Resource Adequacy (RA) procurement. It is also the intention of the ISO to mitigate any reliability conditions that will remain, even if the LSEs procured all the available resources in these local areas. These results, in the absence of SONGS, will also provide a basis to allocate the costs of any ISO procurement needed to mitigate reliability conditions notwithstanding the resource adequacy procurement of LSEs.[1]

Please note that these studies assume that both SONGS units 2 and 3 are completely unavailable for operation in 2013. At the time this study was completed, SONGS was on an extended forced outage and the expected date that it would return to service was undetermined.

This study includes the most updated data available on July 15, 2012, namely the 2012 Net Qualifying Capacity (NQC) list and the California Energy Commission (CEC) adopted load forecast that was published in June 2012.

[1] For information regarding the conditions under which the CAISO may engage in procurement of local capacity and the allocation of the costs of such procurement, please see Sections 41 and 43 of the current CAISO Tariff, at: http://www.caiso.com/238a/238acd24167f0.html.

Below is a comparison of the LCR need with and without SONGS:

2013 Local Capacity Requirements with SONGS

	Qualifying Capacity			2013 LCR Need Based on Category B			2013 LCR Need Based on Category C with operating procedure		
Local Area Name	**QF/ Muni (MW)**	**Market (MW)**	**Total (MW)**	**Existing Capacity Needed**	**Deficiency**	**Total (MW)**	**Existing Capacity Needed****	**Deficiency**	**Total (MW)**
LA Basin	4452	8675	13127	10295	0	**10295**	10295	0	**10295**
San Diego/ Imperial Valley	158	3991	4149	2938	0	**2938**	2938	144*	**3082**
Total	**4610**	**12666**	**17276**	**13233**	**0**	**13233**	**13233**	**144**	**13377**
Local Sub-Area Name									
Ellis	0	458	458	0	0	0	0	0	0
Western	3457	6118	9575	N/A	0	N/A	5540	0	5540
San Diego	158	2911	3069	2192	0	2192	2570	0	2570

2013 Local Capacity Requirements without SONGS

	Qualifying Capacity			2013 LCR Need Based on Category B			2013 LCR Need Based on Category C with operating procedure		
Local Area Name	**QF/ Muni (MW)**	**Market (MW)**	**Total (MW)**	**Existing Capacity Needed**	**Deficiency**	**Total (MW)**	**Existing Capacity Needed****	**Deficiency**	**Total (MW)**
LA Basin	2206	7710	9916	9745	0	**9745**	9916	1241	**11157**
San Diego/ Imperial Valley	158	3991	4149	3385	0	**3385**	3385	467*	**3852**
Total	**2364**	**11701**	**14065**	**13130**	**0**	**13130**	**13301**	**1708**	**15009**
Local Sub-Area Name									
Ellis	0	458	458	0	0	0	458	360	818
Western	1211	5153	6364	N/A	0	N/A	4597	0	4597
San Diego	158	2911	3069	2462	0	2462	3069	467	3536

* San Diego-Imperial Valley area is not “overall deficient”. Resource deficiency values result from a few deficient sub-areas; and since there are no resources that can mitigate this deficiency the numbers are carried forward into the total area needs.
** Since “deficiency” cannot be mitigated by any available resource, the “Existing Capacity Needed” will be split among LSEs on a load share ratio during the assignment of local area resource responsibility.
N/A - It is feasible that Western sub-area has Category B needs however they are smaller than the Category C needs and overall irrelevant due to high Category B need in the entire LA Basin.

Compared to the final 2013 Local Capacity Technical (LCT) report, the total available capacity in the LA Basin has decreased by 3,211 MW, representing the capacity from SONGS, El Segundo # 3 retirement and El Segundo Repower (because of the in-service date delay from June1 to August 2013). The Ellis sub-area requirements have increased significantly by 818 MW, while the Western sub-area LCR needs have decreased by about 943 MW. Overall the LA Basin LCR needs are now driven by a new overlapping Category C contingency in the San Diego's electric system, due to voltage support needs that arise in the area. Without SONGS in operation, the LA Basin reflects a net increase of 862 MW in LCR need. The need for existing resources has decreased, however, by 379 MW due to the retirement or shut-down of other units. Basically, all existing available resources are needed for LCR in this area and additional deficiencies exist. For further details please see pages 5-19 below.

The total available capacity remains unchanged in the San Diego-Imperial Valley LCR area. The San Diego sub-area requirements have increased significantly, by 966 MW, and the San Diego-Imperial Valley area requirements have increased also by 447 MW, due to voltage support needs in the absence of SONGS. Overall for the San Diego-Imperial Valley LCR area, the additional resources needed for LCR has increased by 447 MW; however, there is a shift of sub-area needs and all available existing resources in the San Diego sub-area are now required for LCR. For further details, please see pages 19-27 below.

Even though resource procurement is the responsibilities of the LSEs in the area, the ISO is proposing mitigation for all new deficiencies created due to the absence of SONGS as a contingency plan for summer 2013. This mitigation is described in chapter II below.

II. Mitigation Plan for LA Basin and San Diego-Imperial Valley LCR areas and sub-areas due to the absence of SONGS

Ellis sub-area:
The following transmission upgrade plan has been identified which mitigates the identified reliability concerns in this sub-area:

Barre-Ellis 230k V lines reconfiguration from 2 to 4 circuits.

In addition to the mitigation measures needed for the adjacent LCR areas described below, reconfiguring the Barre-Ellis 230 kV lines from 2 to 4 circuits prior to next summer will mitigate the identified reliability concern in this sub-area, which is the loss of the Imperial Valley-North Gila 500 kV line followed by the loss of the Barre – Ellis #1 or #2 230 kV lines. Re-configuring the Barre-Ellis lines from 2 to 4 circuits will mitigate this issue by allowing three of the new Barre–Ellis circuits to remain in operation under this contingency.

LA Basin area and San Diego sub-area – common mitigation plan:
The following upgrade plan has been identified which mitigates the identified reliability concerns in this common area:

Install shunt capacitors (1 x 80 MVAR each) at Johanna and Santiago, (2 x 80 MVAR) at Viejo Substation (or 1 x 80 MVAR at Talega as an alternate location for the second 1 x 80 MVAR at Viejo) and convert Huntington Beach units 3 and 4 to synchronous condensers.

Together these projects will mitigate the post-transient voltage stability concerns in the San Diego sub-area and low voltage concern in the LA Basin LCR area[2]. A mixture of dynamic (i.e., synchronous condensers) and static (shunt capacitors) reactive support is required in order to satisfy fast voltage recovery need at the SONGS 230 kV

[2] The NERC NUC-001 Standards require that the post-contingency voltage at San Onofre 230 kV switchyard be recovered to a minimum of 218 kV after a major contingency in less than 80 seconds.

bus without causing further operational concerns (i.e., capacitor “hunting” issue and slow response time if only static reactive support is installed).

Huntington Beach units 3 and 4, as generating units, will no longer be available due to lack of air emission credits, however due to their proximity to San Onofre switchyard they are best suited for dynamic voltage support which they can still provide without air emission credits or water permits by being converted to synchronous condensers.

As an added benefit, the shunt capacitors eliminate the need for a new SPS in the Johanna-Santiago area that is required to protect against voltage instability for the loss of 230 kV double circuit tower line (DCTL) of Ellis-Johanna and Ellis-Santiago when generating resources in the San Diego area are at medium to low output level. As a second benefit, this alternative will reduce the single contingency resource need to 3,069 MW in the San Diego-Imperial Valley LCR area. This amount of LCR need is equivalent to the need based on meeting Category C contingency requirement for the San Diego sub-area, effectively reducing the procurement target in the SDG&E service area by 316 MW.

The reduction in SDG&E service area need will consequently increase the LA Basin single contingency need to the point where a new small 83 MW deficiency exists. Mitigation for this new single contingency deficiency is twofold:

1. Some units at Imperial Valley (not required for local RA without SONGS and these mitigation measures) may be under un RA contract therefore satisfying this need, and

2. The ISO has received Demand Response (DR) program information from the Participating Transmission Owners (PTOs). It is possible that about 48 MW in Orange County and another 252 MW in the South of Lugo area could be used if available within 30 minutes of a transmission line loss or overload. If possible, the ISO will rely on them for the first part of summer 2013 until El Segundo Repower or Sentinel become commercially operational in August 2013 in order to mitigate this single contingency need that causes South of Lugo loading concerns. However, even if available within 30 minutes, these DR programs and the new generating resources are insufficient in mitigating the double contingency need as addressed above, however.

III. Local Capacity Requirement Study Results

1. LA Basin Area

Area Definition

The transmission tie lines into the LA Basin Area are:

1) San Onofre - San Luis Rey #1, #2, & #3 230 kV Lines
2) San Onofre - Talega #1 & #2 230 kV Lines
3) Lugo - Mira Loma #2 & #3 500 kV Lines
4) Lugo – Rancho Vista #1 500 kV line
5) Sylmar - Eagle Rock 230 kV Line
6) Sylmar - Gould 230 kV Line
7) Vincent - Mesa Cal 230 kV Line
8) Vincent - Rio Hondo #1 & #2 230 kV Lines
9) Eagle Rock - Pardee 230 kV Line
10) Devers - Palo Verde 500 kV Line
11) Mirage - Coachelv 230 kV Line
12) Mirage - Ramon 230 kV Line
13) Mirage - Julian Hinds 230 kV Line

These sub-stations form the boundary surrounding the LA Basin area:

1) San Onofre is in San Luis Rey is out
2) San Onofre is in Talega is out
3) Mira Loma is in Lugo is out
4) Rancho Vista is in Lugo is out
5) Eagle Rock is in Sylmar is out
6) Gould is in Sylmar is out
7) Mesa Cal is in Vincent is out
8) Rio Hondo is in Vincent is out
9) Eagle Rock is in Pardee is out
10) Devers is in Palo Verde is out
11) Mirage is in Coachelv is out
12) Mirage is in Ramon is out
13) Mirage is in Julian Hinds is out

This study includes the new CEC forecast posted June 2012. Total 2013 busload within the defined area is 19,300 MW with 133 MW of losses and 27 MW of pumps resulting in total load + losses + pumps of 19,460 MW. However, the electrically “defined area” is not aligned with the geographic substations included in the CEC demand forecast, and the load modeled in the base cases represents a 1-in-10 level or 20,460 MW (based on

the adopted CEC forecast).

Total units and qualifying capacity available in the LA Basin area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
ALAMIT_7_UNIT 1	24001	ALAMT1 G	18	174.56	1	Western		Market
ALAMIT_7_UNIT 2	24002	ALAMT2 G	18	175.00	2	Western		Market
ALAMIT_7_UNIT 3	24003	ALAMT3 G	18	332.18	3	Western		Market
ALAMIT_7_UNIT 4	24004	ALAMT4 G	18	335.67	4	Western		Market
ALAMIT_7_UNIT 5	24005	ALAMT5 G	20	497.97	5	Western		Market
ALAMIT_7_UNIT 6	24161	ALAMT6 G	20	495.00	6	Western		Market
ANAHM_2_CANYN1	25211	CanyonGT	13.8	49.40	1	Western		MUNI
ANAHM_2_CANYN2	25212	CanyonGT	13.8	48.00	2	Western		MUNI
ANAHM_2_CANYN3	25213	CanyonGT	13.8	48.00	3	Western		MUNI
ANAHM_2_CANYN4	25214	CanyonGT	13.8	49.40	4	Western		MUNI
ANAHM_7_CT	25203	ANAHEIMG	13.8	40.64	1	Western	Aug NQC	MUNI
ARCOGN_2_UNITS	24011	ARCO 1G	13.8	54.28	1	Western	Aug NQC	QF/Selfgen
ARCOGN_2_UNITS	24012	ARCO 2G	13.8	54.28	2	Western	Aug NQC	QF/Selfgen
ARCOGN_2_UNITS	24013	ARCO 3G	13.8	54.28	3	Western	Aug NQC	QF/Selfgen
ARCOGN_2_UNITS	24014	ARCO 4G	13.8	54.28	4	Western	Aug NQC	QF/Selfgen
ARCOGN_2_UNITS	24163	ARCO 5G	13.8	27.14	5	Western	Aug NQC	QF/Selfgen
ARCOGN_2_UNITS	24164	ARCO 6G	13.8	27.15	6	Western	Aug NQC	QF/Selfgen
BARRE_2_QF	24016	BARRE	230	0.00		Western	Not modeled	QF/Selfgen
BARRE_6_PEAKER	29309	BARPKGEN	13.8	45.38	1	Western		Market
BRDWAY_7_UNIT 3	29007	BRODWYSC	13.8	65.00	1	Western		MUNI
BUCKWD_7_WINTCV	25634	BUCKWIND	115	0.15	W5	None	Aug NQC	Wind
CABZON_1_WINDA1	29290	CABAZON	33	11.29	1	None	Aug NQC	Wind
CENTER_2_QF	24203	CENTER S	66	18.10		Western	Not modeled Aug NQC	QF/Selfgen
CENTER_2_RHONDO	24203	CENTER S	66	1.91		Western	Not modeled	QF/Selfgen
CENTER_6_PEAKER	29308	CTRPKGEN	13.8	44.57	1	Western		Market
CENTRY_6_PL1X4	25302	CLTNCTRY	13.8	36.00	1	None	Aug NQC	MUNI
CHEVMN_2_UNITS	24022	CHEVGEN1	13.8	0.00	1	Western, El Nido	Aug NQC	QF/Selfgen
CHEVMN_2_UNITS	24023	CHEVGEN2	13.8	0.00	2	Western, El Nido	Aug NQC	QF/Selfgen
CHINO_2_QF	24024	CHINO	66	7.83		Western	Not modeled Aug NQC	QF/Selfgen
CHINO_2_SOLAR	24024	CHINO	66	0.00		Western	Not modeled	Market
CHINO_6_CIMGEN	24026	CIMGEN	13.8	25.29	1	Western	Aug NQC	QF/Selfgen
CHINO_6_SMPPAP	24140	SIMPSON	13.8	27.15	1	Western	Aug NQC	QF/Selfgen
CHINO_7_MILIKN	24024	CHINO	66	1.37		Western	Not modeled Aug NQC	Market
COLTON_6_AGUAM1	25303	CLTNAGUA	13.8	43.00	1	None		MUNI
CORONS_6_CLRWTR	24210	MIRALOMA	66	14.00		None	Not modeled	MUNI
CORONS_6_CLRWTR	24210	MIRALOMA	66	14.00		None	Not modeled	MUNI
DEVERS_1_QF	24815	GARNET	115	1.51	QF	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25632	TERAWND	115	2.94	QF	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25633	CAPWIND	115	0.56	QF	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25634	BUCKWIND	115	1.73	QF	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25635	ALTWIND	115	1.35	Q1	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25635	ALTWIND	115	2.50	Q2	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25636	RENWIND	115	0.59	Q1	None	Aug NQC	QF/Selfgen

DEVERS_1_QF	25636	RENWIND	115	2.28	Q2	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25636	RENWIND	115	0.27	W1	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25637	TRANWIND	115	6.68	QF	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25639	SEAWIND	115	2.01	QF	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25640	PANAERO	115	1.79	QF	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25645	VENWIND	115	1.53	EU	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25645	VENWIND	115	3.58	Q1	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25645	VENWIND	115	2.41	Q2	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25646	SANWIND	115	0.80	Q1	None	Aug NQC	QF/Selfgen
DEVERS_1_QF	25646	SANWIND	115	2.68	Q2	None	Aug NQC	QF/Selfgen
DMDVLY_1_UNITS	25425	ESRP P2	6.9	1.39		None	Not modeled Aug NQC	QF/Selfgen
DREWS_6_PL1X4	25301	CLTNDREW	13.8	36.00	1	None	Aug NQC	MUNI
DVLCYN_1_UNITS	25603	DVLCYN3G	13.8	67.15	3	None	Aug NQC	MUNI
DVLCYN_1_UNITS	25604	DVLCYN4G	13.8	67.15	4	None	Aug NQC	MUNI
DVLCYN_1_UNITS	25648	DVLCYN1G	13.8	50.35	1	None	Aug NQC	MUNI
DVLCYN_1_UNITS	25649	DVLCYN2G	13.8	50.35	2	None	Aug NQC	MUNI
ELLIS_2_QF	24197	ELLIS	66	0.00		Western, Ellis	Not modeled Aug NQC	QF/Selfgen
ELSEGN_7_UNIT 3	24047	ELSEG3 G	18	0.00	3	Western, El Nido	Retired	Market
ELSEGN_7_UNIT 4	24048	ELSEG4 G	18	335.00	4	Western, El Nido		Market
ETIWND_2_FONTNA	24055	ETIWANDA	66	0.81		None	Not modeled Aug NQC	QF/Selfgen
ETIWND_2_QF	24055	ETIWANDA	66	14.86		None	Not modeled Aug NQC	QF/Selfgen
ETIWND_2_SOLAR	24055	ETIWANDA	66	0.00		None	Not modeled Aug NQC	Market
ETIWND_6_GRPLND	29305	ETWPKGEN	13.8	42.53	1	None		Market
ETIWND_6_MWDETI	25422	ETI MWDG	13.8	10.37	1	None	Aug NQC	Market
ETIWND_7_MIDVLY	24055	ETIWANDA	66	1.54		None	Not modeled Aug NQC	QF/Selfgen
ETIWND_7_UNIT 3	24052	MTNVIST3	18	320.00	3	None		Market
ETIWND_7_UNIT 4	24053	MTNVIST4	18	320.00	4	None		Market
GARNET_1_UNITS	24815	GARNET	115	0.71	G1	None	Aug NQC	QF/Selfgen
GARNET_1_UNITS	24815	GARNET	115	0.25	G2	None	Aug NQC	QF/Selfgen
GARNET_1_UNITS	24815	GARNET	115	0.51	G3	None	Aug NQC	QF/Selfgen
GARNET_1_UNITS	24815	GARNET	115	0.25	PC	None	Aug NQC	QF/Selfgen
GARNET_1_WIND	24815	GARNET	115	0.66	W2	None	Aug NQC	Wind
GARNET_1_WIND	24815	GARNET	115	0.66	W3	None	Aug NQC	Wind
GLNARM_7_UNIT 1	29005	PASADNA1	13.8	22.30	1	Western		MUNI
GLNARM_7_UNIT 2	29006	PASADNA2	13.8	22.30	1	Western		MUNI
GLNARM_7_UNIT 3	29005	PASADNA1	13.8	44.83		Western	Not modeled	MUNI
GLNARM_7_UNIT 4	29006	PASADNA2	13.8	42.42		Western	Not modeled	MUNI
HARBGN_7_UNITS	24062	HARBOR G	13.8	76.28	1	Western		Market
HARBGN_7_UNITS	24062	HARBOR G	13.8	11.86	HP	Western		Market
HARBGN_7_UNITS	25510	HARBORG4	4.16	11.86	LP	Western		Market
HINSON_6_CARBGN	24020	CARBOGEN	13.8	21.46	1	Western	Aug NQC	Market
HINSON_6_LBECH1	24078	LBEACH1G	13.8	65.00	1	Western		Market
HINSON_6_LBECH2	24170	LBEACH2G	13.8	65.00	2	Western		Market
HINSON_6_LBECH3	24171	LBEACH3G	13.8	65.00	3	Western		Market
HINSON_6_LBECH4	24172	LBEACH4G	13.8	65.00	4	Western		Market
HINSON_6_SERRGN	24139	SERRFGEN	13.8	28.38	1	Western	Aug NQC	QF/Selfgen
HNTGBH_7_UNIT 1	24066	HUNT1 G	13.8	225.75	1	Western, Ellis		Market

HNTGBH_7_UNIT 2	24067	HUNT2 G	13.8	225.80	2	Western, Ellis		Market
INDIGO_1_UNIT 1	29190	WINTECX2	13.8	42.00	1	None		Market
INDIGO_1_UNIT 2	29191	WINTECX1	13.8	42.00	1	None		Market
INDIGO_1_UNIT 3	29180	WINTEC8	13.8	42.00	1	None		Market
INLDEM_5_UNIT 1	29041	IEEC-G1	19.5	335.00	1	Valley	Aug NQC	Market
INLDEM_5_UNIT 2	29042	IEEC-G2	19.5	335.00	1	Valley	Aug NQC	Market
JOHANN_6_QFA1	24072	JOHANNA	230	0.00		Western, Ellis	Not modeled Aug NQC	QF/Selfgen
LACIEN_2_VENICE	24337	VENICE	13.8	4.45	1	Western, El Nido	Aug NQC	MUNI
LAFRES_6_QF	24073	LA FRESA	66	2.55		Western, El Nido	Not modeled Aug NQC	QF/Selfgen
LAGBEL_6_QF	24075	LAGUBELL	66	10.60		Western	Not modeled Aug NQC	QF/Selfgen
LGHTHP_6_ICEGEN	24070	ICEGEN	13.8	46.55	1	Western	Aug NQC	QF/Selfgen
LGHTHP_6_QF	24083	LITEHIPE	66	1.10		Western	Not modeled Aug NQC	QF/Selfgen
MESAS_2_QF	24209	MESA CAL	66	1.06		Western	Not modeled Aug NQC	QF/Selfgen
MIRLOM_2_CORONA				2.35		None	Not modeled Aug NQC	QF/Selfgen
MIRLOM_2_TEMESC				2.49		None	Not modeled Aug NQC	QF/Selfgen
MIRLOM_6_DELGEN	24030	DELGEN	13.8	29.78	1	None	Aug NQC	QF/Selfgen
MIRLOM_6_PEAKER	29307	MRLPKGEN	13.8	43.18	1	None		Market
MIRLOM_7_MWDLKM	24210	MIRALOMA	66	4.60		None	Not modeled Aug NQC	MUNI
MOJAVE_1_SIPHON	25657	MJVSPHN1	13.8	6.00	1	None	Aug NQC	Market
MOJAVE_1_SIPHON	25657	MJVSPHN1	13.8	6.00	2	None	Aug NQC	Market
MOJAVE_1_SIPHON	25657	MJVSPHN1	13.8	6.00	3	None	Aug NQC	Market
MTWIND_1_UNIT 1	29060	MOUNTWND	115	7.08	S1	None	Aug NQC	Wind
MTWIND_1_UNIT 2	29060	MOUNTWND	115	2.76	S2	None	Aug NQC	Wind
MTWIND_1_UNIT 3	29060	MOUNTWND	115	2.88	S3	None	Aug NQC	Wind
OLINDA_2_COYCRK	24211	OLINDA	66	3.13		Western	Not modeled	QF/Selfgen
OLINDA_2_QF	24211	OLINDA	66	0.78	1	Western	Aug NQC	QF/Selfgen
OLINDA_7_LNDFIL	24201	BARRE	66	4.50		Western	Not modeled Aug NQC	QF/Selfgen
PADUA_2_ONTARO	24111	PADUA	66	0.91		None	Not modeled Aug NQC	QF/Selfgen
PADUA_6_MWDSDM	24111	PADUA	66	7.70		None	Not modeled Aug NQC	MUNI
PADUA_6_QF	24111	PADUA	66	0.74		None	Not modeled Aug NQC	QF/Selfgen
PADUA_7_SDIMAS	24111	PADUA	66	1.05		None	Not modeled Aug NQC	QF/Selfgen
PWEST_1_UNIT				0.15		Western	Not modeled Aug NQC	Market
REDOND_7_UNIT 5	24121	REDON5 G	18	178.87	5	Western		Market
REDOND_7_UNIT 6	24122	REDON6 G	18	175.00	6	Western		Market
REDOND_7_UNIT 7	24123	REDON7 G	20	505.96	7	Western		Market
REDOND_7_UNIT 8	24124	REDON8 G	20	495.90	8	Western		Market
RHONDO_2_QF	24213	RIOHONDO	66	2.54		Western	Not modeled Aug NQC	QF/Selfgen
RHONDO_6_PUENTE	24213	RIOHONDO	66	0.00		Western	Not modeled Aug NQC	Market
RVSIDE_2_RERCU3	24299	RERC2G3	13.8	48.50	1	None		MUNI
RVSIDE_2_RERCU4	24300	RERC2G4	13.8	48.50	1	None		MUNI

RVSIDE_6_RERCU1	24242	RERC1G	13.8	48.35	1	None		MUNI
RVSIDE_6_RERCU2	24243	RERC2G	13.8	48.50	1	None		MUNI
RVSIDE_6_SPRING	24244	SPRINGEN	13.8	36.00	1	None		Market
SANTGO_6_COYOTE	24133	SANTIAGO	66	6.08	1	Western, Ellis	Aug NQC	Market
SBERDO_2_PSP3	24921	MNTV-CT1	18	129.71	1	None		Market
SBERDO_2_PSP3	24922	MNTV-CT2	18	129.71	1	None		Market
SBERDO_2_PSP3	24923	MNTV-ST1	18	225.08	1	None		Market
SBERDO_2_PSP4	24924	MNTV-CT3	18	129.71	1	None		Market
SBERDO_2_PSP4	24925	MNTV-CT4	18	129.71	1	None		Market
SBERDO_2_PSP4	24926	MNTV-ST2	18	225.08	1	None		Market
SBERDO_2_QF	24214	SANBRDNO	66	0.14		None	Not modeled Aug NQC	QF/Selfgen
SBERDO_2_SNTANA	24214	SANBRDNO	66	0.27		None	Not modeled Aug NQC	QF/Selfgen
SBERDO_6_MILLCK	24214	SANBRDNO	66	1.28		None	Not modeled Aug NQC	QF/Selfgen
SONGS_7_UNIT 2	24129	S.ONOFR2	22	0.00	2	Western	Not available	Nuclear
SONGS_7_UNIT 3	24130	S.ONOFR3	22	0.00	3	Western	Not available	Nuclear
TIFFNY_1_DILLON				5.63		Western	Not modeled Aug NQC	Wind
VALLEY_5_PERRIS	24160	VALLEYSC	115	7.94		Valley	Not modeled Aug NQC	QF/Selfgen
VALLEY_5_REDMTN	24160	VALLEYSC	115	2.00		Valley	Not modeled Aug NQC	QF/Selfgen
VALLEY_7_BADLND	24160	VALLEYSC	115	0.54		Valley	Not modeled Aug NQC	Market
VALLEY_7_UNITA1	24160	VALLEYSC	115	1.34		Valley	Not modeled Aug NQC	Market
VERNON_6_GONZL1				5.75		Western	Not modeled	MUNI
VERNON_6_GONZL2				5.75		Western	Not modeled	MUNI
VERNON_6_MALBRG	24239	MALBRG1G	13.8	42.37	C1	Western		MUNI
VERNON_6_MALBRG	24240	MALBRG2G	13.8	42.37	C2	Western		MUNI
VERNON_6_MALBRG	24241	MALBRG3G	13.8	49.26	S3	Western		MUNI
VILLPK_2_VALLYV	24216	VILLA PK	66	4.10		Western	Not modeled Aug NQC	QF/Selfgen
VILLPK_6_MWDYOR	24216	VILLA PK	66	0.00		Western	Not modeled Aug NQC	MUNI
VISTA_6_QF	24902	VSTA	66	0.17	1	None	Aug NQC	QF/Selfgen
WALNUT_6_HILLGEN	24063	HILLGEN	13.8	47.07	1	Western	Aug NQC	QF/Selfgen
WALNUT_7_WCOVCT	24157	WALNUT	66	3.43		Western	Not modeled Aug NQC	Market
WALNUT_7_WCOVST	24157	WALNUT	66	2.98		Western	Not modeled Aug NQC	Market
WHTWTR_1_WINDA1	29061	WHITEWTR	33	8.26	1	None	Aug NQC	Wind
ARCOGN_2_UNITS	24018	BRIGEN	13.8	0.00	1	Western	No NQC - hist. data	Market
HINSON_6_QF	24064	HINSON	66	0.00	1	Western	No NQC - hist. data	QF/Selfgen
INLAND_6_UNIT	24071	INLAND	13.8	30.30	1	None	No NQC - hist. data	QF/Selfgen
MOBGEN_6_UNIT 1	24094	MOBGEN	13.8	20.20	1	Western, El Nido	No NQC - hist. data	QF/Selfgen
NA	24324	SANIGEN	13.8	6.80	D1	None	No NQC - hist. data	QF/Selfgen
NA	24325	ORCOGEN	13.8	0.00	1	Western, Ellis	No NQC - hist. data	QF/Selfgen

NA	24327	THUMSGEN	13.8	40.00	1	Western	No NQC - hist. data	QF/Selfgen
NA	24328	CARBGEN2	13.8	15.2	1	Western	No NQC – hist. data	Market
NA	24329	MOBGEN2	13.8	20.2	1	Western, El Nido	No NQC – hist. data	QF/Selfgen
NA	24330	OUTFALL1	13.8	0.00	1	Western, El Nido	No NQC - hist. data	QF/Selfgen
NA	24331	OUTFALL2	13.8	0.00	1	Western, El Nido	No NQC - hist. data	QF/Selfgen
NA	24332	PALOGEN	13.8	3.60	D1	Western, El Nido	No NQC - hist. data	QF/Selfgen
NA	24341	COYGEN	13.8	0.00	1	Western, Ellis	No NQC - hist. data	QF/Selfgen
NA	24342	FEDGEN	13.8	0.00	1	Western	No NQC - hist. data	QF/Selfgen
NA	24839	BLAST	115	45.00	1	None	No NQC – hist. data	QF/Selfgen
NA	29021	WINTEC6	115	45.00	1	None	No NQC – hist. data	Wind
NA	29023	WINTEC4	12	16.50	1	None	No NQC – hist. data	Wind
NA	29060	SEAWEST	115	44.40	S1	None	No NQC – hist. data	Wind
NA	29060	SEAWEST	115	22.20	S2	None	No NQC – hist. data	Wind
NA	29060	SEAWEST	115	22.40	S3	None	No NQC – hist. data	Wind
NA	29260	ALTAMSA4	115	40.00	1	None	No NQC – hist. data	Wind
NA	29338	CLEARGEN	13.8	0.00	1	None	No NQC - hist. data	QF/Selfgen
NA	29339	DELGEN	13.8	0.00	1	None	No NQC - hist. data	QF/Selfgen
NA	29951	REFUSE	13.8	9.90	D1	Western	No NQC - Pmax	QF/Selfgen
NA	29953	SIGGEN	13.8	24.90	D1	Western	No NQC - Pmax	QF/Selfgen
HNTGBH_7_UNIT 3	24167	HUNT3 G	13.8	0.00	3	Western, Ellis	Retired	Market
HNTGBH_7_UNIT 4	24168	HUNT4 G	13.8	0.00	4	Western, Ellis	Retired	Market
New unit	29201	EME WCG1	13.8	100	1	Western	No NQC - Pmax	Market
New unit	29202	EME WCG2	13.8	100	1	Western	No NQC - Pmax	Market
New unit	29203	EME WCG3	13.8	100	1	Western	No NQC - Pmax	Market
New unit	29204	EME WCG4	13.8	100	1	Western	No NQC - Pmax	Market
New unit	29205	EME WCG5	13.8	100	1	Western	No NQC - Pmax	Market

Major new projects modeled:

1. Walnut Creek Energy Center
2. Huntington Beach #3 and #4 retirement
3. Del Amo – Ellis 230 kV line loops into Barre 230 kV substation

4. Recalibrate arming level for Santiago SPS
5. El Segundo #3 retirement

El Segundo Repowering (630 MW) and Sentinel (850 MW) have not been relied upon since the publicly announced commercial operating date is August 2013 (based on CEC web site http://www.energy.ca.gov/sitingcases/all_projects.html).

Critical Contingency Analysis Summary

LA Basin Overall:

The most critical contingency for the LA Basin is the loss of Imperial Valley-Miguel 500 kV line followed Imperial Valley-Suncrest 500 kV line or vice versa, which would result in voltage below the minimum allowable (218 kV) at the San Onofre 230 kV switchyard as specified in the Appendix E of the Transmission Control Agreement (TCA)[3] as required by the NERC NUC-001 Standards. This limiting contingency establishes an LCR of 11,157 MW in 2013 (includes 810 MW of QF, 230 MW of Wind and 1166 MW of Muni generation as well as 1241 MW of deficiency) as the minimum generation capacity necessary for reliable load serving capability within this area.

The most critical single contingency for the LA Basin is the loss of Alamitos Unit #5 followed by Palo Verde-Devers 500 kV line, which would cause the South of Lugo flow to exceed its 6400 MW path rating limit. This limiting contingency establishes an LCR of 9,745 MW for 2013 (includes 810 MW of QF, 230 MW of Wind and 1166 MW of Muni generation as well as 83 MW of deficiency).

Effectiveness factors:

The following table has units that have at least 5% effectiveness to the above-mentioned South of Lugo constraint within the LA Basin area:

Gen Bus	Gen Name	Gen ID	MW Eff Fctr (%)
24052	MTNVIST3	3	76

[3] TCA: http://www.caiso.com/Documents/TransmissionControlAgreement-Updatedas-Dec3_2010.pdf

24053	MTNVIST4	4	76
24071	INLAND	1	75
25422	ETI MWDG	1	75
29305	ETWPKGEN	1	75
29041	IEEC-G1	1	74
29042	IEEC-G2	2	74
24242	RERC1G	1	74
24243	RERC2G	1	74
24244	SPRINGEN	1	74
25301	CLTNDREW	1	74
25302	CLTNCTRY	1	74
25303	CLTNAGUA	1	74
24299	RERC2G3	1	74
24300	RERC2G4	1	74
24921	MNTV-CT1	1	72
24922	MNTV-CT2	1	72
24923	MNTV-ST1	1	72
24924	MNTV-CT3	1	72
24925	MNTV-CT4	1	72
24926	MNTV-ST2	1	72
29307	MRLPKGEN	1	72
29338	CLEARGEN	1	71
29339	DELGEN	1	71
24026	CIMGEN	D1	71
24140	SIMPSON	D1	71
24030	DELGEN	1	71
24815	GARNET	QF	71
24815	GARNET	W3	71
29190	WINTECX2	1	70
29191	WINTECX1	1	70
29180	WINTEC8	1	70
29023	WINTEC4	1	70
29021	WINTEC6	1	70
24839	BLAST	1	70
25648	DVLCYN1G	1	70
25649	DVLCYN2G	2	70
25603	DVLCYN3G	3	70
25604	DVLCYN4G	4	70
25632	TERAWND	QF	70
25634	BUCKWND	QF	70
25635	ALTWIND	Q1	70
25635	ALTWIND	Q2	70
25637	TRANWND	QF	70

25645	VENWIND	EU	70
25645	VENWIND	Q2	70
25645	VENWIND	Q1	70
25646	SANWIND	Q2	70
29060	MOUNTWND	S1	70
29060	MOUNTWND	S3	70
29060	MOUNTWND	S2	70
29061	WHITEWTR	1	70
29290	CABAZON	1	70
25639	SEAWIND	QF	69
25640	PANAERO	QF	69
29260	ALTAMSA4	1	69
25633	CAPWIND	QF	66
25657	MJVSPHN1	1	66
25658	MJVSPHN2	2	66
25659	MJVSPHN3	3	66
25203	ANAHEIMG	1	62
25211	CanyonGT 1	1	60
25212	CanyonGT 2	2	60
25213	CanyonGT 3	3	60
25214	CanyonGT 4	4	60
29309	BARPKGEN	1	58
24066	HUNT1 G	1	58
24067	HUNT2 G	2	58
24133	SANTIAGO	1	58
24325	ORCOGEN	1	58
24341	COYGEN	1	57
24005	ALAMT5 G	5	53
24161	ALAMT6 G	6	53
24063	HILLGEN	D1	53
29201	EME WCG1	1	53
29203	EME WCG3	1	53
29204	EME WCG4	1	53
29205	EME WCG5	1	53
29202	EME WCG2	1	53
24001	ALAMT1 G	1	50
24002	ALAMT2 G	2	50
24003	ALAMT3 G	3	50
24004	ALAMT4 G	4	50
29953	SIGGEN	D1	48
24018	BRIGEN	1	46
24011	ARCO 1G	1	44
24012	ARCO 2G	2	44

24013	ARCO 3G	3	44
24014	ARCO 4G	4	44
24163	ARCO 5G	5	44
24164	ARCO 6G	6	44
24020	CARBGEN1	1	44
24064	HINSON	1	44
24070	ICEGEN	D1	44
24170	LBEACH12	2	44
24171	LBEACH34	3	44
24094	MOBGEN1	1	44
24062	HARBOR G	1	44
25510	HARBORG4	LP	44
24062	HARBOR G	HP	44
24139	SERRFGEN	D1	44
24170	LBEACH12	1	44
24171	LBEACH34	4	44
24327	THUMSGEN	1	44
24328	CARBGEN2	1	44
24022	CHEVGEN1	1	41
24023	CHEVGEN2	2	41
24330	OUTFALL1	1	41
24331	OUTFALL2	1	41
24332	PALOGEN	D1	41
24333	REDON1 G	R1	41
24334	REDON2 G	R2	41
24335	REDON3 G	R3	41
24336	REDON4 G	R4	41
24337	VENICE	1	41
24047	ELSEG3 G	3	41
24048	ELSEG4 G	4	41
24121	REDON5 G	5	41
24122	REDON6 G	6	41
24123	REDON7 G	7	41
24124	REDON8 G	8	41
24329	MOBGEN2	1	41
29209	BLY1ST1	1	40
29207	BLY1CT1	1	40
29208	BLY1CT2	1	40
24342	FEDGEN	1	39
29951	REFUSE	D1	37
24241	MALBRG3G	S3	37
24240	MALBRG2G	C2	37
24239	MALBRG1G	C1	37

29005	PASADNA1	1	29
29006	PASADNA2	1	29
29007	BRODWYSC	1	29
29308	CTRPKGEN	1	19

Valley Sub-Area:

The most critical contingency for the Valley sub-area is the loss of Palo Verde – Devers 500 kV line and Valley – Serrano 500 kV line or vice versa, which would result in voltage collapse. This limiting contingency establishes a LCR of 670 MW (includes 10 MW of QF generation) in 2013 as the generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

The generators inside the sub-area have the same effectiveness factors.

Western Sub-Area:

The most critical contingency for the Western sub-area is the loss of Serrano-Villa Park #2 230 kV line followed by the loss of the Serrano-Lewis 230 kV line or vice versa, which would result in thermal overload of the remaining Serrano-Villa Park 230 kV line. This limiting contingency establishes a LCR of 4,597 MW (includes 623 MW of QF, 6 MW of Wind and 582 MW of Muni generation) in 2013 as the generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

The following table has units that have at least 5% effectiveness to the above-mentioned constraint:

Gen Bus	Gen Name	Gen ID	MW Eff Fctr (%)
29309	BARPKGEN	1	29
25203	ANAHEIMG	1	28
25211	CanyonGT 1	1	27
25212	CanyonGT 2	2	27
25213	CanyonGT 3	3	27
25214	CanyonGT 4	4	27
24066	HUNT1 G	1	25

24067	HUNT2 G	2	25
24325	ORCOGEN	1	24
24005	ALAMT5 G	5	23
24161	ALAMT6 G	6	23
24001	ALAMT1 G	1	22
24002	ALAMT2 G	2	22
24003	ALAMT3 G	3	22
24004	ALAMT4 G	4	22
24133	SANTIAGO	1	18
24341	COYGEN	1	18
24011	ARCO 1G	1	17
24012	ARCO 2G	2	17
24013	ARCO 3G	3	17
24014	ARCO 4G	4	17
24018	BRIGEN	1	17
24020	CARBGEN1	1	17
24064	HINSON	1	17
24070	ICEGEN	D1	17
24170	LBEACH12	2	17
24171	LBEACH34	3	17
24062	HARBOR G	1	17
25510	HARBORG4	LP	17
24062	HARBOR G	HP	17
24139	SERRFGEN	D1	17
24170	LBEACH12	1	17
24171	LBEACH34	4	17
24173	LBEACH5G	R5	17
24174	LBEACH6G	R6	17
24327	THUMSGEN	1	17
24328	CARBGEN2	1	17
24079	LBEACH7G	R7	17
24080	LBEACH8G	R8	17
24081	LBEACH9G	R9	17
24163	ARCO 5G	5	17
24164	ARCO 6G	6	17
24094	MOBGEN1	1	16
29308	CTRPKGEN	1	16
24329	MOBGEN2	1	16
24330	OUTFALL1	1	16
24331	OUTFALL2	1	16
24332	PALOGEN	D1	16
24022	CHEVGEN1	1	15
24023	CHEVGEN2	2	15

24048	ELSEG4 G	4	15
24333	REDON1 G	R1	15
24334	REDON2 G	R2	15
24335	REDON3 G	R3	15
24336	REDON4 G	R4	15
24337	VENICE	1	15
29953	SIGGEN	D1	15
24047	ELSEG3 G	3	15
24121	REDON5 G	5	15
24122	REDON6 G	6	15
24123	REDON7 G	7	15
24124	REDON8 G	8	15
29951	REFUSE	D1	14
24342	FEDGEN	1	14
24241	MALBRG3G	S3	14
24240	MALBRG2G	C2	14
24239	MALBRG1G	C1	14
29005	PASADNA1	1	11
29006	PASADNA2	1	11
29007	BRODWYSC	1	11
24063	HILLGEN	D1	7
29201	EME WCG1	1	7
29203	EME WCG3	1	7
29204	EME WCG4	1	7
29205	EME WCG5	1	7
29202	EME WCG2	1	7

There are numerous other combinations of contingencies in the area that could overload a significant number of 230 kV lines in this sub-area but have less LCR need. As such, anyone of them (combination of contingencies) could become binding for any given set of procured resources. As a result, effectiveness factors may not be the best indicator towards informed procurement.

Ellis sub-area

The most critical contingency for Ellis sub-area is the loss of the Imperial Valley-North Gila 500 kV line followed by the loss of the Barre – Ellis #1 or #2 230 kV lines, which overload the remaining line. This limiting contingency establishes an LCR of 818 MW in 2013 (which includes 6 MW of QF generation as well as 360 MW of deficiency) as the

minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:
The generators inside the sub-area have the same effectiveness factors.

El Nido sub-area
The most critical contingency for the El Nido sub-area is the loss of the La Fresa – Hinson 230 kV line followed by the loss of the La Fresa – Redondo #1 and #2 230 kV lines, which would cause voltage collapse. This limiting contingency establishes an LCR of 386 MW in 2013 (which includes 47 MW of QF and 4 MW of MUNI generation) as the minimum capacity necessary for reliable load serving capability within this sub-area.
Effectiveness factors:
The generators inside the sub-area have the same effectiveness factors.

Changes to study results compared to SONGS being operational:
The load forecast is essentially the same. The total available capacity has decreased by 3,211 MW (2246 MW SONGS + 335 MW El Segundo # 3 + 630 MW El Segundo Repower). The Ellis sub-area LCR needs have increased significantly, by 818 MW, due to the additional flow through this sub-area required to serve San Diego load in absence of SONGS. The Western sub-area LCR needs have decreased by about 943 MW mainly due to the fact that there are other units in this sub-area with higher effectiveness factors than SONGS that are now required and that have not been previously accounted for, due to unit dispatch methodology (see final 2013 LCR manual for order in which units are turned on). The LA Basin single contingency need has decreased by a total of 550 MW, mainly due to the difference between P max of SONGS and Alamitos #5 (new worst-case resource outage) and due to higher LCR needs in the San Diego-Imperial Valley area and has partly (increased) due to the smaller effectiveness factors relative to South of Lugo path for units required to replace SONGS. The LA Basin has a new multiple contingency requirement due to voltage support issues that arise in the area, without SONGS, for outages in San Diego's system. For mitigation of new deficiencies please see chapter II.

LA Basin Overall Requirements:

2013	QF/Wind (MW)	Muni (MW)	Nuclear (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	1040	1166	0	7710	9916

2013	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW LCR Need
Category B (Single)[4]	9,745	0	9,745
Category C (Multiple)[5]	9,916	1,241	11,157

2. San Diego-Imperial Valley Area

Area Definition

The transmission tie lines forming a boundary around the Greater San Diego-Imperial Valley area include:

1) Imperial Valley – North Gila 500 kV Line
2) Otay Mesa – Tijuana 230 kV Line
3) San Onofre - San Luis Rey #1 230 kV Line
4) San Onofre - San Luis Rey #2 230 kV Line
5) San Onofre - San Luis Rey #3 230 kV Line
6) San Onofre – Talega #1 230 kV Line
7) San Onofre – Talega #2 230 kV Line
8) Imperial Valley – El Centro 230 kV Line
9) Imperial Valley – Dixieland 230 kV Line
10) Imperial Valley – La Rosita 230 kV Line

The substations that delineate the Greater San Diego-Imperial Valley area are:

1) Imperial Valley is in North Gila is out
2) Otay Mesa is in Tijuana is out
3) San Onofre is out San Luis Rey is in
4) San Onofre is out San Luis Rey is in
5) San Onofre is out San Luis Rey is in

[4] A single contingency means that the system will be able the survive the loss of a single element, however the operators will not have any means (other than load drop) in order to bring the system within a safe operating zone and get prepared for the next contingency as required by NERC transmission operations standards.

[5] Multiple contingencies means that the system will be able the survive the loss of a single element, and the operators will have enough generation (other operating procedures) in order to bring the system within a safe operating zone and get prepared for the next contingency as required by NERC transmission operations standards.

6) San Onofre is out Talega is in
7) San Onofre is out Talega is in
8) Imperial Valley is in El Centro is out
9) Imperial Valley is in Dixieland is out
10) Imperial Valley is in La Rosita is out

Study includes the new CEC adopted forecast that was posted in June 2012. The total 2013 busload within the defined area: 4990 MW with 134 MW of losses resulting in total load + losses of 5124 MW.

Total units and qualifying capacity available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
BORDER_6_UNITA1	22149	CALPK_BD	13.8	48.98	1	San Diego		Market
CBRLLO_6_PLSTP1	22092	CABRILLO	69	2.23	1	San Diego	Aug NQC	QF/Selfgen
CCRITA_7_RPPCHF	22124	CHCARITA	138	3.69	1	San Diego	Aug NQC	QF/Selfgen
CHILLS_1_SYCENG	22120	CARLTNHS	138	0.26	1	San Diego	Aug NQC	QF/Selfgen
CHILLS_7_UNITA1	22120	CARLTNHS	138	1.31	2	San Diego	Aug NQC	QF/Selfgen
CPSTNO_7_PRMADS	22112	CAPSTRNO	138	4.73	1	San Diego	Aug NQC	QF/Selfgen
CRSTWD_6_KUMYAY	22915	KUMEYAAY	34.5	6.70	1	San Diego	Aug NQC	Wind
DIVSON_6_NSQF	22172	DIVISION	69	34.41	1	San Diego	Aug NQC	QF/Selfgen
EGATE_7_NOCITY	22204	EASTGATE	69	0.21	1	San Diego	Aug NQC	QF/Selfgen
ELCAJN_6_LM6K	23320	EC GEN2	13.8	48.10	1	San Diego, El Cajon		Market
ELCAJN_6_UNITA1	22150	CALPK_EC	13.8	45.42	1	San Diego, El Cajon		Market
ELCAJN_7_GT1	22212	ELCAJNGT	12.5	16.00	1	San Diego, El Cajon		Market
ENCINA_7_EA1	22233	ENCINA 1	14.4	106.00	1	San Diego		Market
ENCINA_7_EA2	22234	ENCINA 2	14.4	104.00	1	San Diego		Market
ENCINA_7_EA3	22236	ENCINA 3	14.4	110.00	1	San Diego		Market
ENCINA_7_EA4	22240	ENCINA 4	22	300.00	1	San Diego		Market
ENCINA_7_EA5	22244	ENCINA 5	24	330.00	1	San Diego		Market
ENCINA_7_GT1	22248	ENCINAGT	12.5	14.50	1	San Diego		Market
ESCNDO_6_PL1X2	22257	ESGEN	13.8	35.50	1	San Diego		Market
ESCNDO_6_UNITB1	22153	CALPK_ES	13.8	48.04	1	San Diego		Market
ESCO_6_GLMQF	22332	GOALLINE	69	39.92	1	San Diego, Esco	Aug NQC	QF/Selfgen
KEARNY_7_KY1	22377	KEARNGT1	12.5	16.00	1	San Diego, Mission		Market
KEARNY_7_KY2	22373	KEARN2AB	12.5	15.02	1	San Diego, Mission		Market
KEARNY_7_KY2	22373	KEARN2AB	12.5	15.02	2	San Diego, Mission		Market
KEARNY_7_KY2	22374	KEARN2CD	12.5	15.02	1	San Diego, Mission		Market
KEARNY_7_KY2	22374	KEARN2CD	12.5	13.95	2	San Diego, Mission		Market
KEARNY_7_KY3	22375	KEARN3AB	12.5	14.98	1	San Diego, Mission		Market
KEARNY_7_KY3	22375	KEARN3AB	12.5	16.05	2	San Diego,		Market

						Mission		
KEARNY_7_KY3	22376	KEARN3CD	12.5	14.98	1	San Diego, Mission		Market
KEARNY_7_KY3	22376	KEARN3CD	12.5	14.98	2	San Diego, Mission		Market
LAKHDG_6_UNIT 1	22625	LKHODG1	13.8	20.00	1	San Diego, Bernardo		Market
LARKSP_6_UNIT 1	22074	LRKSPBD1	13.8	46.00	1	San Diego		Market
LARKSP_6_UNIT 2	22075	LRKSPBD2	13.8	46.00	1	San Diego		Market
LAROA1_2_UNITA1	20187	LRP-U1	16	165	1	None		Market
LAROA2_2_UNITA1	22996	INTBST	18	157	1	None		Market
LAROA2_2_UNITA1	22997	INTBCT	16	165	1	None		Market
MRGT_6_MEF2	22487	MFE_MR2	13.8	47.90	1	San Diego, Mission, Miramar		Market
MRGT_6_MMAREF	22486	MFE_MR1	13.8	48.00	1	San Diego, Mission, Miramar		Market
MRGT_7_UNITS	22488	MIRAMRGT	12.5	18.55	1	San Diego, Mission, Miramar		Market
MRGT_7_UNITS	22488	MIRAMRGT	12.5	17.45	2	San Diego, Mission, Miramar		Market
MSHGTS_6_MMARLF	22448	MESAHGTS	69	3.19	1	San Diego, Mission	Aug NQC	QF/Selfgen
MSSION_2_QF	22496	MISSION	69	0.74	1	San Diego	Aug NQC	QF/Selfgen
NIMTG_6_NIQF	22576	NOISLMTR	69	35.59	1	San Diego	Aug NQC	QF/Selfgen
OGROVE_6_PL1X2	22628	PA99MWQ1	13.8	49.95	1	San Diego, Pala		Market
OGROVE_6_PL1X2	22629	PA99MWQ2	13.8	49.95	2	San Diego, Pala		Market
OTAY_6_PL1X2	22617	OYGEN	13.8	35.50	1	San Diego		Market
OTAY_6_UNITB1	22604	OTAY	69	2.80	1	San Diego	Aug NQC	QF/Selfgen
OTAY_7_UNITC1	22604	OTAY	69	2.65	3	San Diego	Aug NQC	QF/Selfgen
OTMESA_2_PL1X3	22605	OTAYMGT1	18	185.06	1	San Diego		Market
OTMESA_2_PL1X3	22606	OTAYMGT2	18	185.06	1	San Diego		Market
OTMESA_2_PL1X3	22607	OTAYMST1	16	233.48	1	San Diego		Market
PALOMR_2_PL1X3	22262	PEN_CT1	18	162.39	1	San Diego		Market
PALOMR_2_PL1X3	22263	PEN_CT2	18	162.39	1	San Diego		Market
PALOMR_2_PL1X3	22265	PEN_ST	18	240.83	1	San Diego		Market
PTLOMA_6_NTCCGN	22660	POINTLMA	69	1.65	2	San Diego	Aug NQC	QF/Selfgen
PTLOMA_6_NTCQF	22660	POINTLMA	69	16.70	1	San Diego	Aug NQC	QF/Selfgen
SAMPSN_6_KELCO1	22704	SAMPSON	12.5	0.72	1	San Diego	Aug NQC	QF/Selfgen
SMRCOS_6_UNIT 1	22724	SANMRCOS	69	0.47	1	San Diego	Aug NQC	QF/Selfgen
TERMEX_2_PL1X3	22981	IV GEN1	18	281	1	None		Market
TERMEX_2_PL1X3	22982	IV GEN2	18	156	1	None		Market
TERMEX_2_PL1X3	22983	IVGEN3	18	156	1	None		Market
NA	22444	MESA RIM	69	0.00	1	San Diego	No NQC - hist. data	QF/Selfgen
NA	22592	OLD TOWN	69	0.00	1	San Diego	No NQC - hist. data	QF/Selfgen
NA	22602	OMWD	69	0.00	1	San Diego	No NQC - hist. data	QF/Selfgen
NA	22708	SANLUSRY	69	0.00	1	San Diego	No NQC - hist. data	QF/Selfgen
NA	22916	PFC-AVC	0.6	0.00	1	San Diego	No NQC - hist. data	QF/Selfgen
LAKHDG_6_UNIT 2	22626	LKHODG2	13.8	20.00	2	San Diego, Bernardo	No NQC - Pmax	Market

Major new projects modeled:

1. Sunrise Power Link Project (Southern Route)
2. Eastgate – Rose Canyon 69kV (TL6927) reconductor
3. New Imperial Valley-Dixieland 230 kV line
4. East County 500 kV substation (ECO)
5. Lake Hodges unit # 2

Critical Contingency Analysis Summary

El Cajon Sub-area:

The most critical contingency for the El Cajon sub-area is the loss of the El Cajon-Jamacha 69 kV line (TL624) followed by the loss of Miguel-Granite-Los Coches 69 kV line (TL632), which would thermally overload the El Cajon – Los Coches 69 kV line (TL631). This limiting contingency establishes a LCR of 83 MW (including 0 MW of QF generation) in 2013 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

The most critical single contingency for this sub-area is the loss of Miguel-Granite-Los Coches 69 kV line (TL632) with El Cajon Energy Center already out of service, which would thermally overload the El Cajon – Los Coches 69 kV line (TL631). This limiting contingency establishes a LCR of 53 MW (including 0 MW of QF generation) in 2013.

Effectiveness factors:

All units within this sub-area (El Cajon Peaker, El Cajon GT and El Cajon Energy Center) have the same effectiveness factor.

Rose Canyon Sub-area

This sub-area has been eliminated due to TL6927, Eastgate-Rose Canyon 69 kV reconductor which is already in-service.

Mission Sub-area

The most critical contingency for the Mission sub-area is the loss of Mission - Kearny 69 kV line (TL663) followed by the loss of Mission – Mesa Heights 69kV line (TL676), which would thermally overload the Mission - Clairmont 69kV line (TL670). This limiting contingency establishes a local capacity need of 126 MW (including 3 MW of QF generation) in 2013 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:
Miramar Energy Facility units and Miramar GTs (Cabrillo Power II) are 8% effective, Miramar Landfill unit and all Kearny peakers are 32% effective.

Bernardo Sub-area:
The most critical contingency for the Bernardo sub-area is the loss of Artesian - Sycamore 69 kV line followed by the loss of Poway-Rancho Carmel 69 kV line, which would thermally overload the Felicita Tap-Bernardo 69 kV line (TL689). This limiting contingency establishes a LCR of 110 MW (including 0 MW of QF generation and 70 MW of deficiency) in 2013 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:
All units within this sub-area (Lake Hodges) are needed so there is no effectiveness factor required.

Esco Sub-area
The most critical contingency for the Esco sub-area is the loss of Poway-Pomerado 69 kV line (TL6913) followed by the loss of Esco - Escondido 69kV line (TL6908) which would thermally overload the Bernardo – Rancho Carmel 69 kV line (TL633). This limiting contingency establishes a LCR of 114 MW (including 40 MW of QF generation and 74 MW of deficiency) in 2013 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

Only unit within this sub-area (Goal line) is needed so no effectiveness factor is required.

Pala Sub-area

The most critical contingency for the Pala sub-area is the loss of Pendleton – San Luis Rey 69 kV line (TL6912) followed by the loss of Lilac - Pala 69kV line (TL6932) which would thermally overload the Melrose – Morro Hill Tap 69 kV line. This limiting contingency establishes a LCR of 43 MW (including 0 MW of QF generation) in 2013 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

All units within this sub-area (Orange Grove) have the same effectiveness factor.

Miramar Sub-area

The most critical contingency for the Miramar sub-area is the loss of Otay Mesa – Miguel Tap – Silvergate 230kV line (TL23042) followed by the loss of Sycamore 230/138 kV Bank #60, which would thermally overload the Sycamore - Scripps 69 kV line (TL6916). This limiting contingency establishes a LCR of 97 MW (including 0 MW of QF generation) in 2013 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

The most critical single contingency for this sub-area is the loss of Otay Mesa – Miguel Tap – Silvergate 230kV line (TL23042) with Miramar Energy Facility #1 or #2 out of service, which would thermally overload the Sycamore - Scripps 69 kV line (TL6916). This limiting contingency establishes a LCR of 86 MW (including 0 MW of QF generation) in 2013.

Effectiveness factors:

All units within this sub-area (Miramar Energy Facility and Miramar GTs) have the same

effectiveness factor.

San Diego Sub-area:

The most limiting contingency for San Diego sub-area is the loss of Imperial Valley-Suncrest 500 kV line followed by the loss of ECO-Miguel 500 kV line. The limiting constraint is the post-transient voltage instability. This contingency establishes an LCR of 3,536 MW in 2013 (includes 151 MW of QF generation and 7 MW of Wind as well as 467 MW of deficiency) as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

The most limiting single contingency in the San Diego sub-area is a (G-1/N-1) contingency described by the outage of ECO-Miguel 500 kV line with Otay Mesa Combined-Cycle Power Plant (603 MW) already out of service. The limiting constraint is post-transient voltage instability. This contingency establishes an LCR of 2,462 MW in 2013 (includes 151 MW of QF generation and 7 MW of Wind).

Effectiveness factors:

All units within this area have the same effectiveness factor. Units outside of this area are not effective.

San Diego Sub-area Requirements:

2013	QF (MW)	Wind (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	151	7	2911	3069

2013	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW LCR Need
Category B (Single)[6]	2,462	0	2,462
Category C (Multiple)[7]	3,069	467	3,536

[6] A single contingency means that the system will be able the survive the loss of a single element, however the operators will not have any means (other than load drop) in order to bring the system within a safe operating zone and get prepared for the next contingency as required by NERC transmission operations standards.

[7] Multiple contingencies means that the system will be able the survive the loss of a single element, and the operators will have enough generation (other operating procedures) in order to bring the system within a safe operating zone and get prepared for the next contingency as required by NERC

San Diego-Imperial Valley Area Overall:

The most limiting contingency in the San Diego-Imperial Valley area is described by the outage of 500 kV Southwest Power Link (SWPL) between Imperial Valley and North Gila Substations over-lapping with an outage of the Otay Mesa Combined-Cycle Power plant (603 MW) while maintaining post-transient voltage stability. This limiting contingency establishes a local capacity need of 3,385 MW in 2013 (includes 151 MW of QF generation and 7 MW of Wind) as the minimum capacity necessary for reliable load serving capability within this area.

It is worth mentioning that Imperial Valley – Dixieland 230kV line was modeled between IID and ISO. There were no additional upgrades modeled between CFE and ISO control areas at Imperial Valley 230 kV bus in 2013 base case. The ISO acknowledges that the LCR needs for the San Diego-Imperial Valley area will decrease as additional transmission is constructed between the IID/CFE systems and Imperial Valley and more power is flowing in real-time from these control areas into the ISO control area.

Effectiveness factors:

All units within this area have the same effectiveness factor. Units outside of this area are not effective.

Changes to study results compared to SONGS being operational:

The load forecast went up by 10 MW. The total available capacity is the same. The San Diego sub-area requirements have increased significantly, by 966 MW, due to the voltage support issues that arise in the area without SONGS for outages in San Diego's system. The San Diego-Imperial Valley area requirements have increased also, by 447 MW, due to the same voltage support issues. For mitigation of new deficiencies and potential reduction in the San Diego-Imperial Valley area LCR, in the absence of SONGS, please see chapter II.

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transmission operations standards.

San Diego-Imperial Valley Area Overall Requirements:

2013	QF (MW)	Wind (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	151	7	3991	4149

2013	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW LCR Need
Category B (Single)[8]	3,385	0	3,385
Category C (Multiple)[9]	3,385	467[10]	3,852

[8] A single contingency means that the system will be able the survive the loss of a single element, however the operators will not have any means (other than load drop) in order to bring the system within a safe operating zone and get prepared for the next contingency as required by NERC transmission operations standards.

[9] Multiple contingencies means that the system will be able the survive the loss of a single element, and the operators will have enough generation (other operating procedures) in order to bring the system within a safe operating zone and get prepared for the next contingency as required by NERC transmission operations standards.

[10] San Diego-Imperial Valley area is not “overall deficient”. Resource deficiency values result from a few deficient sub-areas; and since there are no resources that can mitigate this deficiency the numbers are carried forward into the total area needs.