



California ISO
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California Independent
System Operator

2010-2012 LOCAL CAPACITY TECHNICAL ANALYSIS

REPORT AND STUDY RESULTS

December 28, 2007

Local Capacity Technical Analysis Overview and Study Results

I. Executive Summary

This Report provides a description of the 2010 and 2012 LCR Study objectives, inputs, methodologies and assumptions, and the important policy considerations that are presented by the study results.

Most LCR requirements trend up by about 2%/year mainly due to load forecast increase. However overall there is significant decrease (over 5,000 MW) mainly due to new projects like: Palo Verde-Devers #2, Sunrise, Green path north and later Vincent-Mira Loma 500 kV as well as upgrades to the Sylmar-Pardee #1 and #2 230 kV in southern California and Table Mountain-Rio Oso 230 kV lines in the north. For comparison below you find the 2008, 2010 and 2012 total LCR needs.

2008 Local Capacity Needs

Local Area Name	Qualifying Capacity			2008 LCR Need Based on Category B			2008 LCR Need Based on Category C with operating procedure		
	QF/ Muni (MW)	Market (MW)	Total (MW)	Existing Capacity Needed	Deficiency	Total (MW)	Existing Capacity Needed	Deficiency	Total (MW)
Humboldt	45	135	180	175	0	175	175	0	175
North Coast / North Bay	262	621	883	676	0	676	676	0	676
Sierra	1014	766	1780	1780	89	1869	1780	312	2092
Stockton	272	264	536	460	15	475	536	250	786
Greater Bay	1116	5098	6214	4688	0	4688	4688	0	4688
Greater Fresno	496	2495	2991	2212	0	2212	2274	108	2382
Kern	615	31	646	259	0	259	463	23	486
LA Basin	3545	8545	12093	10130	0	10130	10130	0	10130
Big Creek/ Ventura	1463	3933	5396	3562	0	3562	3658	0	3658
San Diego	201	2718	2919	2919	114	3033	2919	114	3033
Total	9029	24606	33638	26861	218	27079	27299	804	28106

2010 Local Capacity Needs

Local Area Name	Qualifying Capacity			2010 LCR Need Based on Category B			2010 LCR Need Based on Category C with operating procedure		
	QF/ Muni (MW)	Market (MW)	Total (MW)	Existing Capacity Needed	Deficiency	Total (MW)	Existing Capacity Needed	Deficiency	Total (MW)
Humboldt	45	166	211	145	6	151	145	11	156
North Coast / North Bay	262	676	938	811	0	811	826	0	826
Sierra	1014	766	1780	1190	48	2038	1640	262	1902
Stockton	272	264	536	486	25	511	536	241	777
Greater Bay	1174	5907	7081	5225	0	5225	5225	0	5225
Greater Fresno	496	3268	3764	2123	0	2123	2351	0	2351
Kern	615	31	646	222	0	222	437	2	439
LA Basin	3545	9590	13135	7000*	0	7000*	7000*	0	7000*
Big Creek/ Ventura	1463	3980	5443	2045	0	2045	2322	0	2322
San Diego	201	2762	2963	2193**	0	2193**	2193**	73	2266**
Total	9087	27410	36497	21440	79	22319	22675	589	23264

2012 Local Capacity Needs

Local Area Name	Qualifying Capacity			2012 LCR Need Based on Category B			2012 LCR Need Based on Category C with operating procedure		
	QF/ Muni (MW)	Market (MW)	Total (MW)	Existing Capacity Needed	Deficiency	Total (MW)	Existing Capacity Needed	Deficiency	Total (MW)
Humboldt	45	166	211	145	10	155	145	15	160
North Coast / North Bay	262	676	938	851	0	851	856	0	856
Sierra	1014	766	1780	1423	95	1518	1739	422	2161
Stockton	272	264	536	486	59	545	536	344	880
Greater Bay	1174	5907	7081	5452	0	5452	5452	0	5452
Greater Fresno	496	3268	3764	2114	0	2114	2237	7	2244
Kern	615	31	646	254	0	254	497	2	499
LA Basin	3545	9590	13135	7000*	0	7000*	7000*	0	7000*
Big Creek/ Ventura	1463	3980	5443	2350	0	2350	2656	0	2656
San Diego	201	2762	2963	2329**	0	2329**	2329**	115	2444**
Total	9087	27410	36497	22404	164	22568	23447	905	24352

* - Potentially lower requirements – limit not reached (see detail description).

** - Potentially higher requirements combined with another area (see detail description).

The term “Qualifying Capacity” used in this report is the same as the latest “Net Qualifying Capacity” list posted on the CAISO web site at:

<http://www.caiso.com/1796/179688b22c970.html>

The first column, “Qualifying Capacity”, reflects two sets of generation. The first set is comprised of generation that would normally be expected to be on-line such as Municipal generation and Regulatory Must-take generation (state, federal, QFs, wind and nuclear units). The second set is “market” generation. The second column, “LCR Requirement Based on Category B” identifies the local capacity requirements, and deficiencies that must be addressed, in order to achieve a service reliability level based on Performance Criteria- Category B. The third column, “LCR Requirement Based on Category C with Operating Procedure”, sets forth the local capacity requirements, and deficiencies that must be addressed, necessary to attain a service reliability level based on Performance Criteria-Category C with operational solutions.

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II. Overview of The Study: Inputs, Outputs and Options

A. Objectives

Similar to the 2006, 2007, 2008, 2009-2011 Local Capacity Technical Analysis the purpose of the 2010-2012 LCR Study is to identify specific areas within the CAISO Controlled Grid that have local reliability problems and to determine the generation capacity (MW) that would be required to mitigate these local reliability problems.

B. Key Study Assumptions

Inputs and Methodology

The CAISO used the same Inputs and Methodology as does agreed upon by interested parties previously incorporated into the 2008 LCR Study. The following table sets forth a summary of the approved inputs and methodology that have been used in the previous 2008 LCR Study as well as this 2010 and 2012 LCR Study:

Summary Table of Inputs and Methodology Used in this LCR Study:

Issue:	HOW INCORPORATED INTO THIS LCR STUDY:
<u>Input Assumptions:</u>	
<ul style="list-style-type: none"> • Transmission System Configuration 	The existing transmission system has been modeled, including all projects operational on or before June 1, of the study year and all other feasible operational solutions brought forth by the PTOs and as agreed to by the CAISO.
<ul style="list-style-type: none"> • Generation Modeled 	The existing generation resources has been modeled and also includes all projects that will be on-line and commercial on or before June 1, of the study year
<ul style="list-style-type: none"> • Load Forecast 	Uses a 1-in-10 year summer peak load forecast
<u>Methodology:</u>	
<ul style="list-style-type: none"> • <u>Maximize Import Capability</u> 	Import capability into the load pocket has been maximized, thus minimizing the generation required in the load pocket to meet applicable reliability requirements.
<ul style="list-style-type: none"> • <u>QF/Nuclear/State/Federal Units</u> 	Regulatory Must-take and similarly situated units like QF/Nuclear/State/Federal resources have been modeled on-line at qualifying capacity output values for purposes of this LCR Study.
<ul style="list-style-type: none"> • <u>Maintaining Path Flows</u> 	Path flows have been maintained below all established path ratings into the load pockets, including the 500 kV. For clarification, given the existing transmission system configuration, the only 500 kV path that flows directly into a load pocket and will, therefore, be considered in this LCR Study is the South of Lugo transfer path flowing into the LA Basin.
<u>Performance Criteria:</u>	
<ul style="list-style-type: none"> • <u>Performance Level B & C, including incorporation of PTO operational solutions</u> 	This LCR Study is being published based on Performance Level B and Performance Level C criterion, yielding the low and high range LCR scenarios. In addition, the CAISO will incorporate all new projects and other feasible and CAISO-approved operational solutions brought forth by the PTOs that can be operational on or before June 1, of the study year. Any such solutions that can reduce the need for procurement to meet the Performance Level C criteria will be incorporated into the LCR Study.
<u>Load Pocket:</u>	
<ul style="list-style-type: none"> • <u>Fixed Boundary, including limited reference to published effectiveness factors</u> 	This LCR Study has been produced based on load pockets defined by a fixed boundary. The CAISO only publishes effectiveness factors where they are useful in facilitating procurement where excess capacity exists within a load pocket.

Further details regarding the 2008 as well as 2010 and 2012 LCR Study methodology and assumptions are provided in Section III, below.

C. Grid Reliability

Service reliability builds from grid reliability because grid reliability is reflected in the planning standards of the Western Electricity Coordinating Council (“WECC”) that incorporate standards set by the North American Electric Reliability Council (“NERC”) (collectively “NERC Planning Standards”). The NERC Planning Standards primarily apply to the bulk, interconnected electric system in the Western United States and are intended to address the reality that within an integrated network, whatever one control area does can affect the reliability of other control areas. Consistent with the mandatory nature of the NERC Planning Standards, the CAISO is under a statutory obligation to ensure efficient use and reliable operation of the transmission grid consistent with achievement of the NERC Planning Standards.¹ The CAISO is further under an obligation, pursuant to its FERC-approved Transmission Control Agreement, to secure compliance with all “Applicable Reliability Criteria.” Applicable Reliability Criteria consists of the NERC Planning Standards as well as reliability criteria adopted by the CAISO, in consultation with the CAISO’s Participating Transmission Owners (“PTOs”), which affect a PTO’s individual system.

The NERC Planning Standards define reliability on interconnected bulk electric systems using the terms “adequacy” and “security.” “Adequacy” is the ability of the electric systems to supply the aggregate electrical demand and energy requirements of their customers at all times, taking into account physical characteristics of the transmission system such as transmission ratings and scheduled and reasonably expected unscheduled outages of system elements. “Security” is the ability of the electric systems to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements. The NERC Planning Standards are organized by Performance Categories. For instance, one category could require that the grid operator not only ensure grid integrity is maintained under certain adverse system conditions, e.g., security, but also that all customers continue to receive electric supply

¹ Pub. Utilities Code § 345

to meet demand, e.g., adequacy. In that case, grid reliability and service reliability would overlap. But there are other levels of performance where security can be maintained without ensuring adequacy.

Performance Criteria

As set forth on the Summary Table of Inputs and Methodology, this LCR Report is based on NERC Performance Level B and Performance Level C criterion, yielding the low and high range LCR scenarios. These Performance Levels can be described as follows:

i. Performance Criteria- Category B

Category B describes the system performance that is expected immediately following the loss of a single transmission element, such as a transmission circuit, a generator, or a transformer.

Category B system performance requires that all thermal and voltage limits must be within their “Applicable Rating,” which, in this case, are the emergency ratings as generally determined by the PTO or facility owner. Applicable Rating includes a temporal element such that emergency ratings can only be maintained for a certain duration. Under this category, load cannot be shed in order to assure the Applicable Ratings are met however there is no guaranty that facilities are returned to within normal ratings or to a state where it is safe to continue to operate the system in a reliable manner, such that the next element out will no cause a violation of the applicable ratings and criteria.

ii. Performance Criteria- Category C

The NERC Standards require system operators to “look forward” to make sure they safely prepare for the “next” N-1 following the loss of the “first” N-1 (stay within Applicable Ratings after the “next” N-1). This is commonly referred to as N-1-1. Because it is assumed that some time exists between the “first” and “next” element

losses, operating personnel may make any reasonable and feasible adjustments to the system to prepare for the loss of the second element, including, operating procedures, dispatching generation, moving load from one substation to another to reduce equipment loading, dispatching operating personnel to specific station locations to manually adjust load from the substation site, or installing a “Special Protection Scheme” that would remove pre-identified load from service upon the loss of the “next” element.² All Category C requirements in this report only refer to situations when in real time (N-0) or after the first contingency (N-1) the system requires additional readjustment in order to prepare for the next worst contingency. In this time frame load drop is not allowed per existing planning criteria.

Generally Category C describes system performance that is expected following the loss of two or more system elements. This loss of two elements is generally expected to happen simultaneously, referred to as N-2. It should be noted that once the “next” element is lost after the first contingency, as discussed above under the Performance Criteria B, N-1-1 scenario, the event is effectively a Category C. As noted above, depending on system design and expected system impacts, the **planned and controlled** interruption of supply to customers (load shedding), the removal from service of certain generators and curtailment of exports may be utilized to maintain grid “security.”

D. The Two Options Presented In This LCR Study

This LCR study sets forth different solution “options” with varying ranges of potential service reliability consistent with CAISO’s Applicable Reliability Criteria:

1. Option 1- Meet Performance Criteria Category B

² A Special Protection Scheme is typically proposed as an operational solution that does not require additional generation and permits operators to effectively prepare for the next event as well as ensure security should the next event occur. However, these systems have their own risks, which limit the extent to which they could be deployed as a solution for grid reliability augmentation. While they provide the value of protecting against the next event without the need for pre-contingency load shedding, they add points of potential failure to the transmission network. This increases the potential for load interruptions because sometimes these systems will operate when not required and other times they will not operate when needed.

Option 1 is a service reliability level that reflects generation capacity that must be available to comply with reliability standards immediately after a NERC Category B given that load cannot be removed to meet this performance standard under Applicable Reliability Criteria. However, this capacity amount implicitly relies on load interruption as the **only means** of meeting any Applicable Reliability Criteria that is beyond the loss of a single transmission element (N-1). These situations will likely require substantial load interruptions in order to maintain system continuity and alleviate equipment overloads including load interruptions prior to the actual occurrence of the second contingency.³

2. Option 2- Meet Performance Criteria Category C and Incorporate Suitable Operational Solutions

Option 2 is a service reliability level that reflects generation capacity that is needed to readjust the system to prepare for the loss of a second transmission element (N-1-1) using generation capacity *after* considering all reasonable and feasible operating solutions (involving customer load interruption) developed and approved by the CAISO, in consultation with the PTOs. Under this option, there is no expected load interruption to end-use customers under normal or single contingency conditions as the CAISO operators prepare for the second contingency. However, the customer load will be interrupted in the event the second contingency occurs.

III. Assumption Details: How the Study was Conducted

A. System Planning Criteria

The following table provides a comparison of system planning criteria, based on the NERC performance standards, used in the study:

³ This potential for pre-contingency load shedding also occurs because real time operators must prepare for the loss of a common mode N-2 at all times.

Table 1: Criteria Comparison

Contingency Component(s)	ISO Grid Planning Criteria	Existing RMR Criteria	Locational Capacity Criteria
<u>A – No Contingencies</u>	X	X	X
<u>B – Loss of a single element</u> 1. Generator (G-1) 2. Transmission Circuit (L-1) 3. Transformer (T-1) 4. Single Pole (dc) Line 5. G-1 system readjusted L-1	 X X X X	 X X X ² X X	 X ¹ X ¹ X ^{1,2} X ¹ X
<u>C – Loss of two or more elements</u> 1. Bus Section 2. Breaker (failure or internal fault) 3. L-1 system readjusted G-1 3. G-1 system readjusted T-1 or T-1 system readjusted G-1 3. L-1 system readjusted T-1 or T-1 system readjusted L-1 3. G-1 system readjusted G-1 3. L-1 system readjusted L-1 3. T-1 system readjusted T-1 4. Bipolar (dc) Line 5. Two circuits (Common Mode) L-2 6. SLG fault (stuck breaker or protection failure) for G-1 7. SLG fault (stuck breaker or protection failure) for L-1 8. SLG fault (stuck breaker or protection failure) for T-1 9. SLG fault (stuck breaker or protection failure) for Bus section WECC-S3. Two generators (Common Mode) G-2	 X X X X X X X X X X X X X X X ³		 X X X X X X X X X X
<u>D – Extreme event – loss of two or more elements</u> Any B1-4 system readjusted (Common Mode) L-2 All other extreme combinations D1-14.	 X ⁴ X ⁴		 X ³
1 System must be able to readjust to a safe operating zone in order to be able to support the loss of the next contingency. 2 A thermal or voltage criterion violation resulting from a transformer outage may not be cause for a local area reliability requirement if the violation is considered marginal (e.g. acceptable loss of facility life or low voltage), otherwise, such a violation will necessitate creation of a requirement. 3 Evaluate for risks and consequence, per NERC standards. No voltage collapse or dynamic instability allowed. 4 Evaluate for risks and consequence, per NERC standards.			

A significant number of simulations were run to determine the most critical contingencies within each Local Capacity Area. Using power flow, post-transient load flow, and stability assessment tools, the system performance results of all the contingencies that were studied were measured against the system performance requirements defined by the criteria shown in Table 1. Where the specific system performance requirements were not met, generation was adjusted such that the minimum amount of generation required to meet the criteria was determined in the Local Capacity Area. The following describes how the criteria were tested for the specific type of analysis performed.

1. Power Flow Assessment:

<u>Contingencies</u>	<u>Thermal Criteria</u> ³	<u>Voltage Criteria</u> ⁴
Generating unit ^{1, 6}	Applicable Rating	Applicable Rating
Transmission line ^{1, 6}	Applicable Rating	Applicable Rating
Transformer ^{1, 6}	Applicable Rating ⁵	Applicable Rating ⁵
(G-1)(L-1) ^{2, 6}	Applicable Rating	Applicable Rating
Overlapping ^{6, 7}	Applicable Rating	Applicable Rating

- ¹ All single contingency outages (i.e. generating unit, transmission line or transformer) will be simulated on Participating Transmission Owners' local area systems.
- ² Key generating unit out, system readjusted, followed by a line outage. This overlapping outage is considered a single contingency within the ISO Grid Planning Criteria. Therefore, load dropping for an overlapping G-1, L-1 scenario is not permitted.
- ³ Applicable Rating – Based on ISO Transmission Register or facility upgrade plans including established Path ratings.
- ⁴ Applicable Rating – ISO Grid Planning Criteria or facility owner criteria as appropriate including established Path ratings.
- ⁵ A thermal or voltage criterion violation resulting from a transformer outage may not be cause for a local area reliability requirement if the violation is considered marginal (e.g. acceptable loss of facility life or low voltage), otherwise, such a violation will necessitate creation of a requirement.
- ⁶ Following the first contingency (N-1), the generation must be sufficient to allow the operators to bring the system back to within acceptable (normal) operating range (voltage and loading) and/or appropriate OTC following the studied outage conditions.
- ⁷ During normal operation or following the first contingency (N-1), the generation must be sufficient to allow the operators to prepare for the next worst N-1 or common mode N-2 without pre-contingency interruptible or firm load shedding. SPS/RAS/Safety Nets may be utilized to satisfy the criteria after the second N-1

or common mode N-2 except if the problem is of a thermal nature such that short-term ratings could be utilized to provide the operators time to shed either interruptible or firm load. T-2s (two transformer bank outages) would be excluded from the criteria.

2. Post Transient Load Flow Assessment:

Contingencies
Selected¹

Reactive Margin Criteria²
Applicable Rating

- ¹ If power flow results indicate significant low voltages for a given power flow contingency, simulate that outage using the post transient load flow program. The post-transient assessment will develop appropriate Q/V and/or P/V curves.
- ² Applicable Rating – positive margin based on the higher of imports or load increase by 5% for N-1 contingencies, and 2.5% for N-2 contingencies.

3. Stability Assessment:

Contingencies
Selected¹

Stability Criteria²
Applicable Rating

- ¹ Base on historical information, engineering judgment and/or if power flow or post transient study results indicate significant low voltages or marginal reactive margin for a given contingency.
- ² Applicable Rating – ISO Grid Planning Criteria or facility owner criteria as appropriate.

B. Load Forecast

1. System Forecast

The load forecast at the system as well as PTO levels originates from California Energy Commission (CEC). This most recent CEC forecast is then distributed across the entire system, down to the local area, division and substation level. PTO’s use an econometric equation to forecast the system load. The predominant parameters affecting the system load are (1) number of households, (2) economic activity (gross metropolitan products, GMP), (3) temperature and (4) increased energy efficiency and distributed generation programs.

2. Base Case Load Development Method

The method used to develop the base case loads is a melding process that extracts, adjusts and modifies the information from the system, distribution and muni forecasts. The melding process consists of two parts. Part 1 deals with the PTO load. Part 2 deals with the muni load. There may be small differences between the methodologies used by each PTO to disaggregate the CEC load forecast to their level of local area as well as bar-bus model; please refer to each PTO expansion plan for additional details.

a. PTO Loads in Base Case

The methods used to determine the PTO loads are for the most part similar. One part of the method deals with the determination of the division loads that would meet the requirements of 1-in-5 or 1-in-10 system or area base cases and the other part deals with the allocation of the division load to the transmission buses.

i. Determination of division loads

The annual division load is determined by summing the previous year division load and the current division load growth. Thus the key steps are the determination of the initial year division load and the annual load growth. The initial year for the base case development method is based heavily on recorded data. The division load growth in the system base case is determined in two steps. First, the total PTO load growth for the year is determined, as the product of the PTO load and the load growth rate from the system load forecast. Then this total PTO load growth is allocated to the division, based on the relative magnitude of the load growths projected for the divisions by the distribution planners. For example the 1-in-10 area base case, the division load growth determined for the system base case is adjusted to the 1-in-10 temperature using the load temperature relation determined from the latest peak load and temperature data of the division.

ii. Allocation of division load to transmission bus level

Since the base case loads are modeled at the various transmission buses, the division loads developed would need to be allocated to those buses. The allocation

process is different depending on the load types. For the most part each PTO's classifies its loads into four types: conforming, non-conforming, self-generation and generation-plant loads. Since the non-conforming and self-generation loads are assumed to not vary with temperature, their magnitude would be the same in the system or area base cases of the same year. The remaining load (the total division load developed above, less the quantity of non-conforming and self-generation load) is the conforming load. The remaining load would be allocated to the transmission buses based on the relative magnitude of the distribution forecast. The summation of all base case loads usually is higher than the load forecast because some load like self-generation and generation-plant are load behind the meter and they need to be modeled in the base cases, however for the most part metered or aggregated data with telemetry is used to come up with the load forecast.

b. Municipal Loads in Base Case

The muni forecasts provided to the PTOs for the purposes of their base cases were used for this study.

C. Power Flow Program Used in the LCR analysis

The LCR technical studies were conducted using General Electric's Power System Load Flow (GE PSLF) program version 15.2 or higher. This E PSLF program is available directly from GE or through the Western System Electricity Council (WECC) to any member.

To complete the local area component of this study, the starting base case was adjusted to reflect the latest generation and transmission projects as well as the one-in-ten-year peak load forecast for each local area as provided to the ISO by the Participating Transmission Owners ("PTOs").

Electronic contingency files provided by the PTOs were utilized to perform the numerous contingencies required to identify the LCR needs. These contingency files include remedial action and special protection schemes that are expected to be in operation during the year of study. An CAISO created EPCL (a GE programming language contained within the GE PSLF package) routine was used to run the

combination of contingencies; however, other routines are available from WECC with the GE PSFL package or can be developed by third parties to identify the most limiting combination of contingencies requiring the highest amount of generation within the local area to maintain power flows within applicable ratings.

IV. Locational Capacity Requirement Study Results

A. Summary of Study Results

The LCR results reflect two sets of generation. The first set is comprised of generation that would normally be expected to be on-line such as Municipal generation and Regulatory Must-take generation (State, Federal, QFs and nuclear units). The second set is “market” generation. Within this overview, LCR is defined as the amount of generating capacity that is required within a Local Capacity Area to reliably serve the load located within this area. The results of the CAISO’s analysis are summarized in the Executive Summary Tables.

Table 2: 2008 Local Capacity Requirements vs. Peak Load and Local Area Generation

	2008 Total LCR (MW)	Peak Load (1 in10) (MW)	2008 LCR as % of Peak Load	Total Dependable Local Area Generation (MW)	2008 LCR as % of Total Area Generation
Humboldt	175	199	88%	180	97%
North Coast/North Bay	676	1495	45%	883	77%
Sierra	2092	2091	100%	1780	118%**
Stockton	786	1333	59%	536	147%**
Greater Bay	4688	9870	47%	6214	75%
Greater Fresno	2382	3260	73%	2991	80%**
Kern	486	1324	37%	646	75%**
LA Basin	10130	19648	52%	12093	84%
Big Creek/Ventura	3658	4911	74%	5396	68%
San Diego	3033	4992	61%	2919	104%**
Total	28106	49123*	57%*	33638	84%

Table 3: 2010 Local Capacity Requirements vs. Peak Load and Local Area Generation

	2010 Total LCR (MW)	Peak Load (1 in10) (MW)	2010 LCR as % of Peak Load	Total Dependable Local Area Generation (MW)	2010 LCR as % of Total Area Generation
Humboldt	156	206	76%	211	74%**
North Coast/North Bay	826	1544	53%	938	88%
Sierra	1902	2107	90%	1780	107%**
Stockton	777	1406	55%	536	145%**
Greater Bay	5225	10070	52%	7081	74%
Greater Fresno	2351	3312	71%	3764	62%
Kern	439	1315	33%	646	68%**
LA Basin	7000	20476	34%	13135	53%
Big Creek/Ventura	2322	5766	40%	5443	43%
San Diego	2266	5132	44%	2963	76%**
Total	23264	51334*	45%*	36497	64%

Table 4: 2012 Local Capacity Requirements vs. Peak Load and Local Area Generation

	2012 Total LCR (MW)	Peak Load (1 in10) (MW)	2012 LCR as % of Peak Load	Total Dependable Local Area Generation (MW)	2012 LCR as % of Total Area Generation
Humboldt	160	210	76%	211	76%**
North Coast/North Bay	856	1618	53%	938	91%
Sierra	2161	2212	98%	1780	121%**
Stockton	880	1457	60%	536	164%**
Greater Bay	5452	10306	53%	7081	77%
Greater Fresno	2244	3391	66%	3764	60%**
Kern	499	1333	37%	646	77%**
LA Basin	7000	20938	33%	13135	53%
Big Creek/Ventura	2656	6045	44%	5443	49%
San Diego	2444	5268	46%	2963	82%**
Total	24352	52778*	46%*	36497	67%

* Value shown only illustrative, since each local area peaks at a different time.

** Generation deficient LCA (or with sub-area that are deficient) – deficiency included in LCR. Generator deficient area implies that in order to comply with the criteria, at summer peak, load must be shed immediately after the first contingency.

Tables 2, 3 and 4 shows how much of the local area load is dependent on local generation and how much local generation needs to be available in order to reliably (see LCR criteria) serve the load in those Local Capacity Areas. These tables also indicates where new transmission projects, new generation additions or demand side management programs would be most useful in order to reduce the dependency on existing (mostly old and inefficient) local area generation.

B. Summary of Results by Local Area

Each local area's overall requirement is determined by also achieving each sub-area requirement. Because these areas are a part of the interconnected electric system, the total for each local area is not simply a summation of the sub-area requirements. For example, some sub-areas may overlap and therefore the same units have been counted toward both sub-area requirements. Of course some sub-areas requirements are directly counted toward the total requirements of a bigger local area or the overall area.

1. Humboldt Area

Area Definition

The transmission tie lines into the area include:

- 1) Bridgeville-Cottonwood 115 kV line #1
- 2) Humboldt-Trinity 115 kV line #1
- 3) Willits-Garberville 60 kV line #1
- 4) Trinity-Maple Creek 60 kV line #1

The substations that delineate the Humboldt Area are:

- 1) Bridgeville is in Cottonwood and Low Gap are out
- 2) Humboldt is in Trinity is out
- 3) Willits and Kekawaka are out Garberville is in

4) Trinity and Ridge Cabin are out Maple Creek is in

Total 2010 busload within the defined area: 199 MW with 7 MW of losses resulting in total load + losses of 206 MW. Total 2012 busload within the defined area: 203 MW with 7 MW of losses resulting in total load + losses of 210 MW.

Total units and qualifying capacity available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	NQC Comments	CAISO Tag
FAIRHV_6_UNIT	31150	FAIRHAVN	13.8	12.58	1		QF/Selfgen
HUMBPP_1_MOBLE2	31154	HUMBOLDT	13.2	15.00	2	Not modeled	Market
HUMBPP_1_MOBLE3	31154	HUMBOLDT	13.2	15.00	1	Not modeled	Market
HUMBPP_7_UNIT 1	31170	HMBOLDT1	13.8	52.00	1	Not modeled	Market
HUMBPP_7_UNIT 2	31172	HMBOLDT2	13.8	53.00	1	Not modeled	Market
KEKAWK_6_UNIT	31166	KEKAWAK	9.1	0.00	1		QF/Selfgen
LAPAC_6_UNIT	31158	LP SAMOA	12.5	12.00	1	No NQC - historical data	QF/Selfgen
PACLUM_6_UNIT	31152	PAC.LUMB	13.8	10.33	1		QF/Selfgen
PACLUM_6_UNIT	31152	PAC.LUMB	13.8	10.33	2		QF/Selfgen
ULTPBL_6_UNIT 1	31156	ULTRAPWR	12.5	0.00	1	No NQC - historical data	Market
NA	31180	HUMB_G1	13.8	16.6	1	No NQC - Pmax	Market
NA	31180	HUMB_G1	13.8	16.6	2	No NQC - Pmax	Market
NA	31180	HUMB_G1	13.8	16.6	3	No NQC - Pmax	Market
NA	31180	HUMB_G1	13.8	16.6	4	No NQC - Pmax	Market
NA	31181	HUMB_G2	13.8	16.6	5	No NQC - Pmax	Market
NA	31181	HUMB_G2	13.8	16.6	6	No NQC - Pmax	Market
NA	31181	HUMB_G2	13.8	16.6	7	No NQC - Pmax	Market
NA	31182	HUMB_G3	13.8	16.6	8	No NQC - Pmax	Market
NA	31182	HUMB_G3	13.8	16.6	9	No NQC - Pmax	Market
NA	31182	HUMB_G3	13.8	16.6	10	No NQC - Pmax	Market

Major new projects modeled:

1. Humboldt Reactive Support
2. Humboldt Bay Repower

Critical Contingency Analysis Summary

Humboldt overall:

The most critical contingency for the Humboldt area is the outage of the Humboldt 115/60 kV transformer #1 or #2 overlapping with an outage of one of the new 60 kV Humboldt Bay CTs. The local area limitation is potential overload on the remaining Humboldt 115/60 kV transformer #1 or #2. This contingency establishes a local capacity need of 156 MW in 2010 and 160 MW in 2012 (includes 45 MW of QF/Selfgen

generation) as the minimum capacity necessary for reliable load serving capability within this area.

The single most critical contingency for the Humboldt area is the outage of the Humboldt 115/60 kV transformer #1 or #2. The local area limitation is potential overload on the remaining Humboldt 115/60 kV transformer #1 or #2. This contingency establishes a local capacity need of 151 MW in 2010 and 155 MW (includes 45 MW of QF/Selfgen generation) in 2012.

Effectiveness factors:

All units (in Humboldt’s 60 kV system only) within this area are needed therefore no effectiveness factor is needed.

Humboldt Overall Requirements:

	QF/Selfgen (MW)	Muni (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	45	0	166	211

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ⁴	145	6	151
Category C (Multiple) ⁵	145	11	156

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ⁴	145	10	155
Category C (Multiple) ⁵	145	15	160

2. North Coast / North Bay Area

Area Definition

The North Coast/North Bay Area is composed of three sub-areas and the generation requirements within them.

⁴ A single contingency means that the system will be able to 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 MORC.

⁵ Multiple contingencies means that the system will be able to 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 MORC.

The transmission tie facilities coming into the North Coast/North Bay area are:

- 1) Cortina-Mendocino 115 kV Line
- 2) Cortina-Eagle Rock 115 kV Line
- 3) Willits-Garberville 60 kV line #1
- 4) Vaca Dixon-Lakeville 230 kV line #1
- 5) Tulucay-Vaca Dixon 230 kV line #1
- 6) Lakeville-Sobrante 230 kV line #1
- 7) Ignacio-Sobrante 230 kV line #1

The substations that delineate the North Coast/North Bay area are:

- 1) Cortina is out Mendocino and Indian Valley are in
- 2) Cortina is out Eagle Rock , Highlands and Homestake are in
- 3) Willits and Kekawaka are in Garberville is out
- 4) Vaca Dixon is out Lakeville is in
- 5) Tulucay is in Vaca Dixon is out
- 6) Lakeville is in Sobrante is out
- 7) Ignacio is in Sobrante and Crocket are out

Total 2010 busload within the defined area: 1475 MW with 69 MW of losses resulting in total load + losses of 1544 MW. Total 2012 busload within the defined area: 1542 MW with 76 MW of losses resulting in total load + losses of 1618 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
ADLIN_1_UNIT 1	31435	GEO.ENGY	9.1	6.80	1	Eagle Rock, Eagle Rock-Fulton, Lakeville		QF/Selfgen
ADLIN_1_UNIT 2	31435	GEO.ENGY	9.1	7.01	2	Eagle Rock, Eagle Rock-Fulton, Lakeville		QF/Selfgen
GEYS11_7_UNIT11	31412	GEYSER11	13.8	60.00	1	Eagle Rock, Eagle Rock-Fulton, Lakeville		Market
GYS5X6_7_UNITS	31406	GEYSR5-6	13.8	36.00	1	Eagle Rock, Eagle Rock-Fulton, Lakeville		Market
GYS5X6_7_UNITS	31406	GEYSR5-6	13.8	36.00	2	Eagle Rock, Eagle Rock-Fulton, Lakeville		Market
GYS7X8_7_UNITS	31408	GEYSER78	13.8	31.00	1	Eagle Rock, Eagle Rock-Fulton, Lakeville		Market
GYS7X8_7_UNITS	31408	GEYSER78	13.8	31.00	2	Eagle Rock, Eagle Rock-Fulton,		Market

					Lakeville		
INDVLY_1_UNITS	31436	INDIAN V	9.1	1.79	1	Eagle Rock, Eagle Rock-Fulton, Lakeville	QF/Selfgen
POTTER_6_UNITS	31433	POTTRVLY	2.4	4.70	1	Eagle Rock, Eagle Rock-Fulton, Lakeville	Market
POTTER_6_UNITS	31433	POTTRVLY	2.4	2.25	3	Eagle Rock, Eagle Rock-Fulton, Lakeville	Market
POTTER_6_UNITS	31433	POTTRVLY	2.4	2.25	4	Eagle Rock, Eagle Rock-Fulton, Lakeville	Market
BEARCN_2_UNIT 1	31402	BEAR CAN	13.8	7.41	1	Fulton, Eagle Rock-Fulton, Lakeville	QF/Selfgen
BEARCN_2_UNIT 2	31402	BEAR CAN	13.8	7.37	2	Fulton, Eagle Rock-Fulton, Lakeville	QF/Selfgen
GEYS12_7_UNIT12	31414	GEYSER12	13.8	41.00	1	Fulton, Eagle Rock-Fulton, Lakeville	Market
GEYS14_7_UNIT14	31418	GEYSER14	13.8	63.00	1	Fulton, Eagle Rock-Fulton, Lakeville	Market
GEYS16_7_UNIT16	31420	GEYSER16	13.8	75.00	1	Fulton, Eagle Rock-Fulton, Lakeville	Market
GEYS17_7_UNIT17	31422	GEYSER17	13.8	51.00	1	Fulton, Eagle Rock-Fulton, Lakeville	Market
MONTPH_7_UNITS	32700	MONTICLO	9.1	2.50	1	Fulton, Eagle Rock-Fulton, Lakeville	Monthly NQC - used August for LCR QF/Selfgen
MONTPH_7_UNITS	32700	MONTICLO	9.1	2.50	2	Fulton, Eagle Rock-Fulton, Lakeville	Monthly NQC - used August for LCR QF/Selfgen
MONTPH_7_UNITS	32700	MONTICLO	9.1	0.59	3	Fulton, Eagle Rock-Fulton, Lakeville	Monthly NQC - used August for LCR QF/Selfgen
NCPA_7_GP2UN3	38110	NCPA2GY1	13.8	31.00	1	Fulton, Eagle Rock-Fulton, Lakeville	MUNI
NCPA_7_GP2UN4	38112	NCPA2GY2	13.8	30.00	1	Fulton, Eagle Rock-Fulton, Lakeville	MUNI
SNMALF_6_UNITS	31446	SONMA LF	9.1	7.70	1	Fulton, Eagle Rock-Fulton, Lakeville	QF/Selfgen
WDFRDF_2_UNITS	31404	WEST FOR	13.8	12.07	1	Fulton, Eagle Rock-Fulton, Lakeville	QF/Selfgen
WDFRDF_2_UNITS	31404	WEST FOR	13.8	12.07	2	Fulton, Eagle Rock-Fulton, Lakeville	QF/Selfgen
NA	31421	BOTTLERK	13.8	55.00	1	Fulton, Eagle Rock-Fulton, Lakeville	No NQC - Pmax Market
GEYS13_7_UNIT13	31416	GEYSER13	13.8	70.00	1	Lakeville	Market
GEYS18_7_UNIT18	31424	GEYSER18	13.8	40.00	1	Lakeville	Market
GEYS20_7_UNIT20	31426	GEYSER20	13.8	40.00	1	Lakeville	Market
NCPA_7_GP1UN1	38106	NCPA1GY1	13.8	34.25	1	Lakeville	MUNI
NCPA_7_GP1UN2	38108	NCPA1GY2	13.8	32.25	1	Lakeville	MUNI
SANTFG_7_UNITS	31400	SANTA FE	13.8	33.21	1	Lakeville	QF/Selfgen
SANTFG_7_UNITS	31400	SANTA FE	13.8	33.20	2	Lakeville	QF/Selfgen
SMUDGO_7_UNIT 1	31430	SMUDGEO1	13.8	38.00	1	Lakeville	Market

Major new projects modeled:

None.

Critical Contingency Analysis Summary

Eagle Rock Sub-area

The most critical overlapping contingency is the outage of the Eagle Rock-Silverado-Fulton 115 kV line and the Cortina #4 230/115kV bank. The sub-area area limitation is thermal overloading of Fulton-Hopland 60kV. This limiting contingency establishes a local capacity need of 229 MW in 2010 and 241 MW in 2012 (includes 16 MW of QF generation) as the minimum capacity necessary for reliable load serving capability within this sub-area.

The single most critical overlapping contingency is the outage of Cortina #4 230/115kV bank. The sub-area area limitation is thermal overloading of Fulton-Hopland 60kV. This limiting contingency establishes a local capacity need of 112 MW in 2010 and 149 MW in 2012 (includes 16 MW of QF generation) as the minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

The units within the Eagle-Rock pocket have the same effectiveness to the above-mentioned constraint. Units outside this area are not effective.

Fulton Sub-area

The most critical overlapping contingency is the outage of the Fulton-Ignacio 230 kV line #1 and the Fulton-Lakeville 230 kV line #1. The sub-area area limitation is thermal overloading of Sonoma-Pueblo 115 kV line #1. This limiting contingency establishes a local capacity need of 400 MW in 2010 and 435 MW in 2012 (includes 68 MW of QF generation) as the minimum capacity necessary for reliable load serving capability within this sub-area. All of the units required to meet the Eagle Rock pocket count towards the Fulton total requirement.

Effectiveness factors:

The following table has units within the Fulton pocket as well as units outside the pocket that are at least 5% effective to the above-mentioned constraint.

Gen Bus	Gen Name	Gen ID	Eff Fctr (%)
38112	NCPA2GY2	1	25
38110	NCPA2GY1	1	25
31422	GEYSER17	1	25
31421	BOTTLERK	1	25
31420	GEYSER16	1	25
31418	GEYSER14	1	25
31414	GEYSER12	1	25
31404	WEST FOR	2	25
31404	WEST FOR	1	25
31402	BEAR CAN	1	25
31402	BEAR CAN	2	25
31435	GEO.ENGY	1	15
31435	GEO.ENGY	2	15
31412	GEYSER11	1	15
31408	GEYSER78	1	15
31408	GEYSER78	2	15
31406	GEYSR5-6	1	15
31406	GEYSR5-6	2	15

Lakeville Sub-area

The most limiting contingency is the outage of Vaca Dixon-Tulucay 230 kV line followed by Crockett-Sobrante 230 kV line or vice versa. The sub-area limitation is thermal overloading of the Vaca Dixon-Lakeville 230 kV. This limiting contingency establishes a local capacity need of 826 MW in 2010 and 856 MW (includes 134 MW of QF generation) in 2012 as the minimum capacity necessary for reliable load serving capability within this area. The local capacity need for Eagle Rock and Fulton sub-area can be counted toward fulfilling the need of Lakeville sub-area.

The single most limiting contingency is the outage of Vaca Dixon-Tulucay 230 kV line with DEC power plant out of service. The sub-area limitation is thermal overloading of the Vaca Dixon-Lakeville 230 kV. This limiting contingency establishes a local capacity need of 811 MW in 2010 and 851 MW (includes 134 MW of QF generation) in 2012. The local capacity need for Eagle Rock and Fulton sub-area can be counted toward fulfilling the need of Lakeville sub-area.

Effectiveness factors:

The following table has units at least 5% effective to the above-mentioned constraint.

Gen Bus	Gen Name	Gen ID	Eff Fctr (%)
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31400	SANTA FE	2	37
31430	SMUDGE01	1	37
31400	SANTA FE	1	37
31416	GEYSER13	1	37
31424	GEYSER18	1	37
31426	GEYSER20	1	37
38106	NCPA1GY1	1	37
38108	NCPA1GY2	1	37
31421	BOTTLERK	1	35
31404	WEST FOR	2	35
31402	BEAR CAN	1	35
31402	BEAR CAN	2	35
31404	WEST FOR	1	35
31414	GEYSER12	1	35
31418	GEYSER14	1	35
31420	GEYSER16	1	35
31422	GEYSER17	1	35
38110	NCPA2GY1	1	35
38112	NCPA2GY2	1	35
31406	GEYSR5-6	1	19
31406	GEYSR5-6	2	19
31408	GEYSER78	1	19
31408	GEYSER78	2	19
31412	GEYSER11	1	19
31435	GEO.ENGY	1	19
31435	GEO.ENGY	2	19

North Coast/North Bay Overall Requirements:

	QF/Selfgen (MW)	Muni (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	134	128	676	938

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ⁶	811	0	811
Category C (Multiple) ⁷	826	0	826

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ⁶	851	0	851
Category C (Multiple) ⁷	856	0	856

⁶ A single contingency means that the system will be able to 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 MORC.

⁷ Multiple contingencies means that the system will be able to 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 MORC.

3. Sierra Area

Area Definition

The transmission tie lines into the Sierra Area are:

- 1) Table Mountain-Rio Oso 230 kV line
- 2) Table Mountain-Palermo 230 kV line
- 3) Table Mt-Pease 60 kV line
- 4) Caribou-Palermo 115 kV line
- 5) Drum-Summit 115 kV line #1
- 6) Drum-Summit 115 kV line #2
- 7) Spaulding-Summit 60 kV line
- 8) Brighton-Bellota 230 kV line
- 9) Rio Oso-Lockeford 230 kV line
- 10) Gold Hill-Eight Mile Road 230 kV line
- 11) Gold Hill-Lodi Stig 230 kV line
- 12) Gold Hill-Lake 230 kV line

The substations that delineate the Sierra Area are:

- 1) Table Mountain is out Rio Oso is in
- 2) Table Mountain is out Palermo is in
- 3) Table Mt is out Pease is in
- 4) Caribou is out Palermo is in
- 5) Drum is in Summit is out
- 6) Drum is in Summit is out
- 7) Spaulding is in Summit is out
- 8) Brighton is in Bellota is out
- 9) Rio Oso is in Lockeford is out
- 10) Gold Hill is in Eight Mile is out
- 11) Gold Hill is in Lodi Stig is out
- 12) Gold Hill is in Lake is out

Total 2010 busload within the defined area: 1997 MW with 110 MW of losses resulting in total load + losses of 2107 MW. Total 2012 busload within the defined area: 2092 MW with 120 MW of losses resulting in total load + losses of 2212 MW.

Total units and qualifying capacity available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNI T ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
BOGUE_1_UNITA1	32451	FREC	13.8	45.00	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		Market
GRNLF1_1_UNITS	32490	GRNLEAF1	13.8	7.54	1	Drum-Rio Oso, South of Palermo, South of Table		QF/Self gen

GRNLF1_1_UNITS	32490	GRNLEAF1	13.8	38.52	2	Mountain Drum-Rio Oso, South of Palermo, South of Table Mountain		QF/Self gen
CAMPFW_7_FARWS T	32470	CMP.FARW	9.1	6.50	1	South of Table Mountain	No NQC - historical data	MUNI
NAROW2_2_UNIT	32468	NARROWS2	9.1	34.88	1	South of Table Mountain	Monthly NQC - used August for LCR	MUNI
BIOMAS_1_UNIT 1	32156	WOODLAND	9.1	18.53	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		QF/Self gen
BOWMN_6_UNIT	32480	BOWMAN	9.1	1.15	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		MUNI
DEERCR_6_UNIT 1	32474	DEER CRK	9.1	5.70	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		Market
DRUM_7_PL1X2	32504	DRUM 1-2	6.6	13.00	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		Market
DRUM_7_PL1X2	32504	DRUM 1-2	6.6	13.00	2	Drum-Rio Oso, South of Palermo, South of Table Mountain		Market
DRUM_7_PL3X4	32506	DRUM 3-4	6.6	14.00	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		Market
DRUM_7_PL3X4	32506	DRUM 3-4	6.6	14.00	2	Drum-Rio Oso, South of Palermo, South of Table Mountain		Market
DRUM_7_UNIT 5	32454	DRUM 5	13.8	49.50	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		Market
DUTCH1_7_UNIT 1	32464	DTCHFLT1	11	22.00	1	Drum-Rio Oso, South of Rio Oso, South of Palermo, South of Table Mountain		Market
DUTCH2_7_UNIT 1	32502	DTCHFLT2	6.9	26.00	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		MUNI
HAYPRS_6_QFUNTS	32488	HAYPRES+	9.1	0.68	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		QF/Self gen
HAYPRS_6_QFUNTS	32488	HAYPRES+	9.1	0.68	2	Drum-Rio Oso, South of Palermo, South of Table Mountain		QF/Self gen
NA	32162	RIV.DLTA	9.11	3.10	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		QF/Self gen
OXBOW_6_DRUM	32484	OXBOW F	9.1	6.00	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		MUNI
ROLLIN_6_UNIT	32476	ROLLINSF	9.1	11.70	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		MUNI
SPAULD_6_UNIT 3	32472	SPAULDG	9.1	5.80	3	Drum-Rio Oso, South of Palermo, South of Table Mountain		Market
SPAULD_6_UNIT12	32472	SPAULDG	9.1	4.78	1	Drum-Rio Oso, South of Palermo, South of Table Mountain	Monthly NQC - used August for LCR	Market

SPAULD_6_UNIT12	32472	SPAULDG	9.1	4.78	2	Drum-Rio Oso, South of Palermo, South of Table Mountain	Monthly NQC - used August for LCR	Market
UCDAVS_1_UNIT	32166	UC DAVIS	9.1	3.50	1	Drum-Rio Oso, South of Palermo, South of Table Mountain	No NQC - historical data	QF/Self gen
FORBST_7_UNIT 1	31814	FORBSTWN	11.5	39.00	1	Drum-Rio Oso, South of Table Mountain		MUNI
NA	31862	DEADWOOD	9.1	2.00	1	Drum-Rio Oso, South of Table Mountain	No NQC - historical data	MUNI
SLYCRK_1_UNIT 1	31832	SLY.CR.	9.1	13.00	1	Drum-Rio Oso, South of Table Mountain		MUNI
WDLEAF_7_UNIT 1	31794	WOODLEAF	13.8	55.00	1	Drum-Rio Oso, South of Table Mountain		MUNI
GRNLF1_1_UNIT 1	32496	YCEC	13.8	46.00	1	Pease, Drum-Rio Oso, South of Table Mountain		Market
GRNLF2_1_UNIT	32492	GRNLEAF2	13.8	45.79	1	Pease, Drum-Rio Oso, South of Table Mountain		QF/Self gen
YUBACT_1_SUNSW T	32494	YUBA CTY	9.1	49.50	1	Pease, Drum-Rio Oso, South of Table Mountain		QF/Self gen
HALSEY_6_UNIT	32478	HALSEY F	9.1	11.00	1	Placer, Drum-Rio Oso, South of Rio Oso, South of Palermo, South of Table Mountain		Market
WISE_1_UNIT 1	32512	WISE	12	9.20	1	Placer, Drum-Rio Oso, South of Rio Oso, South of Palermo, South of Table Mountain	Monthly NQC - used August for LCR	Market
WISE_1_UNIT 2	32512	WISE	12	2.79	1	Placer, Drum-Rio Oso, South of Rio Oso, South of Palermo, South of Table Mountain	Monthly NQC - used August for LCR	Market
NWCSTL_7_UNIT 1	32460	NEWCASTLE	13.2	1.30	1	Placer, Drum-Rio Oso, South of Rio Oso, South of Palermo, South of Table Mountain	Monthly NQC - used August for LCR	Market
ELDORO_7_UNIT 1	32513	ELDRADO1	21.6	11.00	1	Placer, Drum-Rio Oso, South of Rio Oso, South of Palermo, South of Table Mountain		Market
ELDORO_7_UNIT 2	32514	ELDRADO2	21.6	11.00	1	Placer, Drum-Rio Oso, South of Rio Oso, South of Palermo, South of Table Mountain		Market
PLACVL_1_CHILIB	32510	CHILIBAR	4.2	7.00	1	Placerville, South of Rio Oso, South of Table Mountain		Market
BELDEN_7_UNIT 1	31784	BELDEN	13.8	115.00	1	South of Palermo, South of Table Mountain		Market
BUCKCK_7_PL1X2	31820	BCKS CRK	11	29.00	1	South of Palermo, South of Table Mountain		Market
BUCKCK_7_PL1X2	31820	BCKS CRK	11	29.00	2	South of Palermo, South of Table Mountain		Market
CRESTA_7_PL1X2	31812	CRESTA	11.5	35.00	1	South of Palermo, South of Table Mountain		Market
CRESTA_7_PL1X2	31812	CRESTA	11.5	35.00	2	South of Palermo, South of Table Mountain		Market
POEPH_7_UNIT 1	31790	POE 1	13.8	60.00	1	South of Palermo, South of Table Mountain		Market
POEPH_7_UNIT 2	31792	POE 2	13.8	60.00	1	South of Palermo, South of Table Mountain		Market

RCKCRK_7_UNIT 1	31786	ROCK CK1	13.8	56.00	1	South of Palermo, South of Table Mountain		Market
RCKCRK_7_UNIT 2	31788	ROCK CK2	13.8	56.00	1	South of Palermo, South of Table Mountain		Market
CHICPK_7_UNIT 1	32462	CHI.PARK	11.5	38.00	1	Drum-Rio Oso, South of Palermo, South of Table Mountain		MUNI
FMEADO_7_UNIT	32508	FRNCH MD	4.2	16.01	1	South of Rio Oso, South of Palermo, South of Table Mountain	Monthly NQC - used August for LCR	MUNI
HELLHL_6_UNIT	32486	HELLHOLE	9.1	0.50	1	South of Rio Oso, South of Palermo, South of Table Mountain	No NQC - historical data	MUNI
MIDFRK_7_UNIT 1	32456	MIDLFORK	13.8	63.40	1	South of Rio Oso, South of Palermo, South of Table Mountain	No NQC - historical data	MUNI
MIDFRK_7_UNIT 2	32456	MIDLFORK	13.8	63.40	2	South of Rio Oso, South of Palermo, South of Table Mountain	No NQC - historical data	MUNI
RALSTN_7_UNIT 1	32458	RALSTON	13.8	86.00	1	South of Rio Oso, South of Palermo, South of Table Mountain	No NQC - historical data	MUNI
SPI LI_2_UNIT 1	32498	SPILINCF	12.5	4.19	1	Drum-Rio Oso, South of Palermo, South of Rio Oso, South of Table Mountain		QF/Self gen
ULTRCK_2_UNIT	32500	ULTR RCK	9.1	19.64	1	Drum-Rio Oso, South of Palermo, South of Rio Oso, South of Table Mountain		QF/Self gen
COLGAT_7_UNIT 1	32450	COLGATE1	13.8	165.80	1	South of Table Mountain		MUNI
COLGAT_7_UNIT 2	32452	COLGATE2	13.8	161.68	1	South of Table Mountain	Monthly NQC - used August for LCR	MUNI
KELYRG_6_UNIT	31834	KELLYRDG	9.1	10.00	1	Drum-Rio Oso, South of Table Mountain		MUNI
NAROW1_2_UNIT	32466	NARROWS1	9.1	0.01	1	South of Table Mountain	Monthly NQC - used August for LCR	Market
OROVIL_6_UNIT	31888	OROVILLE	9.1	6.08	1	Drum-Rio Oso, South of Table Mountain		QF/Self gen
PACORO_6_UNIT	31890	PO POWER	9.1	8.20	1	Drum-Rio Oso, South of Table Mountain		QF/Self gen
PACORO_6_UNIT	31890	PO POWER	9.1	8.20	2	Drum-Rio Oso, South of Table Mountain		QF/Self gen

Major new projects modeled:

1. Table Mountain-Rio Oso Reconductor and Tower Upgrade
2. Palermo-Rio Oso 115 kV Reconductoring
3. Atlantic-Lincoln Transmission

Critical Contingency Analysis Summary

South of Table Mountain Sub-area

The most critical contingency is the loss of the Table Mountain-Rio Oso 230 kV and Table Mountain-Palermo double circuit tower line outage. The area limitation is thermal overloading of the Caribou-Palermo 115 kV line. This limiting contingency establishes a local capacity need of 1640 MW (includes 214 MW of QF and 800 MW of Muni generation) in 2010 and 1739 MW (includes 214 MW of QF and 800 MW of Muni generation) in 2012 as the minimum capacity necessary for reliable load serving capability within this area.

The most critical single contingency is the loss of the Table Mountain-Rio Oso 230 kV line with one of the Colgate Units out of service. The area limitation is thermal overloading of the Table Mt-Palermo 230 kV line. This limiting contingency establishes a local capacity need of 1190 MW (includes 214 MW of QF and 800 MW of Muni generation) in 2010 and 1423 MW (includes 214 MW of QF and 800 MW of Muni generation) in 2012.

Effectiveness factors:

The following table has all units in Sierra area and their effectiveness factor to the above-mentioned constraint.

Gen Bus	Gen Name	Gen ID	Eff Fctr. (%)
31814	FORBSTWN	1	8
31794	WOODLEAF	1	8
31832	SLY.CR.	1	7
31862	DEADWOOD	1	7
31888	OROVILLE	1	6
31890	PO POWER	2	6
31890	PO POWER	1	6
31834	KELLYRDG	1	6
32452	COLGATE2	1	5
32450	COLGATE1	1	5
32466	NARROWS1	1	5
32468	NARROWS2	1	5
32470	CMP.FARW	1	5
32451	FREC	1	5
32490	GRNLEAF1	2	4
32490	GRNLEAF1	1	4
32496	YCEC	1	3
32494	YUBA CTY	1	3
32492	GRNLEAF2	1	3
32156	WOODLAND	1	3

31820	BCKS CRK	1	2
31820	BCKS CRK	2	2
31788	ROCK CK2	1	2
31812	CRESTA	1	2
31812	CRESTA	2	2
31792	POE 2	1	2
31790	POE 1	1	2
31786	ROCK CK1	1	2
31784	BELDEN	1	2
32166	UC DAVIS	1	2
32500	ULTR RCK	1	2
32498	SPILINCF	1	2
32162	RIV.DLTA	1	2
32510	CHILIBAR	1	2
32514	ELDRADO2	1	2
32513	ELDRADO1	1	2
32478	HALSEY F	1	2
32458	RALSTON	1	2
32456	MIDLFORK	1	2
32456	MIDLFORK	2	2
32460	NEWCSTLE	1	2
32512	WISE	1	2
32486	HELLHOLE	1	2
32508	FRNCH MD	1	2
32502	DTCHFLT2	1	2
32462	CHI.PARK	1	2
32464	DTCHFLT1	1	1
32454	DRUM 5	1	1
32476	ROLLINSF	1	1
32484	OXBOW F	1	1
32474	DEER CRK	1	1
32506	DRUM 3-4	1	1
32506	DRUM 3-4	2	1
32504	DRUM 1-2	1	1
32504	DRUM 1-2	2	1
32488	HAYPRES+	1	1
32488	HAYPRES+	2	1
32480	BOWMAN	1	1
32472	SPAULDG	1	1
32472	SPAULDG	2	1
32472	SPAULDG	3	1

Colgate Sub-area

No requirements due to the addition of the Atlantic-Lincoln 115 kV upgrade project.

Pease Sub-area

The most critical contingency is the loss of the Palermo-East Nicolaus 115 kV line with one of the Greenleaf #2 (or Yuba City) units out of service. The area limitation is thermal overloading of the Palermo-Pease 115 kV line. This limiting contingency establishes a local capacity need of 107 MW (includes 96 MW of QF generation) in 2010 and 124 MW in 2012 (includes 96 MW of QF generation) as the minimum capacity necessary for reliable load serving capability within this sub-area. It is assumed that Oliverhurst is normally served from Palermo-Bogue 115 kV line and not from Pease-Rio Oso 115 kV line.

Effectiveness factors:

All units within this area (Greenleaf #2, Yuba City and Yuba City EC) are needed therefore no effectiveness factor is required.

Bogue Sub-area

No requirements due to the addition of the South of Palermo 115 kV reconductoring project.

South of Palermo Sub-area

The most critical contingency is the loss of the Double Circuit Tower Line Table Mountain-Rio Oso and Colgate-Rio Oso 230 kV lines. The area limitation is thermal overloading of the Pease-Rio Oso 115 kV line. This limiting contingency establishes a local capacity need of 1425 MW (includes 475 MW of QF and Muni generation as well as 225 MW of deficiency) in 2010 and 1582 MW (includes 475 MW of QF and Muni generation as well as 382 MW of deficiency) in 2012 as the minimum capacity necessary for reliable load serving capability within this sub-area. It is assumed that Oliverhurst is normally served from Palermo-Bogue 115 kV line and not from Pease-Rio Oso 115 kV line.

Effectiveness factors:

All units within this sub-area are needed therefore no effectiveness factor is required.

Placerville Sub-area

The most critical contingency is the loss of the Gold Hill-Clarksville 115 kV line followed by loss of the Gold Hill-Missouri Flat #2 115 kV line. The area limitation is thermal overloading of the Gold Hill-Missouri Flat #1 115 kV line. This limiting contingency establishes a local capacity need of 143 MW (includes 0 MW of QF and Muni generation as well as 114 MW of deficiency) in 2010 and 154 MW (includes 0 MW of QF and Muni generation as well as 125 MW of deficiency) in 2012 as the minimum capacity necessary for reliable load serving capability within this sub-area.

The single most critical contingency is the loss of the Gold Hill-Clarksville 115 kV line with one of the El Dorado units out of service. The area limitation is thermal overloading of the Gold Hill-Missouri Flat #1 115 kV line. This limiting contingency establishes a local capacity need of 43 MW (includes 0 MW of QF and Muni generation as well as 14 MW of deficiency) in 2010 and 73 MW (includes 0 MW of QF and Muni as well as 44 MW of deficiency) in 2012.

Effectiveness factors:

All units within this sub-area are needed therefore no effectiveness factor is required.

Placer Sub-area

The most critical contingency is the loss of the Drum-Higgins 115 kV line followed by loss of the Gold Hill-Placer #2 115 kV line. The area limitation is thermal overloading of the Gold Hill-Placer #1 115 kV line. This limiting contingency establishes a local capacity need of 138 MW (includes 0 MW of QF and Muni generation as well as 114 MW of deficiency) in 2010 and 151 MW (includes 0 MW of QF and Muni generation as well as 127 MW of deficiency) in 2012 as the minimum capacity necessary for reliable load serving capability within this sub-area.

The single most critical contingency is the loss of the Drum-Higgins 115 kV line with the Halsey unit out of service. The area limitation is thermal overloading of the Gold Hill-Placer #1 115 kV line. This limiting contingency establishes a local capacity need of 34 MW (includes 0 MW of QF and Muni generation as well as 10 MW of deficiency) in 2010

and 51 MW (includes 0 MW of QF and Muni generation as well as 26 MW of deficiency) in 2012.

Effectiveness factors:

All units within this sub-area are needed therefore no effectiveness factor is required.

Drum-Rio Oso Sub-area

No requirements due to the replacement of the Rio Oso #1 and #2 230/115 kV transformers project.

South of Rio Oso Sub-area

The most critical contingency is the loss of the Rio Oso-Gold Hill 230 line followed by loss of the Gold Hill-Ralston 230 kV line or vice versa. The area limitation is thermal overloading of the Rio Oso-Atlantic 230 kV line. This limiting contingency establishes a local capacity need of 528 MW (includes 310 MW of QF and Muni generation as well as 165 MW of deficiency) in 2010 and 582 MW (includes 310 MW of QF and Muni generation as well as 219 MW of deficiency) in 2012 as the minimum capacity necessary for reliable load serving capability within this sub-area.

The single most critical contingency is the loss of the Rio Oso-Gold Hill 230 line with the Ralston unit out of service. The area limitation is thermal overloading of the Rio Oso-Atlantic 230 kV line. This limiting contingency establishes a local capacity need of 386 MW (includes 310 MW of QF and Muni generation as well as 23 MW of deficiency) in 2010 and 440 MW (includes 310 MW of QF and Muni generation as well as 77 MW of deficiency) in 2012.

Effectiveness factors:

All units within this sub-area are needed for the most limiting contingency therefore no effectiveness factor is required.

Sierra Overall Requirements:

	QF (MW)	Muni (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	214	800	766	1780

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ⁸	1190	48	1238
Category C (Multiple) ⁹	1640	262	1902

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ⁸	1423	95	1518
Category C (Multiple) ⁹	1739	422	2161

4. Stockton Area

Area Definition

The transmission facilities that establish the boundary of the Tesla-Bellota Sub-area are:

- 1) Bellota 230/115 kV Transformer #1
- 2) Bellota 230/115 kV Transformer #2
- 3) Tesla-Tracy 115 kV Line
- 4) Tesla-Salado 115 kV Line
- 5) Tesla-Salado-Manteca 115 kV line
- 6) Tesla-Schulte 115 kV Line
- 7) Tesla-Kasson-Manteca 115 kV Line

The substations that delineate the Tesla-Bellota Sub-area are:

- 1) Bellota 230 kV is out Bellota 115 kV is in
- 2) Bellota 230 kV is out Bellota 115 kV is in
- 3) Tesla is out Tracy is in
- 4) Tesla is out Salado is in
- 5) Tesla is out Salado and Manteca are in
- 6) Tesla is out Schulte is in
- 7) Tesla is out Kasson and Manteca are in

The transmission facilities that establish the boundary of the Lockeford Sub-area are:

- 1) Lockeford-Industrial 60 kV line
- 2) Lockeford-Lodi #1 60 kV line
- 3) Lockeford-Lodi #2 60 kV line

⁸ A single contingency means that the system will be able to 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 MORC.

⁹ Multiple contingencies means that the system will be able to 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 MORC.

4) Lockeford-Lodi #3 60 kV line

The substations that delineate the Lockeford Sub-area are:

- 1) Lockeford is out Industrial is in
- 2) Lockeford is out Lodi is in
- 3) Lockeford is out Lodi is in
- 4) Lockeford is out Lodi is in

The transmission facilities that establish the boundary of the Stagg Sub-area are:

- 1) Tesla – Stagg 230 kV Line
- 2) Tesla – Eight Mile Road 230 kV Line
- 3) Gold Hill – Eight Mile Road 230 kV Line
- 4) Gold Hill - Lodi Stigg 230 kV Line

The substations that delineate the Stagg Sub-area is:

- 1) Tesla is out Stagg is in
- 2) Tesla is out Eight Mile Road is in
- 3) Gold Hill is out Eight Mile Road is in
- 4) Gold Hill is out Lodi Stigg is in

Total 2010 busload within the defined area: 1380 MW with 26 MW of losses resulting in total load + losses of 1406 MW. Total 2012 busload within the defined area: 1425 MW with 32 MW of losses resulting in total load + losses of 1457 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
LODI25_2_UNIT 1	38120	LODI25CT	9.11	22.70	1	Lockeford	No NQC - historical data	MUNI
NA	33830	GEN.MILL	9.11	2.50	1	Lockeford	No NQC - historical data	QF/Selfgen
STIGCT_2_LODI	38114	Stig CC	13.8	49.50	1	Stagg		MUNI
BEARDS_7_UNIT 1	34074	BEARDSLY	6.9	8.36	1	TeslaBellota	Monthly NQC - used August for LCR	MUNI
CAMCHE_1_PL1X3	33850	CAMANCHE	4.2	3.50	1	TeslaBellota	No NQC - historical data	MUNI
CAMCHE_1_PL1X3	33850	CAMANCHE	4.2	3.50	2	TeslaBellota	No NQC - historical data	MUNI
CAMCHE_1_PL1X3	33850	CAMANCHE	4.2	3.50	3	TeslaBellota	No NQC - historical data	MUNI
DONNLS_7_UNIT	34058	DONNELLS	13.8	72.00	1	TeslaBellota	Monthly NQC - used August for LCR	MUNI
SCHLTE_1_UNITA1	33805	GWFTRCY1	13.8	83.56	1	TeslaBellota		Market
SCHLTE_1_UNITA2	33807	GWFTRCY2	13.8	82.88	1	TeslaBellota		Market
SNDBAR_7_UNIT 1	34060	SANDBAR	13.8	8.54	1	TeslaBellota		MUNI
SPIFBD_1_PL1X2	33917	FBERBORD	115	3.20	1	TeslaBellota	No NQC - historical data	QF/Selfgen
SPRGAP_1_UNIT 1	34078	SPRNG GP	6	6.70	1	TeslaBellota		Market
STANIS_7_UNIT 1	34062	STANISLS	13.8	91.00	1	TeslaBellota		Market
STNRES_1_UNIT	34056	STNSLSRP	13.8	16.33	1	TeslaBellota		QF/Selfgen
STOKCG_1_UNIT 1	33814	CPC STCN	12.5	45.33	1	TeslaBellota		QF/Selfgen
TULLCK_7_UNITS	34076	TULLOCH	6.9	8.23	1	TeslaBellota	Monthly NQC - used August for LCR	MUNI

TULLCK_7_UNITS	34076	TULLOCH	6.9	8.24	2	TeslaBellota	Monthly NQC - used August for LCR	MUNI
ULTPCH_1_UNIT 1	34050	CH.STN.	13.8	14.62	1	TeslaBellota		QF/Selfgen

Major new projects modeled:

1. Tesla 115 kV Capacity Increase

Critical Contingency Analysis Summary

Stockton overall

The requirement for this area is driven by the sum of requirements for the Tesla-Bellota, Lockeford, and Stagg Sub-areas.

Tesla-Bellota Sub-area

The critical contingency for the Tesla-Bellota pocket is the loss of Tesla-Tracy 115 kV and Tesla-Kasson-Manteca 115 kV. The area limitation is thermal overloading of the Manteca-Ingram Creek section of Tesla-Salado-Manteca 115 kV line above its emergency rating. This limiting contingency establishes a local capacity need of 518 MW (includes 195 MW of QF and Muni generation as well as 57 MW of deficiency) in 2010 and 567 MW (includes 195 MW of QF and Muni generation as well as 106 MW of deficiency) in 2012 as the minimum capacity necessary for reliable load serving capability within this sub-area.

The single most critical contingency for the Tesla-Bellota pocket is the loss of Tesla-Kasson-Manteca 115 kV line and the loss of the Stanislaus unit #1. The area limitation is thermal overloading of the Manteca-Ingram Creek section of Tesla-Salado-Manteca 115 kV line above its emergency rating. This single contingency establishes a local capacity need of 481 MW (includes 195 MW of QF and Muni generation as well as 20 MW of deficiency) in 2010 and 512 MW (includes 195 MW of QF and Muni generation as well as 51 MW of deficiency) in 2012.

Effectiveness factors:

All units within this sub-area are needed for the most limiting contingency therefore no effectiveness factor is required.

Lockeford Sub-area

The critical contingency for the Lockeford area is the loss of Lockeford-Industrial 60 kV circuit and Lockeford-Lodi #2 60 kV circuit. The area limitation is thermal overloading of the Lockeford-Lodi Jct. section of the Lockeford-Lodi #3 60 kV circuit. This limiting contingency establishes a local capacity need of 84 MW (including 25 MW of QF and Muni as well as a deficiency of 59 MW) in 2010 and 88 MW (including 25 MW of QF and Muni as well as a deficiency of 63 MW) in 2012 as the minimum capacity necessary for reliable load serving capability within this sub-area.

The single most critical contingency for the Lockeford pocket is the loss of Lockeford-Lodi #2 60 kV line and the loss of the Lodi CT with possible overload of the Lockeford-Industrial 60 kV. This single contingency establishes a local capacity need of 30 MW (includes 25 MW of QF and Muni generation as well as 5 MW of deficiency) in 2010 and 33 MW (includes 25 MW of QF and Muni generation as well as 8 MW of deficiency) in 2012.

Effectiveness factors:

All units within this sub-area are needed therefore no effectiveness factor is required.

Stagg Sub-area

The outage of the Tesla-Stagg 230 kV line and Tesla-Eight Mile 230 kV line causes low voltages at Stagg, Eight Mile Road and Lodi Stig 230 kV busses. Post-contingency steady-state voltages at these three busses are less than 0.90 pu. Lodi Stig generating unit is needed to support voltage at these three 230 kV busses. This limiting contingency establishes a local capacity need of 175 MW (includes 50 MW of Muni generation as well as 125 MW of deficiency) in 2010 and 225 MW (includes 50 MW of Muni generation as well as 175 MW of deficiency) in 2012 as the minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

The only unit within this sub-area (Lodi Stig) is needed therefore no effectiveness factor is required.

Stockton Overall Requirements:

	QF (MW)	Muni (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	82	190	264	536

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹⁰	486	25	511
Category C (Multiple) ¹¹	536	241	777

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹⁰	486	59	545
Category C (Multiple) ¹¹	536	344	880

5. Greater Bay Area

Area Definition

The transmission tie lines into the Greater Bay Area are:

- 1) Lakeville-Sobrante 230 kV
- 2) Ignacio-Sobrante 230 kV
- 3) Parkway-Moraga 230 kV
- 4) Bahia-Moraga 230 kV
- 5) Lambie SW Sta-Vaca Dixon 230 kV
- 6) Peabody-Contra Costa P.P. 230 kV
- 7) Tesla-Kelso 230 kV
- 8) Tesla-Delta Switching Yard 230 kV
- 9) Tesla-Pittsburg #1 230 kV
- 10) Tesla-Pittsburg #2 230 kV
- 11) Tesla-Newark #1 230 kV
- 12) Tesla-Newark #2 230 kV
- 13) Tesla-Ravenswood 230 kV
- 14) Tesla-Metcalf 500 kV
- 15) Moss Landing-Metcalf 500 kV
- 16) Moss Landing-Metcalf #1 230 kV
- 17) Moss Landing-Metcalf #2 230 kV
- 18) Oakdale TID-Newark #1 115 kV

¹⁰ A single contingency means that the system will be able to 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 MORC.

¹¹ Multiple contingencies means that the system will be able to 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 MORC.

19) Oakdale TID-Newark #2 115 kV

The substations that delineate the Greater Bay Area are:

- 1) Lakeville is out Sobrante is in
- 2) Ignacio is out Sobrante is in
- 3) Parkway is out Moraga is in
- 4) Bahia is out Moraga is in
- 5) Lambie SW Sta is in Vaca Dixon is out
- 6) Peabody is out Contra Costa P.P. is in
- 7) Tesla is out Kelso is in
- 8) Tesla is out Delta Switching Yard is in
- 9) Tesla is out Pittsburg is in
- 10) Tesla is out Pittsburg is in
- 11) Tesla is out Newark is in
- 12) Tesla is out Newark is in
- 13) Tesla is out Ravenswood is in
- 14) Tesla is out Metcalf is in
- 15) Moss Landing is out Metcalf is in
- 16) Moss Landing is out Metcalf is in
- 17) Moss Landing is out Metcalf is in
- 18) Oakdale TID is out Newark is in
- 19) Oakdale TID is out Newark is in

Total 2010 busload within the defined area: 9834 MW with 236 MW of losses resulting in total load + losses of 10070 MW. Total 2012 busload within the defined area: 10041 MW with 265 MW of losses resulting in total load + losses of 10306 MW.

Total units and qualifying capacity available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNI T ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
GILROY_1_UNIT	35850	GLRY COG	13.8	66.00	1	Llagas		Market
GILROY_1_UNIT	35850	GLRY COG	13.8	34.00	2	Llagas		Market
GILRPP_1_PL1X2	35851	GROYPKR1	13.8	45.00	1	Llagas		Market
GILRPP_1_PL1X2	35852	GROYPKR2	13.8	45.00	1	Llagas		Market
GILRPP_1_PL3X4	35853	GROYPKR3	13.8	45.00	1	Llagas		Market
BRDSLD_2_HIWIND	32172	HIGHWINDS	34.5	78.64	1	None	Monthly NQC - used August for LCR	Wind
BRDSLD_2_SHILO1	32176	SHILOH	34.5	16.41	1	None	Monthly NQC - used August for LCR	Wind
CARDCG_1_UNITS	33463	CARDINAL	12.47	26.91	1	None		QF/Selfgen
CARDCG_1_UNITS	33463	CARDINAL	12.47	26.91	2	None		QF/Selfgen
COCOPP_7_UNIT 6	33116	C.COS 6	18	337.00	1	None		Market
COCOPP_7_UNIT 7	33117	C.COS 7	18	337.00	1	None		Market
FLOWD2_2_UNIT 1	35318	FLOWDPTR	9.11	5.52	1	None	Monthly NQC - used August for LCR	Wind
GAYCRZ_1_UNIT 1	33145	CROWN.Z.	13.8	40.00	1	None	No NQC - historical data	QF/Selfgen

GAYCRZ_1_UNIT 1	33145	CROWN.Z.	13.8	5.40	2	None	No NQC - historical data	QF/Selfgen
GRZZLY_1_BERKLY	32740	HILLSIDE	115	26.73	1	None		QF/Selfgen
LFC 51_2_UNIT 1	35310	LFC FIN+	9.11	4.93	1	None	Monthly NQC - used August for LCR	Wind
LMBEPK_2_UNITA1	32173	LAMBGT1	13.8	47.00	1	None		Market
LMBEPK_2_UNITA2	32174	GOOSEHGT	13.8	46.00	2	None		Market
LMBEPK_2_UNITA3	32175	CREEDGT1	13.8	47.00	3	None		Market
RVRVIEW_1_UNITA1	33178	RVEC_GEN	13.8	46.00	1	None		Market
SEAWST_6_LAPOS	35312	SEAWESTF	9.11	1.83	1	None	Monthly NQC - used August for LCR	Wind
SRINTL_6_UNIT	33468	SRI INTL	9.11	1.07	1	None		QF/Selfgen
STAUFF_1_UNIT	33139	STAUFER	9.11	0.06	1	None		QF/Selfgen
USWND1_2_UNITS	33838	USWP_#3	9.11	9.52	1	None	Monthly NQC - used August for LCR	Wind
USWNRD_2_SMUD	32169	SOLANOWP	21	12.40	1	None	No NQC - historical data	Wind
USWNRD_2_UNITS	32168	USWINDPW	9.11	13.13	1	None	Monthly NQC - used August for LCR	Wind
USWPFK_6_FRICK	35320	USW FRIC	12	0.92	1	None	Monthly NQC - used August for LCR	Wind
USWPFK_6_FRICK	35320	USW FRIC	12	0.93	2	None	Monthly NQC - used August for LCR	Wind
WNDMAS_2_UNIT 1	33170	WINDMSTR	9.11	2.10	1	None	Monthly NQC - used August for LCR	Wind
ZOND_6_UNIT	35316	ZOND SYS	9.11	3.75	1	None	Monthly NQC - used August for LCR	Wind
ALMEGT_1_UNIT 1	38118	ALMDACT1	13.8	23.80	1	Oakland		MUNI
ALMEGT_1_UNIT 2	38119	ALMDACT2	13.8	24.00	1	Oakland		MUNI
OAK C_7_UNIT 1	32901	OAKLND 1	13.8	55.00	1	Oakland		Market
OAK C_7_UNIT 2	32902	OAKLND 2	13.8	55.00	1	Oakland		Market
OAK C_7_UNIT 3	32903	OAKLND 3	13.8	55.00	1	Oakland		Market
CROKET_7_UNIT	32900	CRCKTCOG	18	240.00	1	Pittsburg		QF/Selfgen
DELTA_2_PL1X4	33108	DEC CTG1	18	181.13	1	Pittsburg		Market
DELTA_2_PL1X4	33109	DEC CTG2	18	181.13	1	Pittsburg		Market
DELTA_2_PL1X4	33110	DEC CTG3	18	181.13	1	Pittsburg		Market
DELTA_2_PL1X4	33107	DEC STG1	24	269.61	1	Pittsburg		Market
DOWCHM_1_UNITS	33161	DOWCHEM 1	13.8	10.30	1	Pittsburg		QF/Selfgen

DOWCHM_1_UNITS	33162	DOWCHEM 2	13.8	13.63	1	Pittsburg		QF/Selfgen
DOWCHM_1_UNITS	33163	DOWCHEM 3	13.8	13.63	1	Pittsburg		QF/Selfgen
GWFPW1_6_UNIT	33131	GW F #1	9.11	19.00	1	Pittsburg		QF/Selfgen
GWFPW2_1_UNIT 1	33132	GW F #2	13.8	18.81	1	Pittsburg		QF/Selfgen
GWFPW3_1_UNIT 1	33133	GW F #3	13.8	19.16	1	Pittsburg		QF/Selfgen
GWFPW4_6_UNIT 1	33134	GW F #4	13.8	19.19	1	Pittsburg		QF/Selfgen
GWFPW5_6_UNIT 1	33135	GW F #5	13.8	18.83	1	Pittsburg		QF/Selfgen
IMHOFF_1_UNIT 1	33136	CCCS D	12.47	4.40	1	Pittsburg	No NQC - historical data	QF/Selfgen
LMEC_1_PL1X3	33112	LMECCT1	18	164.37	1	Pittsburg		Market
LMEC_1_PL1X3	33111	LMECCT2	18	164.37	1	Pittsburg		Market
LMEC_1_PL1X3	33113	LMECST1	18	231.26	1	Pittsburg		Market
PITTSP_7_UNIT 5	33105	PTSB 5	18	312.00	1	Pittsburg		Market
PITTSP_7_UNIT 6	33106	PTSB 6	18	317.00	1	Pittsburg		Market
PITTSP_7_UNIT 7	30000	PTSB 7	20	682.00	1	Pittsburg		Market
SHELRF_1_UNITS	33141	SHELL 1	12.47	20.00	1	Pittsburg	No NQC - historical data	QF/Selfgen
SHELRF_1_UNITS	33142	SHELL 2	12.47	40.00	1	Pittsburg	No NQC - historical data	QF/Selfgen
SHELRF_1_UNITS	33143	SHELL 3	12.47	40.00	1	Pittsburg	No NQC - historical data	QF/Selfgen
STOILS_1_UNITS	32921	CHEVGEN1	13.8	0.42	1	Pittsburg		QF/Selfgen
STOILS_1_UNITS	32922	CHEVGEN2	13.8	0.41	1	Pittsburg		QF/Selfgen
TIDWTR_2_UNITS	33151	FOSTER W	12.47	6.30	1	Pittsburg		QF/Selfgen
TIDWTR_2_UNITS	33151	FOSTER W	12.47	6.29	2	Pittsburg		QF/Selfgen
TIDWTR_2_UNITS	33151	FOSTER W	12.47	6.29	3	Pittsburg		QF/Selfgen
UNCHEM_1_UNIT	32920	UNION CH	9.11	20.00	1	Pittsburg		QF/Selfgen
UNOCAL_1_UNITS	32910	UNOCAL	12	0.70	1	Pittsburg		QF/Selfgen
UNOCAL_1_UNITS	32910	UNOCAL	12	0.69	2	Pittsburg		QF/Selfgen
UNOCAL_1_UNITS	32910	UNOCAL	12	0.69	3	Pittsburg		QF/Selfgen
POTRPP_7_UNIT 3	33252	POTRERO3	20	206.00	1	San Francisco		Market
POTRPP_7_UNIT 4	33253	POTRERO4	13.8	52.00	1	San Francisco		Market
POTRPP_7_UNIT 5	33254	POTRERO5	13.8	52.00	1	San Francisco		Market
POTRPP_7_UNIT 6	33255	POTRERO6	13.8	52.00	1	San Francisco		Market

UNTDQF_7_UNITS	33466	UNTED CO	9.11	26.93	1	San Francisco		QF/Selfgen
CALPIN_1_AGNEW	35860	OLS-AGNE	9.11	27.94	1	San Jose		QF/Selfgen
CONTAN_1_UNIT	36856	CSC_CCA	13.8	16.15	1	San Jose		QF/Selfgen
CSCCOG_1_UNIT 1	36854	CSC COG.	12	3.00	1	San Jose		MUNI
CSCCOG_1_UNIT 1	36854	CSC COG.	12	3.00	2	San Jose		MUNI
CSCGNR_1_UNIT 1	36858	CSC_GNR1	13.8	21.30	1	San Jose	Monthly NQC - used August for LCR	MUNI
CSCGNR_1_UNIT 2	36895	CSC_GNR2	13.8	21.30	2	San Jose	Monthly NQC - used August for LCR	MUNI
DUANE_1_PL1X3	36863	DVRPPCT1	13.8	49.27	1	San Jose		MUNI
DUANE_1_PL1X3	36864	DVRPPCT2	13.8	49.27	1	San Jose		MUNI
DUANE_1_PL1X3	36865	DVRPPSTA	13.8	49.26	1	San Jose		MUNI
IBMCTL_1_UNIT 1	35637	IBM-CTLE	115	0.00	1	San Jose	No NQC - historical data	Market
LECEF_1_UNITS	35854	LECEFGT1	13.8	46.50	1	San Jose		Market
LECEF_1_UNITS	35855	LECEFGT2	13.8	46.50	1	San Jose		Market
LECEF_1_UNITS	35856	LECEFGT3	13.8	46.50	1	San Jose		Market
LECEF_1_UNITS	35857	LECEFGT4	13.8	46.50	1	San Jose		Market
MARKHM_1_CATLS T	35863	CATALYST	9.11	0.00	1	San Jose		QF/Selfgen
METEC_2_PL1X3	35881	MEC CTG1	18	185.68	1	San Jose		Market
METEC_2_PL1X3	35882	MEC CTG2	18	185.68	1	San Jose		Market
METEC_2_PL1X3	35883	MEC STG1	18	221.79	1	San Jose		Market
ZANKER_1_UNIT 1	35861	SJ-SCL W	9.11	2.50	1	San Jose	No NQC - historical data	QF/Selfgen
ZANKER_1_UNIT 2	35861	SJ-SCL W	9.11	2.50	2	San Jose	No NQC - historical data	QF/Selfgen
NA	33469	OX_MTN	4.16	1.90	1	None	No NQC - Pmax	Market
NA	33469	OX_MTN	4.16	1.90	2	None	No NQC - Pmax	Market
NA	33469	OX_MTN	4.16	1.90	3	None	No NQC - Pmax	Market
NA	33469	OX_MTN	4.16	1.90	4	None	No NQC - Pmax	Market
NA	33469	OX_MTN	4.16	1.90	5	None	No NQC - Pmax	Market
NA	33469	OX_MTN	4.16	1.90	6	None	No NQC - Pmax	Market
NA	33469	OX_MTN	4.16	1.90	7	None	No NQC - Pmax	Market
NA	32177	SHILO	34.5	35	2	None	No NQC - Estimated	Market
NA	32171	HIGHWND3	34.5	9	1	None	No NQC - Estimated	Market
NA	33118	GATEWAY1	18	207	1	None	No NQC - Pmax	Market
NA	33119	GATEWAY2	18	196	1	None	No NQC - Pmax	Market
NA	33120	GATEWAY3	18	196	1	None	No NQC - Pmax	Market
NA	33283	CCSFCT3	13.8	53	1	San Francisco	No NQC - Pmax	Market
NA	33282	CCSFCT2	13.8	53	1	San Francisco	No NQC - Pmax	Market
NA	33281	CCSFCT1	13.8	53	1	San Francisco	No NQC - Pmax	Market
NA	33467	SFAERP	13.8	50.5	1	San Francisco	No NQC - Pmax	Market
NA	32168	ENXCO	9.11	14	2	None	No NQC - Estimated	Market

Major new projects modeled:

1. Oakland New 115 kV Cable
2. Trans Bay 230 kV Cable
3. HP #4 115 kV Cable
4. Tesla-Pittsburg 230 kV Reconductoring

Critical Contingency Analysis Summary

San Francisco Sub-area

Per the CAISO Revised Action Plan for SF, all Potrero units (360 MW) will continued to be required until completion of the plan as it is presently described.

The most critical contingency is an outage of the TransBay cable and the A-H-W #1 115 kV cable. The limiting contingency is an overload of the A-H-W #2 115 kV Cable. This limiting contingency establishes a local capacity need of 35 MW and 50 MW as the minimum capacity necessary for reliable load serving capability within this sub-area in 2010 and 2012, respectively.

Effectiveness factors:

All units within this sub-area [3 CCSF CT's and Potrero units (if available)] have the same effectiveness factor.

Oakland Sub-area

The critical contingency for the Oakland pocket is the loss of C-X #2 and C-X #3 115 kV cables. The area limitation is thermal overloading of the D-L #1 115 kV cable above its emergency rating. This limiting contingency establishes a local capacity need of 7 MW in 2010 and 10 MW (excludes 50 MW of Muni generation and accounts for the existing SPS in the area) in 2012 as minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

All units (Oakland CT's) within this sub-area have the same effectiveness factor. Units outside of this sub-area are not effective.

Llagas Sub-area

The most critical contingency is an outage between Metcalf D and Morgan Hill 115 kV (with one of the Gilroy Peaker off-line). The area limitation is low voltage at Morgan Hill substation. This limiting contingency establishes a local capacity need of 100 MW in 2010 and 150 MW in 2012 respectively (includes 0 MW of QF and Muni generation) as the minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

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

San Jose Sub-area

The most critical contingencies in the San Jose area are a combined loss of Metcalf-EI Patio #1 115kV and the Metcalf-Evergreen #1 115kV lines. The limiting element is the Metcalf-Evergreen #2 115kV line. This limiting contingency establishes a local capacity need of 199 MW in 2010 and 205 MW in 2012 (includes 44 MW of QF and 196 MW of Muni generation) as minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

All units within this sub-area have the same effectiveness factor.

Pittsburg Sub-area

This sub-area has no local capacity need due to reconductoring of the Tesla-Pittsburg #1 and #2 230 kV lines.

Bay Area overall

The most critical contingency is the loss of the Tesla-Metcalf 500 kV followed by Delta Energy Center or vice versa. The area limitation is reactive margin. This limiting contingency establishes a local capacity need of 5225 MW in 2010 and 5452 MW in

2012 (includes 722 MW of QF, 206 MW of Wind and 244 MW of Muni generation) as the minimum capacity necessary for reliable load serving capability within this area (with both Contra Costa 4 & 5 off-line).

The second most critical contingency is the loss of the Tesla-Metcalf 500kV line followed by Tesla #2 500/230kV transformer. The limiting element is the Tesla #6 500/230kV transformer. This limiting contingency establishes a local capacity need of 5205 MW in 2010 and 5432 MW for 2012 (includes 722 MW of QF, 206 MW of Wind and 244 MW of Muni generation). (This requirement only includes units in the Greater Bay Area, assuming all effective units in Stockton are at their historical output levels and not included in the requirement total.)

Effectiveness factors:

For most helpful procurement information please read procedure T-133Z effectiveness factors – Bay Area at:

<http://www.caiso.com/docs/2004/11/01/2004110116234011719.pdf>

Bay Area Overall Requirements:

	Wind (MW)	QF/Selfgen (MW)	Muni (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	208	722	244	5907	7081

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹²	5225	0	5225
Category C (Multiple) ¹³	5225	0	5225

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹²	5452	0	5452
Category C (Multiple) ¹³	5452	0	5452

¹² A single contingency means that the system will be able to 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 MORC.

¹³ Multiple contingencies means that the system will be able to 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 MORC.

6. Greater Fresno Area

Area Definition

The transmission facilities coming into the Greater Fresno area are:

- 1) Gates-Henrietta Tap 1 230 kV
- 2) Gates-Henrietta Tap 2 230 kV
- 3) Gates #1 230/115 kV Transformer Bank
- 4) Los Banos #3 230/70 Transformer Bank
- 5) Los Banos #4 230/70 Transformer Bank
- 6) Panoche-Gates #1 230 kV
- 7) Panoche-Gates #2 230 kV
- 8) Panoche-Coburn 230 kV
- 9) Panoche-Moss Landing 230 kV
- 10) Panoche-Los Banos #1 230 kV
- 11) Panoche-Los Banos #2 230 kV
- 12) Panoche-Dos Amigos 230 kV
- 13) Warnerville-Wilson 230 kV
- 14) Wilson-Melones 230 kV
- 15) Midway-Semitropic-Smyrna 115kV
- 16) Coalinga #1-San Miguel 70 kV

The substations that delineate the Greater Fresno area are:

- 1) Gates is out Henrietta is in
- 2) Gates is out Henrietta is in
- 3) Gates 230 is out Gates 115 is in
- 4) Los Banos 230 is out Los Banos 70 is in
- 5) Los Banos 230 is out Los Banos 70 is in
- 6) Panoche is in Gates is out
- 7) Panoche is in Gates is out
- 8) Panoche is in Coburn is out
- 9) Panoche is in Moss Landing is out
- 10) Panoche is in Los Banos is out
- 11) Panoche is in Los Banos is out
- 12) Panoche is in Dos Amigos is out
- 13) Warnerville is out Wilson is in
- 14) Wilson is in Melones is out
- 15) Midway and Semitropic are out Smyrna is in
- 16) Coalinga is in San Miguel is out

Total 2010 busload within the defined area: 3196 MW with 116 MW of losses resulting in total load + losses of 3312 MW. Total 2012 busload within the defined area: 3290 MW with 101 MW of losses resulting in total load + losses of 3391 MW.

Total units and qualifying capacity available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNI T ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
PINFLT_7_UNITS	38720	PINEFLAT	13.8	75.00	3	Wilson, Herndon		MUNI
PINFLT_7_UNITS	38720	PINEFLAT	13.8	75.00	2	Wilson, Herndon		MUNI
PINFLT_7_UNITS	38720	PINEFLAT	13.8	75.00	1	Wilson, Herndon		MUNI
GWFPWR_6_UNIT	34650	GWFPWR	9.11	23.87	1	Wilson, Henrietta		QF/Selfgen
HENRTA_6_UNITA1	34539	GWFTGT1	13.8	45.33	1	Wilson, Henrietta		Market
HENRTA_6_UNITA2	34541	GWFTGT2	13.8	45.23	1	Wilson, Henrietta		Market
AGRICO_6_PL3N5	34608	AGRICO	13.8	21.00	3	Wilson, Herndon		Market
AGRICO_7_UNIT	34608	AGRICO	13.8	42.62	2	Wilson, Herndon		Market
AGRICO_7_UNIT	34608	AGRICO	13.8	7.38	4	Wilson, Herndon		Market
BALCHS_7_UNIT 1	34624	BALCH	13.2	34.00	1	Wilson, Herndon		Market
BALCHS_7_UNIT 2	34612	BLCH	13.8	52.50	1	Wilson, Herndon		Market
BALCHS_7_UNIT 3	34614	BLCH	13.8	52.50	1	Wilson, Herndon		Market
CAPMAD_1_UNIT 1	34179	MADERA_G	13.8	19.70	1	Wilson		Market
CHEVCO_6_UNIT 1	34652	CHV.COAL	9.11	9.76	1	Wilson		QF/Selfgen
CHEVCO_6_UNIT 2	34652	CHV.COAL	9.11	1.25	2	Wilson		QF/Selfgen
CHWCHL_1_UNIT	34301	CHOWCOGN	13.8	48.00	1	Wilson, Herndon		Market
COLGA1_6_SHELLW	34654	COLNEAGN	9.11	35.44	1	Wilson		QF/Selfgen
CRNEVL_6_SJQN 2	34631	SJ2GEN	9.11	3.20	1	Wilson		Market
CRNEVL_6_SJQN 3	34633	SJ3GEN	9.11	4.20	1	Wilson		Market
DINUBA_6_UNIT	34648	DINUBA E	13.8	9.89	1	Wilson, Herndon		Market
FRIANT_6_UNITS	34636	FRIANTDM	6.6	8.49	2	Wilson		QF/Selfgen
FRIANT_6_UNITS	34636	FRIANTDM	6.6	4.53	3	Wilson		QF/Selfgen
FRIANT_6_UNITS	34636	FRIANTDM	6.6	1.20	4	Wilson		QF/Selfgen
GATES_6_UNIT	34553	WHD_GAT2	13.8	49.00	1	Wilson	No NQC - historical data	Market
GWFPWR_1_UNITS	34431	GWHEP1	13.8	84.40	1	Wilson, Herndon		Market
GWFPWR_1_UNITS	34433	GWHEP2	13.8	84.40	1	Wilson, Herndon		Market
HAASPH_7_PL1X2	34610	HAAS	13.8	68.15	1	Wilson, Herndon	Monthly NQC - used August for LCR	Market
HAASPH_7_PL1X2	34610	HAAS	13.8	68.15	2	Wilson, Herndon	Monthly NQC - used August for LCR	Market
KERKH1_7_UNIT 1	34344	KERCKHOF	6.6	13.00	1	Wilson, Herndon		Market
KERKH1_7_UNIT 2	34344	KERCKHOF	6.6	8.50	2	Wilson, Herndon		Market
KERKH1_7_UNIT 3	34344	KERCKHOF	6.6	12.80	3	Wilson, Herndon		Market
KERKH2_7_UNIT 1	34308	KERCKHOF	13.8	153.90	1	Wilson, Herndon		Market
KINGCO_1_KINGBR	34642	KINGSBUR	9.11	28.81	1	Wilson, Herndon		QF/Selfgen
KINGRV_7_UNIT 1	34616	KINGSRIV	13.8	51.20	1	Wilson, Herndon		Market

MALAGA_1_PL1X2	34671	KRCDPCT1	13.8	96.00	1	Wilson, Herndon		Market
MALAGA_1_PL1X2	34672	KRCDPCT2	13.8	96.00	1	Wilson, Herndon		Market
MENBIO_6_UNIT	34334	BIO PWR	9.11	19.69	1	Wilson		QF/Selfgen
NA	34485	FRESNOW W	12.5	9.00	1	Wilson	No NQC - historical data	QF/Selfgen
ONLLPP_6_UNITS	34316	ONEILPMP	9.11	0.50	1	Wilson	No NQC - historical data	MUNI
PNOCHE_1_UNITA1	34186	DG_PAN1	13.8	42.78	1	Wilson		Market
PNOCHE_1_UNITB1	34142	WHD_PAN2	13.8	49.00	1	Wilson, Herndon	No NQC - historical data	Market
ULTPFR_1_UNIT 1	34640	ULTR.PWR	9.11	20.26	1	Wilson, Herndon		QF/Selfgen
WISHON_6_UNITS	34658	WISHON	2.3	4.60	1	Wilson		Market
WISHON_6_UNITS	34658	WISHON	2.3	4.60	2	Wilson		Market
WISHON_6_UNITS	34658	WISHON	2.3	4.60	3	Wilson		Market
WISHON_6_UNITS	34658	WISHON	2.3	4.60	4	Wilson		Market
WISHON_6_UNITS	34658	WISHON	2.3	0.00	5	Wilson		Market
HELMPG_7_UNIT 1	34600	HELMS	18	404.00	1	Wilson		Market
HELMPG_7_UNIT 2	34602	HELMS	18	404.00	2	Wilson		Market
HELMPG_7_UNIT 3	34604	HELMS	18	404.00	3	Wilson		Market
INTTRB_6_UNIT	34342	INT.TURB	9.11	3.99	1	Wilson	Monthly NQC - used August for LCR	QF/Selfgen
SGREGY_6_SANG R	34646	SANGERCO	9.11	31.03	1	Wilson		QF/Selfgen
EXCHEC_7_UNIT 1	34306	EXCHQUER	13.8	61.77	1	Wilson	Monthly NQC - used August for LCR	MUNI
JRWOOD_1_UNIT 1	34332	JRWCOGEN	9.11	6.31	1	Wilson, Merced		QF/Selfgen
MCSWAN_6_UNITS	34320	MCSWAIN	9.11	5.04	1	Wilson	Monthly NQC - used August for LCR	MUNI
MERCFL_6_UNIT	34322	MERCEDFL	9.11	2.20	1	Wilson	Monthly NQC - used August for LCR	Market
(Chowchilla Biomass)	34305	CHWCHLA2	13.8	12.5	1	Wilson	New gen. in 2007	Market
(El Nido)	34330	CHWCHLA2	13.8	12.5	1	Wilson	New gen. in 2007	Market
(Bullard Energy Center, Unit #1)	34605	BULRD_EC	13.8	108.2	1	Wilson	New gen. in 2009	Market
(Bullard Energy Center, Unit #2)	34605	BULRD_EC	13.8	108.2	2	Wilson	New gen. in 2009	Market
(Panoche Energy Center, Unit #1)	34326	PANO_BS1	13.8	102.5	1	Wilson	New gen. in 2009	Market
(Panoche Energy Center, Unit #2)	34326	PANO_BS2	13.8	102.5	2	Wilson	New gen. in 2009	Market
(Panoche Energy Center, Unit #3)	34327	PANO_BS3	13.8	102.5	3	Wilson	New gen. in 2009	Market
(Panoche Energy Center, Unit #4)	34327	PANO_BS4	13.8	102.5	4	Wilson	New gen. in 2009	Market
(Starwood Power Midway LLC, Unit #1)	34328	STARGT1	13.8	60.9	1	Wilson	New gen. in 2009	Market
(Starwood Power Midway LLC, Unit #2)	34329	STARGT2	13.8	60.9	2	Wilson	New gen. in 2009	Market

Major new projects modeled:
None.

Critical Contingency Analysis Summary

Wilson Sub-area

The most critical contingency for the Wilson sub-area is the loss of the Wilson - Melones 230 kV line overlapped with the loss of the Gates – Gregg 230 kV line, which would thermally overload the –Warnerville - Wilson 230 kV line and the Gates – McCall 230 kV line. This limiting contingency establishes a local capacity need of 1570 MW (which includes 161 MW of Muni generation and 212 MW of QF generation) in 2010 and 1590 MW (which includes 161 MW of Muni generation and 212 MW of QF generation) in 2012 as the generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

The following table has units within Fresno that are at least 5% effective to the constraint on the Warnerville – Wilson 230 kV line.

Gen Bus	Gen Name	Gen ID	Eff Fctr (%)
34332	JRWCOGEN	1	41
34330	ELNIDO	1	38
34322	MERCEDFL	1	34
34320	MCSWAIN	1	34
34306	EXCHQUER	1	32
34305	CHWCHLA2	1	32
34301	CHOWCOGN	1	32
34631	SJ2GEN	1	30
34658	WISHON	1	30
34658	WISHON	2	30
34658	WISHON	3	30
34658	WISHON	4	30
34658	WISHON	SJ	30
34633	SJ3GEN	1	29
34600	HELMS 1	1	0
34602	HELMS 2	1	28
34604	HELMS 3	1	28
34636	FRIANTDM	2	28
34636	FRIANTDM	3	28
34636	FRIANTDM	4	28

34605	BULRD_EC	1	28
34605	BULRD_EC	2	28
34308	KERCKHOF	1	26
34344	KERCKHOF	1	26
34344	KERCKHOF	2	26
34344	KERCKHOF	3	26
34485	FRESNOWW	1	25
34648	DINUBA E	1	22
34616	KINGSRIV	1	22
34624	BALCH 1	1	22
34179	MADERA_G	1	22
34671	KRCDPCT1	1	21
34672	KRCDPCT2	1	21
34640	ULTR.PWR	1	21
34646	SANGERCO	1	21
34642	KINGSBUR	1	19
34610	HAAS	1	18
34610	HAAS	2	18
34614	BLCH 2-3	1	18
38720	PINE FLT	1	18
38720	PINE FLT	2	18
38720	PINE FLT	3	18
34612	BLCH 2-2	1	18
34431	GWF_HEP1	1	17
34533	GWF_HEP2	1	17
34334	BIO PWR	1	14
34608	AGRICO	2	13
34608	AGRICO	3	13
34608	AGRICO	4	13
34539	GWF_GT1	1	13
34541	GWF_GT2	1	13
34650	GWF-PWR.	1	12
34328	STARGT1	1	11
34329	STARGT2	2	11
34186	DG_PAN1	1	11
34142	WHD_PAN2	1	11
34326	PANO_BS1	1	9
34326	PANO_BS2	2	9
34327	PANO_BS2	3	9
34327	PANO_BS3	4	9
34652	CHV.COAL	1	9
34652	CHV.COAL	2	9
34553	WHD_GAT2	1	9
34654	COLNGAGN	1	8
34342	INT.TURB	1	6
34316	ONEILPMP	1	6

The following table has units within Fresno that are at least 5% effective to the constraint on the Gates – McCall 230 kV line.

Gen Bus	Gen Name	Gen ID	Eff Fctr (%)
38720	PINE FLT	1	33
38720	PINE FLT	2	33
38720	PINE FLT	3	33
34612	BLCH 2-2	1	33
34614	BLCH 2-3	1	32
34610	HAAS	1	32
34610	HAAS	2	32
34642	KINGSBUR	1	30
34539	GWF_GT1	1	30
34541	GWF_GT2	1	30
34431	GWF_HEP1	1	30
34533	GWF_HEP2	1	30
34650	GWF-PWR.	1	29
34640	ULTR.PWR	1	28
34671	KRCDPCT1	1	28
34672	KRCDPCT2	1	28
34648	DINUBA E	1	28
34616	KINGSRIV	1	27
34646	SANGERCO	1	27
34624	BALCH 1	1	26
34344	KERCKHOF	1	23
34344	KERCKHOF	2	23
34344	KERCKHOF	3	23
34308	KERCKHOF	1	23
34631	SJ2GEN	1	21
34658	WISHON	1	20
34658	WISHON	2	20
34658	WISHON	3	20
34658	WISHON	4	20
34658	WISHON	SJ	20
34633	SJ3GEN	1	20
34636	FRIANTDM	2	20
34636	FRIANTDM	3	20
34636	FRIANTDM	4	20
34605	BULRD_EC	1	15
34605	BULRD_EC	2	15
34600	HELMS 1	1	14
34602	HELMS 2	1	14
34604	HELMS 3	1	14
34301	CHOWCOGN	1	14
34305	CHWCHLA2	1	14
34485	FRESNOWW	1	13
34332	JRWCOGEN	1	11

34608	AGRICO	2	11
34608	AGRICO	3	11
34608	AGRICO	4	11
34330	ELNIDO	1	11
34322	MERCEDFL	1	10
34320	MCSWAIN	1	10
34306	EXCHQUER	1	10
34179	MADERA_G	1	8
34334	BIO PWR	1	7

Herndon Sub-area

The most critical contingency for the Herndon sub-area is the loss of the Herndon 230/115 kV bank 1 overlapped with the loss of Kerckhoff II unit, which would thermally overload the parallel Herndon 230/115 kV bank 2. This limiting contingency establishes a local capacity need of 803 MW (which includes 49 MW of QF generation and 57 MW of Muni generation) in 2010 and 816 MW (which includes 49 MW of QF generation and 57 MW of Muni generation) in 2012 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

The following table has units within Fresno area that are at least 5% effective to the above-mentioned constraint.

Gen Bus	Gen Name	Gen ID	Eff Fctr (%)
34344	KERCKHOF	1	36
34344	KERCKHOF	2	36
34344	KERCKHOF	3	36
34308	KERCKHOF	1	36
34624	BALCH 1	1	35
34616	KINGSRIV	1	32
34646	SANGERCO	1	32
34671	KRCDPCT1	1	32
34672	KRCDPCT2	1	32
34640	ULTR.PWR	1	31
34648	DINUBA E	1	29
34642	KINGSBUR	1	26
34610	HAAS	1	23
34610	HAAS	2	23
34614	BLCH 2-3	1	23
38720	PINE FLT	1	23
38720	PINE FLT	2	23
38720	PINE FLT	3	23
34612	BLCH 2-2	1	23

34431	GWF_HEP1	1	14
34541	GWF_HEP2	1	14
34301	CHOWCOGN	1	9
34305	CHWCHLA2	1	9
34608	AGRICO	2	7
34608	AGRICO	3	7
34608	AGRICO	4	7
34332	JRWCOGEN	1	-6
34485	FRESNOWW	1	-13
34600	HELMS 1	1	-13
34602	HELMS 2	1	-13
34604	HELMS 3	1	-13
34605	BULRD_EC	1	-16
34605	BULRD_EC	2	-16

McCall Sub-area

McCall 230/115kV TB#1 is to be replaced May 2008. As a result the LCR need for the McCall sub-area has been eliminated.

Henrietta Sub-area

The most critical contingency for the Henrietta sub-area is the loss of the Henrietta 230/70 kV transformer bank #4 with Henrietta-GWF Henrietta 70 kV line out of service, which would thermally overload the Henrietta 230/70 kV transformer bank #2. (Note that in November 2007 PG&E did a re-rating of the Henrietta transformer #2. The re-rate increase the transformer’s contingency rating from 107 MVA to 119 MVA.) This combined contingency establishes a local capacity need of 130 MW (which includes 23 MW of QF generation) in 2010 and 140 MW (which includes 23 MW of QF generation and 7 MW of deficiency) in 2012 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

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

Merced Sub-area

No requirements. As a part of the 2007 CAISO Transmission Expansion Plan, PG&E is planning to install in 2008 an SPS to protect against double-circuit outage of the Wilson

– Altwater 115 kV lines. In event the fault happens, the SPS will open up the Atwater circuit breaker (CB162) and isolate the load at El Capitan and Castle 115 kV substations. This protection scheme will protect against the above-mentioned “Category C” contingency. Therefore the 2010 and 2012 LCR requirements for the Merced sub-area have been eliminated.

Additional helpful effectiveness factors for Fresno area:

Please read procedure T-129Z effectiveness factors - Fresno Area at:

<http://www.caiso.com/docs/2005/07/13/2005071314483315210.pdf>

Fresno Area Overall Requirements:

	QF/Selfgen (MW)	Muni (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	204	292	3268	3764

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹⁴	2123	0	2123
Category C (Multiple) ¹⁵	2351	0	2351

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹⁴	2114	0	2114
Category C (Multiple) ¹⁵	2237	7	2244

7. Kern Area

Area Definition

The transmission facilities coming into the Kern PP sub-area are:

- 1) Wheeler Ridge-Lamont 115 kV line
- 2) Kern PP 230/115 kV Bank # 3 & 3A
- 3) Kern PP 230/115 kV Bank # 4
- 4) Kern PP 230/115 kV Bank # 5

¹⁴ A single contingency means that the system will be able to 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 MORC.

¹⁵ Multiple contingencies means that the system will be able to 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 MORC.

- 5) Midway 230/115 Bank # 1
- 6) Midway 230/115 Bank # 2 & 2a
- 7) Midway 230/115 Bank #3
- 8) Temblor – San Luis Obispo 115 kV line

The substations that delineate the Kern-PP sub-area are:

- 1) Wheeler Ridge is out Lamont is in
- 2) Kern PP 230 is out Kern PP 115 kV is in
- 3) Kern PP 230 is out Kern PP 115 kV is in
- 4) Kern PP 230 is out Kern PP 115 kV is in
- 5) Midway 230 is out Midway 115 is in
- 6) Midway 230 is out Midway 115 is in
- 7) Midway 230 is out Midway 115 is in
- 8) Temblor is in San Luis Obispo is out

The transmission facilities coming into the Weedpatch sub-area are:

- 1) Wheeler Ridge-Tejon 60 kV line
- 2) Wheeler Ridge-Weedpatch 60 kV line
- 3) Wheeler Ridge-San Bernard 60 kV line

The substations that delineate the Weedpatch sub-area are:

- 1) Wheeler Ridge is out Tejon is in
- 2) Wheeler Ridge is out Weedpatch is in
- 3) Wheeler Ridge is out San Bernard is in

Total 2010 busload within the defined area: 1300 MW with 15 MW of losses resulting in total load + losses of 1315 MW. Total 2012 busload within the defined area: 1333 MW with 16 MW of losses resulting in total load + losses of 1348 MW.

Total units and qualifying capacity available in this Kern PP sub-area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNI T ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
BDGRCK_1_UNITS	35029	BADGERCK	9.11	42.67	1	Kern PP		QF/Selfgen
BEARMT_1_UNIT	35066	PSE-BEAR	9.11	39.91	1	Kern PP		QF/Selfgen
CHALK_1_UNIT	35038	CHLKCLF+	9.11	41.56	1	Kern PP		QF/Selfgen
CHEVCD_6_UNIT	35052	CHEV.USA	9.11	0.73	1	Kern PP		QF/Selfgen
CHEVCY_1_UNIT	35032	CHV-CYMR	9.11	7.74	1	Kern PP		QF/Selfgen
DEXZEL_1_UNIT	35024	DEXEL +	9.11	29.32	1	Kern PP		QF/Selfgen
DISCOV_1_CHEVRN	35062	DISCOVERY	9.11	5.45	1	Kern PP		QF/Selfgen
DOUBLC_1_UNITS	35023	DOUBLE C	9.11	46.81	1	Kern PP		QF/Selfgen
FRITO_1_LAY	35048	FRITOLAY	9.11	0.09	1	Kern PP		QF/Selfgen
KERNFT_1_UNITS	35026	KERNFRNT	9.11	45.00	1	Kern PP		QF/Selfgen

KERNRG_1_UNITS	35040	KERNRDGE	9.11	0.47	1	Kern PP		QF/Selfgen
KERNRG_1_UNITS	35040	KERNRDGE	9.11	0.48	2	Kern PP		QF/Selfgen
LIVOAK_1_UNIT 1	35058	PSE-LVOK	9.11	39.67	1	Kern PP		QF/Selfgen
MIDSET_1_UNIT 1	35044	TX MIDST	9.11	33.75	1	Kern PP		QF/Selfgen
MIDSUN_1_UNITA1	35034	MIDSUN +	9.11	22.00	1	Kern PP		Market
MKTRCK_1_UNIT 1	35060	PSEMCKIT	9.11	42.99	1	Kern PP		QF/Selfgen
MTNPOS_1_UNIT	35036	MT POSO	9.11	50.61	1	Kern PP		QF/Selfgen
NAVY35_1_UNITS	35064	NAVY 35R	9.11	0.00	1	Kern PP		QF/Selfgen
NAVY35_1_UNITS	35064	NAVY 35R	9.11	0.00	2	Kern PP		QF/Selfgen
OILDAL_1_UNIT 1	35028	OILDALE	9.11	35.39	1	Kern PP		QF/Selfgen
SIERRA_1_UNITS	35027	HISIERRA	9.11	45.58	1	Kern PP		QF/Selfgen
TANHIL_6_SOLART	35050	SLR-TANN	9.11	9.78	1	Kern PP		QF/Selfgen
TXNMID_1_UNIT 2	34783	TEXCO_NM	9.11	0.00	1	Kern PP		QF/Selfgen
TXNMID_1_UNIT 2	34783	TEXCO_NM	9.11	0.00	2	Kern PP		QF/Selfgen
ULTOGL_1_POSO	35035	ULTR PWR	9.11	30.87	1	Kern PP		QF/Selfgen
UNVRSY_1_UNIT 1	35037	UNIVRSTY	9.11	30.64	1	Kern PP		QF/Selfgen
VEDDER_1_SEKER N	35046	SEKR	9.11	20.46	1	Kern PP		QF/Selfgen
N/A	35056	TX-LOSTH	4.16	9.00	1	Kern PP	No NQC - historical data	QF/Selfgen
KRNCNY_6_UNIT	35018	KERNCNYN	9.11	9.22	1	Weedpatch	Monthly NQC - used August for LCR	Market
RIOBRV_6_UNIT 1	35020	RIOBRAVO	9.11	6.15	1	Weedpatch		QF/Selfgen

Major new projects modeled:

None.

Critical Contingency Analysis Summary

Kern PP Sub-area

The most critical contingency for the Kern PP sub-area is the outage of the Kern PP #5 230/115 kV transformer bank and the Kern PP – Kern Front 115 kV line, which would thermally overload the parallel Kern PP 230/115 kV Bank 3 and Bank 3a. This limiting contingency establishes a local capacity need of 422 MW (which includes 422 MW of QF generation) in 2010 and 482 MW (which includes 482 MW QF generation) in 2012

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

Effectiveness factors:

The following table shows units that are at least 5% effective to the above-mentioned constraint.

Gen Bus	Gen Name	Gen ID	Eff Fctr (%)
35066	PSE-BEAR	1	22
35027	HISIERRA	1	21
35029	BADGERCK	1	21
35023	DOUBLE C	1	21
35026	KERNFRNT	1	21
35058	PSE-LVOK	1	21
35028	OILDALE	1	21
35062	DISCOVERY	1	21
35024	DEXEL +	1	21
35046	SEKR	1	21
35036	MT POSO	1	15
35035	ULTR PWR	1	15
35052	CHEV.USA	1	6

Weedpatch Sub-area

The most critical contingency is the loss of the Wheeler Ridge – San Bernard 70 kV line and the Wheeler Ridge – Tejon 70 kV line, which would thermally overload the Wheeler Ridge – Weedpatch 70 kV line and cause low voltage problem at the local 70 kV transmission system. This limiting contingency establishes a local capacity need of 17 MW (which includes 6 MW of QF generation and 2 MW of deficiency) for both 2010 and 2012 as the minimum generation capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

All units within this sub-area are needed therefore no effectiveness factor is required.

Kern Area Overall Requirements:

	QF/Selfgen (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	615	31	646

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹⁶	222	0	222
Category C (Multiple) ¹⁷	437	2	439

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹⁶	254	0	254
Category C (Multiple) ¹⁷	497	2	499

8. 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 #1 230 kV Line
- 8) Antelope - Mesa Cal #1 230 kV Line
- 9) Vincent - Rio Hondo #1 & #2 230 kV Lines
- 10) Eagle Rock - Pardee #1 230 kV Line
- 11) Devers - Palo Verde 500 kV Line
- 12) Devers - Harquahala 500 kV Line
- 13) Devers - Coachelv # 1 230 kV Line
- 14) Mirage - Ramon # 1 230 kV Line
- 15) Mirage - Julian Hinds 230 kV Line

The substations that delineate the LA Basin Area are:

- 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

¹⁶ A single contingency means that the system will be able to 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 MORC.

¹⁷ Multiple contingencies means that the system will be able to 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 MORC.

- 8) Mesa Cal is in Antelope is out
- 9) Rio Hondo is in Vincent is out
- 10) Eagle Rock is in Pardee is out
- 11) Devers is in Palo Verde is out
- 12) Devers is in Harquahala is out
- 13) Devers is in Coachelv is out
- 14) Mirage is in Ramon is out
- 15) Mirage is in Julian Hinds is out

Total 2010 busload within the defined area is 20,143 MW with 310 MW of losses and 23 MW of pumps resulting in total load + losses + pumps of 20,476 MW. Total 2012 busload within the defined area is 20,688 MW with 227 MW of losses and 23 MW of pumps resulting in total load + losses + pumps of 20,938 MW.

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

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	KV	NQC	UNI T ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
CABZON_1_WINDA1	28280	CABAZON	33	10.86	1	Eastern	Monthly NQC - used August for LCR	Wind
CHINO_2_QF	24024	CHINO	66	12.09	1	Eastern		QF/Selfgen
CHINO_6_SMPPAP	24140	SIMPSON	13.8	40.06	1	Eastern		QF/Selfgen
CORONS_6_CLRWTR	24210	MIRALOMA	66	14.00	1	Eastern		MUNI
CORONS_6_CLRWTR	24210	MIRALOMA	66	14.00	2	Eastern		MUNI
DEVERS_1_QF	24815	GARNET	115	64.02	1	Eastern	Monthly NQC - used August for LCR	QF/Selfgen
DVLCYN_1_UNITS	25648	DVLCYN1G	13.8	50.74	1	Eastern		MUNI
DVLCYN_1_UNITS	25649	DVLCYN2G	13.8	50.74	2	Eastern		MUNI
DVLCYN_1_UNITS	25603	DVLCYN3G	13.8	67.66	3	Eastern		MUNI
DVLCYN_1_UNITS	25604	DVLCYN4G	13.8	67.66	4	Eastern		MUNI
ETIWND_2_QF	24055	ETIWANDA	66	17.76	2	Eastern		QF/Selfgen
ETIWND_6_MWDETI	24055	ETIWANDA	66	18.55	1	Eastern		Market
ETIWND_6_MWDETI	25422	ETI MWDG	13.8	18.55	1	Eastern		Market
ETIWND_7_UNIT 3	24052	MTNVIST3	18	320.00	3	Eastern		Market
ETIWND_7_UNIT 4	24053	MTNVIST4	18	320.00	4	Eastern		Market
INDIGO_1_UNIT 1	28190	WINTECX2	13.8	42.00	1	Eastern		Market
INDIGO_1_UNIT 2	28191	WINTECX1	13.8	42.00	1	Eastern		Market
INDIGO_1_UNIT 3	28180	WINTECX8	13.8	42.00	1	Eastern		Market
INLAND_6_UNIT	24071	INLAND	13.8	30.00	1	Eastern	No NQC - historical data	QF/Selfgen
MIRLOM_6_DELGEN	24030	DELGEN	13.8	39.59	1	Eastern		QF/Selfgen
NA	24111	PADUA	66	0.00	1	Eastern		QF/Selfgen
NA	24214	SANBRDNO	66	0.00	1	Eastern		QF/Selfgen
NA	24214	SANBRDNO	66	0.00	2	Eastern		QF/Selfgen
NA	24826	INDIGO	115	0.00	1	Eastern		QF/Selfgen
NA	25632	TERAWND	115	0.00	1	Eastern		Wind
NA	25633	CAPWIND	115	0.00	1	Eastern		Wind
BUCKWD_Y_WINTCV	25634	BUCKWIND	115	0.00	1	Eastern		Wind
NA	25635	ALTWIND	115	0.00	1	Eastern		Wind
NA	25636	RENWIND	115	0.00	1	Eastern		Wind
NA	25637	TRANWIND	115	0.00	1	Eastern		Wind

NA	25639	SEAWIND	115	0.00	1	Eastern		Wind
NA	25640	PANAERO	115	0.00	1	Eastern		Wind
NA	25645	VENWIND	115	0.00	1	Eastern		Wind
NA	25646	SANWIND	115	0.00	1	Eastern		Wind
NA	28020	WINTEC6	115	0.00	1	Eastern		Wind
NA	28060	SEAWEST	115	0.00	1	Eastern		Wind
NA	28060	SEAWEST	115	0.00	2	Eastern		Wind
WHTWTR_1_WINDA1	28061	WHITEWTR	33	0.00	1	Eastern		Wind
NA	28260	ALTAMSA4	115	0.00	1	Eastern		Wind
PADUA_6_QF	24111	PADUA	66	7.25	2	Eastern		QF/Selfgen
SBERDO_2_PSP3	24921	MNTV-CT1	18	129.71	1	Eastern		Market
SBERDO_2_PSP3	24922	MNTV-CT2	18	129.71	1	Eastern		Market
SBERDO_2_PSP3	24923	MNTV-ST1	18	225.07	1	Eastern		Market
SBERDO_2_PSP4	24924	MNTV-CT3	18	129.71	1	Eastern		Market
SBERDO_2_PSP4	24925	MNTV-CT4	18	129.71	1	Eastern		Market
SBERDO_2_PSP4	24926	MNTV-ST2	18	225.07	1	Eastern		Market
VALLEY_2_QF	24160	VALLEYSC	115	6.73	1	Eastern		QF/Selfgen
VALLEY_7_UNITA1	24229	VALLEY-S	115	1.94	1	Eastern		QF/Selfgen
VISTA_6_QF	24902	VSTA	66	0.08	1	Eastern		QF/Selfgen
VISTA_6_QF	24902	VSTA	66	0.08	2	Eastern		QF/Selfgen
NA	24242	RERC1G	13.8	48.00	1	Eastern	No NQC - Pmax	Market
NA	24243	RERC2G	13.8	48.00	1	Eastern	No NQC - Pmax	Market
NA	24244	SPRINGEN	13.8	44.00	1	Eastern	No NQC - Pmax	Market
NA	28041	TOT037C1	19.5	405.00	1	Eastern	No NQC - Pmax	Market
NA	28042	TOT037C2	19.5	405.00	2	Eastern	No NQC - Pmax	Market
NA	28101	OCTILOG1	13.8	107.00	1	Eastern	No NQC - Pmax	Market
NA	28102	OCTILOG2	13.8	107.00	1	Eastern	No NQC - Pmax	Market
NA	28103	OCTILOG3	13.8	107.00	1	Eastern	No NQC - Pmax	Market
NA	28104	OCTILOG4	13.8	107.00	1	Eastern	No NQC - Pmax	Market
NA	28105	OCTILOG5	13.8	107.00	1	Eastern	No NQC - Pmax	Market
NA	28106	OCTILOG6	13.8	107.00	1	Eastern	No NQC - Pmax	Market
NA	28107	OCTILOG7	13.8	107.00	1	Eastern	No NQC - Pmax	Market
NA	28108	OCTILOG8	13.8	107.00	1	Eastern	No NQC - Pmax	Market
NA	28305	ETWPKGEN	13.8	47.2	1	Eastern	No NQC - Pmax	Market
NA	28307	MRLPKGEN	13.8	47.2	1	Eastern	No NQC - Pmax	Market
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_7_CT	25203	ANAHEIMG	13.8	46.00	1	Western		MUNI
ARCOGN_2_UNITS	24018	BRIGEN	13.8	35.00	1	Western, Barre	No NQC - historical data	Market
ARCOGN_2_UNITS	24011	ARCO 1G	13.8	62.63	1	Western, Barre		QF/Selfgen
ARCOGN_2_UNITS	24012	ARCO 2G	13.8	62.63	2	Western, Barre		QF/Selfgen
ARCOGN_2_UNITS	24013	ARCO 3G	13.8	62.63	3	Western, Barre		QF/Selfgen
ARCOGN_2_UNITS	24014	ARCO 4G	13.8	62.63	4	Western, Barre		QF/Selfgen
ARCOGN_2_UNITS	24163	ARCO 5G	13.8	31.31	5	Western, Barre		QF/Selfgen
ARCOGN_2_UNITS	24164	ARCO 6G	13.8	31.31	6	Western, Barre		QF/Selfgen
BRDWAY_7_UNIT 3	28007	BRODWYSC	13.8	65.00	1	Western, Barre		MUNI
CENTER_2_QF	24203	CENTER S	66	25.27	1	Western		QF/Selfgen
CHEVMN_2_UNITS	24022	CHEVGEN1	13.8	0.91	1	Western, Barre		QF/Selfgen
CHEVMN_2_UNITS	24023	CHEVGEN2	13.8	0.92	2	Western, Barre		QF/Selfgen
CHINO_6_CIMGEN	24026	CIMGEN	13.8	25.65	1	Western		QF/Selfgen
ELLIS_2_QF	24197	ELLIS	66	0.13	1	Western		QF/Selfgen

ELSEGN_7_UNIT 3	24047	ELSEG3 G	18	335.00	3	Western, Barre		Market
ELSEGN_7_UNIT 4	24048	ELSEG4 G	18	335.00	4	Western, Barre		Market
GLNARM_7_UNIT 1	28005	PASADNA1	13.8	22.30	1	Western, Barre		MUNI
GLNARM_7_UNIT 2	28006	PASADNA2	13.8	22.30	1	Western, Barre		MUNI
GLNARM_7_UNIT 3	28005	PASADNA1	13.8	44.83	1	Western, Barre		MUNI
GLNARM_7_UNIT 4	28006	PASADNA2	13.8	42.42	1	Western, Barre		MUNI
HARBGN_7_UNITS	24062	HARBOR G	13.8	76.27	1	Western, Barre		Market
HARBGN_7_UNITS	24062	HARBOR G	13.8	11.86	2	Western, Barre		Market
HARBGN_7_UNITS	25510	HARBORG4	4.16	11.86	3	Western, Barre		Market
HINSON_6_CARBG	24020	CARBOGEN	13.8	29.00	1	Western, Barre		Market
HINSON_6_QF	24064	HINSON	66	0.00	1	Western, Barre	No NQC - historical data	QF/Selfgen
HINSON_6_SERRGN	24139	SERRFGEN	13.8	25.90	1	Western, Barre		QF/Selfgen
HNTGBH_7_UNIT 1	24066	HUNT1 G	13.8	225.80	1	Western, Barre		Market
HNTGBH_7_UNIT 2	24067	HUNT2 G	13.8	225.80	2	Western, Barre		Market
HNTGBH_7_Unit 3	24167	HUNT3 G	13.8	225.00	3	Western, Barre		Market
HNTGBH_7_Unit 4	24168	HUNT4 G	13.8	227.00	4	Western, Barre		Market
LAFRES_6_QF	24073	LA FRESA	66	5.38	1	Western		QF/Selfgen
LAGBEL_6_QF	24075	LAGUBELL	66	10.85	1	Western		QF/Selfgen
LGHTHP_6_ICEGEN	24070	ICEGEN	13.8	44.67	1	Western, Barre		QF/Selfgen
LGHTHP_6_QF	24083	LITEHIPE	66	0.43	1	Western		QF/Selfgen
MESAS_2_QF	24209	MESA CAL	66	1.47	1	Western		QF/Selfgen
MOBGEN_6_UNIT 1	24094	MOBGEN	13.8	45.00	1	Western, Barre	No NQC - historical data	QF/Selfgen
NA	24027	COLDGEN	13.8	0.00	1	Western, Barre	No NQC - historical data	Market
NA	24028	DELAMO	66	0.00	1	Western		QF/Selfgen
NA	24060	GROWGEN	13.8	0.00	1	Western, Barre	No NQC - historical data	Market
NA	24208	LCIENEGA	66	0.00	1	Western		QF/Selfgen
OLINDA_2_QF	24211	OLINDA	66	4.75	1	Western		QF/Selfgen
PULPGN_6_UNIT	24120	PULPGEN	13.8	35.00	1	Western, Barre	No NQC - historical data	Market
REDOND_7_UNIT 5	24121	REDON5 G	18	178.87	5	Western, Barre		Market
REDOND_7_UNIT 6	24122	REDON6 G	18	175.00	6	Western, Barre		Market
REDOND_7_UNIT 7	24123	REDON7 G	20	493.24	7	Western, Barre		Market
REDOND_7_UNIT 8	24124	REDON8 G	20	495.90	8	Western, Barre		Market
RHONDO_2_QF	24213	RIOHONDO	66	1.50	1	Western		QF/Selfgen
SANTGO_6_COYOTE	24133	SANTIAGO	66	9.99	1	Western, Barre		Market
SONGS_7_UNIT 2	24129	S.ONOFR2	22	1,122.00	2	Western		Nuclear
SONGS_7_UNIT 3	24130	S.ONOFR3	22	1,124.00	3	Western		Nuclear
WALNUT_6_HILLGEN	24063	HILLGEN	13.8	46.97	1	Western		QF/Selfgen
WALNUT_6_QF	24157	WALNUT	66	7.49	1	Western		QF/Selfgen
NA	24239	MALBRG1G	13.8	43.00	C1	Western, Barre	No NQC - Pmax	Market
NA	24240	MALBRG2G	13.8	43.00	C2	Western, Barre	No NQC - Pmax	Market
NA	24241	MALBRG3G	13.8	50.00	S3	Western, Barre	No NQC - Pmax	Market
NA	24078	LBEACH1G	13.8	63.00	1	Western, Barre	No NQC - Pmax	Market
NA	24170	LBEACH2G	13.8	56.50	2	Western, Barre	No NQC - Pmax	Market
NA	24171	LBEACH3G	13.8	56.50	3	Western, Barre	No NQC - Pmax	Market
NA	24172	LBEACH4G	13.8	56.50	4	Western, Barre	No NQC - Pmax	Market
NA	24173	LBEACH5G	13.8	56.50	5	Western, Barre	No NQC - Pmax	Market
NA	24174	LBEACH6G	13.8	56.50	6	Western, Barre	No NQC - Pmax	Market
NA	24079	LBEACH7G	13.8	63.00	7	Western, Barre	No NQC - Pmax	Market
NA	24080	LBEACH8G	13.8	82.50	8	Western, Barre	No NQC - Pmax	Market
NA	24081	LBEACH9G	13.8	63.00	9	Western, Barre	No NQC - Pmax	Market
NA	28308	CTRPKGEN	13.8	47.2	1	Western	No NQC - Pmax	Market
NA	28309	BARPKGEN	13.8	47.2	1	Western	No NQC - Pmax	Market

Major new projects modeled:

1. Palo Verde-Devers #2 500 kV line
2. Rancho Vista 500 kV substation
3. Green Path North (LADWP)
4. Vincent-Mira Loma 500 kV (part of Tehachapi Upgrade) – 2012 only

Critical Contingency Analysis Summary

LA Basin overall:

Due to the addition of the Vincent-Mira Loma 500 kV line together with (LADWPs) Victorville-Hesperia-Devers LA-Devers (Green path north) 500 kV line as well as Palo Verde-Devers #2 500 kV line the imports into the LA Basin local area have increased considerably. Given that the Maximum Import Capacity is maintained fixed (see current import allocation process) the CAISO can only dispatch units outside this area and within SCE/SDG&E territory (path 26 has been maximized). The study has run out of generation in the “other SCE/SG&E areas” without being able to reach a limit in the LA Basin local area. It is estimated that the local capacity need is below 7000 MW and will not be bounding since the southern system will reach its zonal limits before reaching the local area limits. Further detailed analysis will be done at a later date part of the CAISO grid expansion process and will greatly depend on the new path ratings established after these new projects become operational as well as the location of future generation within SCE/SDG&E territory.

Barre Sub-area:

The most critical contingency for Barre sub-area within LA Basin is the loss of the two S. Onofre - Santiago 230 kV lines followed by the loss of Barre – Ellis 230kV line, which would result in voltage collapse. This limiting contingency establishes a local capacity need of 2,946 MW in 2010 and 3930 MW in 2012 (includes 431 MW of QF and 197 of Muni generation) as the minimum capacity necessary for reliable load serving capability within this sub-area.

LA Basin Overall Requirements:

	QF/Wind (MW)	Muni (MW)	Nuclear (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	791	508	2246	9590	13135

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹⁸	7000	0	7000
Category C (Multiple) ¹⁹	7000	0	7000

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ¹⁸	7000	0	7000
Category C (Multiple) ¹⁹	7000	0	7000

9. Big Creek/Ventura Area

Area Definition

The transmission tie lines into the Big Creek/Ventura Area are:

- 1) Vincent-Antelope 230 kV Line
- 2) Mesa-Antelope 230 kV Line
- 3) Sylmar-Pardee #1 230 kV Line
- 4) Sylmar-Pardee #2 230 kV Line
- 5) Eagle Rock-Pardee #1 230 kV Line
- 6) Vincent-Pardee 230 kV Line
- 7) Vincent-Santa Clara 230 kV Line

The substations that delineate the Big Creek/Ventura Area are:

- 1) Vincent is out Antelope is in
- 2) Mesa is out Antelope is in
- 3) Sylmar is out Pardee is in
- 4) Sylmar is out Pardee is in
- 5) Eagle Rock is out Pardee is in
- 6) Vincent is out Pardee is in
- 7) Vincent is out Santa Clara is in

¹⁸ A single contingency means that the system will be able to 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 MORC.

¹⁹ Multiple contingencies means that the system will be able to 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 MORC.

Total 2010 busload within the defined area is 5,256 MW with 105 MW of losses and 405 MW of pumps resulting in total load + losses + pumps of 5,766 MW. Total 2012 busload within the defined area is 5,522 MW with 118 MW of losses and 405 MW of pumps resulting in total load + losses of 6,045 MW.

Total units and qualifying capacity available in the Big Creek/Ventura area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	KV	NQC	UNIT ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
ALAMO_6_UNIT	25653	ALAMO SC	13.8	18	1	Big Creek		Market
ANTLPE_2_QF	24457	ARBWIND	66	21.8	1	Big Creek		Wind
ANTLPE_2_QF	28506	BREEZE1	12	4.5	1	Big Creek		Wind
ANTLPE_2_QF	28507	BREEZE2	12	8	1	Big Creek		Wind
ANTLPE_2_QF	24460	DUTCHWND	66	14	1	Big Creek		Wind
ANTLPE_2_QF	24458	ENCANWND	66	112.9	1	Big Creek		Wind
ANTLPE_2_QF	24459	FLOWIND	66	40.8	1	Big Creek		Wind
ANTLPE_2_QF	28501	MIDWIND	12	18	1	Big Creek		Wind
ANTLPE_2_QF	24465	MORWIND	66	56	1	Big Creek		Wind
ANTLPE_2_QF	28503	NORTHWND	12	19.4	1	Big Creek		Wind
ANTLPE_2_QF	24491	OAKWIND	66	18	1	Big Creek		Wind
ANTLPE_2_QF	28502	SOUTHWND	12	6.6	1	Big Creek		Wind
ANTLPE_2_QF	28504	ZONDWND1	12	13.2	1	Big Creek		Wind
ANTLPE_2_QF	28505	ZONDWND2	12	12.8	1	Big Creek		Wind
APPGEN_6_UNIT 1	24009	APPGEN1G	13.8	60.5	1	Big Creek		Market
APPGEN_6_UNIT 1	24010	APPGEN2G	13.8	60.5	2	Big Creek		Market
BIGCRK_2_PROJCT	24314	B CRK 4	11.5	48.96	41	Big Creek		Market
BIGCRK_2_PROJCT	24314	B CRK 4	11.5	49.15	42	Big Creek		Market
BIGCRK_2_PROJCT	24315	B CRK 8	13.8	23.70	81	Big Creek		Market
BIGCRK_2_PROJCT	24315	B CRK 8	13.8	42.74	82	Big Creek		Market
BIGCRK_2_PROJCT	24306	B CRK1-1	7.2	19.33	1	Big Creek		Market
BIGCRK_2_PROJCT	24306	B CRK1-1	7.2	20.98	2	Big Creek		Market
BIGCRK_2_PROJCT	24307	B CRK1-2	13.8	20.98	3	Big Creek		Market
BIGCRK_2_PROJCT	24307	B CRK1-2	13.8	30.31	4	Big Creek		Market
BIGCRK_2_PROJCT	24308	B CRK2-1	13.8	49.35	1	Big Creek		Market
BIGCRK_2_PROJCT	24308	B CRK2-1	13.8	50.51	2	Big Creek		Market
BIGCRK_2_PROJCT	24309	B CRK2-2	7.2	18.17	3	Big Creek		Market
BIGCRK_2_PROJCT	24309	B CRK2-2	7.2	19.14	4	Big Creek		Market
BIGCRK_2_PROJCT	24310	B CRK2-3	7.2	16.51	5	Big Creek		Market
BIGCRK_2_PROJCT	24310	B CRK2-3	7.2	17.97	6	Big Creek		Market
BIGCRK_2_PROJCT	24311	B CRK3-1	13.8	34.00	1	Big Creek		Market
BIGCRK_2_PROJCT	24311	B CRK3-1	13.8	34.00	2	Big Creek		Market
BIGCRK_2_PROJCT	24312	B CRK3-2	13.8	34.00	3	Big Creek		Market
BIGCRK_2_PROJCT	24312	B CRK3-2	13.8	39.83	4	Big Creek		Market
BIGCRK_2_PROJCT	24313	B CRK3-3	13.8	37.89	5	Big Creek		Market
BIGCRK_2_PROJCT	24319	EASTWOOD	13.8	201.09	1	Big Creek		Market
BIGCRK_2_PROJCT	24317	MAMOTH1G	13.8	90.83	1	Big Creek		QF/Selfgen
BIGCRK_2_PROJCT	24318	MAMOTH2G	13.8	90.83	2	Big Creek		QF/Selfgen
BIGCRK_2_PROJCT	24323	PORTAL	4.8	9.33	1	Big Creek		Market
GOLETA_6_ELLWOD	28004	ELLWOOD	13.8	54	1	Big Creek		Market
KERRGN_1_UNIT 1	24437	KERNRVR	66	23.5	1	Big Creek		Market

LEBECS_2_UNITS	28051	PSTRIAG1	18	157.6	G1	Big Creek		Market
LEBECS_2_UNITS	28052	PSTRIAG2	18	157.6	G2	Big Creek		Market
LEBECS_2_UNITS	28054	PSTRIAG3	18	157.6	G3	Big Creek		Market
LEBECS_2_UNITS	28053	PSTRIAS1	18	162.2	S1	Big Creek		Market
LEBECS_2_UNITS	28055	PSTRIAS2	18	78.8	S2	Big Creek		Market
MONLTH_6_BOREL	24456	BOREL	66	9.24	1	Big Creek		QF/Selfgen
NA	24422	PALMDALE	66	1	1	Big Creek	No NQC - historical data	Market
OMAR_2_UNITS	24102	OMAR 1G	13.8	69.44	1	Big Creek		QF/Selfgen
OMAR_2_UNITS	24103	OMAR 2G	13.8	69.44	2	Big Creek		QF/Selfgen
OMAR_2_UNITS	24104	OMAR 3G	13.8	69.44	3	Big Creek		QF/Selfgen
OMAR_2_UNITS	24105	OMAR 4G	13.8	69.44	4	Big Creek		QF/Selfgen
PANDOL_6_UNIT 1	24113	PANDOL	13.8	27.5	1	Big Creek	No NQC - historical data	QF/Selfgen
PANDOL_6_UNIT 2	24113	PANDOL	13.8	22.4	2	Big Creek	No NQC - historical data	QF/Selfgen
SNCLRA_6_PROCGN	24119	PROCGEN	13.8	55.62	1	Big Creek	No NQC - historical data	Market
SYCAMR_2_UNITS	24143	SYCCYN1G	13.8	76.5	1	Big Creek		QF/Selfgen
SYCAMR_2_UNITS	24144	SYCCYN2G	13.8	76.3	2	Big Creek		QF/Selfgen
SYCAMR_2_UNITS	24145	SYCCYN3G	13.8	76.3	3	Big Creek		QF/Selfgen
SYCAMR_2_UNITS	24146	SYCCYN4G	13.8	76.3	4	Big Creek		QF/Selfgen
TENGEN_6_UNIT 1	24148	TENNGEN1	13.8	24.2	1	Big Creek	No NQC - historical data	QF/Selfgen
TENGEN_6_UNIT 2	24149	TENNGEN2	13.8	17.5	2	Big Creek	No NQC - historical data	QF/Selfgen
VESTAL_6_ULTRGN	24150	ULTRAGEN	13.8	34.92	1	Big Creek		QF/Selfgen
WARNE_2_UNIT	25651	WARNE1	13.8	19.5	1	Big Creek		Market
WARNE_2_UNIT	25652	WARNE2	13.8	19.5	1	Big Creek		Market
NA	24436	GOLDTOWN	66	13	1	Big Creek		Market
NA	28008	LAKEGEN	13.8	11	1	Big Creek		QF/Selfgen
NA	24118	PITCHGEN	13.8	30	1	Big Creek		QF/Selfgen
NA	24152	VESTAL	66	50	1	Big Creek		QF/Selfgen
MNDALY_7_UNIT 1	24089	MANDLY1G	13.8	215	1	Ventura		Market
MNDALY_7_UNIT 2	24090	MANDLY2G	13.8	215.29	2	Ventura		Market
MNDALY_7_UNIT 3	24222	MANDLY3G	16	130	3	Ventura		Market
ORMOND_7_UNIT 1	24107	ORMOND1G	26	741.27	1	Ventura		Market
ORMOND_7_UNIT 2	24108	ORMOND2G	26	775	2	Ventura		Market
SNCLRA_6_OXGEN	24110	OXGEN	13.8	48.5	1	Ventura		QF/Selfgen
SNCLRA_6_WILLMT	24159	WILLAMET	13.8	27.81	1	Ventura	No NQC - historical data	QF/Selfgen
NA	24127	S.CLARA	66	49	1	Ventura		QF/Selfgen
NA	28306	MCGPKGEN	13.8	47.2	1	Ventura	No NQC - Pmax	Market

Major new projects modeled:

1. Sylmar – Pardee 230 kV Upgrade
2. Green Path North (LADWP)

Critical Contingency Analysis Summary

Big Creek/Ventura overall:

The most critical contingency for the Big Creek – Ventura sub-area is the loss of the Lugo - Victorville 500 kV line followed by loss of one of the Sylmar - Pardee 230 kV line, which would thermally overload the remaining Sylmar - Pardee 230 kV line. This limiting

contingency establishes a local capacity need of 2322 MW in 2010 and 2656 MW (which includes 1117 MW of QF and 346 MW of Wind generation) in 2012 as the minimum capacity necessary for reliable load serving capability within this area. The single most critical contingency is the loss of Sylmar-Pardee #1 (or # 2) line With one of the Eastwood or Mandalay Unit # 1 or #2 out of service, which could thermally overload the remaining Sylmar-Pardee #1 or #2 230 kV line. This limiting contingency establishes a Local Capacity Need of 2045 MW in 2010 and 2350 MW (includes 1117 MW of QF and 346 MW of Wind generation) in 2012. (If Pastoria EC or one of the Ormond Beach units are considered the biggest unit out-of-service then the requirement will go up by about 535 MW.)

Effectiveness factors:

The following table has units that have at least 5% effectiveness to the above-mentioned constraint within the Big Creek/Ventura area:

Gen Bus	Gen Name	Gen ID	Eff Fctr (%)
24148	TENNGEN1	1	41
24009	APPGEN1G	1	40
24010	APPGEN2G	2	40
24107	ORMOND1G	1	40
24108	ORMOND2G	2	40
24118	PITCHGEN	1	39
24149	TENNGEN2	2	38
24089	MANDLY1G	1	37
24090	MANDLY2G	2	37
25651	WARNE1	1	36
25652	WARNE2	1	36
28055	PSTRIAS2	S2	35
28054	PSTRIAG3	G3	35
28053	PSTRIAS1	S1	35
28052	PSTRIAG2	G2	35
28051	PSTRIAG1	G1	35
25605	EDMON1AP	1	35
25606	EDMON2AP	2	35
25607	EDMON3AP	3	35
25607	EDMON3AP	4	35
25608	EDMON4AP	5	35
25608	EDMON4AP	6	35
25609	EDMON5AP	7	35
25609	EDMON5AP	8	35
25610	EDMON6AP	9	35

25610	EDMON6AP	10	35
25611	EDMON7AP	11	35
25611	EDMON7AP	12	35
24222	MANDLY3G	3	34
24110	OXGEN	1	34
24119	PROCGEN	1	34
24159	WILLAMET	1	34
25614	OSO A P	1	34
25614	OSO A P	2	34
25615	OSO B P	7	34
25615	OSO B P	8	34
25653	ALAMO SC	1	34
24127	S.CLARA	1	34
28004	ELLWOOD	1	34
24319	EASTWOOD	1	34
24306	B CRK1-1	1	34
24306	B CRK1-1	2	34
24307	B CRK1-2	3	34
24307	B CRK1-2	4	34
24308	B CRK2-1	1	34
24308	B CRK2-1	2	34
24309	B CRK2-2	3	34
24309	B CRK2-2	4	34
24310	B CRK2-3	5	34
24310	B CRK2-3	6	34
24311	B CRK3-1	1	34
24311	B CRK3-1	2	34
24312	B CRK3-2	3	34
24312	B CRK3-2	4	34
24313	B CRK3-3	5	34
24314	B CRK 4	41	34
24314	B CRK 4	42	34
24315	B CRK 8	81	34
24315	B CRK 8	82	34
24317	MAMOTH1G	1	34
24318	MAMOTH2G	2	34
28306	MCGPKGEN	1	34
25612	EDMON8AP	13	33
25612	EDMON8AP	14	33
24113	PANDOL	1	33
24113	PANDOL	2	33
28008	LAKEGEN	1	33
24150	ULTRAGEN	1	33
24105	OMAR 4G	4	31
24143	SYCCYN1G	1	31
24144	SYCCYN2G	2	31
24145	SYCCYN3G	3	31
24146	SYCCYN4G	4	31

24152	VESTAL	1	31
24102	OMAR 1G	1	30
24103	OMAR 2G	2	30
24104	OMAR 3G	3	30
24437	KERNRVR	1	21
24436	GOLDTOWN	1	13
24457	ARBWIND	1	12
24459	FLOWIND	1	12
24460	DUTCHWND	1	12
24465	MORWIND	1	12
25617	PEARBMAP	1	11
25617	PEARBMAP	2	11
25620	PEARBMDP	9	11
24458	ENCANWND	1	11
25618	PEARBMBP	5	10
25618	PEARBMBP	6	10
25619	PEARBMCP	7	10
25619	PEARBMCP	8	10
24456	BOREL	1	10
28505	ZONDWND2	1	10
28501	MIDWIND	1	9
28503	NORTHWND	1	9
28504	ZONDWND1	1	9

Big Creek-Rector Sub-area:

The most critical contingency for the Big Creek - Rector sub-area is the loss of the Rector - Vestal 230 kV line with the Eastwood unit out of service, which would thermally overload the remaining Rector-Vestal 230 kV line. This limiting contingency establishes a local capacity need of 434 MW in 2010 and 504 MW in 2012 (which includes 182 MW of QF generation) as the minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

All units within the sub-area have the same effectiveness factor: Big Creek units, Mammoth Units, Eastwood and Potal.

Big Creek-Rector-Vestal Sub-area:

The most critical contingency for the Big Creek – Rector – Vestal sub-area is the loss of the Magunden - Vestal 230 kV line with the Eastwood unit out of service, which would

thermally overload the remaining Magunden-Vestal 230 kV line. This limiting contingency establishes a local capacity need of 581 MW in 2010 and 651 MW in 2012 (which includes 329 MW of QF generation) as the minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

The following table has units within Big Creek that are at least 5% effective to the constraint on the Magunden – Vestal 230 kV line.

Gen Bus	Gen Name	Gen ID	Eff Fctr (%)
24113	PANDOL	1	43
24113	PANDOL	2	43
28008	LAKEGEN	1	43
24150	ULTRAGEN	1	43
24152	VESTAL	1	43
24319	EASTWOOD	1	26
24323	POTAL	1	26
24306	B CRK1-1	1	26
24306	B CRK1-1	2	26
24307	B CRK1-2	3	26
24307	B CRK1-2	4	26
24308	B CRK2-1	1	26
24308	B CRK2-1	2	26
24309	B CRK2-2	3	26
24309	B CRK2-2	4	26
24310	B CRK2-3	5	26
24310	B CRK2-3	6	26
24311	B CRK3-1	1	26
24311	B CRK3-1	2	26
24312	B CRK3-2	3	26
24312	B CRK3-2	4	26
24313	B CRK3-3	5	26
24315	B CRK 8	81	26
24315	B CRK 8	82	26
24314	B CRK 4	41	25
24314	B CRK 4	42	25
24317	MAMOTH1G	1	25
24318	MAMOTH2G	2	25

Big Creek/Ventura Overall Requirements:

	QF (MW)	Wind (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	1117	346	3980	5443

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ²⁰	2045	0	2045
Category C (Multiple) ²¹	2322	0	2322

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ²⁰	2350	0	2350
Category C (Multiple) ²¹	2656	0	2656

10. San Diego Area

Area Definition

The transmission tie lines forming a boundary around San Diego include:

- 1) Imperial Valley – Miguel 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 – Central 500 kV Line

The substations that delineate the San Diego Area are:

- 1) Imperial Valley is out Miguel is in
- 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
- 6) San Onofre is out Talega is in
- 7) San Onofre is out Talega is in
- 8) Imperial Valley is out Central is in

Total 2010 busload within the defined area: 4980 MW with 152 MW of losses resulting in total load + losses of 5132 MW. Total 2012 busload within the defined area: 5114 MW with 154 MW of losses resulting in total load + losses of 5268 MW.

²⁰ A single contingency means that the system will be able to 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 MORC.

²¹ Multiple contingencies means that the system will be able to 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 MORC.

Total units and qualifying capacity available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	KV	NQC	UNIT ID	NQC Comments	CAISO Tag
BORDER_6_UNITA1	22149	CALPK_BD	13.8	43.80	1		Market
CBRLLO_6_PLSTP1	22092	CABRILLO	69	3.50	1		QF/Selfgen
CHILLS_1_SYCLFL	22120	CARLTNHS	138	1.00	1		QF/Selfgen
CHILLS_7_UNITA1	22120	CARLTNHS	138	2.50	2		QF/Selfgen
CPSTNO_7_PRMADS	22112	CAPISTRANO	138	4.10	1		QF/Selfgen
CRSTWD_6_KUMYAY	22915	KUMEYAAY	34.5	8.32	1	Monthly NQC - used August for LCR	Wind
DIVSON_6_NSQF	22172	DIVISION	69	47.00	1		QF/Selfgen
EGATE_7_NOCITY	22204	EASTGATE	69	1.00	1		QF/Selfgen
ELCAJN_6_UNITA1	22150	CALPK_EC	13.8	42.20	1		Market
ELCAJN_7_GT1	22212	ELCAJNGT	12.5	13.00	1		Market
ENCINA_7_EA1	22233	ENCINA 1	14.4	106.00	1		Market
ENCINA_7_EA2	22234	ENCINA 2	14.4	103.00	1		Market
ENCINA_7_EA3	22236	ENCINA 3	14.4	109.00	1		Market
ENCINA_7_EA4	22240	ENCINA 4	22	299.00	1		Market
ENCINA_7_EA5	22244	ENCINA 5	24	329.00	1		Market
ENCINA_7_GT1	22248	ENCINAGT	12.5	14.00	1		Market
ESCND0_6_PL1X2	22257	MMC_ES	13.8	35.50	1		Market
ESCND0_6_UNITB1	22153	CALPK_ES	13.8	45.50	1		Market
ESCO_6_GLMQF	22332	GOALLINE	69	50.00	1		QF/Selfgen
KEARNY_7_KY1	22377	KEARNGT1	12.5	15.00	1		Market
KEARNY_7_KY2	22373	KEARN2AB	12.5	14.00	2		Market
KEARNY_7_KY2	22373	KEARN2AB	12.5	14.00	1		Market
KEARNY_7_KY2	22374	KEARN2CD	12.5	14.00	1		Market
KEARNY_7_KY2	22374	KEARN2CD	12.5	13.00	2		Market
KEARNY_7_KY3	22375	KEARN3AB	12.5	15.00	2		Market
KEARNY_7_KY3	22375	KEARN3AB	12.5	14.00	1		Market
KEARNY_7_KY3	22376	KEARN3CD	12.5	14.00	1		Market
KEARNY_7_KY3	22376	KEARN3CD	12.5	14.00	2		Market
KYCORA_7_UNIT 1	22384	KYOCERA	69	0.00	1		QF/Selfgen
LARKSP_6_UNIT 1	22074	LRKSPBD1	13.8	46.00	1		Market
LARKSP_6_UNIT 2	22075	LRKSPBD2	13.8	46.00	1		Market
MRGT_6_MMAREF	22486	MFE_MR1	13.8	46.60	1		Market
MRGT_7_UNITS	22488	MIRAMRGT	12.5	17.00	1		Market
MRGT_7_UNITS	22488	MIRAMRGT	12.5	16.00	2		Market
MSHGTS_6_MMARLF	22448	MESAHGTS	69	2.70	1		QF/Selfgen
NIMTG_6_NIQF	22576	NOISLMTR	69	35.10	1		QF/Selfgen
OTAY_6_PL1X2	22617	MMC_OY	13.8	35.50	1		Market
OTAY_6_UNITB1	22604	OTAY	69	2.90	1		QF/Selfgen
PALOMR_2_PL1X3	22262	PENCT1	18	155.42	1		Market
PALOMR_2_PL1X3	22263	PENCT2	18	155.42	1		Market
PALOMR_2_PL1X3	22265	PENST	18	230.63	1		Market
PTLOMA_6_NTCCGN	22660	POINTLMA	69	2.40	2		QF/Selfgen
PTLOMA_6_NTCQF	22660	POINTLMA	69	21.90	1		QF/Selfgen
SAMPSN_6_KELCO1	22704	SAMPSON	12.5	14.10	1		QF/Selfgen
SMRCOS_6_UNIT 1	22724	SANMRCOS	69	1.10	1		QF/Selfgen
SOBAY_7_GT1	22776	SOUTHBGT	12.5	13.00	1	Not modeled	Market
SOBAY_7_SY1	22780	SOUTHBY1	15	145.00	1	Not modeled	Market
SOBAY_7_SY2	22784	SOUTHBY2	15	149.00	1	Not modeled	Market
SOBAY_7_SY3	22788	SOUTHBY3	20	174.00	1	Not modeled	Market
SOBAY_7_SY4	22792	SOUTHBY4	20	221.00	1	Not modeled	Market
MSSION_2_QF	22532	MURRAY	69	0.20	1	No NQC - historical data	QF/Selfgen
MSSION_2_QF	22680	R.SNTAFE	69	0.80	1	No NQC - historical data	QF/Selfgen
MSSION_2_QF	22496	MISSION	69	2.10	1		QF/Selfgen
MSSION_2_QF	22760	SHADOWR	138	0.10	1	No NQC - historical data	QF/Selfgen

MSSION_2_QF	22008	ASH	69	0.90	1	No NQC - historical data	QF/Selfgen
NA	22625	LKHODG1	13.8	20.00	1	No NQC - Pmax	Market
NA	22626	LKHODG2	13.8	20.00	2	No NQC - Pmax	Market
NA	22605	OTAYMGT1	18	174	1	No NQC - Pmax	Market
NA	22606	OTAYMGT2	18	174	1	No NQC - Pmax	Market
NA	22607	OTAYMST1	16	225	1	No NQC - Pmax	Market
NA	22628	PA99MWQ1	13.8	41.5	Q1	No NQC - Pmax	Market
NA	22629	PA99MWQ2	13.8	41.5	Q2	No NQC - Pmax	Market
NA	22433	MAR49MW	13.8	50.00	Q	No NQC - Pmax	Market

Additional units available in 2010-12 for the Greater Imperial Valley-San Diego area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	NQC Comments	CAISO Tag
TERMEX_2_CTG1	22982	IV GEN2	18	155	1		Market
TERMEX_2_CTG2	22983	IVGEN2	18	155	1		Market
TERMEX_2_PL1X3	22981	IV GEN1	18	280	1		Market
LAROA2_2_UNITA1	22996	INTBST	18	157	1		Market
LAROA2_2_UNITA1	22997	INTBCT	16	165	1		Market
LAROA1_2_UNITA1	20187	LRP-U1	16	165	1		Market
NA	22999	SOLAR	230	100	1	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	2	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	3	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	4	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	5	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	6	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	7	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	8	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	9	No NQC - Pmax	Market
2010-2012 Additional		Total		1977			

Major new projects modeled:

1. Sunrise 500 kV line
2. Otay Mesa (with 230 kV transmission line upgrades past Miguel)
3. South Bay area transmission upgrades due to South Bay PP retire

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 . This limiting contingency establishes a local capacity need of 93 MW (including 0 MW of QF and 38 MW of deficiency) in 2010 and 100 MW (includes 0 MW of QF and 45 MW of deficiency) in 2012.

Effectiveness factors:

All units within this sub-area (El Cajon Peaker and El Cajon GT) are needed therefore no effectiveness factor is required.

Rose Canyon Sub-area

The most critical contingency for the Rose Canyon Sub-area is the loss of Old Town-Pacific Beach 69 kV line (TL613) followed by the loss of Rose Canyon-Penasquitos 69 kV line (TL661), which would thermally overload the Eastgate – Rose Canyon 69 kV line (TL6927). This limiting contingency establishes a local capacity need of 127 MW (including 0 MW of QF) in 2010 and 151 MW (includes 0 MW of QF and 24 MW of deficiency) in 2012.

Effectiveness factors:

All units within this area (Kearny GTs) are needed therefore no effectiveness factor is required.

Bernardo Sub-area

The most critical contingency for the Bernardo Sub-area is the loss of Artesian - Sycamore 69 kV line (TL6920) followed by the loss of Poway-Rancho Carmel 69 kV line (TL648), which would thermally overload the Felicita Tap – Bernardo 69 kV line (TL689). This limiting contingency establishes a local capacity need of 75 MW (including 0 MW of QF and 35 MW of deficiency) in 2010 and 86 MW (includes 0 MW of QF and 46 MW of deficiency) in 2012.

Effectiveness factors:

All units within this area (Lake Hodge) are needed therefore no effectiveness factor is required.

Escondido Sub-area

The most critical contingency for the Escondido sub-area is the loss of Poway-Pomerado 69 kV line (TL6913) followed by the loss of Escondido Bank #71 230/69 kV,

which would thermally overload the Escondido Bank #70 230/60 kV. This limiting contingency establishes a local capacity need of 70 MW in 2010 and 100 MW in 2012 (including 50 MW of QF).

Effectiveness factors:

All units within this area (Escondido Cal peak, MMC and Goal line) have about the same effectiveness factors.

Border-Otay Sub-area

The most critical contingency for the Border – Otay Sub-area is the loss of Border – Miguel 69 kV line (TL6910) followed by the loss of Imperial Beach-Otay-Syo 69 kV line (TL623), which would thermally overload Otay-Otay Lake Tap (TL649). This limiting contingency establishes a local capacity need of 32 MW in 2010 and 34 MW in 2012 (includes 0 MW of QF).

Effectiveness factors:

All units in this sub-area (Boarder Cal peak and Larkspur) have the same effectiveness factors.

San Diego overall:

Starting in 2010 the most limiting contingency in the San Diego area is described by the outage of the 500 kV Southwest Power Link (SWPL) between Imperial Valley and Miguel Substations with the Otay Mesa Combined-Cycle Power plant (561 MW) out of service while staying within the maximum import achieved after the new Imperial Valley-Central 500 kV is in service (3,500 MW). This limiting contingency establishes a local capacity need of 2193 MW in 2010 and 2329 MW in 2012 (which includes 183 MW of QF generation and 8 MW of wind) as the minimum capacity necessary for reliable load serving capability within this area. The outage of 500 kV Southwest Power Link (SWPL) between Imperial Valley and Miguel Substations followed by Imperial Valley-Central 500 kV line will push the flow on South of San Onofre (WECC Path 44) to above its 2,500 MW rating; however all equipment will be within Applicable Rating. For consideration of

LCR and in order to return the system to the import capability rating of Path 44 to 2,500 MW (within 30 minutes) the reliability criteria would permit load drop in San Diego if additional resource capacity in the area is not available.

Also starting in 2010 the most limiting contingency in the Greater Imperial Valley-San Diego area is described by the outage of 500 kV Southwest Power Link (SWPL) between Imperial Valley and N. Gila Substations over-lapping with an outage of the Otoy Mesa Combined-Cycle Power plant (561 MW) while staying within the South of San Onofre (WECC Path 44) non-simultaneous import capability rating of 2,500 MW. This limiting contingency establishes a local capacity need of 3193 MW in 2010 and 3329 MW in 2012 (which includes 183 MW of QF generation and 8 MW of wind) as the minimum capacity necessary for reliable load serving capability within this area in order to reduce Path 44 to its non-simultaneous rating of 2,500 MW within 30 minutes.

Effectiveness factors:

All units within this area have the same effectiveness factor.

San Diego Overall Requirements:

	QF (MW)	Wind (MW)	Market (MW)	Max. Qualifying Capacity (MW)
Available generation	193	8	2762	2963

2010	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ²²	2193	0	2193
Category C (Multiple) ²³	2193	73	2266

2012	Existing Generation Capacity Needed (MW)	Deficiency (MW)	Total MW Requirement
Category B (Single) ²²	2329	0	2329
Category C (Multiple) ²³	2329	115	2444

²² A single contingency means that the system will be able to 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 MORC.

²³ Multiple contingencies means that the system will be able to 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 MORC.