

Electric Reliability Report

Conducted by Jones & Stokes and
Global Energy Decisions for the
California Water Resources Control Board
and Ocean Protection Council
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Disclaimer

- Neither the Water Board, the Ocean Protection Council, nor any other state agency have reviewed nor endorsed the study and this presentation
- Any opinion expressed is that of the speaker, Matt Trask of Trask & Associates, and no one else

Study Purpose

- Analyze energy implications of Water Board's proposed rules regarding Clean Water Act Section 316(b)
- Assess potential impacts to electric system reliability and to Utilities & Services
- Explore means to reduce or eliminate impacts to reliability and the environment

Study Process

- Gather data on present operations
- Analyze other related studies
 - CEC Scenarios Study for 2007 IEPR
 - OPC Study of Alternative Cooling Systems
- Form study work group, with members from CEC, CPUC, and CAISO
- Vet modeling assumptions and results with work group
- Multiple reviews by work group

The OTC Fleet

- 54 generating units at 18 plants
 - 41 older steam boiler units
 - Nine newer combined-cycle units
 - Two units each at two large nuclear plants (Diablo Canyon and SONGS)
- Provide baseload, load-following, reliability and ancillary services
- Diverse settings, including rural, industrial, and mixed use



Diablo Canyon Nuclear Plant

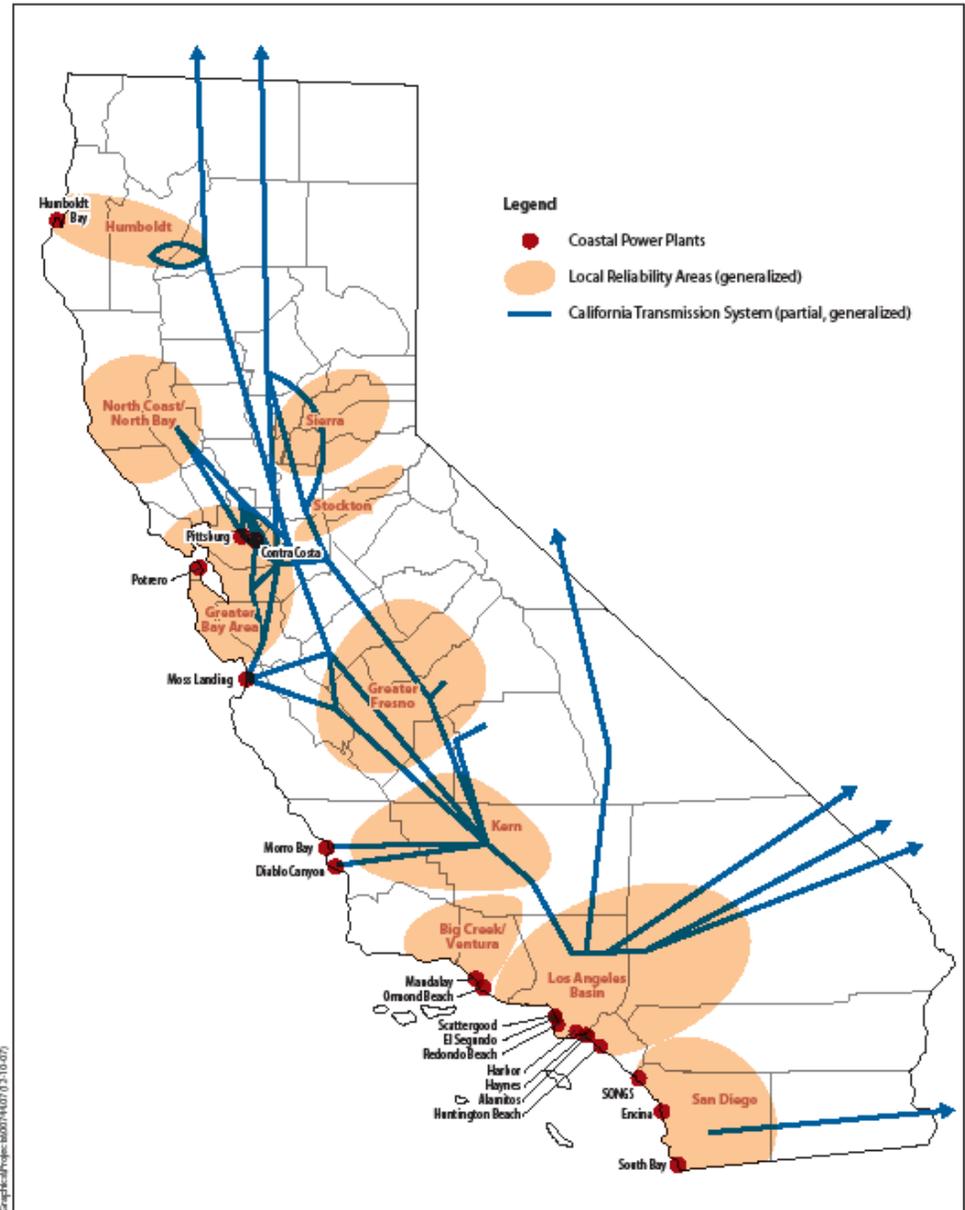


Harbor Generating Station



El Segundo Generating Station

The California Grid
Local Reliability Areas
OTC Plant Locations



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Figure 1
Locations of Power Plants, Local Reliability Areas, and California's Major Transmission System

OTC Units 2001-2006 Capacity Factors and 2006 Capacity

Plant Name	Unit	CF						MW
		2001	2002	2003	2004	2005	2006	2006
Alamitos	1	10.0%	9.5%	8.1%	6.5%	2.7%	3.3%	175
	2	20.7%	11.1%	8.5%	6.9%	2.1%	2.7%	175
	3	44.5%	35.0%	36.7%	23.7%	9.1%	17.1%	326
	4	47.6%	23.6%	20.8%	19.1%	5.5%	7.9%	324
	5	66.9%	33.7%	20.2%	25.2%	9.3%	9.3%	485
	6	63.8%	18.8%	18.4%	10.8%	10.1%	11.3%	485
Contra Costa	6	62.0%	28.5%	1.9%	4.1%	1.1%	0.8%	340
	7	49.7%	37.1%	16.3%	21.6%	10.0%	3.8%	340
Diablo Canyon	1	98.4%	72.7%	99.2%	74.6%	86.0%	102.9%	1103
	2	89.8%	96.4%	80.0%	83.1%	98.1%	88.5%	1099
El Segundo	1	19.4%	3.3%	0.0%	0.0%	0.0%	0.0%	0
	2	17.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0
	3	24.4%	35.3%	23.7%	8.8%	12.5%	11.6%	335
	4	56.0%	45.6%	19.7%	7.8%	10.2%	9.5%	335
	5	41.1%	16.8%	13.8%	20.4%	15.6%	4.6%	107
Encina	2	40.2%	19.4%	15.5%	23.7%	17.3%	9.6%	104
	3	46.5%	18.8%	21.1%	34.2%	18.7%	11.6%	110
	4	56.5%	33.1%	33.7%	43.9%	30.7%	17.9%	300
	5	42.6%	34.6%	38.5%	43.5%	19.9%	18.7%	330
	Harbor	CC	28.4%	31.7%	24.9%	15.1%	13.5%	9.1%
Haynes	all	23.6%	16.5%	17.7%	14.5%	25.9%	24.7%	1606
Humboldt Bay	1	62.1%	39.7%	26.8%	38.7%	46.6%	46.2%	53
	2	77.3%	38.8%	18.7%	38.4%	45.0%	45.6%	54
	1	36.2%	31.5%	36.5%	38.6%	26.0%	20.4%	215
	2	32.4%	37.4%	36.8%	40.8%	22.1%	16.7%	215
Huntington Beach	3	0.0%	0.0%	8.2%	18.7%	19.3%	11.6%	225
	4	0.0%	0.0%	8.9%	17.5%	13.7%	10.8%	225
	1	53.7%	25.2%	14.2%	15.5%	7.3%	7.8%	218
	2	54.2%	28.2%	18.1%	20.1%	11.2%	8.6%	218
Morro Bay	1	30.5%	2.1%	0.3%	0.0%	0.0%	0.0%	
	2	34.1%	5.1%	1.2%	0.0%	0.0%	0.0%	
Mandalay	3	67.6%	18.2%	5.3%	8.5%	6.3%	6.8%	300
	4	55.9%	36.2%	5.3%	4.1%	5.8%	5.6%	300
	CC1	0.0%	29.7%	60.0%	50.2%	50.0%	56.7%	540
	CC2	0.0%	26.0%	53.6%	58.9%	53.2%	56.6%	540
Moss Landing	6	57.2%	36.2%	9.0%	5.6%	3.8%	6.2%	702
	7	79.9%	27.1%	11.8%	12.0%	3.8%	10.8%	702
	1	46.5%	17.7%	11.2%	20.0%	2.0%	0.2%	806
Ormond Beach	2	45.0%	17.9%	16.5%	14.2%	6.0%	6.5%	806
	5	54.4%	19.1%	26.0%	23.1%	12.0%	7.4%	325
Pittsburg	6	62.3%	23.9%	7.0%	20.3%	7.1%	5.2%	325
	7	71.4%	40.9%	16.3%	9.0%	1.7%	1.4%	720
	3	56.4%	30.0%	45.5%	46.6%	21.3%	28.8%	207
Potrero	5	10.8%	5.4%	8.3%	2.3%	1.0%	1.7%	179
	6	24.3%	3.1%	1.7%	1.5%	1.1%	1.7%	175
	7	67.2%	22.8%	12.6%	17.5%	6.6%	6.7%	493
	8	66.7%	23.2%	8.6%	11.1%	2.7%	5.6%	496
San Onofre	2	96.1%	86.1%	98.4%	81.6%	90.5%	68.4%	1127
	3	57.2%	96.7%	87.1%	70.7%	95.9%	69.0%	1127
Scattergood	all	24.8%	16.5%	31.7%	24.8%	13.6%	21.3%	803
South Bay	1	51.5%	35.5%	34.1%	43.6%	45.9%	32.5%	136
	2	51.2%	37.3%	39.2%	51.3%	35.8%	29.7%	136
	3	31.0%	16.2%	22.2%	29.8%	23.6%	7.0%	210
	4	9.6%	4.1%	2.5%	12.5%	6.7%	4.8%	214
								21098

Future of OTC Fleet

- Future operations largely dependant on ability to secure contracts
 - CPUC Resource Adequacy and Long-Term Procurement Proceedings
 - CAISO Local Capacity Requirements Process
 - Power Purchase Agreements
- Need dependent on growth, success of conservation/efficiency pgms, new plant development (including renewables), etc.

Effects of Board's New OTC Policy

- Possible reduced net generation from cooling system conversions
 - Parasitic load and heat rate up
 - Can be compensated by over-firing at some plants
- Extended outages for cooling system conversions
- Some may repower, others may retire, with decisions likely tied to contracts

Modeling Effort

- Includes economic and reliability runs
- Considers a wide range of potential retirements or de-ratings
- Analyzes effects of enactment in 2009, 2012 or 2015
- Examines wide range of contingencies
- Produces economic effects, transmission segment overloads and solutions, and net effect on power sector emissions

Preliminary Results

- Modeling not exhaustive due to time and budget constraints
- Initial reliability runs show potential for moderate to severe effects on reliability
- Results highly dependent on when the rules are enacted
 - Severe effects from mass retirements in 2009
 - Moderate effects in 2012 and 2015
- All but most severe scenarios can be resolved with transmission system upgrades
- Results should be considered as introduction to CAISO and SCAQMD Processes

Conclusions

- Future of OTC fleet likely a mix of retirements, repowers, and cooling system retrofits
- Predicting the future of any one plant is beyond speculation
- If plants retire, others become more important, requiring constant reassessment
- Industry will need sufficient time to plan, site, and construct needed replacement infrastructure

Ensuring Reliability

- CAISO LCR/Transmission Planning efforts
- CEC Biennial Integrated Energy Policy Report
- CPUC RA/Long-Term Procurement processes
- LADWP Resource Planning process
- SCAQMD Reliability Study
- Planning horizon: 5 years for new power plant, 7 years for new transmission line

Questions?

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