



California ISO
Your Link to Power

California Independent
System Operator

**OLD THERMAL GENERATION
PHASE 1 REPORT
(2008-2012 Study Results)**

February 29, 2008

System, Zonal and Local Capacity Technical Analysis Overview and Study Results

I. Executive Summary

Within the California Independent System Operator (ISO) control area and the State of California, there are a significant number of thermal generating units that use once-through-cooling (O-T-C) technology, utilizing large amounts of ocean or estuarial water. The O-T-C process is used for condensing low-pressure steam to water as part of the thermal cycle of these units. The State Water Resources Control Board (SWRCB) is considering a proposal that would require these units to stop or greatly reduce the amount of ocean or estuarial water they use in the cooling process in order to minimize the intake and mortality of marine life. Further, the California Energy Commission (CEC) has recommended that a significant number of aged generating units (greater than 30 years old) be retired or repowered by 2012.

Considering the SWRCB and CEC proposals, from the perspective of the interconnected electrical grid in California, there are reliability and market implications in the California ISO control area of removing these units from service, even assuming different levels of offsetting generation additions. While a complex technical analysis is needed to fully assess and understand these implications, the California ISO has performed a preliminary analysis and prepared this report in an effort to help inform decisions that are currently pending before State policy makers. It documents the reliability risks associated removing O-T-C generation from service and shows that the greatest risk is with regard to resource adequacy on a system and zonal basis. A decision to retain the level of system and zonal reliability similar to what exists today will constrain the ability to take existing generation out of service more than local reliability requirements. Depending on how the electric system and zonal impacts are handled, the risk of shedding firm load could increase four-fold.

This report is the first phase of a comprehensive study that is being conducted in an open, stakeholder process. The full report is due to be completed in the fourth quarter of 2008.

II. Summary of Results

As noted, a preliminary analysis has been performed to provide the reader insight into how O-T-C decisions could shape the ability of the interconnected grid to continue a level of electrical reliability and market services to California's consumers that is commensurate with what they receive today. As such, this Report relies on studies recently completed by the ISO for the years 2008, 2010, and 2012 to help frame these implications in the context of comparison to the ISO's current 2008 Transmission Plan that was prepared through stakeholder processes during 2007 and based on the best-known information available to the ISO at the time.

In general, this study provides insight into two highly critical reliability measures; Resource Adequacy (RA) and Local Capacity Requirements (LCR). RA provides information about the availability of resources (generation) to meet expected California customer loads. LCR provides information about how much generation is needed to meet expected customer loads within identified load service areas (load pockets) such as San Diego, Los Angeles Basin, San Francisco, and the overall San Francisco Bay Area. Finally, a perspective on the probable impact on California's energy markets is discussed.

Table 1 below shows the capacity at risk in California, the ISO and for the two ISO sub-areas or zones, South of Path 26 (SP26) and North of Path 26 (NP26).

Table 1

Once-Through Cooled and Aged Units Slated for Retirement/Repowering	
Coastal Units Using Once Through Cooling	
Breakdown of O-T-C Units by Type and Location	NQC¹ MW
CAISO Fossil Units	14,151
Nuclear Units	4,530
LADWP Units	2,391
Units in CAISO NP26	7,813
Units in CAISO SP26	10,868
Total Units in CAISO	18,681
Total Units in California	21,072
Aged Non-O-T-C Units Slated to be Retired/Repowered by 2012	
Breakdown of Units by Location	NQC¹ MW
Units in CAISO SP26	1,276
Total Generation At Risk of Retirement	
Breakdown of Units by Location	NQC¹ MW
NP26 Total At Risk Generation	7,813
SP26 Total At Risk Generation	12,143
Total CAISO At Risk Generation	19,956
Total California At Risk Generation	22,347
1) Net Qualifying Capacity	

Overall, this study shows that a policy requiring these units to go off-line could jeopardize the ISO's ability to meet local, zonal and system reliability requirements, even if a considerable number of new power plants come on-line. In addition, ISO's 2007 study, "Integration of Renewable Resources," shows that power plants like many of these, that are capable of providing ramping, load following, and regulation services, are crucial to the reliable integration of intermittent renewable generation. Thus, a policy that requires these units to go off line or reduce operations could make meeting the State's 20% renewable portfolio standard more difficult than our earlier study predicts. In addition, replacing power from in-state nuclear facilities could compromise the State's ability to meet its greenhouse gas reduction requirements.

Table 2 below shows the results of the Zonal analysis for SP26 and NP26. The results for the ISO system as a whole (System) are provided later in the report, as these results are less restrictive than results for the SP26 and NP26 zones. The analysis was based on two scenarios. The first scenario “WECC New Generation Scenario” (WECC Case) assumes that all the generation projects used for Western Electricity Coordinating Council (WECC) transmission study cases for 2012 are successful in reaching commercial status. The second scenario “Conservative New Generation Scenario” (Conservative Case) assumes that 50 percent of these projects are successful in reaching commercial status, an amount that more closely represents recent experience in the ISO. In the WECC Case, 23 percent of the at risk capacity in SP26 and 40 percent of the at risk capacity in NP26 can be off-line during the summer of 2012. In the Conservative Case, 5 percent of the at risk capacity in SP26 and 29 percent of the at risk capacity can be off line during the summer of 2012.

Table 2

Summary of CPUC Resource Adequacy Criteria Analysis				
	WECC New Generation Case		Conservative New Generation Case	
	SP26 (MW)	NP26 (MW)	SP26 (MW)	NP26 (MW)
Total Capacity at Risk	12,143	7,813	12,143	7,813
Capacity that Can be Off-Line and Meet RA Criteria	2,845	3,152	656	2,262
Off-Line Capacity as a Percent of Total at Risk	23%	40%	5%	29%

While these scenarios meet the current California Public Utilities Commission (CPUC) Resource Adequacy (RA) requirement, the probability of shedding firm load increases significantly. Table 3 shows the number of times the ISO has called Stage 1, 2 and 3 Emergencies since 2001 (Stage-3 being the point where the ISO begins shedding firm load). Table 3 also shows the probabilities of these emergency conditions in 2008 in status quo and for 2012 as studied. The table shows an average four-fold increase in the chances of having to shed firm load, or stated another way, the chances of having to shed firm load moves from approximately 1-in-20 years to 1-in-5 years. As

an alternative to using the CPUC RA requirement for determining the amount of capacity that could be taken off-line, 5 percent and 10 percent probabilities of shedding firm load were considered as alternative guidelines. That process and its results are discussed in Section IV of this report.

Table 3

Historical Emergencies Called & Probabilities of Calling Emergencies in Future			
Actual Emergencies Called	Stage-1 Emergency	Stage-2 Emergency	Stage-3 Emergency
2002	2	1	0
2003	1	0	0
2004	1	0	0
2005	1	2	0
2006	3	1	0
2007	1	0	0
2008 Probabilities of Calling Emergencies¹			
NP26	20%	7%	2%
SP26	30%	15%	7%
2012 WECC & Conservative Generation Additions Cases²			
NP26	78%	47%	22%
SP26	69%	52%	13%
¹ Stage-3 probabilities represents an average of the 1.5% and 3% operating reserve probability.			
² WECC & Conservative Generation Additions Cases have the same probabilities.			

Table 4 provides a comprehensive view of the study results regarding the total need at the Local, Zonal and System levels including existing plans for mitigation and their current status. SCE and SDG&E planning areas together represent SP26 Zone and PG&E Planning area represents NP26 Zone. The System level represents the entire California ISO control area. The table is intended to give a broad picture of capacity needed, for detail results please read the individual section related to the Local, Zonal or System capacity needs.

Table 4

Plant	Unit	Res ID	Technology	Planning Area	Capacity (MW)	LCR SUB-AREA NAME	Sub-area LCR need	Plan to eliminate Sub-area LCR need	LCR AREA NAME	Area LCR need	Plan to eliminate Area LCR need	Zonal need	System need	Once Through Cooled
Contra Costa	6	COCOPP_7_UNIT 6	ST	PG&E	337				Bay Area	<33%		>66%	>66%	YES
Contra Costa	7	COCOPP_7_UNIT 7	ST	PG&E	337				Bay Area	<33%		>66%	>66%	YES
Diablo	1	DIABLO_7_UNIT 1	Nuclear	PG&E	1122							>66%	>66%	YES
Diablo	2	DIABLO_7_UNIT 2	Nuclear	PG&E	1118							>66%	>66%	YES
Humboldt Bay	1	HUMBPP_7_UNIT 1	ST	PG&E	52				Humboldt	100%	PA	>66%	>66%	YES
Humboldt Bay	2	HUMBPP_7_UNIT 2	ST	PG&E	53				Humboldt	100%	PA	>66%	>66%	YES
Humboldt Bay CT	2	HUMBPP_1_MOBLE2	CT	PG&E	15				Humboldt	100%	PA	>66%	>66%	NO
Humboldt Bay CT	3	HUMBPP_1_MOBLE3	CT	PG&E	15				Humboldt	100%	PA	>66%	>66%	NO
Morro Bay	3	MORBAY_7_UNIT 3	ST	PG&E	337							>66%	>66%	YES
Morro Bay	4	MORBAY_7_UNIT 4	ST	PG&E	336							>66%	>66%	YES
Moss Landing	6	MOSSLD_7_UNIT 6	ST	PG&E	754							>66%	>66%	YES
Moss Landing	7	MOSSLD_7_UNIT 7	ST	PG&E	756							>66%	>66%	YES
Moss Landing PB1	1	MOSSLD_2_PSP1	CC	PG&E	510							>66%	>66%	YES
Moss Landing PB2	2	MOSSLD_2_PSP2	CC	PG&E	510							>66%	>66%	YES
Pittsburg	5	PITTSP_7_UNIT 5	ST	PG&E	312	Pittsburg	>66%	PA	Bay Area	<33%		>66%	>66%	YES
Pittsburg	6	PITTSP_7_UNIT 6	ST	PG&E	317	Pittsburg	>66%	PA	Bay Area	<33%		>66%	>66%	YES
Pittsburg	7	PITTSP_7_UNIT 7	ST	PG&E	682	Pittsburg	>66%	PA	Bay Area	<33%		>66%	>66%	YES
Potrero	3	POTRPP_7_UNIT 3	ST	PG&E	206	San Francisco	100%	PA	Bay Area	<33%		>66%	>66%	YES
Potrero	4	POTRPP_7_UNIT 4	CT	PG&E	52	San Francisco	100%	PA	Bay Area	<33%		>66%	>66%	NO
Potrero	5	POTRPP_7_UNIT 5	CT	PG&E	52	San Francisco	100%	PA	Bay Area	<33%		>66%	>66%	NO
Potrero	6	POTRPP_7_UNIT 6	CT	PG&E	52	San Francisco	100%	PA	Bay Area	<33%		>66%	>66%	NO
Union Chemical	1	UNCHEM_1_UNIT	ST	PG&E	20	Pittsburg	>66%	PA	Bay Area	<33%		>66%	>66%	YES
Alamitos	1	ALAMIT_7_UNIT 1	ST	SCE	175	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Alamitos	2	ALAMIT_7_UNIT 2	ST	SCE	175	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Alamitos	3	ALAMIT_7_UNIT 3	ST	SCE	332	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Alamitos	4	ALAMIT_7_UNIT 4	ST	SCE	336	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Alamitos	5	ALAMIT_7_UNIT 5	ST	SCE	498	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Alamitos	6	ALAMIT_7_UNIT 6	ST	SCE	495	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Coolwater	1	CWATER_7_UNIT 1	CT	SCE	63							>66%	>66%	NO
Coolwater	2	CWATER_7_UNIT 2	CT	SCE	82							>66%	>66%	NO
Coolwater	3	CWATER_7_UNIT 3	CT	SCE	245							>66%	>66%	NO
Coolwater	4	CWATER_7_UNIT 4	CT	SCE	246							>66%	>66%	NO
El Segundo	3	ELSEGN_7_UNIT 3	ST	SCE	335	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
El Segundo	4	ELSEGN_7_UNIT 4	ST	SCE	335	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Etiwanda	3	ETIWND_7_UNIT 3	ST	SCE	320	Eastern			LA Basin	>66%	PAP	>66%	>66%	NO
Etiwanda	4	ETIWND_7_UNIT 4	ST	SCE	320	Eastern			LA Basin	>66%	PAP	>66%	>66%	NO
Harbor Generation	1	HARBGN_7_UNITS	CC	SCE	100	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Huntington Beach	1	HNTGBH_7_UNIT 1	ST	SCE	226	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Huntington Beach	2	HNTGBH_7_UNIT 2	ST	SCE	226	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Huntington Beach	3	HNTGBH_7_UNIT 3	ST	SCE	225	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Huntington Beach	4	HNTGBH_7_UNIT 4	ST	SCE	227	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Mandalay	1	MNDALY_7_UNIT 1	ST	SCE	215	Vetura			BC/Ventura	<33%	PA	>66%	>66%	YES
Mandalay	2	MNDALY_7_UNIT 2	ST	SCE	215	Vetura			BC/Ventura	<33%	PA	>66%	>66%	YES
Ormond Beach	1	ORMOND_7_UNIT 1	ST	SCE	741	Vetura			BC/Ventura	<33%	PA	>66%	>66%	YES
Ormond Beach	2	ORMOND_7_UNIT 2	ST	SCE	775	Vetura			BC/Ventura	<33%	PA	>66%	>66%	YES
Redondo Beach	5	REDOND_7_UNIT 5	ST	SCE	179	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Redondo Beach	6	REDOND_7_UNIT 6	ST	SCE	175	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Redondo Beach	7	REDOND_7_UNIT 7	ST	SCE	493	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
Redondo Beach	8	REDOND_7_UNIT 8	ST	SCE	496	Western, Barre	>66%		LA Basin	>66%	PAP	>66%	>66%	YES
SONGS	2	SONGS_7_UNIT 2	Nuclear	SCE	1122	Western			LA Basin	>66%	PAP	>66%	>66%	YES
SONGS	3	SONGS_7_UNIT 3	Nuclear	SCE	1124	Western			LA Basin	>66%	PAP	>66%	>66%	YES
Encina	1	ENCINA_7_EA1	ST	SDG&E	106				San Diego	100%	PAP	>66%	>66%	YES
Encina	2	ENCINA_7_EA2	ST	SDG&E	103				San Diego	100%	PAP	>66%	>66%	YES
Encina	3	ENCINA_7_EA3	ST	SDG&E	109				San Diego	100%	PAP	>66%	>66%	YES
Encina	4	ENCINA_7_EA4	ST	SDG&E	299				San Diego	100%	PAP	>66%	>66%	YES
Encina	5	ENCINA_7_EA5	ST	SDG&E	329				San Diego	100%	PAP	>66%	>66%	YES
South Bay	1	SOBAY_7_SY1	ST	SDG&E	146				San Diego	100%	PA	>66%	>66%	YES
South Bay	2	SOBAY_7_SY2	ST	SDG&E	150				San Diego	100%	PA	>66%	>66%	YES
South Bay	3	SOBAY_7_SY3	ST	SDG&E	175				San Diego	100%	PA	>66%	>66%	YES
South Bay	4	SOBAY_7_SY4	ST	SDG&E	222				San Diego	100%	PA	>66%	>66%	YES
South Bay	CT	SOBAY_7_GT1	CT	SDG&E	15				San Diego	100%	PA	>66%	>66%	NO

Need		Plan status	
100%	entire unit	UC	Under Construction
>66%	> 66% combined capacity needed from all the units in this area, zone or system	PA	In Permitting/ Approval process
33%-66%	33%-66% combined capacity needed from all the units in this area, zone or system	PAP	In Permitting/ Approval process to solve Part of the need
<33%	< 33 combined capacity needed from all the units in this area, zone or system	CS	In Conceptual Stage
No need			No plan yet

Finally, in addition to reliability and interactions with RPS and greenhouse gas reduction requirements, market considerations should also be considered. The wholesale power markets currently encompass several interdependent products and services supplied by generation, notably energy, several types of ancillary services that support short-term reliability, including regulation and operating reserves, and Resource Adequacy capacity that support long-term reliability. Market Prices for these products and services are generally sensitive to supply and demand and will be impacted by this proposal. The presence of transmission constraints that subdivide markets can further affect the price impact in local areas. Taking generation capacity off-line will affect the supply side of these markets and place upward pressure on the corresponding market prices. The price signal will help bring on-line efficient replacement generation as well as transmission and demand response solutions, but these investments will also have costs that will be factored into prices.

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III. Overview of System and Zonal Capacity Technical Study

A. Objectives

The objective of this portion of the analysis is to determine the amount of capacity that could be removed from service, either temporarily or permanently during the summer 2012 and meet the CPUC resource adequacy (RA) requirements of a minimum 15% planning reserve margin (PRM) required by the RA program. The probability of entering into various operating reserve emergencies under these conditions was then calculated. This process provided guidance on how quickly a retirement/repowering process could proceed strictly from a reliability viewpoint.

B. Key Study Assumptions

Inputs and Methodology

The analysis performed at the System and Zonal level of the California ISO first used a deterministic analysis to determine the amount of existing generation that can be taken off-line and not drop below the 15% planning reserve margin PRM used for CPUC RA program. The analysis was based on two scenarios. The first scenario “WECC New Generation Scenario” (WECC Case) assumes that all the generation projects used for Western Electricity Coordinating Council (WECC) transmission study cases for 2012 are successful in reaching commercial status. The second scenario “Conservative New Generation Scenario” (Conservative Case) assumes that 50 percent of these projects are successful in reaching commercial status, an amount that more closely represents recent experience in the ISO. The results of these two scenarios were used as inputs to the Supply Adequacy Model (SAM) to determine the probability of meeting various levels of operating reserve margin during the 2012 summer period. This is the same methodology as is used for the California ISO Summer Operational Preparedness Assessment (Summer Assessment). The System and Zonal analysis was performed using the SAM developed for the 2008 Summer Assessment, modified to estimate the loads and resources for the summer 2012 using the CEC 2012 demand forecasts and generation additions based on WECC transmission study cases for 2012. SAM uses a

range of probable operating conditions to develop a range of expected operating reserves for the peak periods of the modeled summer season and develops the probability or likelihood of occurrence for each level of the expected operating reserve range.

IV. Overview of Local Capacity Technical Study

A. Objectives

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

B. Key Study Assumptions

Inputs and Methodology

For the exact inputs assumptions, criteria and methodology as well as definition of local areas, load forecast, units within, contingency analysis, effectiveness factors and local study results please see:

2008 LCR study at: <http://www.caiso.com/1bb5/1bb5ed3d46430.pdf>

2010-12 LCR study at: <http://www.caiso.com/1cc2/1cc2dab86fd50.pdf>

New Generation.

Only new generation projects that are deemed to be moving forward (continuing towards and through construction) in a manner to meet their planned operating date were modeled in the base case. California ISO Generation Assumptions for Grid Planning Studies, located on the California ISO web site at <http://www.caiso.com/docs/2001/06/25/20010625134406100.pdf>, were utilized in determining new generation modeled to meet future load growth.

Any additional future resource additions scenarios can be compared with the status quo and can be used as an alternative in order to achieve the required level of reliability in any given local area.

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 have been modeled and also include 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.

V. System and Zonal Capacity Requirement Study Results

Table 5 is a summary of the deterministic analysis showing the maximum amount of capacity that can be taken off-line during the 2012 summer peak load periods and not drop below the required 15 percent planning reserve margin (PRM) required by the CPUC for its RA program. The results of this analysis are predominately dependent on the assumed capacity additions. The first scenario assumes that all the generation projects used for Western Electricity Coordinating Council (WECC) transmission study cases for 2012 are successful in reaching commercial status. To reach the 7,014 MW of system-wide capacity additions assumed in this scenario to come on-line between now and prior to the summer 2012, approximately 1,400 MW would need to come on-line annually, an achievable but aggressive goal. The Conservative Case assumes that 50 percent of these projects are successful in reaching commercial status.

Table 5

Summer 2012 Outlook - Deterministic Approach - <u>WECC</u> Capacity Additions			
Resource Adequacy Planning Conventions	CAISO	SP26	NP26
Existing Generation	47,716	22,376	25,349
Calculated Maximum Off-Line Capacity to Achieve a 15% PRM	-6,612	-2,845	-3,152
WECC Case Capacity Additions (2008 to summer 2012)	7,014	5,191	1,823
Net Interchange	8,124	7,908	1,062
Total Net Supply (MW)	56,242	32,630	25,082
1-in-2 Summer Temperature Demand	52,112	30,522	22,869
DR & Interruptible Programs (80% of CPUC 2012 estimates)	3,687	2,470	1,217
Planning Reserve Margin (PRM)¹	15.0%	15.0%	15.0%
Summer 2012 Outlook - Deterministic Approach - <u>Conservative</u> Capacity Additions			
Resource Adequacy Planning Conventions	CAISO	SP26	NP26
Existing Generation	47,716	22,376	25,349
Calculated Maximum Off-Line Capacity to Achieve a 15% PRM	-3,533	-656	-2,262
Conservative Case Capacity Additions (2008 to summer 2012)	3,935	3,002	933
Net Interchange	8,124	7,908	1,062
Total Net Supply (MW)	56,242	32,630	25,082
1-in-2 Summer Temperature Demand	52,112	30,522	22,869
DR & Interruptible Programs (80% of CPUC 2012 estimates)	3,687	2,470	1,217
Planning Reserve Margin (PRM)¹	15.0%	15.0%	15.0%
¹ Planning Reserve calculation ((Total Generation+Demand Response+Interruptibles)/Normal Demand)-1.			

The results in Table 5 show the megawatt for megawatt relationship between new capacity brought on-line and the amount of capacity that can be retired or off-line in a repowering process. Table 6 further demonstrates this issue and shows the percentage of at risk capacity that can be off-line at any given point in time. In the Conservative Case only 5 percent of the total SP26 at risk capacity can be off-line in 2012.

Table 6

Summary of CPUC Resource Adequacy Criteria Analysis				
	WECC New Generation Case		Conservative New Generation Case	
	SP26 (MW)	NP26 (MW)	SP26 (MW)	NP26 (MW)
Total Capacity at Risk	12,143	7,813	12,143	7,813
Capacity that Can be Off-Line and Meet RA Criteria	2,845	3,152	656	2,262
Off-Line Capacity as a Percent of Total at Risk	23%	40%	5%	29%

The bottom portion of Table 5 shows the results of the Supply Adequacy Model. The 14 to 22 percent range is the range of probability of having to shed firm load under both the WECC and the Conservative cases. While these Cases meet the RA program requirements, the probability of shedding firm load, otherwise known as rolling blackouts, is fairly high. Table 7 provides a perspective of the frequency of the ISO calling Stage 1, 2 and 3 Emergencies since 2001. Table 7 also shows the projected probabilities for these emergencies for 2008 in status quo, and for 2012 using the capacity additions and retirements from Table 5.

Table 7

Historical Emergencies Called & Probabilities of Calling Emergencies in Future			
Actual Emergencies Called	Stage-1 Emergency	Stage-2 Emergency	Stage-3 Emergency
2002	2	1	0
2003	1	0	0
2004	1	0	0
2005	1	2	0
2006	3	1	0
2007	1	0	0
2008 Probabilities of Calling Emergencies¹			
NP26	20%	7%	2%
SP26	30%	15%	7%
2012 WECC & Conservative Generation Additions Cases²			
NP26	78%	47%	22%
SP26	69%	52%	13%
¹ Stage-3 probabilities represents an average of the 1.5% and 3% operating reserve probability. ² WECC & Conservative Generation Additions Cases have the same probabilities.			

The 2 to 7 percent range for the probability of a Stage-3 Emergency shown for 2008 in Table 7 is equivalent to a 1-in-20 year event. The 14 to 22 percent probability of a Stage-3 Emergency shown in the 2012 cases is a four-fold increase in the chances of having to shed firm load, equivalent to approximately a 1-in-5 year event.

Summary of Probabilistic Results for System

Because the probabilities for Stage-3 Emergencies in Table 5 were high, the study included use of the Supply Adequacy Model to determine the amount of capacity that could be taken off line for the 2012 summer and not exceed a 5 percent and a 10 percent probability of a Stage-3 Emergency. The amount of capacity that could be off-line was calculated for the WECC Case and the Conservative Case. Since the net amount is the same in both cases, the probabilities are the same for both cases. Figures 1 and 2 below show SAM System results for the amount of capacity that could

be off-line and not exceed a 5 percent probability and a 10 percent probability of shedding firm load, respectively. In the not to exceed 5 percent case in Figure 1, 2,600 MW could be off-line on summer 2012 in the WECC Case, and in the Conservative Case, 460 MW would need to be added and no capacity could be retired in order to not exceed the 5 percent probability. In the not to exceed 10 percent case in Figure 2, 5,455 MW could be off-line on summer 2012 in the WECC Case, and 2,300 MW could be off-line in the Conservative Case.

Figure 1

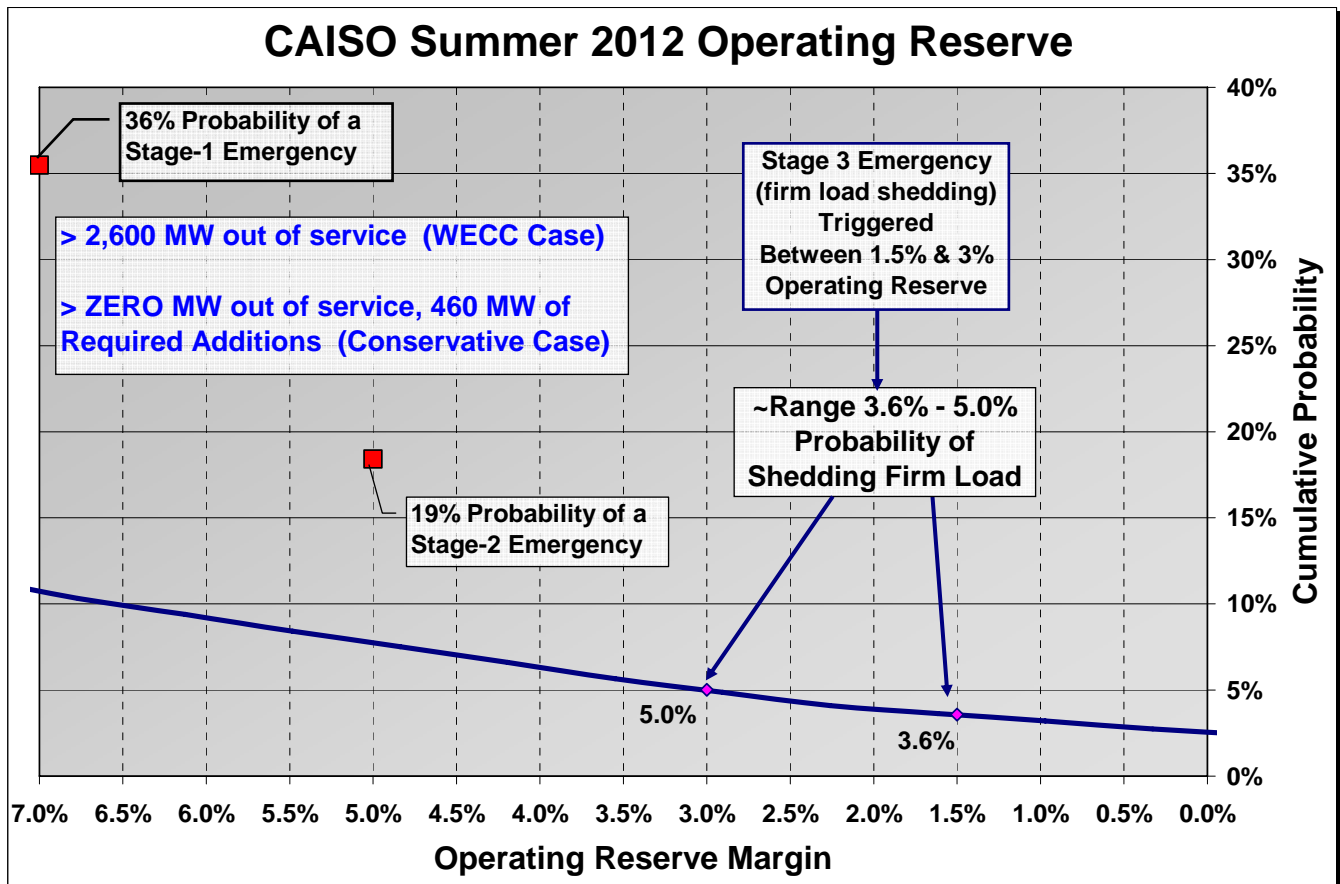
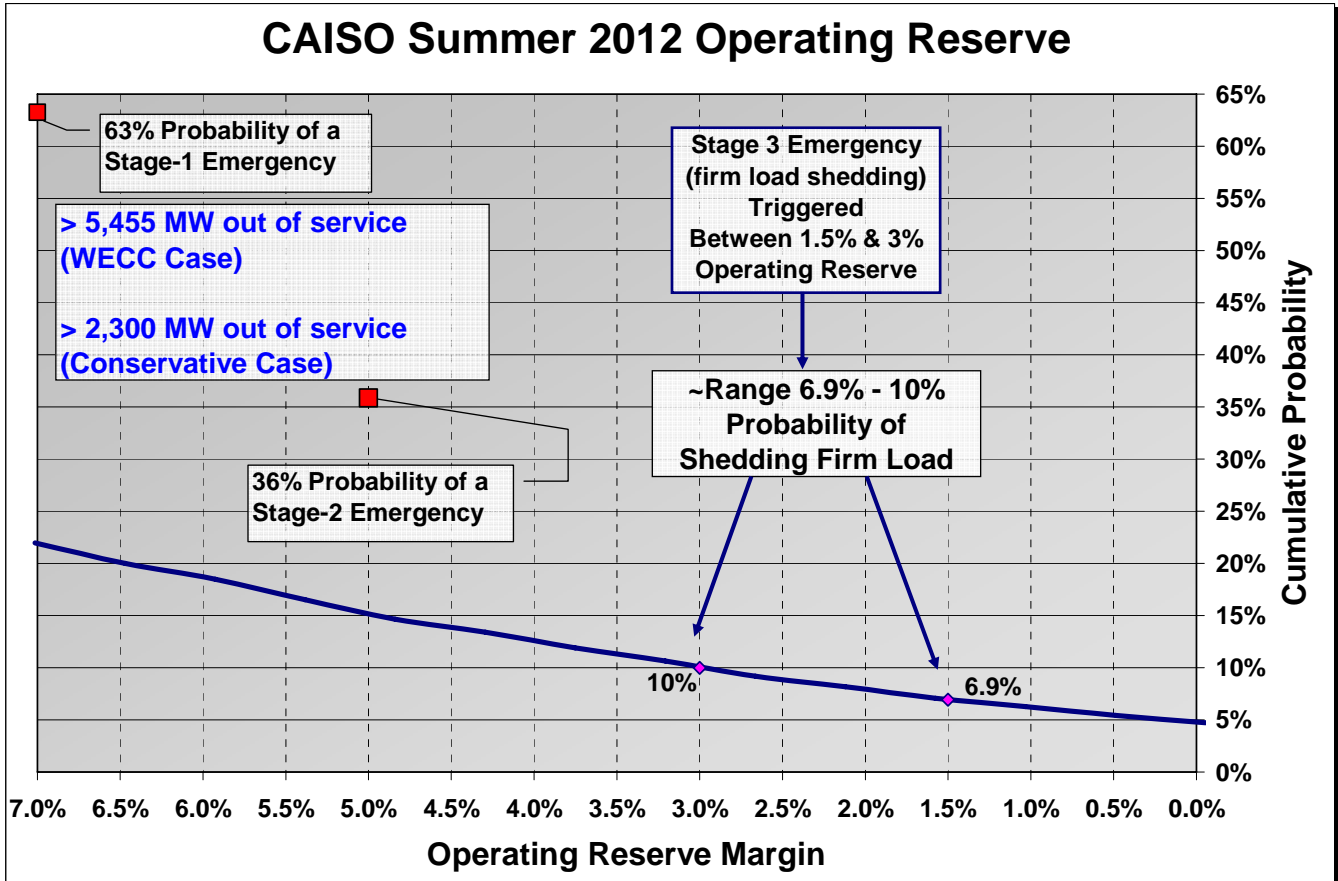


Figure 2



Summary of Probabilistic Results by Zone

Due to transmission constraints on transmission Path 26, each sub-area or Zonal overall generation needs have to be met on a stand-alone basis. The findings for SP26 (South of Path 26) and NP26 (North of Path 26) are discussed in the following sections. As with the System results in Table 5, the probabilities shown for Stage-3 Emergencies are high. The Supply Adequacy Model was again used for the two ISO Zones to develop the amount of capacity that could be taken off line for the 2012 summer and not exceed a 5 percent and a 10 percent probability of a Stage-3 Emergency for the WECC Case and the Conservative Case. Since the net amount is the same in both cases, the probabilities are the same for both cases.

1. SP26 Zone

Figures 3 and 4 below show SAM System results for the amount of capacity that could be off-line and not exceed a 5 percent probability and a 10 percent probability of shedding firm load, respectively in SP26. In the not to exceed 5 percent case in Figure 3, 1,500 MW could be off-line on summer 2012 in the WECC Case, and in the Conservative Case, 685 MW would need to be added and no capacity could be retired in order to not exceed the 5 percent probability. In the not to exceed 10 percent case in Figure 4, 2,315 MW could be off-line on summer 2012 in the WECC Case, and only 125 MW could be off-line in the Conservative Case.

Figure 3

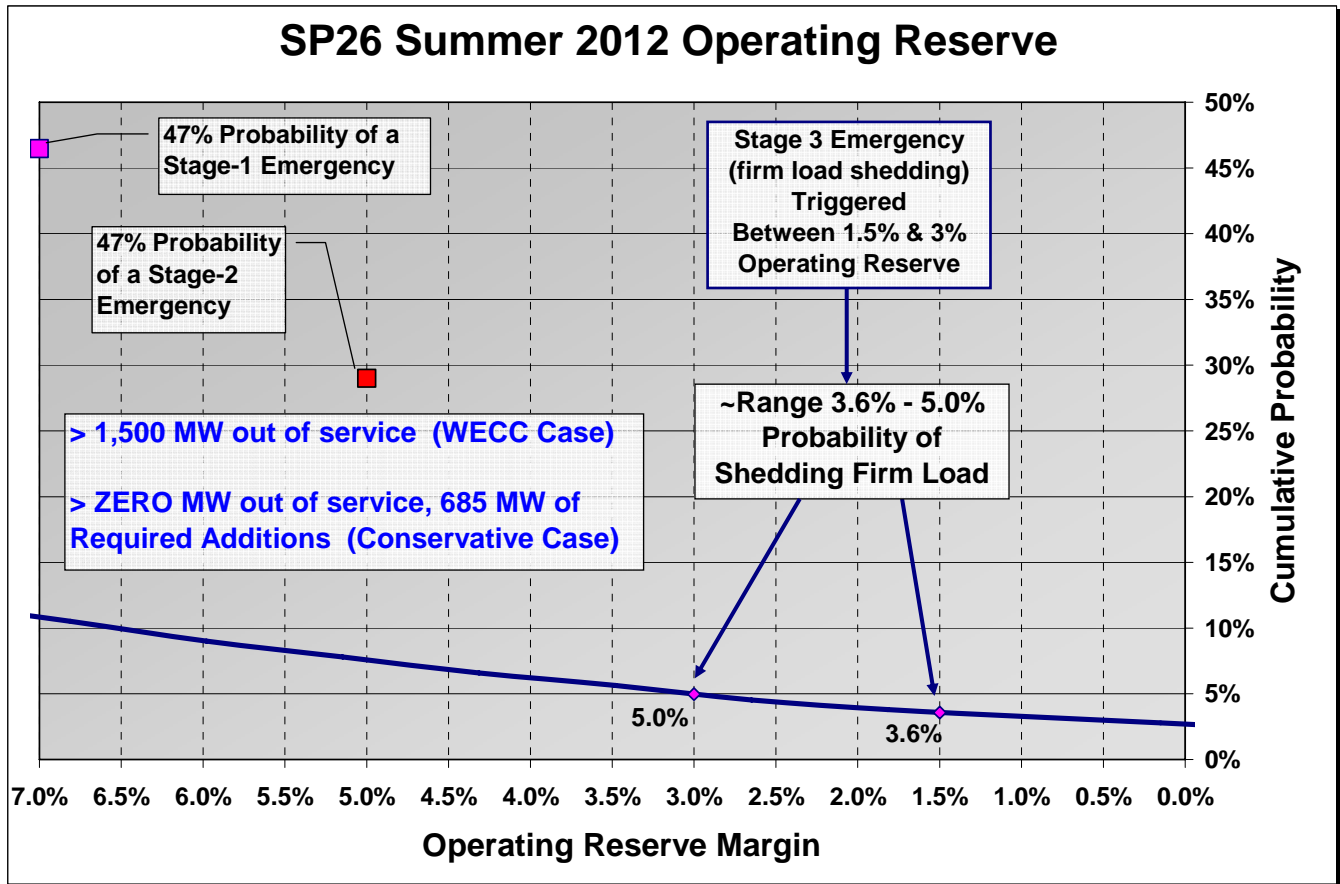
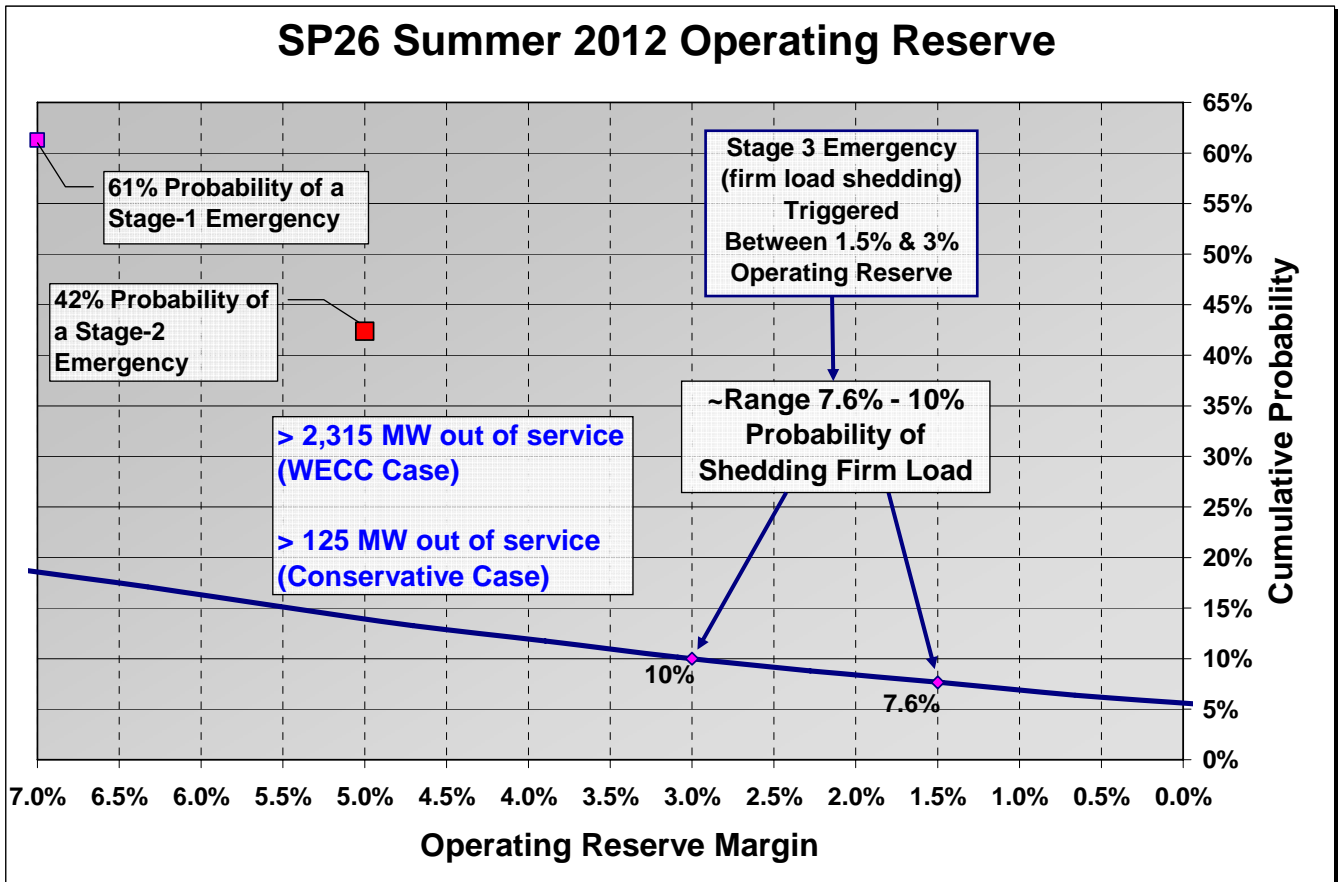


Figure 4



2. NP26 Zone

Figures 5 and 6 below show SAM System results for the amount of capacity that could be off-line and not exceed a 5 percent probability and a 10 percent probability of shedding firm load, respectively in NP26. In the not to exceed 5 percent case in Figure 5, 1,715 MW could be off-line on summer 2012 in the WECC Case, and in the Conservative Case, 820 MW could be off-line. In the not to exceed 10 percent case in Figure 6, 2,240 MW could be off-line on summer 2012 in the WECC Case, and 1,350 MW could be off-line in the Conservative Case.

Figure 5

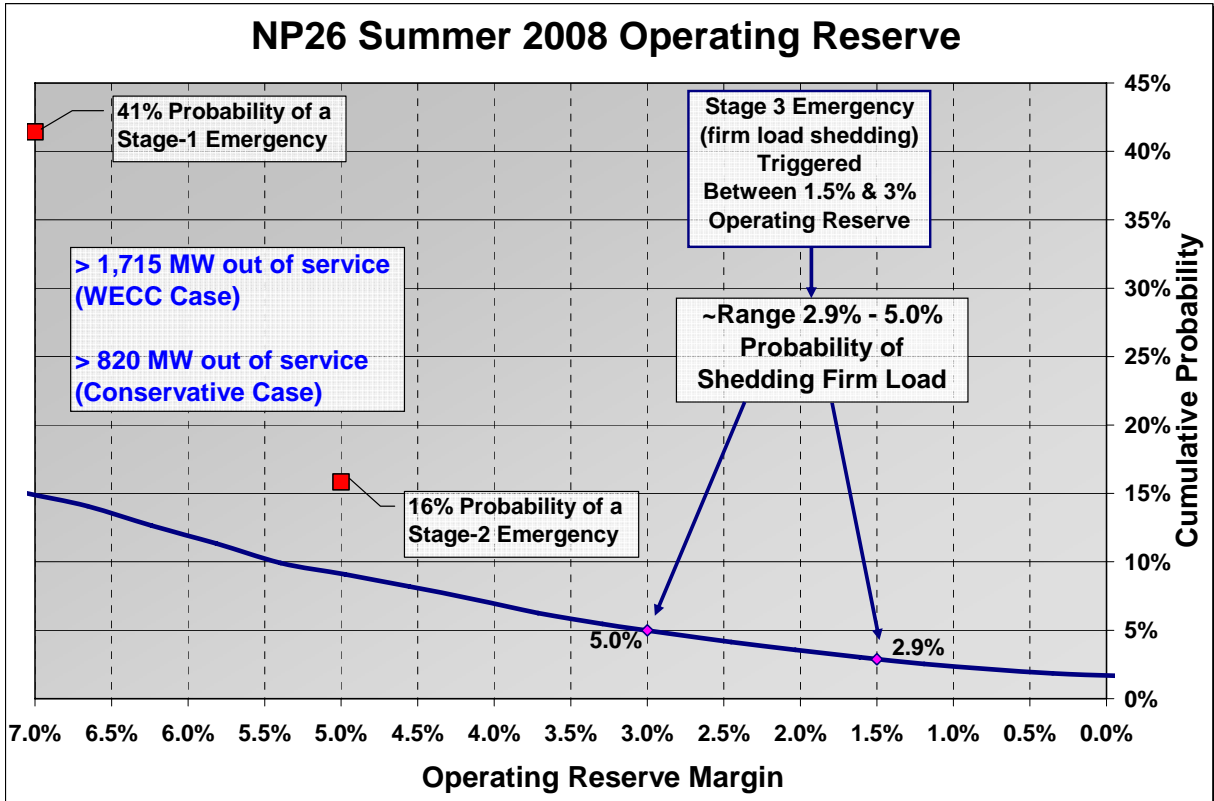
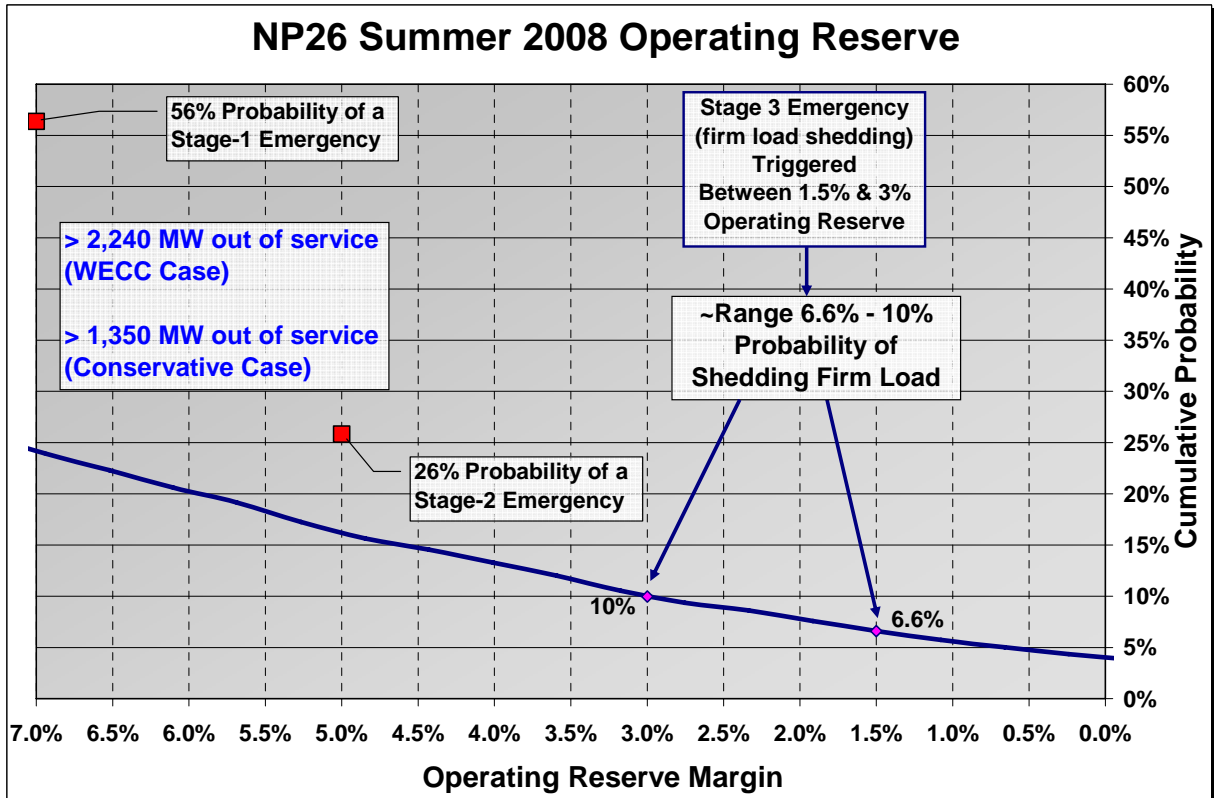


Figure 6



VI. Locational Capacity Requirement Study Results

Summary of Results by Local Area

Each sub-area and local area's overall needs have to be met in order for the existing power plants to be retired without disruptions of electric service. The generation in each local area (and sub-area, as appropriate) is described below. The analytic results are presented in charts that depict the need for generation as a bar. The charts also include a line for the expected available generation (net qualifying capacity or NQC) and a line for the generation available if all units using O-T-C are removed from service.

1. Humboldt Area

Old thermal units available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	NQC Comments	CAISO Tag
HUMBPP_7_UNIT 1	31170	HMBOLDT1	13.8	52.00	1	Possible retire 2010	Market
HUMBPP_7_UNIT 2	31172	HMBOLDT2	13.8	53.00	1	Possible retire 2010	Market

New generation modeled:

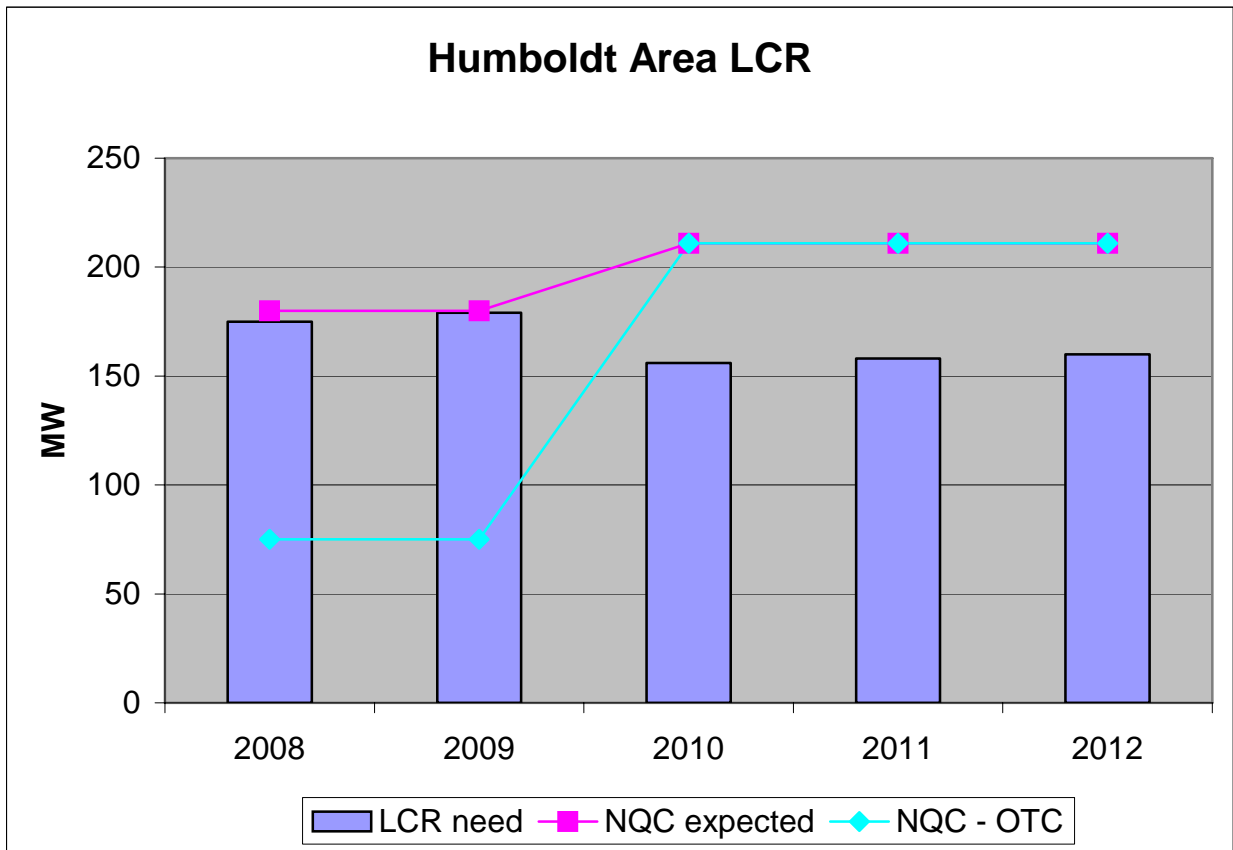
MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	NQC Comments	CAISO Tag
NA	31180	HUMB_G1	13.8	16.6	1	No NQC - Pmax	Market
NA	31180	HUMB_G1	13.8	16.6	2	No NQC - Pmax	Market
NA	31180	HUMB_G1	13.8	16.6	3	No NQC - Pmax	Market
NA	31180	HUMB_G1	13.8	16.6	4	No NQC - Pmax	Market
NA	31181	HUMB_G2	13.8	16.6	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

Analysis Summary

Humboldt overall:



From a local perspective the Humboldt units can retire **after** the installation of the Humboldt Bay Repower and Humboldt Reactive Support (2009-2010).

2. North Coast / North Bay Area

Old thermal units available in this area:

None.

New generation modeled:

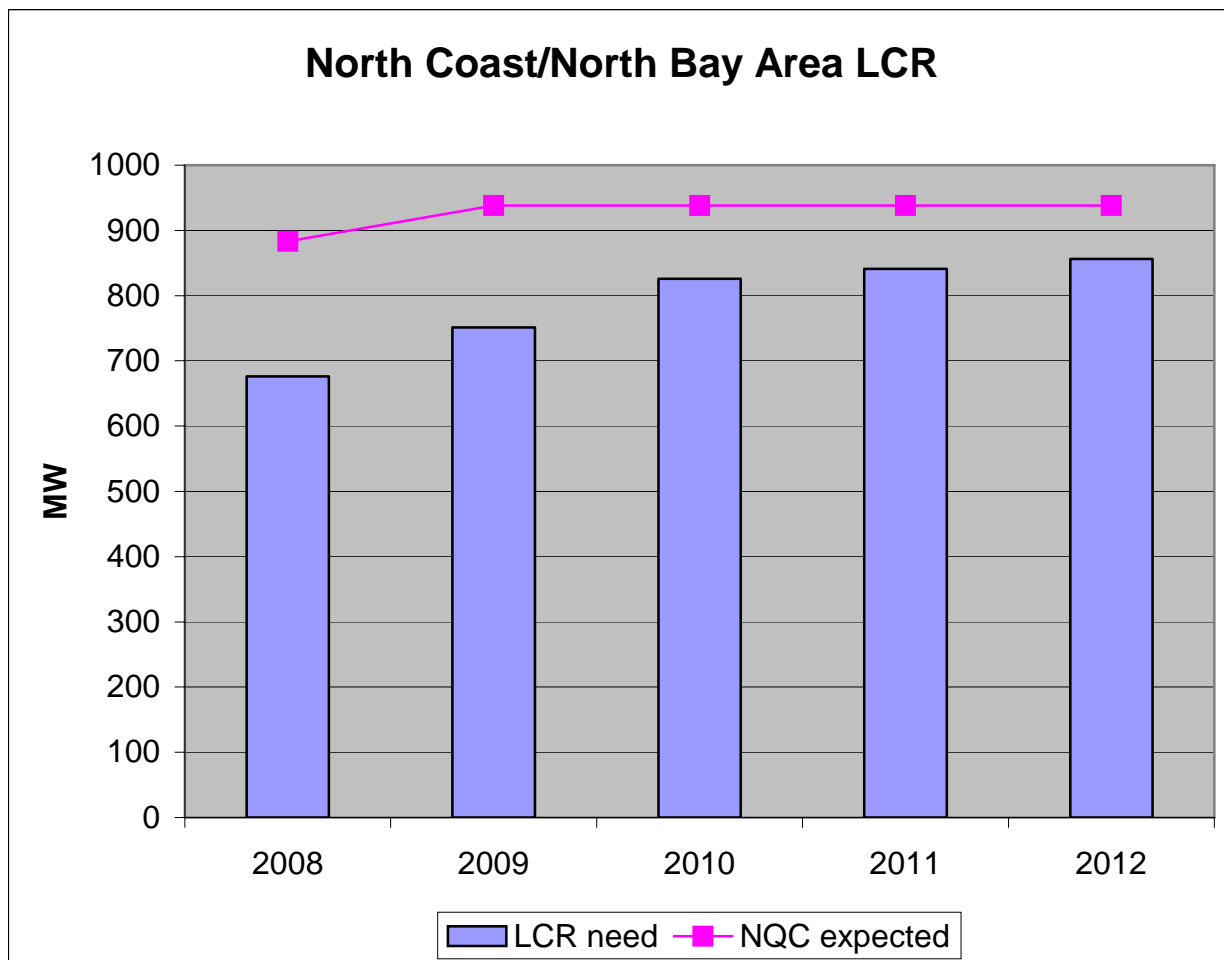
MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
NA	31421	BOTTLERK	13.8	55.00	1	Fulton, Eagle Rock-Fulton, Lakeville	No NQC - Pmax	Market

Major new projects modeled:

None.

Analysis Summary

NCNB overall (Lakeville):



This area has no old thermal power plants.

3. Sierra Area

Old thermal units available in this area:

None.

New generation modeled:

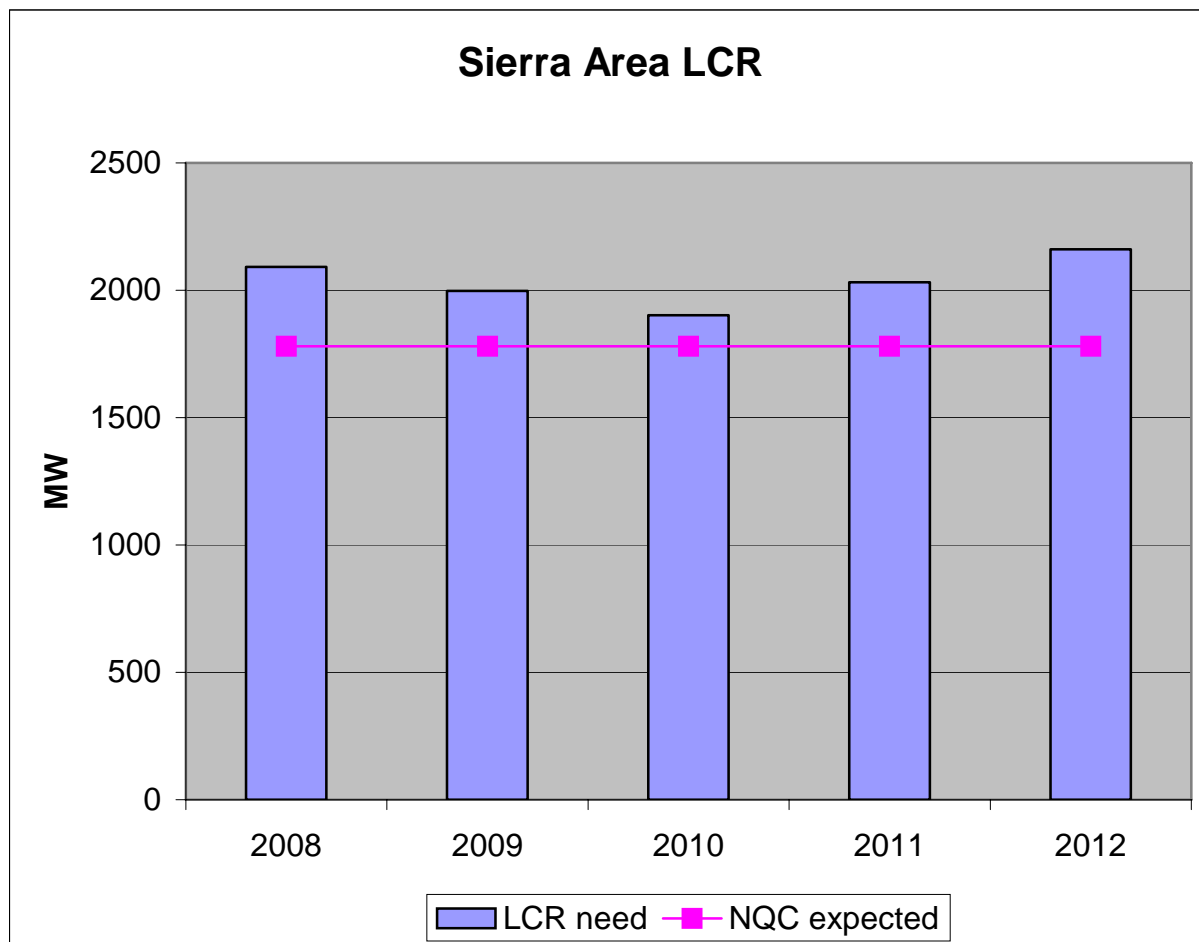
None.

Major new projects modeled:

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

Analysis Summary

Sierra overall:



This area has no old thermal power plants.

4. Stockton Area

Old thermal units available in this area:

None.

New generation modeled:

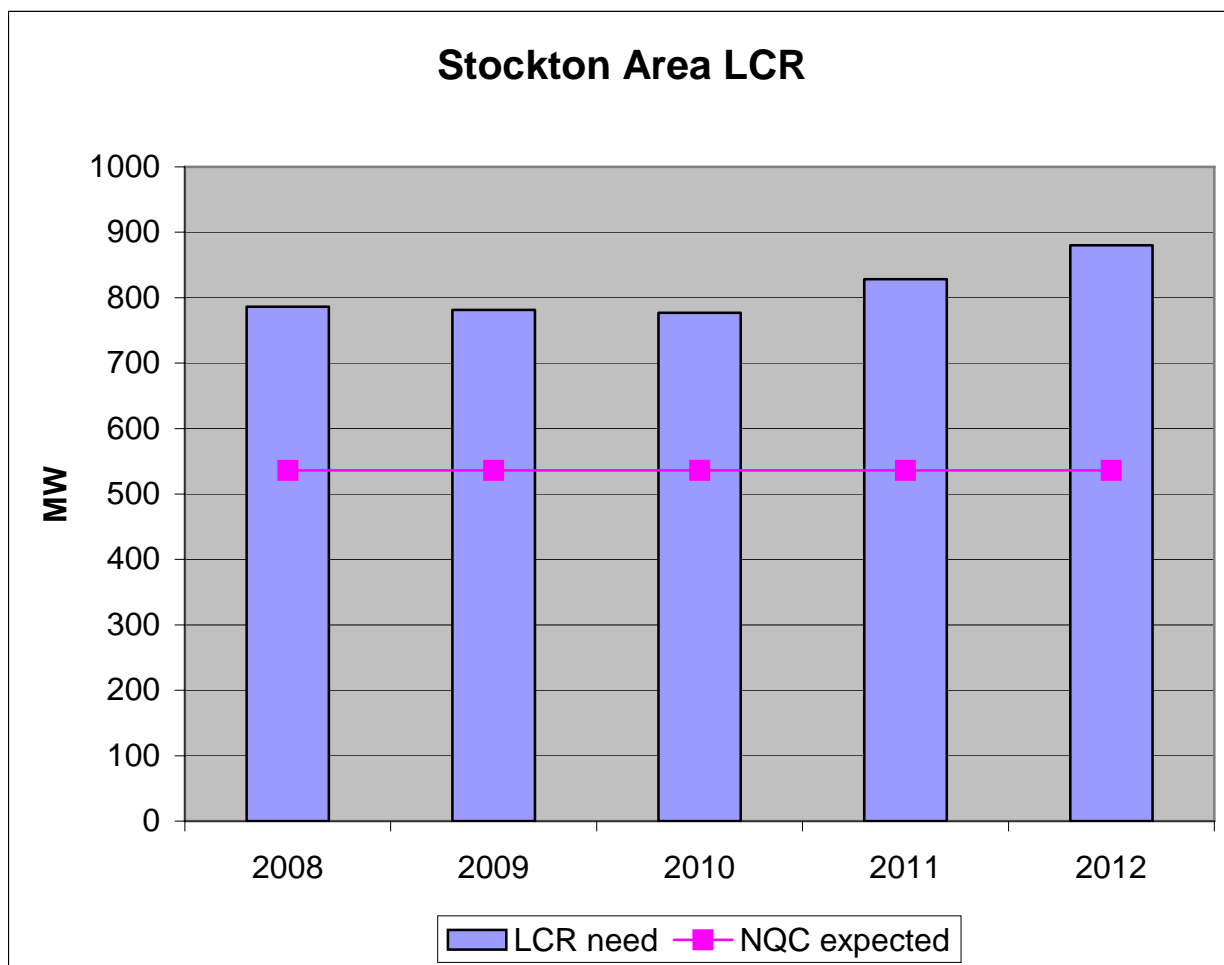
None.

Major new projects modeled:

1. Tesla 115 kV Capacity Increase

Analysis Summary

Stockton total (sum of pockets):



This area has no old thermal power plants.

5. Greater Bay Area

Old thermal units available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
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
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
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
UNCHEM_1_UNIT	32920	UNION CH	9.11	20.00	1	Pittsburg		QF/Selfgen

New generation modeled:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
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:

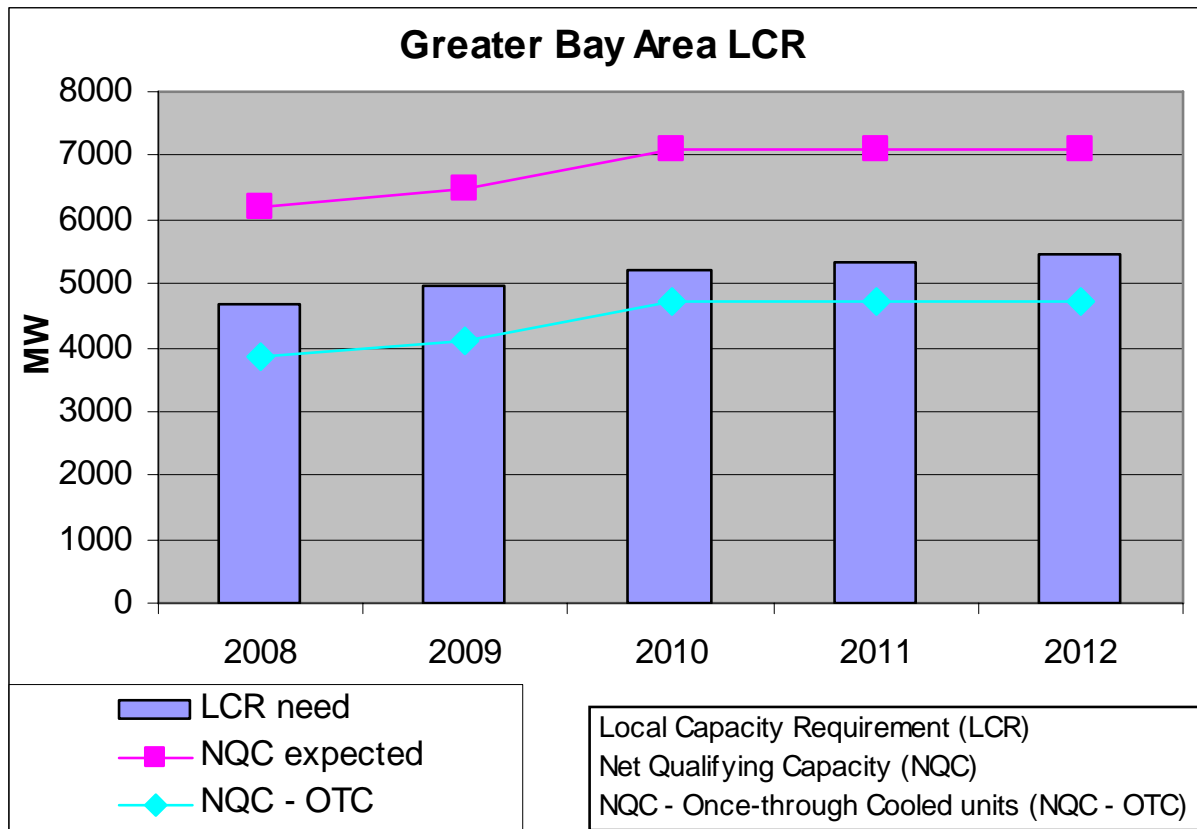
1. Oakland New 115 kV Cable
2. Trans Bay 230 kV Cable
3. HP #4 115 kV Cable
4. Tesla-Pittsburg 230 kV Reconductoring

Analysis Summary

Bay Area overall

From a Bay Area overall perspective the old thermal units in the area can not all retire unless additional resources and/or transmission additions not mentioned here become

operational. However several can retire **after** the installation of the above-mentioned transmission projects and new resources become operational (2010-2011).



San Francisco Sub-area

Per the California ISO 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. Expected final operational date for all projects included in the plan is 2009-2010.

Pittsburg Sub-area

From a Pittsburg area perspective, due to reliability needs, integrated power plant design as well as environmental permits, no more then one unit among Pittsburg 5 and 6 along with Union Chemical can retire unless the reconductoring of the Tesla-Pittsburg #1 and #2 230 kV lines is operational (2010).

6. Greater Fresno Area

Old thermal units available in this area:

None.

New generation modeled:

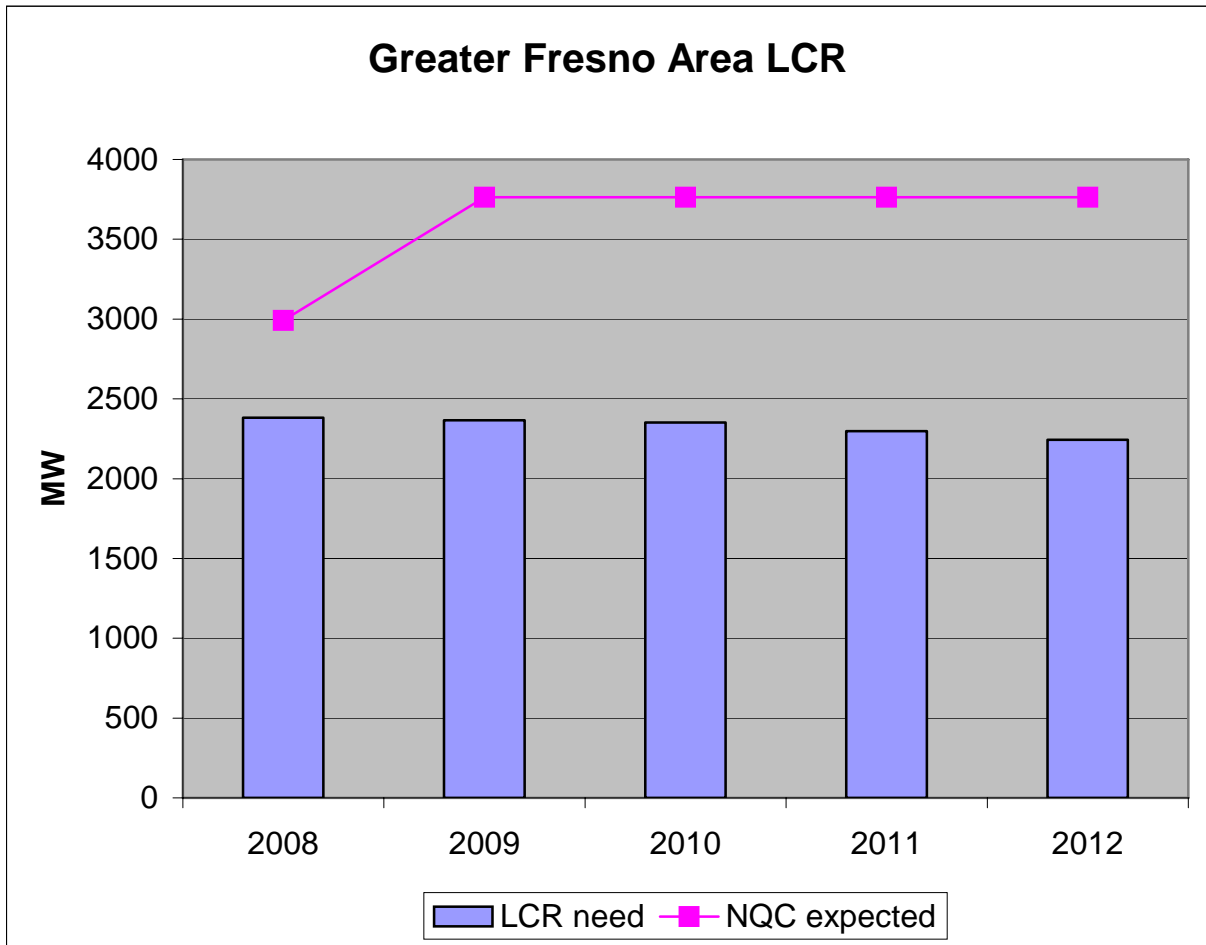
MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNI T ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
(Chowchilla Biomass)	34305	CHWCHLA2	13.8	12.5	1	Wilson	New gen. in 2007	Market
(El Nido)	34330	CHWCHLA2	13.8	12.5	1	Wilson	New gen. in 2007	Market
(Bullard Energy Center, Unit #1)	34605	BULRD_EC	13.8	108.2	1	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	STARGET1	13.8	60.9	1	Wilson	New gen. in 2009	Market
(Starwood Power Midway LLC, Unit #2)	34329	STARGET2	13.8	60.9	2	Wilson	New gen. in 2009	Market

Major new projects modeled:

None.

Analysis Summary

Fresno total requirements



This area has no old thermal power plants.

7. Kern Area

Old thermal units available in this area:

None.

New generation modeled:

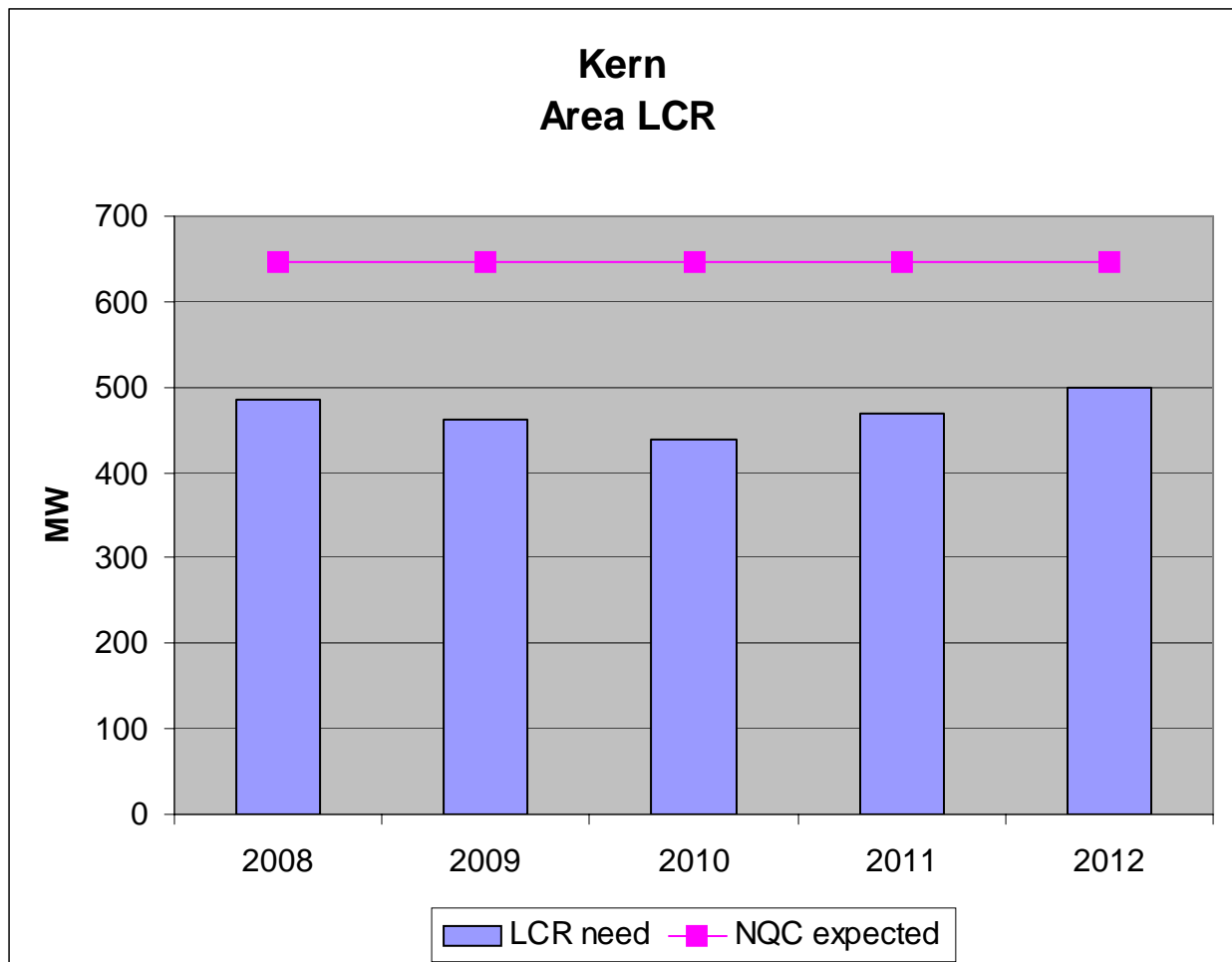
None.

Major new projects modeled:

None.

Analysis Summary

Kern total (sum of pockets)



This area has no old thermal power plants.

8. LA Basin Area

Old thermal and OTC nuclear units available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNI T ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
ETIWND_7_UNIT 3	24052	MTNVIST3	18	320.00	3	Eastern		Market
ETIWND_7_UNIT 4	24053	MTNVIST4	18	320.00	4	Eastern		Market
ALAMIT_7_UNIT 1	24001	ALAMT1 G	18	174.56	1	Western, Barre		Market
ALAMIT_7_UNIT 2	24002	ALAMT2 G	18	175.00	2	Western, Barre		Market
ALAMIT_7_UNIT 3	24003	ALAMT3 G	18	332.18	3	Western, Barre		Market
ALAMIT_7_UNIT 4	24004	ALAMT4 G	18	335.67	4	Western, Barre		Market
ALAMIT_7_UNIT 5	24005	ALAMT5 G	20	497.97	5	Western, Barre		Market
ALAMIT_7_UNIT 6	24161	ALAMT6 G	20	495.00	6	Western, Barre		Market
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
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
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
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
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

New generation modeled:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNI T ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
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
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

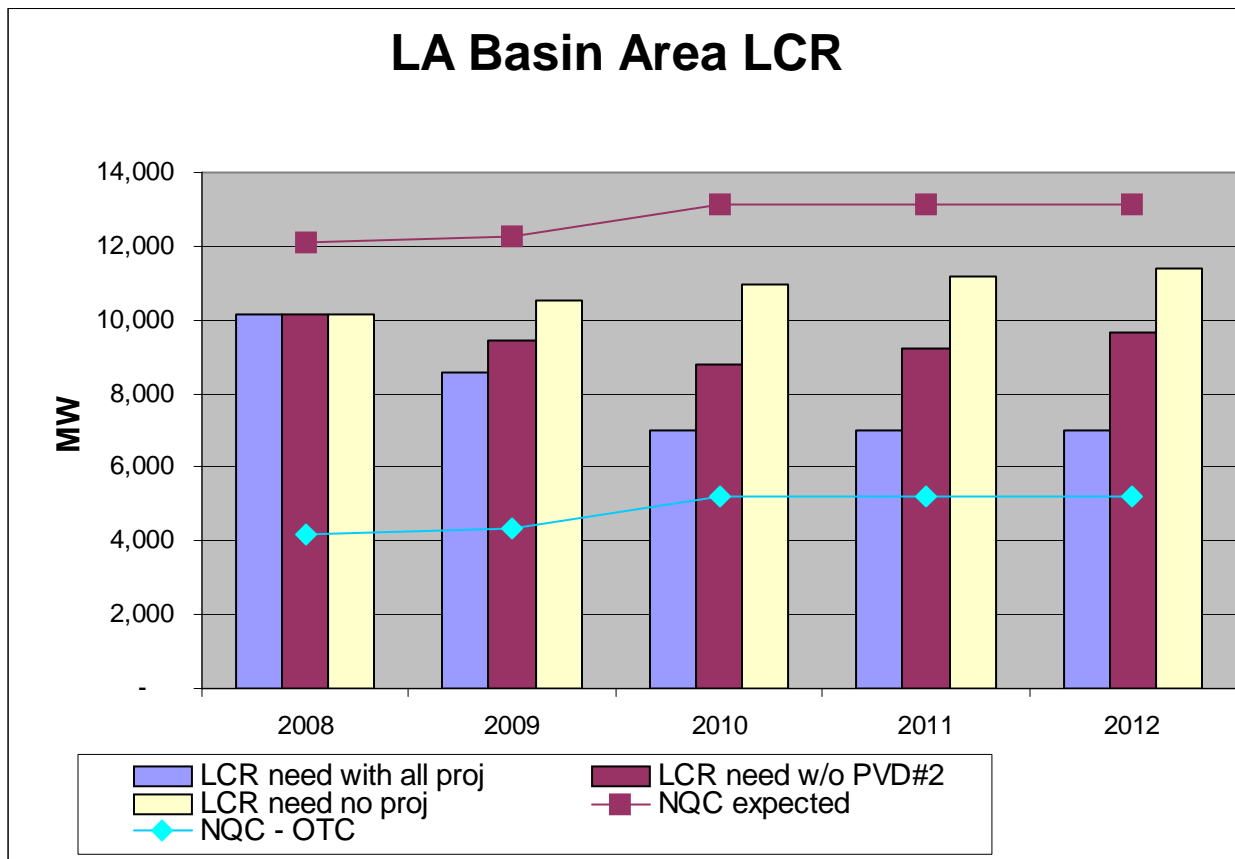
NA	24172	LBEACH4G	13.8	56.50	4	Western, Barre	No NQC - Pmax	Market
NA	24173	LBEACH5G	13.8	56.50	5	Western, Barre	No NQC - Pmax	Market
NA	24174	LBEACH6G	13.8	56.50	6	Western, Barre	No NQC - Pmax	Market
NA	24079	LBEACH7G	13.8	63.00	7	Western, Barre	No NQC - Pmax	Market
NA	24080	LBEACH8G	13.8	82.50	8	Western, 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

Analysis Summary

LA Basin overall:



From a LA Basin overall perspective the old thermal units in the area can not all retire unless additional resources and/or transmission additions not mentioned here become operational. However several can retire **after** the installation of the above-mentioned transmission projects and new resources become operational (2011-2012) given that the Barre sub-area constraints have been eliminated. The graph gives projected LCR needs with and without the major projects proposed in this area as well as sensitivity with all major projects operational but without Palo Verde-Devers #2.

Barre Sub-area:

From a Barre area perspective only about 4-5 units (depending on size and location) among the existing 17 old thermal units in the area can retire unless additional resources and/or transmission additions not mentioned here become operational. Since there are no projects proposed today, additional studies need to be done through the expansion planning process and as such new constraints may be encountered in this general area that are less stringent than the existing limit.

9. Big Creek/Ventura Area

Old thermal units available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
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
ORMOND_7_UNIT 1	24107	ORMOND1G	26	741.27	1	Ventura		Market
ORMOND_7_UNIT 2	24108	ORMOND2G	26	775	2	Ventura		Market

New generation modeled:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	LCR SUB-AREA NAME	NQC Comments	CAISO Tag
NA	28306	MCGPKGEN	13.8	47.2	1	Ventura	No NQC - Pmax	Market

Major new projects modeled:

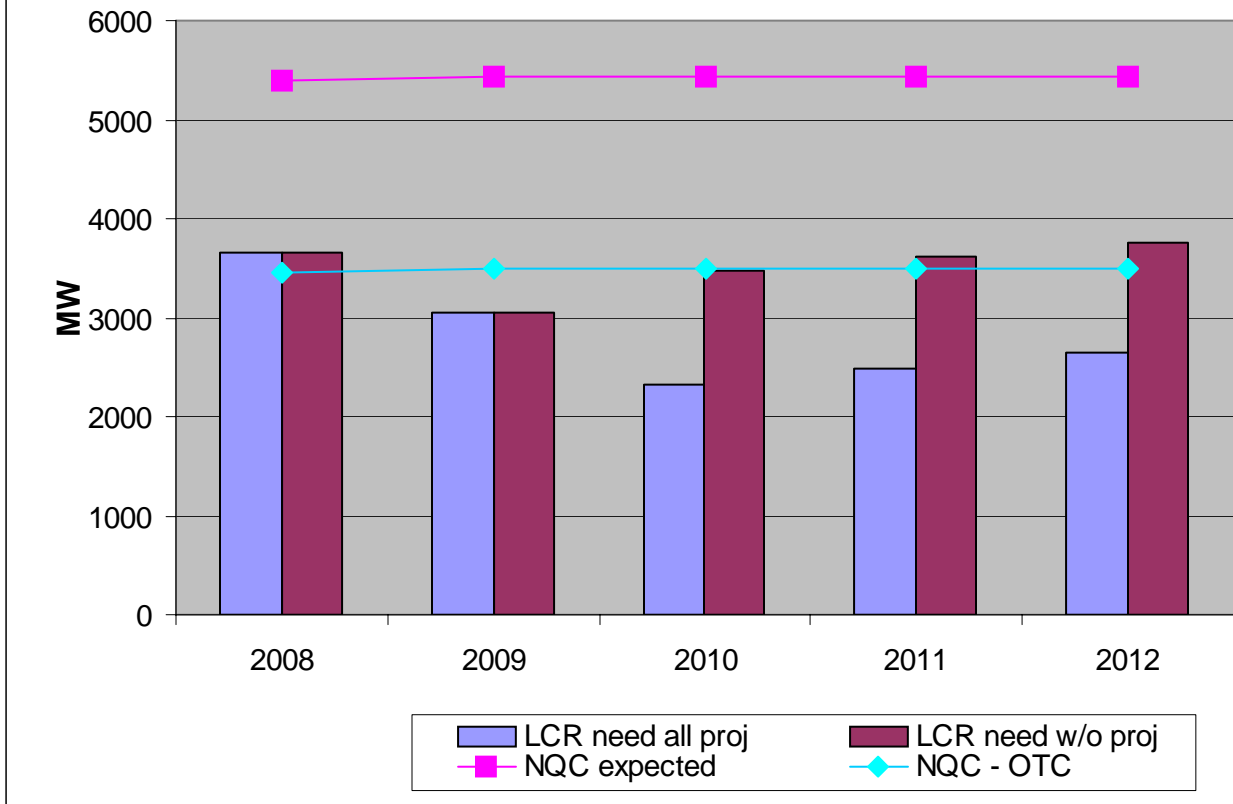
1. Sylmar – Pardee 230 kV Upgrade
2. Green Path North (LADWP)

Analysis Summary

Big Creek/Ventura overall:

From a Big Creek/Ventura overall perspective the old thermal units in the area can retire **after** the installation of the above-mentioned transmission projects and new resources become operational (2010-2011). If these projects do not become operational only a portion of the old thermal units can retire from a local perspective.

Big Creek/Ventura Area LCR



10. San Diego Area

Old thermal units available in this area:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	NQC Comments	CAISO Tag
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
SOBAY_7_GT1	22776	SOUTHBT	12.5	13.00	1	Possible retire 2010	Market
SOBAY_7_SY1	22780	SOUTHBY1	15	145.00	1	Possible retire 2010	Market
SOBAY_7_SY2	22784	SOUTHBY2	15	149.00	1	Possible retire 2010	Market
SOBAY_7_SY3	22788	SOUTHBY3	20	174.00	1	Possible retire 2010	Market
SOBAY_7_SY4	22792	SOUTHBY4	20	221.00	1	Possible retire 2010	Market

New generation modeled:

MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	NQC Comments	CAISO Tag
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

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

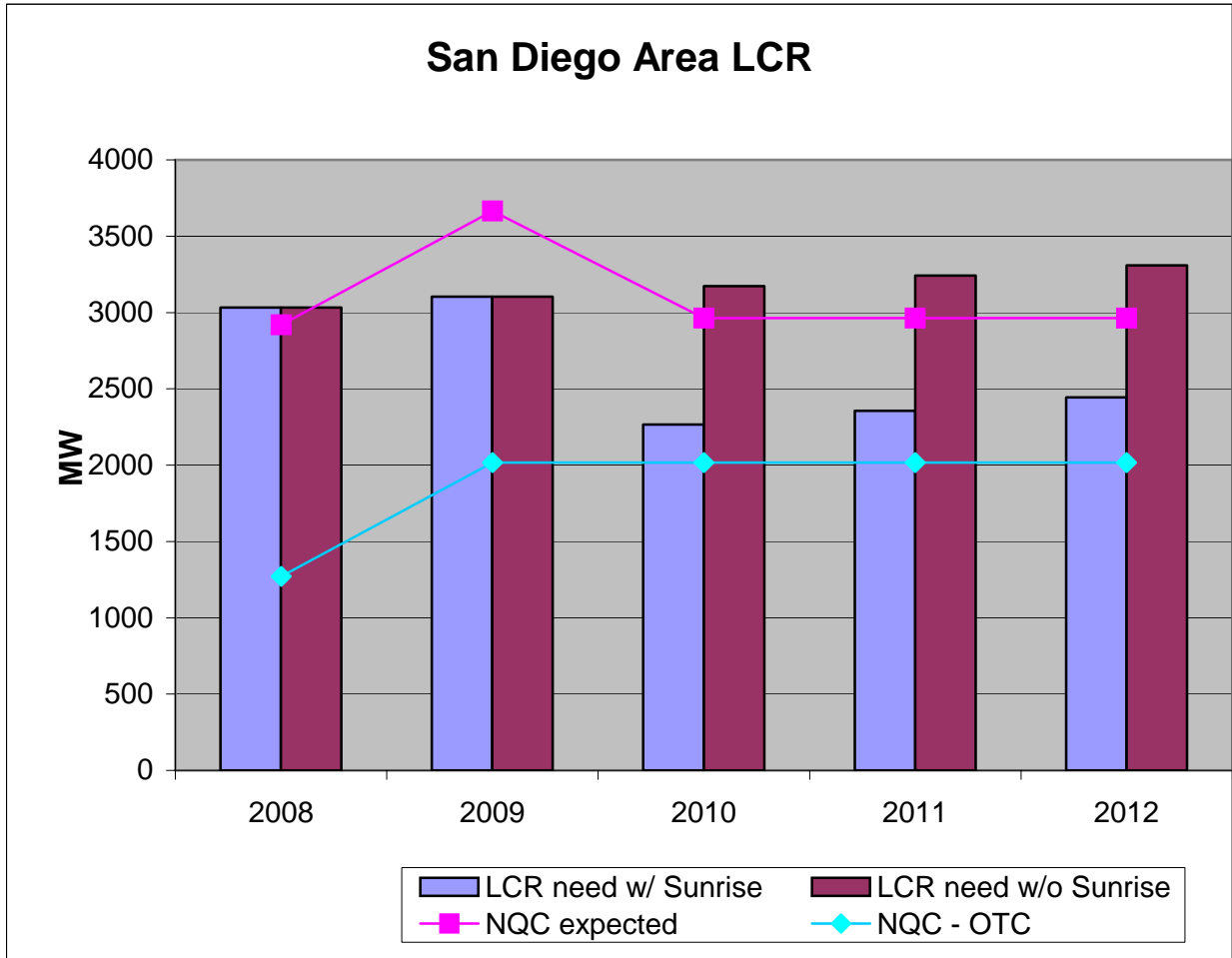
MKT/SCHED RESOURCE ID	BUS #	BUS NAME	kV	NQC	UNIT ID	NQC Comments	CAISO Tag
NA	22999	SOLAR	230	100	1	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	2	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	3	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	4	No NQC - Pmax	Market
NA	22999	SOLAR	230	100	5	No NQC - Pmax	Market
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

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

Analysis Summary

San Diego overall:



From a San Diego overall perspective the South Bay power plant can retire **after** the installation of the above-mentioned transmission projects and new resources become operational (2010-2011). If these projects do not become operational only a portion of the South Bay old thermal units can retire from a local perspective.

Also from a San Diego overall perspective, even if all projects become operational only a small portion of the Encina power plant can retire the rest cannot unless additional resources and/or transmission additions not mentioned here become operational.

Greater Imperial Valley-San Diego area:

After the operational date for the Sunrise 500 kV project this area’s LCR requirements need to be also satisfied. The requirement are higher then San Diego overall however there are additional units available at Imperial Valley that can satisfy the need as such it is not clear at this time if this will have an influence or not on the old power plant retirement scenario in San Diego.

VII. Conclusion

The California ISO prepared this Phase 1 report in an effort to help inform decisions that are currently pending before State policy makers. It documents the reliability risks associated removing O-T-C generation from service and shows that the greatest risk is with regard to resource adequacy on a system and zonal basis. A decision to retain the level of system and zonal reliability similar to what exists today will constrain the ability to take existing generation out of service more than local reliability requirements. Depending on how the electric system and zonal impacts are handled, the risk of shedding firm load could increase four-fold.

This report is the first phase of a comprehensive study that is being conducted in an open, stakeholder process. The full report is due to be completed in the fourth quarter of 2008.