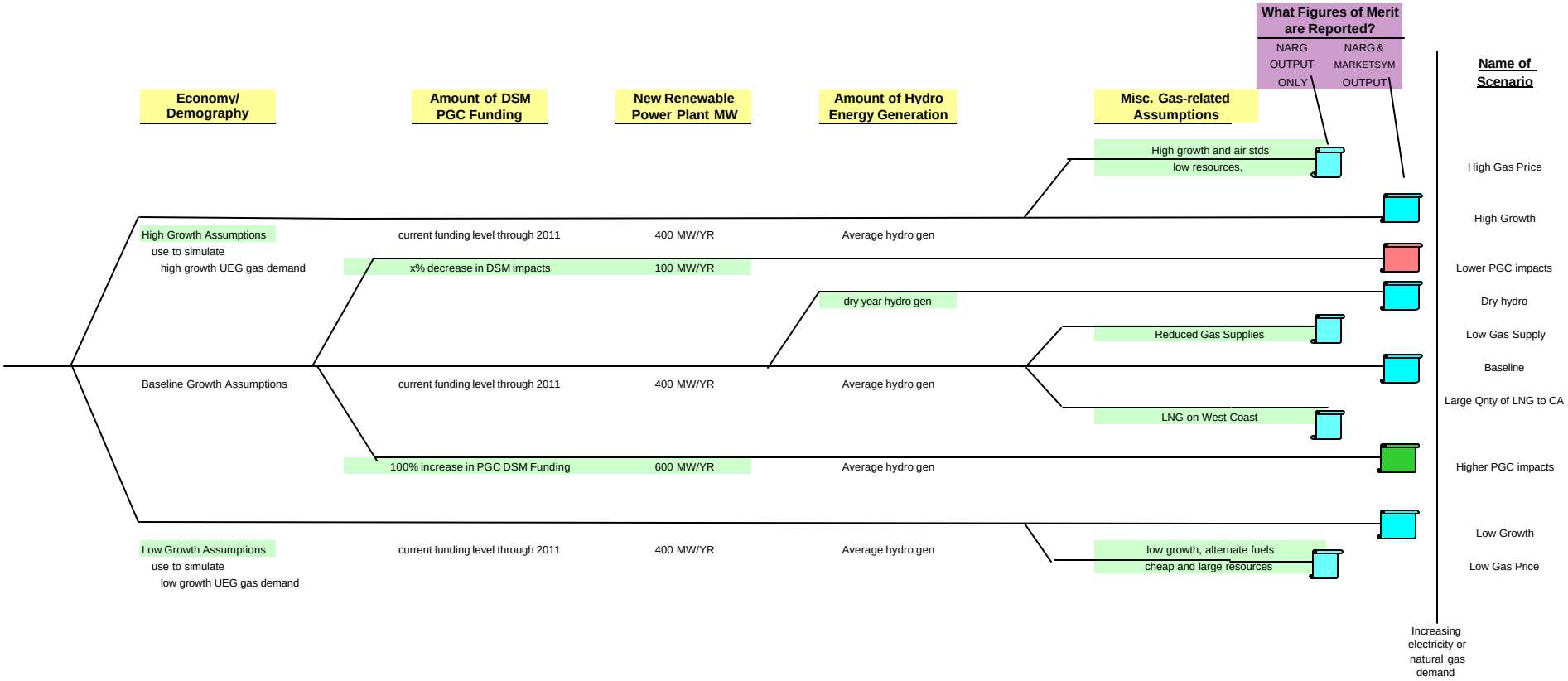
APPENDIX A
ELECTRICITY INFRASTRUCTURE ASSUMPTIONS

This Appendix summarizes the major assumptions used in the Marketsym simulations for the six scenarios assessed in the ***Electricity and Natural Gas Assessment Report*** and shown in **Figure 1**. Results from these six simulations were included in the May 27, 2003 ***Staff Report on Electricity Infrastructure*** (100-03-07F) and discussed at the June 10, 2003 Integrated Energy Policy Report Committee Workshop. The assumptions remain unchanged from the staff report. However, parties requested additional information regarding the assumptions in the staff scenario analysis. The additional tables of the assumptions used in the analysis include the following:

- Derates of hydro energy assumed for the Dry Hydro Scenario – **Table A-13**
- High and Low PGC Scenario, including California capacity additions, retirement and modifications from the Baseline Scenario – **Tables A-5** and **A-6**
- The Baseline, High Growth and Low Growth Scenario forecast of peak demand for regions outside California – **Tables A-9, A-10** and **A-11** respectively
- Planning reserve margins for all WECC regions and scenarios for 2004-2013 –**Tables A-15, A-16** and **A-17** respectively. The Dry Hydro Scenario is excluded since this only impacts California energy assumptions

Figure 1
Electricity and Natural Gas Scenario Infrastructure Study



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*2003 retirements only, 2003 generation additions are included in **Table A**

Table A-1
2003 Generation Additions Statewide

Project	Nameplate	Summer Dependable	Online Date	Cumulative
Calpine - Creed Energy Center	45	40	1/1/2003	
Calpine - Lambie Energy Center	45	40	1/1/2003	
Calpine - Goose haven Energy Center	45	40	1/1/2003	
Calpine - Feather River	45	40	1/1/2003	
	January	**160**		**160**
La Paloma 1 & 3	562	539	01/10/03	
Paramount Refinery (Co-gen)	8	8	1/15/2003	
Calpine - Wolfskill Energy Center [formerly Milpitas Peaker]	45	40	1/23/2003	
	February	**587**		**747**
CalWind Resources, Inc., (WIND)	9	0	2/15/2003	
Blythe	520	499	3/1/2003	
	March	**499**		**1,245**
La Paloma 2 & 4	562	539	3/3/2003	
ISG Energy, LLC, Mesquite Lake Resource Recovery Facility (WASTE TIRE)	30	30	4/1/2003	
	April	**569**		**1,814**
Neo Corporation, Colton (LFG)	1	1	4/9/2003	
Neo Corporation, Mid-Valley (LFG)	3	3	4/11/2003	
Calpine- Riverview Peaker	45	40	4/21/2003	
High Desert	830	796	4/22/2003	
Calpine- Los Esteros Critical Energy Facility Units 1-4	180	160	4/30/2003	
Modesto Irrigation District - Woodland 2	80	77	5/1/2003	
	May	**1,076**		**2,891**
Neo Corporation, Milliken (LFG)	3	3	5/30/2003	
El Dorado Irrigation Dist. (SM HYDRO)	21	21	5/31/2003	
GWF - Tracy (Tesla Substation)	169	150	6/1/2003	
Energy Developments, Inc., Keller Canyon (LFG)	4	4	6/1/2003	
Elk Hills	500	480	6/1/2003	

Table A-1
2003 Generation Additions Statewide
(Continued)

Project	Nameplate	Summer Dependable	Online Date	Cumulative
	June	**657**		**3,548**
Anaheim Convention Center	2	2	6/15/2003	
FPL Energy, High Winds, LLC Phase 1 (WIND)	70	0	7/1/2003	
FPL Energy, High Winds, LLC Phase 2 (WIND)	80	0	7/1/2003	
Sunrise Phase 2 [Combined Cycle]	265	265	7/1/2003	
County of Santa Cruz, Dept. of Public Works, Buena Vista Landfill (LFG)	3	3	7/1/2003	
	July	**270**		**3,817**
Mark Tech. Corp./FORAS Energy, Inc., Alta Mesa VII (WIND)	15	0	8/1/2003	
AES- Huntington Beach Unit 4	225	225	8/1/2003	
	August	**225**		**4,042**
Oak Creek Energy Systems, Inc., Jawbone (WIND)	53	0	9/1/2003	
Oak Creek Energy Systems, Inc., Oak Creek 4	28	8	9/1/2003	
Oak Creek Energy Systems, Inc., Deetricity (WIND)	18	0	9/1/2003	
Oak Creek Energy Systems, Inc., Oak Creek 3	5	2	9/1/2003	
	September	**10**		**4,052**
Energy Unlimited, (WIND)	17	0	9/30/2003	
Wintec Energy #2 (WIND)	4	0	9/30/2003	
	October	**0**		**4,052**
Mark Tech. Corp./FORAS Energy, Inc., Alta Mesa IV (WIND)	25	0	10/31/2003	
Keating Associates, (SMALL HYDRO)	1	1	11/1/2003	
So Cal Water- Big Bear	8	8	11/12/2003	
	November	**9**		**4,061**
No projects in December ranked @ 75% Probability	**December**			**4,061**

Table A-2
Baseline Scenario - California Non RPS Generation
Additions and Retirements
2004* – 2013

Generation Additions					Generation Retirements		
Unit	**On Line Date**	**Installed Capacity**	**Dependable Capacity**	**Region**	**Unit**	**Retirement Date**	**Dependable Capacity**
Glenarm GT 3,4	9/1/2003	94	94	SP-15	Morro Bay 1	9/30/2003	171
Valley LADWP CC	10/1/2003	520	520	Los Angeles	Morro Bay 2	9/30/2003	171
LADWP Wind - SP15	7/1/2004	140	0	SP-15	Haynes 4	11/30/2003	222
Haynes Repower	12/1/2004	575	575	Los Angeles			
Walnut CC	12/1/2004	250	250	NP-15	Alamitos GT 7	12/31/2003	147
Pico	1/1/2005	147	147	NP-15	Etiwanda 5	12/31/2003	141
San Fran. Airport	1/1/2005	180	180	San Francisco	Magnolia GT 5	1/1/2004	22
Magnolia CC	3/1/2005	250	250	Los Angeles	Olive 3,4	1/1/2004	56
Cosumnes River	3/15/2005	547	547	Sacto.	Valley LADWP 1-4	4/15/2004	513
Vernon GTs	5/1/2005	135	135	SP-15	Haynes 3	9/30/2004	222
Metcalf	6/1/2005	602	608	NP-15	Magnolia 3,4	9/30/2004	53.5
Kings River Peaker	7/1/2005	45	45	NP-15	Mohave 1,2	12/31/2005	915
Salton Sea #6	7/1/2005	185	170	IID	Hunters Point 4	1/1/2006	163
MID Cogen	12/1/2005	80	80	NP-15	Hunters Point GT1	1/1/2006	56
Otay Mesa	12/31/2005	510	510	Miguel CA	South Bay 1-4	12/31/2008	623
Generic CC 1 & 2	1/1/2009	600	600	SDG&E	**Total Retirements**		**3,476**

Table A-2
Baseline Scenario - California Non RPS Generation
Additions and Retirements
2004* – 2013
(Continued)

Generation Additions					Generation Retirements		
Unit	**On Line Date**	**Installed Capacity**	**Dependable Capacity**	**Region**	**Unit**	**Retirement Date**	**Dependable Capacity**
Generic CC 1	4/1/2009	250	250	San Francisco			
Generic GT 1	4/1/2009	150	150	IID			
Generic GT 1	4/1/2009	150	150	SP15			
Generic GT 1	4/1/2010	150	150	NP15			
Generic GT 1	4/1/2011	150	150	NP15			
Generic GT 1	4/1/2012	150	150	NP15			
Generic GT 1	4/1/2012	150	150	SP15			
Generic CC 1	4/1/2013	250	250	SP15			
Generic GT 1	4/1/2013	150	150	SP15			
Total Additions		**6,410**	**6,261**				
Does not include RPS renewables							

*2003 retirements only, 2003 generation additions are included in table titled “2003 Generation Additions Statewide”

Table A-3
Renewable Portfolio Standard

New RPS Capacity Additions (Cumulative Installed MW) Baseline Scenario 2004 - 2013				
Year	**Biofuels**	**Geothermal**	**Wind**	**Total**
2004	50	0	342	392
2005	66	0	549	615
2006	129	115	762	1006
2007	180	252	973	1405
2008	266	366	1184	1816
2009	334	503	1394	2231
2010	419	616	1615	2650
2011	504	707	1825	3036
2012	572	775	2047	3394
2013	645	843	2263	3751
Geographic Composition	NP15 - 312 MW SP15 - 294 MW SD - 40 MW	IID - 743 MW NP15 - 100 MW	SP15 - 1454 MW NP15 - 808 MW	

Table A-4
Southwest/Mexico Region
Baseline Scenario – WECC Region Outside California
2004 - 2013

Generation Additions					
Unit Name	**Number of Units**	**On Line Date**	**Fuel Type**	**Installed Capacity**	**Region**
Pyramid Power Plant	4	01-Oct-03	Natural Gas	152	Southwest/Mexico
Reliant Bighorn	2	01-Oct-03	Natural Gas	870	Southwest/Mexico
Harquahala Project	3	01-Nov-03	Natural Gas	1059	Southwest/Mexico
Mesquite CC	2	01-Jan-04	Natural Gas	625	Southwest/Mexico
Generic CC	1	01-Jun-05	Natural Gas	300	Southwest/Mexico
Santan CC New	3	01-Jun-05	Natural Gas	699	Southwest/Mexico
Generic GT	1	01-Apr-08	Natural Gas	150	Southwest/Mexico
Generic GT	1	01-Apr-09	Natural Gas	150	Southwest/Mexico
Generic GT	2	01-Apr-10	Natural Gas	300	Southwest/Mexico
Generic CC	1	01-Apr-11	Natural Gas	250	Southwest/Mexico
Generic GT	2	01-Apr-11	Natural Gas	300	Southwest/Mexico
Generic CC	2	01-Apr-12	Natural Gas	500	Southwest/Mexico
Generic GT	3	01-Apr-12	Natural Gas	450	Southwest/Mexico
Generic CC	1	01-Apr-13	Natural Gas	250	Southwest/Mexico
Generic GT	4	01-Apr-13	Natural Gas	600	Southwest/Mexico
Generic CC	2	01-Apr-13	Natural Gas	530	Southwest/Mexico
Generation Retirements					
Unit Name	**Unit Number**	**Retirement Date**	**Capacity**	**Fuel Type**	**Region**
Mohave (Southwest Portion)	1-2	31-Dec-05	492	Coal	Southwest/Mexico
Clark ST	3	31-Dec-11	70	Natural Gas	Southwest/Mexico

Table A-4a
Northwest Canada Region
Baseline Scenario

Generation Additions						
Unit Name	**Number of Units**	**On Line Date**	**Fuel Type**	**Installed Capacity**	**Dependable Capacity (Wind)**	**Region**
Goldendale	1	01-Jul-03	Natural Gas	253		MW/Canada
SP Newsprint	1	01-Jul-03	Natural Gas	35		MW/Canada
Edmonton Cogen	1	01-Sep-03	Natural Gas	30		MW/Canada
McBride	1	01-Sep-03	WT	75	18	MW/Canada
Labarge Shute Cogen	1	01-Oct-03	Natural Gas	12		MW/Canada
Pincher Creek	1	01-Oct-03	WT	108	28	MW/Canada
Bonanza Upgrade	1	01-Jan-04	Natural Gas	80		MW/Canada
MacKay River Cogen	1	01-Jan-04	Natural Gas	95		MW/Canada
Payson	1	01-Jun-04	Natural Gas	140		MW/Canada
Genesee	2	01-Dec-04	Natural Gas	450		MW/Canada
Generic GT	1	01-Apr-07	Natural Gas	150		MW/Canada
Generic CC	2	01-Apr-08	Natural Gas	500		MW/Canada
Generic GT	1	01-Apr-08	Natural Gas	150		MW/Canada
Generic GT	2	01-May-08	Natural Gas	300		MW/Canada
Generic GT	1	01-Jan-09	Natural Gas	175		MW/Canada
Generic CC	1	01-Jan-09	Natural Gas	295		MW/Canada
Generic CC	2	01-Apr-09	Natural Gas	500		MW/Canada
Generic GT	1	01-Apr-09	Natural Gas	150		MW/Canada
Generic CC	1	01-Jan-10	Natural Gas	295		MW/Canada
Generic CC	1	01-Apr-10	Natural Gas	300		MW/Canada
GenGT_NW	4	01-Apr-10	Natural Gas	150		MW/Canada
Generic New Coal	1	01-May-10	Coal	830		MW/Canada
Generic GT	3	01-May-10	Natural Gas	450		MW/Canada
Generic GT	1	01-Jan-11	Natural Gas	175		MW/Canada
Generic CC	1	01-Jan-11	Natural Gas	295		MW/Canada
Generic CC	2	01-Apr-11	Natural Gas	500		MW/Canada
Generic GT	4	01-Apr-11	Natural Gas	600		MW/Canada
Generic CC	2	01-Apr-12	Natural Gas	500		MW/Canada
Generic GT	3	01-Apr-12	Natural Gas	1450		MW/Canada
Generic GT	1	01-May-12	Natural Gas	150		MW/Canada
Generic GT	1	01-Jan-13	Natural Gas	175		MW/Canada
Generic CC	1	01-Jan-13	Natural Gas	295		MW/Canada
Generic CC	4	01-Apr-13	Natural Gas	1000		MW/Canada
Generic GT	2	01-Apr-13	Natural Gas	150		MW/Canada

Table A-4a
Northwest Canada Region
Baseline Scenario
(continued)

Generation Retirements						
Unit Name	**Unit Number**	**Retirement Date**		**Capacity**	**Fuel Type**	**Region**
Wabamun	1	01-Jan-04		67	Coal	MW/Canada
Wabamun	2	01-Jan-04		67	Coal	MW/Canada
Chelan DGs	1	01-Apr-04		34	FO#2	MW/Canada
Tacoma Tideflats	1	01-Apr-04		58	FO#2	MW/Canada
Boston Bar Diesel	1	01-Apr-06		2	FO#2	MW/Canada
Wabamun	4	01-Jan-10		280	Coal	MW/Canada
Rossdale	8	01-Oct-10		71	Natural gas	MW/Canada
Rossdale	9	01-Oct-10		73	Natural gas	MW/Canada
Rossdale	10	01-Oct-10		72	Natural gas	MW/Canada

Table A-4b
Rocky Mountain Region
Baseline Scenario

Generation Additions					
Unit Name	**Number of Units**	**On Line Date**	**Fuel Type**	**Installed Capacity**	**Region**
Thompson River	1	01-Dec-03	Natural Gas	10	Rocky Mountain
Rocky Mountain EC	1a	01-May-04	Natural Gas	300.5	Rocky Mountain
Rocky Mountain EC	1b	01-May-04	Natural Gas	300.5	Rocky Mountain
Generic GT	1	01-Apr-11	Natural Gas	150	Rocky Mountain
Generic GT	1	01-Apr-12	Natural Gas	150	Rocky Mountain
Generic GT	1	01-Apr-13	Natural Gas	150	Rocky Mountain
Generation Retirements					
Unit Name	**Unit Number**	**Retirement Date**	**Capacity**	**Fuel Type**	**Region**
J E Correte	1	01-Jan-13	160	Coal	Rocky Mountain

Table A-5
California High PGC Scenario
Non RPS Generation and Modifications from Baseline

Generation Retirements and Accelerated Retirements					
Unit Name	**Unit Number**	**Retirement Date**	**Capacity**	**Fuel Type**	**Region**
South Bay	4	31-Dec-03	150	Natural Gas	SDG&E was 12/31/2008
Glenarm GT	1	01-Jan-04	25	Natural Gas	SP15
Mobile GT	1	31-Dec-04	15	FO-#2	NP15
Glenarm GT	2	01-Jan-05	26	Natural Gas	SP15
Brawley GT	1	31-Dec-05	9	FO-#2	IID
Mobile GT	2	31-Dec-05	15	FO-#2	NP15
Brawley GT	2	31-Dec-06	9	FO-#2	IID
Mandalay	3	31-Dec-06	132	FO-#2	SP15
Mobile GT	3	31-Dec-06	15	FO-#2	NP15
Newhall	1	31-Dec-06	19.1	FO-#2	SP15
Newhall	2	31-Dec-06	19.8	FO-#2	SP15
Coachella GT	1	31-Dec-07	20	FO-#2	IID
Coachella GT	2	31-Dec-07	20	FO-#2	IID
Coolwater CC	3	31-Dec-07	241	Natural Gas	SP15
Oakland GT	1	31-Dec-07	58	FO-#2	NP15
Oakland GT	2	31-Dec-08	51	FO-#2	NP15
Coachella GT	3	31-Dec-09	20	FO-#2	IID
Coachella GT	4	31-Dec-09	20	FO-#2	IID
Coolwater CC	4	31-Dec-09	241	Natural Gas	SP15
Oakland GT	3	31-Dec-09	49	FO-#2	NP15
Morro Bay	3	30-Sep-10	343	Natural Gas	ZP26
Potrero GT	4	31-Dec-10	54	FO-#2	CSF
Rockwood GT	1	31-Dec-10	25	FO-#2	IID
Potrero GT	5	31-Dec-11	55	FO-#2	CSF
Rockwood GT	2	31-Dec-11	25	FO-#2	IID
Potrero GT	6	31-Dec-12	53	FO-#2	CSF
Yucca GT	4	31-Dec-12	47	FO-#2	IID
Generation Additions - Cancelled					
Unit Name	**Number of Units**	**On Line Date**	**Installed Capacity**	**Fuel Type**	**Region**
MID Cogen	1	01-Dec-05	80	Natural Gas	NP15
Generic CC	1	01-Apr-09	250	Natural Gas	City of San Francisco
Generic GT	1	01-Apr-09	150	Natural Gas	SP15
Generic GT	1	01-Apr-11	150	Natural Gas	NP15
Generic CC	1	01-Apr-13	250	Natural Gas	SP15
Generation Additions					
Unit Name	**Number of Units**	**On Line Date**	**Installed Capacity**	**Fuel Type**	**Region**
Generic GT	1	01-Apr-09	150	Natural Gas	City of San Francisco

Table A-6
High PGC Scenario

Year	Biofuels	Geothermal	Wind	Total
2004	75	0	513	588
2005	99	0	823.5	922.5
2006	193.5	172.5	1143	1509
2007	270	378	1459.5	2107.5
2008	399	549	1776	2724
2009	501	754.5	2091	3346.5
2010	628.5	924	2422.5	3975
2011	756	1060.5	2737.5	4554
2012	858	1162.5	3070.5	5091
2013	967.5	1264.5	3394.5	5626.5
Geographic Composition	NP15 - 312 MW SP15 - 294 MW SD - 40 MW	IID - 743 MW NP15 - 100 MW	SP15 - 1454 MW NP15 - 808 MW	

Table A-7
Low PGC Scenario
California Non RPS Generation
Modifications from Baseline

Generation Additions					
Unit Name	**Number of Units**	**On Line Date**	**Fuel Type**	**Installed Capacity**	**Region**
Generic GT	1	01-Jan-08	Natural Gas	150	SMUD
Generic CC	2	01-Apr-09	Natural Gas	550	ZP26
Generic GT	1	01-Apr-09	Natural Gas	150	SDG&E
Generic GT	1	01-Jan-10	Natural Gas	150	City Of San Francisco
Generic GT	1	01-Apr-10	Natural Gas	150	SP15
Generic CC	1	01-Jan-11	Natural Gas	287	NP15
Generic GT	1	01-Apr-11	Natural Gas	150	IID
Generation Retirements					
Unit Name	**Unit Number**	**Retirement Date**	**Capacity**	**Fuel Type**	**Region**
None					

Table A-8
Low PGC Scenario

Year	Biofuels	Geothermal	Wind	Total
2004	12.5	0	85.5	98
2005	16.5	0	137.25	153.75
2006	32.25	28.75	190.5	251.5
2007	45	63	243.25	351.25
2008	66.5	91.5	296	454
2009	83.5	125.75	348.5	557.75
2010	104.75	154	403.75	662.5
2011	126	176.75	456.25	759
2012	143	193.75	511.75	848.5
2013	161.25	210.75	565.75	937.75
Geographic Composition	NP15 - 312 MW SP15 - 294 MW SD - 40 MW	IID - 743 MW NP15 - 100 MW	SP15 - 1454 MW NP15 - 808 MW	

Table A-9
Baseline Scenario Peak Demand
Regional Annual Peak Coincident with California Peak
(MW)

Year	California Coincident Peak	Southwest/ Mexico Coincident Peak	Rocky Mountain Coincident Peak	Northwest/ Canada Coincident Peak	WECC Peak Forecast Coincident With California
2004	53,331	24,986	10,391	46,840	135548
2005	54,500	25,926	10,698	48,233	139358
2006	55,487	26,832	10,963	49,009	142291
2007	56,195	27,801	11,202	49,906	145104
2008	57,090	28,714	11,429	50,752	147985
2009	57,757	29,648	11,677	51,562	150643
2010	58,491	30,585	11,913	52,497	153486
2011	59,217	31,559	12,150	53,411	156337
2012	59,975	32,554	12,395	54,289	159213
2013	60,562	33,587	12,631	55,337	162118

Table A-10
High Growth Scenario Peak Demand
Regional Annual Peak Coincident with California Peak
(MW)

Year	California Coincident Peak	Southwest/ Mexico Coincident Peak	Rocky Mountain Coincident Peak	Northwest/ Canada Coincident Peak	WECC Peak Forecast Coincident With California
2004	53,857	25,300	10,698	48,233	138,088
2005	55,420	26,188	10,963	49,009	141,580
2006	56,829	27,139	11,202	49,906	145,076
2007	57,943	28,113	11,429	50,752	148,237
2008	58,710	29,036	11,677	51,562	150,984
2009	59,316	29,949	11,913	52,497	153,675
2010	59,989	30,897	12,150	53,411	156,447
2011	60,654	31,898	12,395	54,289	159,236
2012	61,424	32,903	12,631	55,337	162,295
2013	62,043	33,946	12,853	56,271	165,114

Table A-11
Low Growth Scenario Peak Demand
Regional Annual Peak Coincident with California Peak

Year	California Coincident Peak	Southwest /Mexico Coincident Peak	Rocky Mountain Coincident Peak	Northwest/ Canada Coincident Peak	WECC Peak Forecast Coincident With California
2004	53,021	24,666	10,270	46,693	134,650
2005	53,806	25,425	10,466	47,965	137,662
2006	54,390	26,188	10,645	48,921	140,144
2007	54,710	26,994	10,836	48,470	141,010
2008	55,396	27,913	11,086	49,259	143,653
2009	56,028	28,845	11,315	50,106	146,294
2010	56,755	29,777	11,563	50,936	149,031
2011	57,483	30,751	11,793	51,750	151,778
2012	58,231	31,714	12,027	52,720	154,691
2013	58,879	32,703	12,269	53,599	157,450

Table A-12
High and Low Public Goods Charge Scenarios
California DSM Impacts 2004 - 2013

Year	High PGC Scenario DSM Reductions to Baseline Scenario	Low PGC Scenario DSM Additions to Baseline Scenario
2004	1	73
2005	149	156
2006	424	242
2007	729	325
2008	1,007	405
2009	1,235	482
2010	1,429	553
2011	1,586	622
2012	1,726	686
2013	1,843	747

Table A-13
Dry Hydro Scenario – Percent of Normal Hydro Generation Impacts by WECC Hydro Basin

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Alberta Canada	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Arizona State	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
British Columbia	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Northern California	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Colorado State	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Idaho State	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Montana State	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
New Mexico State	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Nevada State	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Oregon State	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Utah State	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Washington State	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Wyoming State	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Southern California	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Kings River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Kern River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Owens R - Mono L	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%

Table A-13
Dry Hydro Scenario – Percent of Normal Hydro Generation Impacts by WECC Hydro Basin
(continued)

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Stanislaus River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Bear River	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Lower Colorado R	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Cow & Battle Cr	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Kaweah River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Tuolumne River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
American River	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%
Trinity River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Putah Creek	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Yuba River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Upper Sacramento	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Mokelumne River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Truckee River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Merced River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Feather River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Butte Creek	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Upper San Joaqui	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Eel R & Russian	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Tule River	54%	54%	54%	54%	54%	54%	54%	54%	54%	60%	66%	71%
Klamath River	82%	82%	82%	82%	82%	82%	82%	82%	82%	86%	90%	94%

Table A-14
Baseline Scenario Planning Reserve Margins by WECC Region 2004-2013 MWs - August Dependable

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
California Control Area Baseline Planning Reserve Margins										
Total Statewide Coincident Demand	53,331	54,500	55,487	56,195	57,090	57,757	58,491	59,217	59,975	60,562
All Available Resources (excluding Interruptibles and no hydro derate)	65,003	67,484	67,222	67,070	67,170	67,223	68,350	68,918	69,374	69,993
Reserves	11,672	12,984	11,735	10,875	10,080	9,466	9,859	9,702	9,398	9,432
Reserve Margin	21.9%	23.8%	21.1%	19.4%	17.7%	16.4%	16.9%	16.4%	15.7%	15.6%
Southwest/Mexico Control Area Baseline Planning Reserve Margins										
Regional Coincident Demand	24,986	25,926	26,832	27,801	28,714	29,648	30,585	31,559	32,554	33,587
All Available Resources (excluding Interruptibles)	33,845	34,776	34,205	34,355	34,505	34,688	34,988	35,520	36,368	37,515
Reserves	8,859	8,849	7,373	6,554	5,791	5,040	4,403	3,961	3,814	3,927
Reserve Margin	35.5%	34.1%	27.5%	23.6%	20.2%	17.0%	14.4%	12.6%	11.7%	11.7%
Rocky Mountain Control Area Baseline Planning Reserve Margins										
Regional Coincident Demand	10,391	10,698	10,963	11,202	11,429	11,677	11,913	12,150	12,395	12,631
All Available Resources (excluding Interruptibles)	13,474	13,474	13,474	13,474	13,474	13,474	13,474	13,624	13,774	13,924
Reserves	3,082	2,776	2,510	2,272	2,045	1,797	1,561	1,474	1,379	1,292
Reserve Margin	29.7%	26.0%	22.9%	20.3%	17.9%	15.4%	13.1%	12.1%	11.1%	10.2%
NW-Canada Control Area Baseline Planning Reserve Margins										
Regional Coincident Demand	46,840	48,233	49,009	49,906	50,752	51,562	52,497	53,411	54,289	55,337
All Available Resources (excluding Interruptibles)	74,156	74,753	74,737	75,017	75,971	77,532	78,496	79,490	80,555	82,125
Reserves	27,315	26,519	25,728	25,112	25,218	25,970	25,999	26,079	26,267	26,788
Reserve Margin	58.3%	55.0%	52.5%	50.3%	49.7%	50.4%	49.5%	48.8%	48.4%	48.4%

Table A-15
High Growth Scenario Planning Reserve Margins by WECC Region 2004-2013 MWs - August Dependable

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
California Control Area High Growth Planning Reserve Margins										
Total Statewide Coincident Demand	53,857	55,420	56,829	57,943	58,710	59,316	59,989	60,654	61,424	62,043
All Available Resources (excluding Interruptibles)	65,003	67,484	67,222	67,070	67,170	67,223	68,350	68,918	69,374	69,993
Reserves	11,146	12,064	10,393	9,127	8,461	7,907	8,361	8,264	7,950	7,950
Reserve Margin	20.7%	21.8%	18.3%	15.8%	14.4%	13.3%	13.9%	13.6%	12.9%	12.8%
Southwest/Mexico Control Area High Growth Planning Reserve Margins										
Regional Coincident Demand	25,300	26,188	27,139	28,113	29,036	29,949	30,897	31,898	32,903	33,946
All Available Resources (excluding Interruptibles)	33,845	34,776	34,205	34,355	34,505	34,688	34,988	35,520	36,368	37,515
Reserves	8,545	8,588	7,066	6,242	5,469	4,739	4,091	3,622	3,465	3,568
Reserve Margin	33.8%	32.8%	26.0%	22.2%	18.8%	15.8%	13.2%	11.4%	10.5%	10.5%
Rocky Mountain Control Area High Growth Planning Reserve Margins										
Regional Coincident Demand	10,698	10,963	11,202	11,429	11,677	11,913	12,150	12,395	12,631	12,853
All Available Resources (excluding Interruptibles)	13,474	13,474	13,474	13,474	13,474	13,474	13,474	13,624	13,774	13,924
Reserves	2,776	2,510	2,272	2,045	1,797	1,561	1,324	1,229	1,142	1,071
Reserve Margin	26.0%	22.9%	20.3%	17.9%	15.4%	13.1%	10.9%	9.9%	9.0%	8.3%
NW-Canada Control Area High Growth Planning Reserve Margins										
Regional Coincident Demand	48,233	49,009	49,906	50,752	51,562	52,497	53,411	54,289	55,337	56,271
Resources With Transactions	74,156	74,753	74,737	75,017	75,971	77,532	78,496	79,490	80,555	82,125
Reserves	25,922	25,744	24,831	24,265	24,409	25,035	25,085	25,202	25,218	25,855
Reserve Margin	53.7%	52.5%	49.8%	47.8%	47.3%	47.7%	47.0%	46.4%	45.6%	45.9%

Table A-16
Low Growth Scenario Planning Reserve Margins by WECC Region 2004-2013 MWs - August Dependable

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
California Control Area Low Growth Planning Reserve Margins										
Total Statewide Coincident Demand	53,021	53,806	54,390	54,710	55,396	56,028	56,755	57,483	58,231	58,879
All Available Resources (excluding Interruptibles)	65,003	67,484	67,222	67,070	67,170	67,223	68,350	68,918	69,374	69,993
Reserves	11,982	13,679	12,832	12,360	11,775	11,195	11,595	11,435	11,143	11,114
Reserve Margin	22.6%	25.4%	23.6%	22.6%	21.3%	20.0%	20.4%	19.9%	19.1%	18.9%
Southwest/Mexico Control Area Low Growth Planning Reserve Margins										
Regional Coincident Demand	24,666	25,425	26,188	26,994	27,913	28,845	29,777	30,751	31,714	32,703
All Available Resources (excluding Interruptibles)	33,845	34,776	34,205	34,355	34,505	34,688	34,988	35,520	36,368	37,515
Reserves	9,179	9,350	8,017	7,361	6,592	5,842	5,211	4,769	4,654	4,812
Reserve Margin	37.2%	36.8%	30.6%	27.3%	23.6%	20.3%	17.5%	15.5%	14.7%	14.7%
Rocky Mountain Control Area Low Growth Planning Reserve Margins										
Regional Coincident Demand	10,270	10,466	10,645	10,836	11,086	11,315	11,563	11,793	12,027	12,269
All Available Resources (excluding Interruptibles)	13,474	13,474	13,474	13,474	13,474	13,474	13,474	13,624	13,774	13,924
Reserves	3,204	3,008	2,828	2,637	2,388	2,159	1,910	1,831	1,747	1,655
Reserve Margin	31.2%	28.7%	26.6%	24.3%	21.5%	19.1%	16.5%	15.5%	14.5%	13.5%
NW-Canada Control Area Low Growth Planning Reserve Margins										
Regional Coincident Demand	46,693	47,965	48,921	48,470	49,259	50,106	50,936	51,750	52,720	53,599
Resources With Transactions	74,156	74,753	74,737	75,017	75,971	77,532	78,496	79,490	80,555	82,125
Reserves	27,462	26,787	25,816	26,548	26,712	27,426	27,561	27,740	27,836	28,527
Reserve Margin	58.8%	55.8%	52.8%	54.8%	54.2%	54.7%	54.1%	53.6%	52.8%	53.2%

Table A-17
High PGC Scenario Planning Reserve Margins by WECC Region 2004 -2013 MWs - August Dependable

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
California Control Area High PGC Planning Reserve Margins										
Total Statewide Coincident Demand	53,331	54,500	55,487	56,195	57,090	57,757	58,491	59,217	59,975	60,562
High PGC Scenario - DSM Reductions to Baseline Scenario	1	149	424	729	1,007	1,235	1,429	1,586	1,726	1,843
DSM Adjusted Coincident Peak	53,330	54,351	55,064	55,466	56,083	56,522	57,062	57,631	58,249	58,718
All Available Resources (excluding Interruptibles and no hydro derate)	64544	67151	67158	67215	67362	67767	68892	69292	69885	70649
Reserves	11,214	12,800	12,095	11,749	11,279	11,245	11,830	11,661	11,636	11,931
Reserve Margin	21.0%	23.6%	22.0%	21.2%	20.1%	19.9%	20.7%	20.2%	20.0%	20.3%

Table A-18
Low PGC Scenario Planning Reserve Margins by WECC Region 2004 -2013 MWs - August Dependable

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
California Control Area Low PGC Planning Reserve Margins										
Total Statewide Coincident Demand	53,331	54,500	55,487	56,195	57,090	57,757	58,491	59,217	59,975	60,562
Low PGC Scenario - DSM Additions to Baseline Scenario	73	156	242	325	405	482	553	622	686	747
DSM Adjusted Coincident Peak	53,404	54,656	55,729	56,520	57,495	58,239	59,045	59,838	60,661	61,309
All Available Resources (excluding Interruptibles and no hydro derate)	64,600	67,054	66,651	66,351	66,445	67,038	68,255	69,115	69,453	69,953
Reserves	11,196	12,397	10,922	9,830	8,949	8,799	9,210	9,276	8,792	8,644
Reserve Margin	21.0%	22.7%	19.6%	17.4%	15.6%	15.1%	15.6%	15.5%	14.5%	14.1%

Table A-19a
Natural Gas Prices
Monthly Factors to Convert Annual Prices to Monthly Prices

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PG&E	1.06	1.06	0.99	0.97	0.99	0.96	0.96	0.96	0.96	0.96	1.05	1.09
SoCal Gas	1.10	1.07	1.03	0.97	0.95	0.94	0.92	0.94	0.98	1.00	1.08	1.17
SDG&E	1.09	1.04	0.96	0.94	1.00	0.97	0.92	0.97	0.98	0.98	1.09	1.22
So. Calif Prod.	1.10	1.07	1.03	0.97	0.95	0.94	0.92	0.94	0.98	1.00	1.08	1.17
TEOR	1.10	1.07	1.03	0.97	0.95	0.94	0.92	0.94	0.98	1.00	1.08	1.17
Coolwater	1.08	1.05	1.02	0.97	0.96	0.94	0.93	0.94	0.97	0.99	1.08	1.19
Alberta	1.08	1.04	1.00	1.00	0.99	0.93	0.94	0.87	0.91	1.00	1.04	1.08
British Columbia	1.23	1.06	0.88	0.93	0.87	0.83	0.82	0.83	0.87	1.00	1.21	1.22
Colorado	1.08	0.90	0.84	0.86	0.94	1.03	1.02	0.99	0.93	1.04	1.08	1.13
El Paso North-Az	0.98	0.98	0.90	1.02	1.02	1.02	0.92	0.94	1.06	1.00	1.13	1.03
El Paso North-NM	1.12	0.98	0.93	0.94	0.96	0.94	0.97	1.00	0.99	1.03	1.09	1.12
El Paso South-Az	0.98	0.98	0.90	1.02	1.02	1.02	0.92	0.94	1.06	1.00	1.13	1.03
El Paso South-NM	1.12	0.98	0.93	0.94	0.96	0.94	0.97	1.00	0.99	1.03	1.09	1.12
Kern River	1.10	1.07	1.03	0.97	0.95	0.94	0.92	0.94	0.98	1.00	1.08	1.17
Mojave	1.10	1.07	1.03	0.97	0.95	0.94	0.92	0.94	0.98	1.00	1.08	1.17
Montana	1.08	0.90	0.84	0.86	0.94	1.03	1.02	0.99	0.93	1.04	1.08	1.13
Nevada-North	0.99	1.00	0.92	1.02	0.97	1.01	0.93	0.97	1.02	1.08	1.13	1.03
Nevada-South	0.99	1.00	0.92	1.02	0.97	1.01	0.93	0.97	1.02	1.08	1.13	1.03
PGT-Kingsgate	0.98	0.95	0.99	0.92	0.99	1.06	0.97	0.94	0.92	0.99	1.09	1.16
PGT-Malin	0.98	0.95	0.99	0.92	0.99	1.06	0.97	0.94	0.92	0.99	1.09	1.16
PGT-Stansfield	0.98	0.95	0.99	0.92	0.99	1.06	0.97	0.94	0.92	0.99	1.09	1.16
PNW	0.68	0.83	1.00	1.27	1.35	0.76	1.01	1.00	1.11	0.90	0.96	1.09
PNW-Coastal	0.68	0.83	1.00	1.27	1.35	0.76	1.01	1.00	1.11	0.90	0.96	1.09
Utah	1.08	1.09	1.08	1.05	1.00	0.98	0.95	0.82	0.88	0.98	1.08	1.25
Rosarito	1.09	1.04	0.96	0.94	1.00	0.97	0.92	0.97	0.98	0.98	1.09	1.22
Otay Mesa	1.09	1.04	0.96	0.94	1.00	0.97	0.92	0.97	0.98	0.98	1.09	1.22

Table A-19b
Natural Gas Prices for Electricity Generation
Nominal $/mmBtu

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
PG&E	4.55	4.18	4.29	4.52	4.65	4.83	5.00	5.20	5.41	5.62
SoCal Gas	4.68	4.19	4.25	4.52	4.71	4.94	5.14	5.35	5.54	5.76
SDG&E	4.68	4.19	4.25	4.52	4.71	4.94	5.14	5.35	5.54	5.76
So. Calif Prod.	4.46	4.12	4.20	4.43	4.62	4.81	5.01	5.22	5.44	5.69
TEOR	4.65	4.12	4.12	4.29	4.48	4.67	4.87	5.08	5.30	5.52
Coolwater	4.65	4.11	4.12	4.29	4.48	4.67	4.87	5.08	5.30	5.51
Alberta	3.93	3.50	3.59	3.74	3.88	4.03	4.18	4.34	4.51	4.70
British Columbia	4.17	3.78	3.94	4.12	4.29	4.46	4.64	4.82	5.02	5.22
Colorado	4.48	3.93	4.02	4.17	4.31	4.46	4.61	4.76	4.93	5.11
El Paso North-Az	4.41	3.91	4.00	4.21	4.39	4.56	4.75	4.93	5.14	5.42
El Paso North-NM	4.43	3.94	4.00	4.21	4.39	4.56	4.75	4.93	5.14	5.42
El Paso South-Az	4.53	4.06	4.20	4.44	4.62	4.81	5.00	5.20	5.41	5.65
El Paso South-NM	4.55	4.10	4.20	4.44	4.62	4.81	5.00	5.20	5.41	5.65
Kern River	4.63	4.09	4.09	4.25	4.44	4.63	4.82	5.03	5.24	5.46
Mojave	4.85	4.36	4.41	4.62	4.81	5.00	5.20	5.41	5.62	5.87
Montana	N/A	N/A	N/A	4.20	4.36	4.51	4.67	4.83	5.01	5.20
Nevada North	4.96	4.58	4.66	4.85	5.04	5.22	5.42	5.62	5.83	6.07
Nevada South	4.93	4.41	4.45	4.63	4.83	5.02	5.22	5.43	5.65	5.88
PGT-Kingsgate	3.73	3.29	3.35	3.50	3.64	3.79	3.94	4.09	4.26	4.45
PGT-Malin	4.13	3.72	3.80	3.96	4.13	4.29	4.46	4.64	4.82	5.03
PGT-Stansfield	3.90	3.48	3.54	3.70	3.86	4.01	4.17	4.34	4.52	4.72
PNW	4.87	4.49	4.62	4.81	5.00	5.19	5.38	5.58	5.80	6.02
PNW-Coastal	4.28	3.89	3.99	4.18	4.36	4.53	4.72	4.91	5.11	5.33
Utah	4.43	4.01	3.99	4.14	4.29	4.43	4.58	4.74	4.90	5.09
Rosarito	4.82	4.32	4.36	4.56	4.75	4.95	5.14	5.35	5.57	5.82
Otay Mesa	4.76	4.28	4.32	4.54	4.73	4.93	5.13	5.33	5.56	5.78

Table A-20
2004 – 2006 California Generation Additions and Retirements Assumed in Load – Resource Balance

Generation Additions				Generation Retirements		
Unit	**On Line Date***	**Dependable Capacity (MW)**	**Owner**	**Unit**	**Retirement Date**	**Dependable Capacity (MW)**
Glenarm 3-4	2004	94	City of Pasadena	Valley LADWP 3-4	2004	323
Valley LADWP CC	2004	520	Los Angeles DWP	Etiwanda 5	2004	130
Grayson 9	2004	49	City of Glendale	Magnolia GT 5	2004	22
New renewables	2004	50		Haynes 4	2004	222
Haynes Repower	2005	575	Los Angeles DWP	Pittsburg 3-4	2004	304
Kings River peaking units	2005	85	Kings River Conservation District	Alamitos GT 7	2004	134
Ripon	2005	90	Modesto Irrigation District	Olive 3-4	2004	56
Pico	2005	147	Silicon Valley Power	Haynes 3	2005	222
San Francisco peaking units	2005	180	City of San Francisco	Haynes 5-6 derates	2005	82
Magnolia CC	2005	315	SCPPA	Miscellaneous retirements	2005	750
Cosumnes I	2005	458	SMUD	Mohave 1-2	2006	916
Malburg	2005	135	City of Vernon	Hunters Point 1-4	2006	219
SP15 Combined Cycle	2005	500		Miscellaneous retirements	2006	1,250
San Diego Combined Cycle	2005	500		**Total Retirements**		**4,630**
New renewables	2005	15				
Salton Sea #6	2006	177	Cal Energy			
Walnut CC	2006	240	Turlock Irrigation District			
SP15 Combined Cycle	2006	500				
New renewables	2006	179				
Total Additions		**4,809**				

TRANSMISSION UPGRADES ASSUMED IN SIMULATIONS

As noted in its February 11, 2003 Staff Draft Report entitled ***Preliminary Electricity and Natural Gas Infrastructure Assumptions***, there are seven major transmission projects conservatively expected in the next ten years which staff modeled in its MarketSym™ simulations:

1. Path 15 upgrade: The addition of a third 500 kV line between Los Banos and Gates would reduce a major intrastate bottleneck that limits economic transfers between northern and southern California. This joint TransElect/WAPA/PG&E project is modeled by increasing the North-to-South capacity by 1,135 MW and the South-to-North capacity by 1,450 MW beginning in January 2005.

2. Path 26 (Midway to Vincent) upgrade: This project would allow an increase in the path rating from 3,000 MW to 3,400 MW by installing a new remedial action scheme (RAS) to drop new generation in PG&E's Midway area in the event of a contingency. Due to an explosion and fire at SCE's Vincent transformer bank 2AA on March 21, 2003, the current transfer capability of Path 26 is 2,500 MW. Because the installation of a fourth transformer at Vincent had already been planned for July 1, 2003, the fourth transformer will now serve as a functional equivalent for transformer bank 2AA, thereby allowing a return to a path rating of 3,000 MW once it becomes operational. The RAS upgrades are being made independent of the transformer installation, and according to PG&E should be operational by November 2003. Staff had previously assumed an effective date of October 2003; the slip of one month will not impact staff's simulations.

3. Path 45 upgrade: The physical upgrades (line reconductoring from the La Rosita Substation in Mexico to the Imperial Valley Substation in California) necessary to increase the entire path rating from about 400 MW to 800 MW have been completed; however, the WECC has not yet approved the increase in the South-to-North direction for the summer months. That approval is expected in mid-July 2003.

4. Miguel-Mission and Imperial Valley Substation upgrades: The combination of these upgrades will allow for an additional 560 MW of capacity to be delivered to the San Diego load center. The CPUC approved the construction of these projects based on their economic (rather than reliability) merits on February 27, 2003; however, SDG&E must still obtain a Certificate of Public Convenience and Necessity (CPCN) for the Miguel-Mission portion of the project. The CPUC will expedite the CPCN since the economic need for the project has been established and the work will be done within SDG&E's rights-of-way. Staff has assumed an on-line date of January 2005. The most recent SDG&E monthly filing to the CPUC shows an on-line date of June 2005.

5. Path 46 upgrade: Staff has assumed a 1,000 MW increase in the West of Colorado River path from the Imperial Irrigation District area to the SCE area in January 2009. Unlike the other projects discussed here, this is a generic project assumption that does not reflect an actual proposal by a project proponent, but is assumed to be needed to accommodate

the movement of RPS-driven renewable energy from new geothermal facilities in the Salton Sea area.

6. Jefferson-Martin project: This reliability-driven project would increase the transfer capability from PG&E north of Path 15 into the San Francisco area from 700 MW to 1,100 MW. Staff has assumed the CPUC will issue its CPCN and construction will be complete by January 2006. For more information on this project, see the section entitled "Constrained Transmission Paths and Local Reliability Areas."

7. Valley-Rainbow project: Staff has modeled this project as an increase in transfer capability between SCE and SDG&E beginning in January 2009. The CPUC denied SDG&E a CPCN for this project in December 2002. A decision on SDG&E's appeal is currently scheduled for the CPUC's June 5, 2003 business meeting. For more information on the status of this project, see the section entitled "Constrained Transmission Paths and Local Reliability Areas."