

**Robert Anderson**

**SDG&E/SoCalGas**

**2009 BCAP Work Papers**

**Electric Generation Workpapers**  
**Robert Anderson**  
**SDG&E/SoCalGas 2009 BCAP**

The electric generation forecast is based on an analysis of the plant's operation in the western electric market using the Marketsym model from Global Energy Decisions (GED). Marketsym has been used by SoCalGas in previous applications before the Commission. This workpaper includes both the input assumptions and results.

**Workpaper List**

**Link to CEC Load Forecast**

See Form 1.5a and Form 1.5b (non-coincidental) of CEC's California Energy Demand 2008-2018, November 2007. Attached file, *Forms1.5SystemEnergy&Peak2008-2018.xls*, has both tables. To view the total CEC report, you can find it by clicking the link below.  
<http://www.energy.ca.gov/2007publications/CEC-200-2007-015/CEC-200-2007-015-SF2.PDF>

**Load forecasts for Rest of WECC**

For outside of California, load data were based on GED's most recent update of peak and energy. For the most part, GED acquired the data from other utilities' resource plans. The load profiles are based on the average of 10 historical years. For the period 2008-2012, the growth rate is about 1.5% in the PNW region, and about 3.3% in the SW region.

**Renewables**

**Existing and Future Renewable Assumption**

Please see attached file, *renewable.xls*.

**Renewable Range**

Please see attached file, *renewable range.xls*, for the low, base, and high assumption for 2010.

**CPUC Report**

Please see attached report; *CPUC, 10-07.pfd*.

**References for LADWP – see link**

<http://www.ladwp.com/ladwp/cms/ladwp008065.pdf>

**References for SMUD – see attached file (*2007StatusRenewableEnergy.pdf*) and link**

<http://www.smud.org/about/reports-pdfs/2007StatusRenewableEnergy.pdf>

**Throughput Forecasts data**

Please see the consolidated gas demand forecast in Herb Emmrich's workpapers. For SoCal EG annual throughput, the data are embedded in page 17 of *HEmmrich\_SCGDemandForecastWP.pdf*. For the SDG&E EG annual throughput, the data are embedded in page 9 of *HEmmrich\_SDG&EDemandForecastWP.pdf*.

**Peak Day forecasts data**

Please see attached file, *WinterPeak.xls*.

**Hydro graph**

Please see attached file, *hydro.xls*.

**Spread Sheets on Sensitivities**

Please see attached file, *sensitivities.xls*, for gas volume sensitivities due to weather and renewable resource uncertainties.

**CEC spread sheet on weather variability**

Please see attached file, *WeatherAdjustmentstoEnergy011008.xls*.

**Form 1.5a**  
**California Energy Demand 2008-2018 Staff Revised Forecast**  
**Net Energy for Load by Control Area**  
**(GWh)**

	2006	2007	2008	2009	2010	2011	2012
<b>PG&amp;E North</b>	92,918	94,568	95,726	96,994	98,247	99,605	100,936
PG&E Service Area by CEC Forecasting Climate zone:							
Zone 1 (North Coast and Mountain)	4,812	4,837	4,885	4,946	5,005	5,071	5,135
Zone 2 (Sacramento Region)	8,078	8,308	8,504	8,737	8,969	9,215	9,465
Zone 3 (Valley Region)	23,300	23,805	24,140	24,444	24,750	25,087	25,420
Zone 4 (East Bay /Central Coast)	25,315	25,795	26,100	26,460	26,814	27,208	27,590
Zone 5 (San Francisco Region)	24,057	24,377	24,570	24,801	25,026	25,259	25,481
PG&E Service Area Total	85,563	87,123	88,199	89,389	90,565	91,840	93,091
PG&E Direct Access	7,941	7,543	7,468	7,468	7,468	7,468	7,468
PG&E Bundled	77,622	79,579	80,731	81,921	83,097	84,372	85,623
Northern California Power Agency	2,587	2,639	2,674	2,707	2,740	2,774	2,807
Silicon Valley Power	2,871	2,920	2,958	2,992	3,026	3,064	3,099
CCSF	1,390	1,376	1,383	1,390	1,397	1,403	1,410
Other Publicly Owned Utilities	507	510	512	516	520	524	528
Dept of Water Resources - North	1,595	1,558	1,558	1,558	1,558	1,558	1,558
<b>Total North of Path 15</b>	94,513	96,126	97,284	98,552	99,805	101,164	102,494
Path 26 Pacific Gas & Electric - South	6,729	6,857	6,938	7,034	7,128	7,233	7,334
Path 26 - Dept of Water Resources	2,636	2,575	2,575	2,575	2,575	2,575	2,575
<b>Total Zone Path 26</b>	9,365	9,431	9,512	9,608	9,702	9,807	9,909
<b>Total NP15 + ZP26</b>	103,878	105,558	106,796	108,160	109,508	110,971	112,402
<b>Southern California Edison Planning Area Total</b>	103,762	105,332	107,101	108,890	110,722	112,554	114,350
SCE Service Area by CEC Forecasting Climate zone:							
Zone 7 (Southern San Joaquin Valley)	5,439	5,554	5,667	5,782	5,898	6,021	6,148
Zone 8 (Coastal LA Basin)	45,929	46,374	46,901	47,434	48,000	48,569	49,115
Zone 9 (Inland LA Basin)	17,832	18,094	18,345	18,605	18,858	19,128	19,384
Zone 10 (Inland Empire)	25,753	26,372	27,098	27,832	28,579	29,303	30,024
SCE Service Area Total	94,954	96,394	98,011	99,653	101,336	103,020	104,671
SCE Direct access	10,253	10,146	10,045	10,045	10,045	10,045	10,045
SCE Bundled	84,701	86,248	87,966	89,608	91,291	92,976	94,626
Anaheim Public Utilities Dept.	2,873	2,902	2,936	2,968	3,001	3,036	3,068
Riverside Utilities Dept	2,176	2,243	2,318	2,393	2,467	2,538	2,609
Vernon Municipal Light Dept	1,228	1,232	1,243	1,249	1,258	1,268	1,277
Metropolitan Water District	1,317	1,317	1,317	1,318	1,318	1,319	1,321
Other Publicly Owned Utilities	1,215	1,244	1,277	1,309	1,342	1,373	1,404
Pasadena Water and Power Dept	1,322	1,327	1,334	1,339	1,344	1,352	1,358
San Diego Gas & Electric	21,569	21,733	22,020	22,373	22,721	23,073	23,419
SDG&E Bundled Customers	18,202	18,399	18,687	19,040	19,387	19,740	20,086
SDG&E Direct Access	3,367	3,333	3,333	3,333	3,333	3,333	3,333
Dept of Water Resources - South	5,230	5,109	5,109	5,109	5,109	5,109	5,109
<b>Total South of Path 15</b>	131,883	133,501	135,563	137,711	139,895	142,087	144,236
<b>Turlock Irrigation District Control Area</b>	2,483	2,532	2,570	2,608	2,645	2,686	2,727
Sacramento Municipal Utilities District	11,522	11,740	11,887	12,063	12,239	12,431	12,629
WAPA	2,406	2,406	2,406	2,406	2,406	2,406	2,406
Redding	893	916	933	958	992	1,031	1,051
Roseville	1,340	1,379	1,412	1,451	1,489	1,529	1,570
Shasta	203	206	209	211	212	214	216
Modesto Irrigation District	2,808	2,876	2,924	2,970	3,016	3,067	3,117
<b>Total SMUD/WAPA Control Area</b>	19,172	19,524	19,773	20,060	20,354	20,679	20,989
Los Angeles Department of Water and Power	27,596	27,820	28,004	28,221	28,401	28,561	28,711
Burbank Public Service Dept	1,163	1,166	1,169	1,173	1,178	1,183	1,187
Glendale Public Service Dept	1,215	1,218	1,219	1,223	1,229	1,234	1,238
<b>Total LADWP Control Area</b>	29,974	30,205	30,393	30,617	30,807	30,979	31,135
<b>Imperial Irrigation District Control Area</b>	3,562	3,740	3,850	3,966	4,082	4,195	4,310
<b>Total CAISO</b>	235,761	239,058	242,359	245,870	249,403	253,058	256,639
<b>Total State</b>	290,952	295,059	298,945	303,121	307,291	311,597	315,800

System energy requirements tables exclude load located in non-California based control areas

Source:

California Energy Demand 2008 - 2018: Staff Revised Forecast ( <http://www.energy.ca.gov/2007publications/CEC-200-2007-015/CEC-200-2007-015-SF.PDF> ),F

**Form 1.5b**

**California Energy Demand 2008-2018 Staff Revised Forecast**

**1-in-2 Electric Noncoincident Peak Demand by Control Area and Climate Zone (MW)**

	2006	2007	2008	2009	2010	2011	2012
PG&E North	20,392	19,631	19,879	20,143	20,406	20,694	20,981
PG&E Service Area by CEC Forecasting Climate zone:							
Zone 1 (North Coast and Mountain)	847	774	782	794	805	817	830
Zone 2 (Sacramento Region)	2,211	2,141	2,187	2,244	2,298	2,357	2,420
Zone 3 (Valley Region)	6,833	6,418	6,513	6,590	6,671	6,758	6,846
Zone 4 (East Bay /Central Coast)	5,501	5,521	5,583	5,657	5,732	5,817	5,899
Zone 5 (San Francisco Region)	3,710	3,523	3,546	3,574	3,603	3,632	3,659
PG&E Service Area Total	19,102	18,377	18,612	18,860	19,109	19,382	19,654
PG&E Direct Access	1,071	1,017	967	967	967	967	967
PG&E Bundled	18,031	17,359	17,645	17,893	18,142	18,415	18,687
Northern California Power Agency	526	517	525	532	539	546	554
Silicon Valley Power	492	481	487	493	499	505	511
CCSF	165	157	158	159	160	160	161
Other Publicly Owned Utilities	106	98	98	99	100	101	101
Dept of Water Resources - North	145	141	141	141	141	141	141
<b>Total North of Path 15</b>	<b>20,536</b>	<b>19,772</b>	<b>20,021</b>	<b>20,284</b>	<b>20,547</b>	<b>20,835</b>	<b>21,122</b>
Path 26 Pacific Gas & Electric - South	1,462	1,468	1,484	1,504	1,524	1,546	1,568
Path 26 - Dept of Water Resources	239	233	233	233	233	233	233
<b>Total Zone Path 26</b>	<b>1,701</b>	<b>1,701</b>	<b>1,718</b>	<b>1,737</b>	<b>1,757</b>	<b>1,780</b>	<b>1,802</b>
<b>Total NP15</b>	<b>22,238</b>	<b>21,473</b>	<b>21,738</b>	<b>22,021</b>	<b>22,304</b>	<b>22,615</b>	<b>22,924</b>
<b>Turlock Irrigation District Control Area</b>	<b>596</b>	<b>562</b>	<b>572</b>	<b>581</b>	<b>590</b>	<b>600</b>	<b>610</b>
Sacramento Municipal Utilities District	3,286	3,136	3,174	3,216	3,261	3,311	3,363
WAPA	320	293	293	293	292	292	292
Redding	266	253	258	263	271	279	285
Roseville	344	335	343	352	360	369	379
Shasta	36	34	34	35	35	35	36
Modesto Irrigation District	749	709	721	733	745	759	772
<b>Total SMUD/WAPA Control Area</b>	<b>5,000</b>	<b>4,759</b>	<b>4,822</b>	<b>4,892</b>	<b>4,964</b>	<b>5,045</b>	<b>5,127</b>
Southern California Edison Planning Area Total	23,460	22,876	23,272	23,674	24,082	24,480	24,877
SCE Service Area by CEC Forecasting Climate zone:							
Zone 7 (Southern San Joaquin Valley)	1,258	1,239	1,264	1,292	1,318	1,347	1,375
Zone 8 (Coastal LA Basin)	8,867	8,687	8,787	8,888	8,992	9,096	9,198
Zone 9 (Inland LA Basin)	4,055	3,903	3,960	4,018	4,076	4,138	4,194
Zone 10 (Inland Empire)	7,467	7,280	7,464	7,652	7,841	8,017	8,199
SCE Service Area Total	21,647	21,109	21,476	21,849	22,227	22,597	22,966
SCE Direct access	1,700	1,615	1,615	1,615	1,615	1,615	1,615
SCE Bundled	19,865	19,415	19,781	20,153	20,530	20,900	21,267
Anaheim Public Utilities Dept.	578	566	572	578	584	591	597
Riverside Utilities Dept	590	577	593	609	625	640	656
Vernon Municipal Light Dept	207	200	202	203	204	206	207
Metropolitan Water District	202	194	195	194	195	195	195
Other Publicly Owned Utilities	317	308	315	321	328	334	340
Pasadena Water and Power Dept	316	299	300	300	300	302	303
San Diego Gas & Electric	4,419	4,506	4,568	4,641	4,712	4,784	4,856
SDG&E Bundled Customers	3,815	3,907	3,970	4,043	4,114	4,186	4,258
SDG&E Direct Access	604	598	598	598	598	598	598
Dept of Water Resources - South	474	463	463	463	463	463	463
<b>Total South of Path 15</b>	<b>28,669</b>	<b>28,144</b>	<b>28,604</b>	<b>29,079</b>	<b>29,557</b>	<b>30,029</b>	<b>30,498</b>
Los Angeles Department of Water and Power	6,163	5,685	5,717	5,754	5,786	5,813	5,840
Burbank Public Service Dept	312	292	292	292	293	294	295
Glendale Public Service Dept	330	309	308	309	309	310	310
<b>Total LADWP Control Area</b>	<b>6,805</b>	<b>6,285</b>	<b>6,317</b>	<b>6,355</b>	<b>6,388</b>	<b>6,417</b>	<b>6,444</b>
<b>Imperial Irrigation District Control Area</b>	<b>992</b>	<b>1,032</b>	<b>1,063</b>	<b>1,097</b>	<b>1,129</b>	<b>1,162</b>	<b>1,195</b>
<b>Total CAISO</b>	<b>50,907</b>	<b>49,617</b>	<b>50,342</b>	<b>51,100</b>	<b>51,862</b>	<b>52,644</b>	<b>53,422</b>
<b>Total State</b>	<b>64,300</b>	<b>62,255</b>	<b>63,117</b>	<b>64,024</b>	<b>64,933</b>	<b>65,868</b>	<b>66,798</b>
<b>Coincident Demand</b>							
<b>Total CAISO Coincident Demand</b>	<b>49,688</b>	<b>48,429</b>	<b>49,137</b>	<b>49,876</b>	<b>50,620</b>	<b>51,383</b>	<b>52,143</b>
<b>Total Statewide Coincident Demand</b>	<b>62,760</b>	<b>60,764</b>	<b>61,605</b>	<b>62,491</b>	<b>63,378</b>	<b>64,291</b>	<b>65,198</b>

Individual LSE Peaks are coincident with the transmission planning area peak.  
 System energy requirements tables exclude load located in non-California based control areas

<b>2009 BCAP</b>						
<b>Total Existing California Renewable Energy (GWh)</b>						
<b>Renewable</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
NP15 Biomass	927	959	956	956	956	959
NP15 Geothermal	7,583	7,584	7,619	7,801	7,801	7,803
NP15 Wind	2,112	2,221	2,218	2,218	2,218	2,221
NP15 Solar	-	-	-	-	-	-
NP15 Hydro	3,447	3,447	3,447	3,447	3,447	3,447
<b>sub-total</b>	<b>14,068</b>	<b>14,210</b>	<b>14,241</b>	<b>14,422</b>	<b>14,422</b>	<b>14,429</b>
SP15 Biomass	1,109	1,116	1,302	1,302	1,302	1,305
SP15 Geothermal	6,198	6,215	6,582	6,581	6,580	6,598
SP15 Wind	3,169	4,037	4,792	5,530	6,267	7,142
SP15 Solar	556	556	556	556	556	556
SP15 Hydro	1,811	1,811	1,811	1,811	1,811	1,811
<b>sub-total</b>	<b>12,843</b>	<b>13,735</b>	<b>15,042</b>	<b>15,778</b>	<b>16,515</b>	<b>17,412</b>
<b>Total</b>	<b>26,912</b>	<b>27,945</b>	<b>29,283</b>	<b>30,201</b>	<b>30,937</b>	<b>31,841</b>

<b>2009 BCAP</b>						
<b>Total New California Renewable Energy (GWh) *</b>						
<b>Renewable</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
Wind_NP15	289	1,660	2,526	3,320	3,753	4,764
Geothermal_NP15	-	-	613	1,665	2,190	2,628
Solar_NP15	-	-	-	540	1,389	1,389
<b>sub-total</b>	<b>289</b>	<b>1,660</b>	<b>3,139</b>	<b>5,525</b>	<b>7,333</b>	<b>8,781</b>
Wind_SCE	3,138	5,177	5,491	6,432	6,746	7,687
Wind_SDGE	157	157	157	628	628	628
Geothermal_SCE	-	-	395	613	1,139	1,139
Geothermal_IID	-	-	395	613	1,139	1,139
Geothermal_SDGE	-	-	307	307	307	307
Solar_IV	-	-	309	309	309	309
Solar_SCE	-	-	-	502	579	617
Solar_SDGE	-	-	-	232	270	309
<b>sub-total</b>	<b>3,295</b>	<b>5,334</b>	<b>7,053</b>	<b>9,634</b>	<b>11,116</b>	<b>12,135</b>
<b>Total</b>	<b>3,583</b>	<b>6,994</b>	<b>10,193</b>	<b>15,160</b>	<b>18,449</b>	<b>20,916</b>

<b>2009 BCAP</b>						
<b>Total California Renewable Energy (GWh)</b>						
<b>Renewable</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
Existing Renewable	26,912	27,945	29,283	30,201	30,937	31,841
Future Renewable	3,583	6,994	10,193	15,160	18,449	20,916
Total Renewable Forecast	30,495	34,939	39,475	45,361	49,386	52,756
% of Total Renewable Forecast	11.3%	12.8%	14.3%	16.2%	17.4%	18.3%

\* Only RPS renewables, does not include large hydro projects

Note: The target renewable goal is about 45,000 GWh in 2010. Model input data shown is slightly different as a result of keeping the resources in realistic sizes.

**Renewable Range Worksheet**

Sheet was used to develop a total statewide range RPS forecast and NOT forecast what each entity will do  
 Percentages are only for RPS renewables  
 Individual IOU percentages were adjusted to achieve IOU total from CPUC

<b>Utilities</b>	<b>2009</b>	<b>Low 2010</b>	<b>Middle 2010</b>	<b>High 2010</b>
<b>Total SDG&amp;E</b>				
SDG&E Bundled Sales	17,777	18,101	18,101	18,101
% Bundled Renewable		14%	16%	19%
<i>Bundled Renewable Energy</i>		<i>2489</i>	<i>2896</i>	<i>3439</i>
SDG&E DA Sales	3,112	3,112	3,112	3,112
% DA Renewable		5%	10%	15%
<i>DA Renewable Energy</i>		<i>156</i>	<i>311</i>	<i>467</i>
Total	20,889			
<b>Total SCE sales</b>				
SCE Bundled Sales	83,902	85,479	85,479	85,479
% Bundled Renewable		16%	17%	19%
<i>Bundled Renewable Energy</i>		<i>13,424</i>	<i>14,531</i>	<i>16,241</i>
SCE DA Sales	9,405	9,405	9,405	9,405
% DA Renewable		5%	10%	15%
<i>DA Renewable Energy</i>		<i>470</i>	<i>941</i>	<i>1,411</i>
Total	93,307			
<b>Total PG&amp;E sales</b>				
PG&E Bundled Sales	81,149	82,303	82,303	82,303
% Bundled Renewable		17%	18%	19%
<i>Bundled Renewable Energy</i>		<i>13,795</i>	<i>14,815</i>	<i>15,638</i>
PG&E DA Sales	6,814	6,814	6,814	6,814
% DA Renewable		5%	10%	15%
<i>DA Renewable Energy</i>		<i>341</i>	<i>681</i>	<i>1,022</i>
Total	87,963			
<b>LADWP Sales</b>				
LADWP Bundled Sales	24,863	25,022	25,022	25,022
% Bundled Renewable		18%	20%	22%
<i>Bundled Renewable Energy</i>		<i>4,475</i>	<i>5,004</i>	<i>5,505</i>
<b>DWR+Turlock Sales</b>				
DWR+Turlock Bundled Sales	8,865	8,865	8,865	8,865
% Bundled Renewable		0%	0%	0%
<i>Bundled Renewable Energy</i>		-	-	-
<b>IID Sales</b>				
IID Bundled Sales	3,516	3,619	3,619	3,619
% Bundled Renewable		8%	10%	12%
<i>Bundled Renewable Energy</i>		<i>281</i>	<i>362</i>	<i>434</i>
<b>SMUD Sales</b>				
SMUD Bundled Sales	11,337	11,502	11,502	11,502
% Bundled Renewable		16%	18%	20%
<i>Bundled Renewable Energy</i>		<i>1,814</i>	<i>2,070</i>	<i>2,300</i>

<b>NP15 Others Sales</b>	16,614	16,827	16,827	16,827
% Bundled Renewable		10%	13%	16%
<i>Bundled Renewable Energy</i>		1,661	2,188	2,692
<b>SP15 Others Sales</b>	12,156	12,307	12,307	12,307
% Bundled Renewable		10%	13%	16%
<i>Bundled Renewable Energy</i>		1,216	1,600	1,969
<b>Total NP15 Sales</b>	124,779	126,311	126,311	126,311
<b>Total NP15 Renewable Forecast</b>	-	17,611	19,754	21,652
% of Total NP15 Renewable Forecast		14.1%	15.8%	17.4%
<b>Total SP15 Sales</b>	154,731	157,045	157,045	157,045
<b>Total SP15 Renewable Forecast</b>		22,511	25,646	29,466
% of Total SP15 Renewable Forecast		14.5%	16.6%	19.0%
<b>Total CA Sales</b>	<b>279,510</b>	<b>283,356</b>	<b>283,356</b>	<b>283,356</b>
<b>Total Renewable Forecast</b>		<b>40,123</b>	<b>45,399</b>	<b>51,118</b>
<b>% of Total Renewable Forecast</b>		<b>14.4%</b>	<b>16.2%</b>	<b>18.3%</b>
<b>Total IOU Sales</b>	182,828	185,883	185,883	185,883
<b>Total Renewable Forecast</b>		29,708	32,242	35,318
% of Total Renewable Forecast		16.2%	17.3%	19.0%

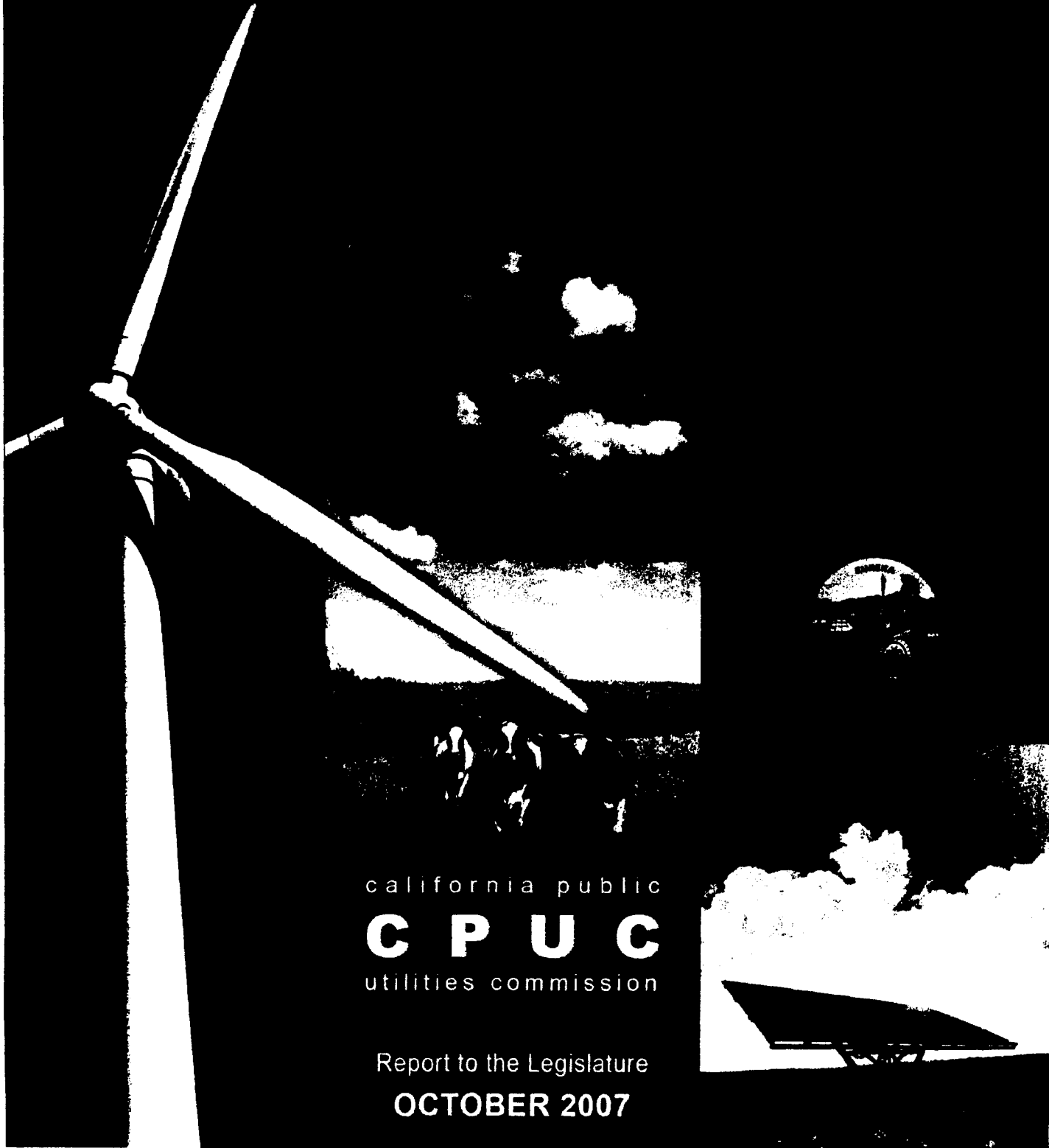
Sales based on November CEC Forecast

Note: NP-15 does not include load from CEC Other Categories which include Sierra Pacific, Pacificorp and other smaller  
 The target renewable goal is about 45,000 GWh. The exact renewable energy in the model may be slightly different due to rounding.



# Progress of The California Renewable Portfolio Standard

As Required by the Supplemental Report of the 2006 Budget Act



california public

**C P U C**

utilities commission

Report to the Legislature

**OCTOBER 2007**

## California's Renewable Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country

Established in 2002 under Senate Bill 1078 and accelerated in 2006 under Senate Bill 107, California's RPS obligates investor-owned utilities (IOUs), energy service providers (ESPs) and community choice aggregators (CCAs) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010. The California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are jointly responsible for implementing the program. This report highlights that:

- The market and procurement mechanisms for RPS energy in California are maturing.
- Transmission, site control, and generation facility permitting are the top barriers to RPS project development.
- The CPUC is working to address statewide barriers to development, in collaboration with other entities. The Renewable Energy Transmission Initiative (RETI) is one such effort.

## CPUC conducts analysis of risk associated with approved RPS projects

As discussed in the January and April Reports to the Legislature, the CPUC works to ensure that the RPS contracts it approves represent viable projects. The CPUC has assigned one contract manager for each of the state's three large IOUs, and these individuals are responsible for reviewing contracts submitted to the CPUC and recommending their approval or rejection.

Employing the additional staff resources provided in the 2006-07 budget, the CPUC staff has conducted an enhanced analysis of the viability of each RPS project submitted to the CPUC and the likely timing of the project's ability to deliver RPS energy. This assessment utilizes information provided by developers, utilities, and others. Major risks to the proposed on-line date for a new RPS facility include transmission, project permitting, site control, financing, and technology risk.

Taking into consideration each of these factors, staff then rates the risk associated with that project's generation of RPS-eligible energy *each year* from its expected online date through contract expiration. Likelihood of delivery in any one year is visually coded either green (low risk), yellow, or red (high risk). For example, a viable project awaiting only a transmission upgrade may be rated "yellow" in its first year of expected deliveries but "green" thereafter, reflecting the possibility of a slip in the schedule for the transmission build-out. A project using technology that has yet to be demonstrated on a commercial scale, on the other hand, may be rated "red" every year of its contract to reflect commercialization risk.

The CPUC has aggregated the project-specific assessments described above into a forecast of RPS generation and associated risk. This forecast, shown in Figure 1 on the next page, includes RPS contracts already approved by the CPUC, those pending approval at the CPUC, and those under negotiation at an IOU. Although the IOUs have begun negotiating with several of the developers short-listed as a result of their 2007 RPS solicitations, this forecast does not include 2007 short-listed bids, since we are not yet able to rate the viability of those early-stage projects.

Figure 2, on page 5, provides a look at the energy deliveries proposed from all projects approved, pending approval, or under negotiation, including the 2007 short-listed bids. What Figure 1 provides is a more sophisticated look at the forecast in Figure 2 and a clearer picture of where the IOUs stand in relation to the 2010 target. The analysis indicates, for example, that the IOUs would collectively reach approximately 16.4% renewable in 2010 if all expiring contracts are re-signed and all low-risk projects come online. Were all of the medium-risk projects to come online, the IOUs would reach 19.5% renewable in 2010.

# IOU Expected RPS Generation and Risk

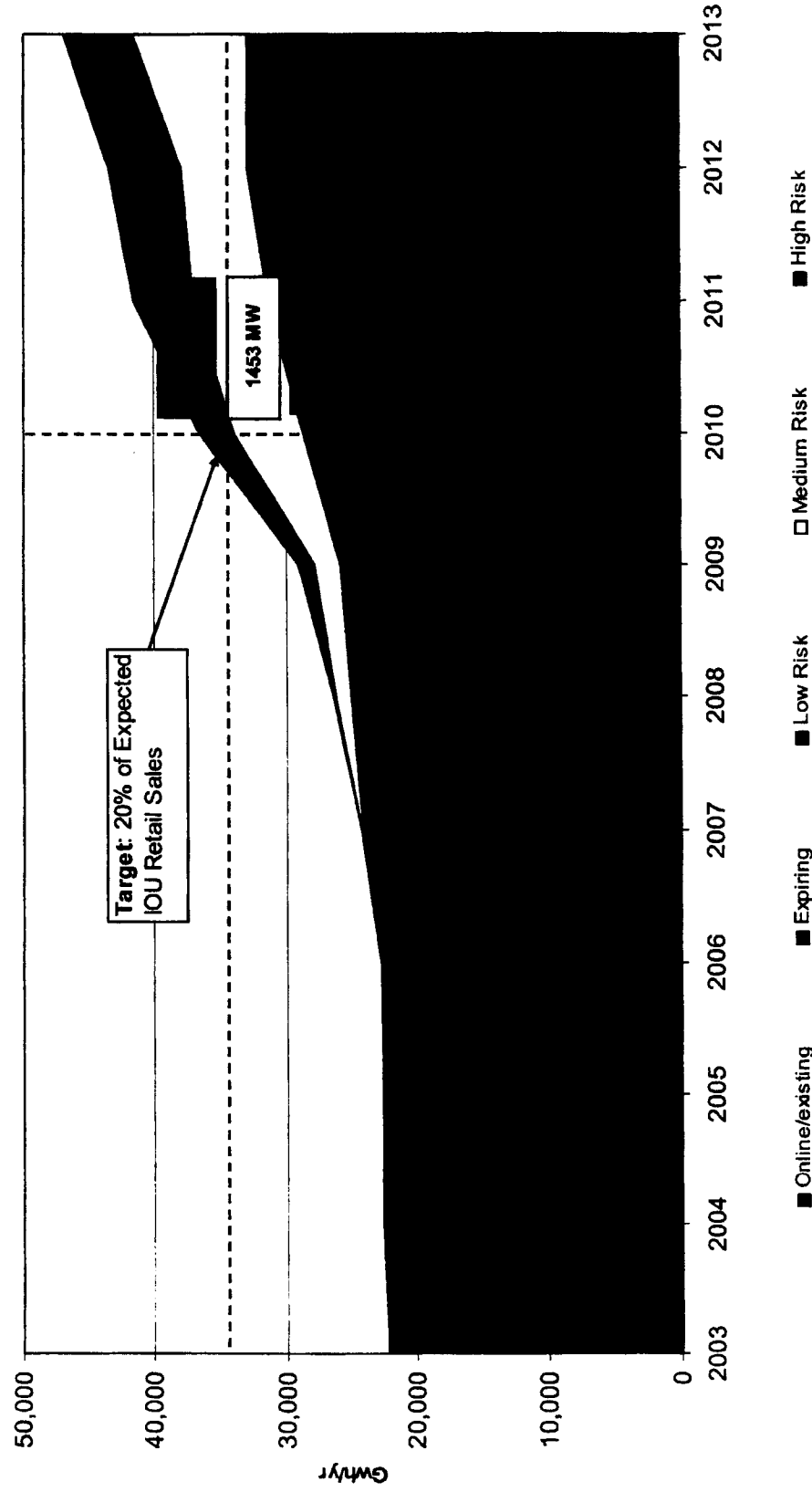


Figure 1.

# IOU Actual and Forecasted RPS Generation

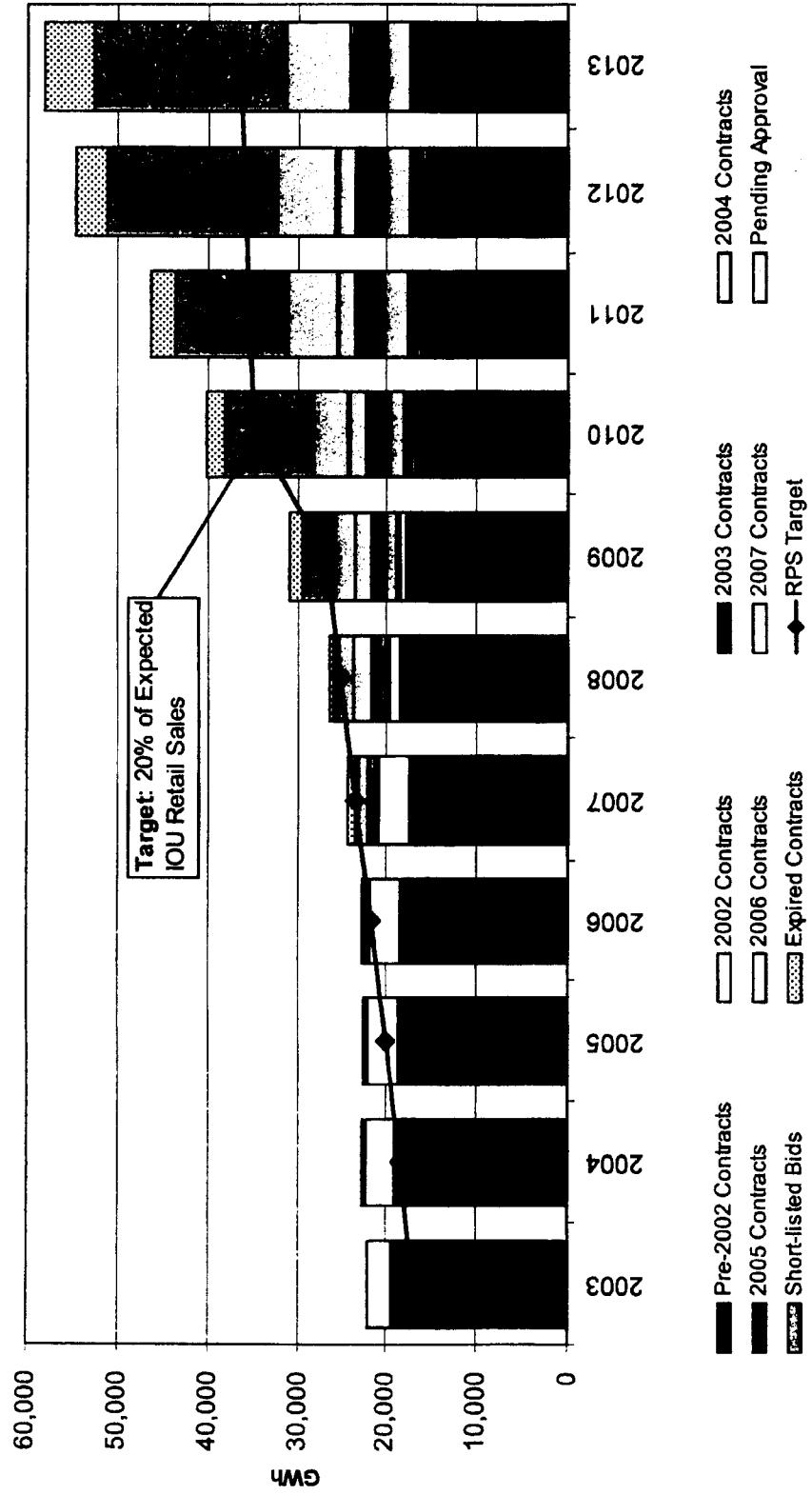


Figure 2.

## RPS Procurement Status Report, October 2007

### Important points regarding Figure 2:

- It takes approximately 2-5 years to bring a project online, assuming adequate transmission is already available. The inclusion of the 2007 bids in this forecast thus results in little visible change before 2010 but very large increases thereafter.
- The grey (short-listed bids) and dotted areas (expired contracts) represent the areas of greatest uncertainty. Expiring contracts represent built RPS capacity, but some may not be re-signed by an IOU. Some of the short-listed bids may not receive contracts, but many represent viable projects that may receive contracts and contribute to the 2010 goal.
- Forecast reflects only minimum energy deliveries; many contracts and short-listed bids include options for the developer or IOU to increase a project's generation.
- Annual RPS targets are based on the CEC's retail sales forecast; actual targets, determined by the CPUC, may change due to consumer choices affecting IOU bundled retail sales.
- Forecast does not assume a percentage of contract failure - see January 2007 Report to the Legislature for discussion on contract failure.
- Forecast uses most recent scheduled completion dates for required transmission upgrades.
- The forecast is based on data reported by the IOUs and analysis by the CPUC's Energy Division, and is updated as more information becomes available.

### CPUC reviewing contracts for almost 3,000 MW of renewable energy

14 contracts between IOUs and renewable generators, representing approximately 2,750 MW of renewable capacity, are currently under review at the CPUC. Among those contracts is the largest contract for wind energy ever signed by a U.S. utility, a SCE contract with Alta Windpower Development, LLC, a subsidiary of the Australian firm Allco Financial Group, Inc. for 1,500 MW of wind in the Tehachapi region.

Table 1 provides a summary of the contracts approved since the first interim solicitation was held in 2002, anticipating the program's implementation in 2003:

Table 1.<sup>1</sup>

2002	4 contracts (119 MW)	5 contracts (268 MW)	15 contracts (239 MW)
2003	3 contracts (44 MW)	8 contracts (687 MW)	1 contract (40 MW)
2004	6 contracts (311 MW)	0 contracts	6 contracts (580 MW)
2005	7 contracts (180 MW)	11 contracts (224 MW)	6 contracts (193 MW)
2006	6 contracts (219 MW)	0 contracts	0 contracts
2007	2 contracts (5 MW) <sup>2</sup>	1 contract (15 MW)	0 contracts

\* Solicitation year or year that bilateral negotiations concluded

<sup>1</sup> 7 of these contracts, totaling 154 MW, were later canceled (see January 2007 report for discussion: [http://www.cpuc.ca.gov/word\\_pdf/REPORT/66515.pdf](http://www.cpuc.ca.gov/word_pdf/REPORT/66515.pdf)). In cases where contracts were later renegotiated for price and/or capacity, the final minimum capacity is counted here.

<sup>2</sup> These contracts, for pipeline quality biogas, have no associated MW capacity. However, each contract's minimum estimated generation, 15 GWh/yr, is the approximate amount of energy produced by a 2.3 MW plant with a 75% capacity factor.

### The market for renewable power in California is maturing

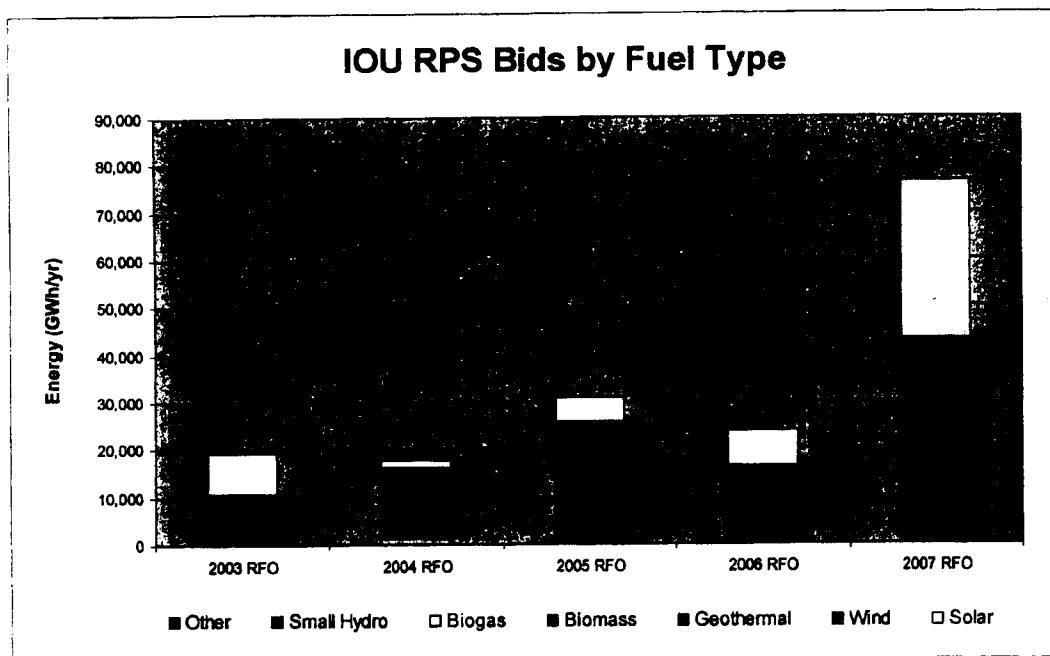
The entrance of large financial agents into the RPS market; the consolidation of the market as large companies buy smaller, well-performing developers; and the record response to the 2007 RPS solicitation all indicate that the RPS procurement environment is maturing.

Figure 3, below, illustrates the change over the last 4 years in both the number and the type of projects bid into the RPS solicitations issued by California's three large IOUs – Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E).

#### Important points:

- Nearly all of the responses to the 2007 Request for Offers were for new projects
- The total amount of generation offered into the 2007 RPS solicitation is more than double that offered into any previous RPS solicitation
- Solar thermal technology has seen a particularly large increase in interest in the past year

Figure 3.<sup>3</sup>



### CPUC requests comment on proposals to focus resources on 2010 goal

As illustrated in Table 1, above, California's three large IOUs have collectively signed more than 80 contracts for more than 3,000 MW of renewable energy. However, less than 300 MW of new capacity has come online since the program began, and a large shortfall remains between current levels of renewable procurement and the 2010 goal. To address this shortfall, the CPUC issued a July ruling asking for comments on two proposals: foregoing the 2008 RPS solicitation; and issuing a solicitation for short-term contracts.

<sup>3</sup> This is a composite of information submitted to the CPUC by the three large IOUs. CPUC staff identified and removed several duplicate bids – bids that were offered into a solicitation at more than one IOU – but the chart may double-count some duplicate bids that were un-identifiable.

The CPUC proposed the idea of foregoing the 2008 RPS solicitation for two reasons. First, recent solicitation results indicate that the state has a very limited supply of built renewable capacity that is not yet under contract. The 2008 solicitation would thus result largely in offers for new construction, and very few of those projects could deliver RPS generation by the 2010 deadline if development did not begin until late 2008. Second, the IOUs have indicated that they are strapped for resources. The dozens of approved RPS contracts now in the development stage and the ongoing work to negotiate additional contracts have stretched IOU staff. The IOUs were asked to consider whether and how it might be beneficial to reallocate resources from the 2008 procurement solicitation to execution of contracts currently under negotiation and project development of Commission-approved projects.

The CPUC asked for comment on the possibility of IOU solicitations for short-term contracts simply to ensure that every means of procuring renewable resources was exhausted. As discussed above, there appears to be very little existing renewable capacity in California that is not already under contract, and new projects usually require long-term contracts to obtain financing. A short-term solicitation would simply be a tool for capturing any remaining renewable facilities that have not bid into long-term RPS solicitations for lack of resources or other possible factors.

### **Renewable Energy Transmission Initiative (RETI) launched on September 20 to address transmission needs of renewable resources**

Nearly all of the bids into the 2007 RPS solicitation were for “new steel in the ground”. While the number of contracts signed and approved by the CPUC and the growing participation in RPS solicitations indicate that the RPS procurement mechanism is working, many projects require upgrades to the transmission network in order to come online.

The California Independent System Operator (California ISO) is working to address short-run challenges around the interconnection of new renewable facilities. A broader process is needed, however, to address the long-run challenge of developing California’s renewable resources and transmission infrastructure in the most cost-effective way. The CPUC, Energy Commission, California ISO, Center for Energy Efficiency and Renewable Technologies (CEERT), IOUs, municipal utilities and other stakeholders have thus begun work on the inter-agency planning process that we introduced in the July Report to the Legislature.

Now called the Renewable Energy Transmission Initiative (RETI), this three-phased process was launched on September 20, 2007 with the first meetings of the RETI Stakeholder Steering Committee and the Plenary Stakeholder Group. Approximately 150 people attended the Plenary Stakeholder Group in person or over the phone, representing a wide and impressive range of stakeholders throughout California and other states. Attendees at both meetings learned about the goals, process, structure, and schedule of RETI, and had the opportunity to ask questions and share their thoughts and concerns. The initial members of the Stakeholder Steering Committee were introduced to the Plenary Stakeholder Group, and feedback on the makeup of the committee will be taken into consideration.

The Stakeholder Steering Committee will meet next on October 15 to begin work on Phase 1 of RETI: a thorough assessment of the developable renewable resource potential in California and neighboring states.

More information about RETI, including presentations from the September 20 meeting and a Mission Statement detailing RETI’s process and administrative structure, is available on the RETI website, <http://www.energy.ca.gov/reti/index.html>.

## **Electric Service Providers file first compliance reports with CPUC**

Electric Service Providers (ESPs), non-utility entities that provide electric service to customer within utilities' service territories, accounted for just over 7% of statewide electricity sales in 2006, according to the California Energy Commission<sup>4</sup>. The RPS is binding on ESPs as of 2006; ESPs now have the same obligations as other RPS-obligated entities to increase annual RPS procurement by at least 1% of the prior-year's retail sales until reaching 20% by 2010. In July, 2007, the CPUC issued a decision modifying for ESPs the formula used to calculate the baseline level of renewable procurement upon which compliance targets in following years are based. That baseline formula is now consistent with the methodology used for all other RPS-obligated entities.

ESPs filed their first progress reports with the CPUC on August 31, 2007. Those reports indicate that, as a group, ESPs currently serve approximately 3% of their retail sales with renewable energy. A compliance determination by the CPUC will not be made, however, until the Energy Commission issues its 2006 RPS Verification Report. On August 13, 2007, the CEC adopted its RPS Verification Report for 2004 and 2005<sup>5</sup>, including verified data for RPS procurement by PG&E, SCE and SDG&E. The CEC's 2006 RPS Verification Report will include data on procurement by ESPs and small and multi-jurisdiction utilities for the first time.

## **CPUC hosts 3-day workshop on Tradable Renewable Energy Credits**

Senate Bill (SB) 107 gave the Commission authority to determine whether unbundled renewable energy credits (RECs) can be used to satisfy RPS requirements. According to the statute, a REC includes all renewable and environmental attributes associated with the generation of one megawatt-hour of renewable energy. Currently, RPS-obligated load-serving entities (LSEs) can comply with RPS targets only with "bundled contracts", or power purchase agreements that include both the renewable energy commodity and the associated REC. Were the CPUC to allow RECs for RPS compliance, LSEs could buy and trade RECs rather than schedule the delivery of actual renewable energy. Proponents of REC trading assert that a REC trading regime would increase the efficiency of the renewable energy market by encouraging wider participation, allowing greater contracting flexibility, and allowing for projects to be built in less transmission-constrained areas, since energy and RECS could be sold to separate buyers. However, ratepayer and environmental advocates are concerned that REC trading could, in the short-run, induce high and/or volatile RPS compliance costs, and discourage the building of new renewable facilities, since those facilities are largely financed through long-term contracts.

SB 107 requires that both the CPUC and the CEC conclude that the REC tracking system<sup>6</sup> is operational before REC trading can be authorized. Should the CPUC approve the use of RECs, statute allows the CPUC to limit the quantity of RECs that may be procured to meet RPS targets and to establish any other conditions it deems necessary.

The CPUC issued a ruling in July 2007 asking for REC trading proposals, and held a 3-day workshop in September to elicit discussion on how REC trading would affect RPS compliance costs, affect the development of new renewable generation, and fit into the existing RPS compliance framework. Parties at the workshop generally agreed that the supply of RECs would be limited in the short-term in California because of the state's transmission constraints and the

<sup>4</sup> IOUs served about 65% of California's load, with most of the rest served by municipal utilities.

<sup>5</sup> <http://www.energy.ca.gov/2007publications/CEC-300-2007-001/CEC-300-2007-001-CMF.PDF>

<sup>6</sup> Pursuant to §399.13, the CEC is required to "establish a system for tracking and verifying renewable energy credits...". In collaboration with the Western Energy Coordinating Council, the CEC helped develop a tracking system called the Western Renewable Energy Generation Information System (WREGIS), which launched in June, 2007.



*RPS Procurement Status Report, October 2007*

statutory requirement that RPS eligible energy be delivered into the state. Economists explained that California REC prices would therefore likely be volatile in at least the next few years, discouraging investment in new facilities based on REC contracts. Most parties concluded that tradable RECs might help with RPS compliance for small LSEs who are reluctant or unable to manage large long-term renewable energy contracts, but RECs would likely contribute only marginally to large LSEs' RPS goals until supply constraints are alleviated.

The CPUC will soon issue a post-workshop ruling to flesh out issues raised during the workshop. The ruling will include a Staff Straw Proposal on compliance rules for tradable RECs. Following comments, replies and possible hearings, the CPUC will issue a proposed decision on REC trading.

Table 2. RPS Projects by Online Date and Contract Status<sup>6</sup>

Contract	Project Name	County	Online Date	Contract Status	Capacity (MW)	Units	Online Date
PG&E	Geyzers #13	Sonoma and Lake Counties	1/1/2003	existing	483	70	5
PG&E	Geyzers #20	Sonoma and Lake Counties	1/1/2003	existing	276	40	5
PG&E	Wheelabrator No. 4	Shasta/Coltonwood	1/1/2003	existing	25	3	5
SCE	Metropolitan Water District	Southern CA various locations	1/1/2003	existing	148	12	25
SDG&E	AES Delano	Delano, Kern County	1/1/2003	existing	366	49	5
SDG&E	City of San Diego (Point Loma STP)	Point Loma	1/1/2003	existing	24	5	5
SDG&E	WTE Acquisitions, Green Power Wind	San Geronimo	5/1/2003	existing	48	17	15
SDG&E	MM Prima Dehecha Energy	San Juan Capistrano	6/1/2003	existing	28	5	5
SDG&E	MM Miramar	Miramar, San Diego County	7/1/2003	existing	22	3	10
SDG&E	MM San Diego North City	San Diego	7/1/2003	existing	7	1	10
PG&E	Madera Power	Firebaugh	10/19/2003	existing	160	25	5
PG&E	Community Renewable Energy Services	Reedley	10/23/2003	existing	90	12	5
PG&E	Sierra Power Corp.	Terra Bella	10/23/2003	existing	75	7	5
SDG&E	GRS (Coyote Canyon)	Irvine	12/1/2003	new	60	8	10
SDG&E	GRS (Sycamore 1)	Santee	12/1/2003	new	19	3	12
SDG&E	PacificCorp Power & SeaWest	Riverside County	12/1/2003	new	89	25	15
SCE	El Sobrante	El Sobrante	2/14/2004	new	30	4	5
SCE	Simi Valley	Simi Valley	4/1/2004	new	20	2	5
SDG&E	Oasis Power Partners	Mojave	12/31/2004	new	179	60	15
PG&E	Beardsley	Sierra	1/1/2005	existing	80	11	5
PG&E	Tulloch	Sierra	1/1/2005	existing	80	18	5
SCE	Boxcar II	Tehachapi	1/1/2005	repower	20	8	30
SCE	Karen Windfarm	San Geronimo	10/1/2005	repower	36	12	30
SCE	CTV Power	Tehachapi	4/1/2006	repower	41	14	30
SCE	Coram Energy	Tehachapi	4/1/2006	repower	11	3	30
PG&E	Diablo Winds	Altamont Pass	5/1/2005	repower	65	18	11.5
PG&E	Big Valley	Lassen/Round Mountain	6/1/2005	existing	41	6	8
SDG&E	Kumeyasay Wind	San Diego County	12/31/2005	new	101	51	20
PG&E	Shiloh 1 Wind Project	Solano County	7/1/2006	new	225	75	15
PG&E	Buena Vista Energy	Altamont Pass	12/29/2006	repower	108	38	15
PG&E	Calpine	Sonoma and Lake Counties	1/1/2007	existing	1752	200	6
SDG&E	Rancho Penasquitos	San Diego County	1/23/2007	new	20	5	10
SDG&E	Covania Olay 3	Chula Vista	3/1/2007	new	24	4	10
SCE	MM Tajiguas	West of Santa Barbara	5/1/2007	existing	19	3	20
<b>APPROVED BY CPUC, NOT YET PERFORMING UNDER CONTRACT</b>							
SDG&E	MM Prima Dehecha Energy (Alpenquid)	San Juan Capistrano	10/1/2007	new	118	15	15
PG&E	Battle Rock Geothermal	Lake County	12/1/2007	re-start	119	17	10
PG&E	Global Commont's Chiochilla	Chicochilla, Madera County	12/31/2007	re-start	72	9	15
PG&E	Global Commont's El Nido	El Nido, Merced County	12/31/2007	re-start	72	9	15
SCE	PPM Dillon	San Geronimo	12/31/2007	new	126	45	20
PG&E	Tunnel Hill Hydro	El Dorado County	1/1/2008	new	2	0.6	10
PG&E	Buckeye Hydro	El Dorado County	1/1/2008	new	1	0.4	10
PG&E	Eden Vale Dairy	Kings County	1/1/2008	existing	1	0.2	10

<sup>6</sup> Actual/Proposed Online Date is as reported by the IOU in its August 1, 2007 report. CPUC analysis of the likelihood that each project will meet its online date is reflected in Figure 1.

RPS Procurement Status Report, October 2007

SDG&E	AES Delano	Delano, Kern County	10	365	10	11/2006
SDG&E	City of San Diego MWD	San Diego	5	22	5	1/12/2008
SCE	Geysers #3, #6, 7R, 11, 12, 17, 18	Geysers and Lake County	20	200	10	9/1/2006
SCE	Imperial Valley Resources Necessary	Imperial	16	12	16	9/1/2006
SDG&E	Redfish Solar #1	Pinnac Ranch, Imperial Valley	2	20	2	9/1/2006
SCE	Chatham Energy	Maricopa Lake	15	20	15	9/1/2006
PG&E	Profile Renewable Energy Generation	Imperial Valley, San Diego	20	20	20	9/1/2006
SDG&E	Redfish Solar #2	Pinnac Ranch, Imperial Valley	20	20	20	9/1/2006
SDG&E	Buff Steens	San Diego County	20	20	20	9/1/2006
PG&E	Mission	San Diego County	17	20	17	9/1/2006
PG&E	PR, Buntam Wind	San Diego County	17	20	17	9/1/2006
PG&E	California Midway #1	San Diego County	17	20	17	9/1/2006
SCE	California SF11	San Diego County	17	20	17	9/1/2006
SCE	Liberty 1 Methane Power	El Centro, Imperial Valley	17	20	17	9/1/2006
PG&E	Military Pass Road (Mudosa)	La Pina, OR / Wood, CA	20	20	20	9/1/2006
PG&E	HPI MidPower	La Pina, OR	20	20	20	9/1/2006
SCE	Sierra Resources	Antelope Vn, Footh W. Sierra	9	20	9	9/1/2006
PG&E	Liberty V Energy	Local Hills	3	20	3	9/1/2006
SCE	Stirling Solar One	San Bernardino County	20	1047	20	9/1/2015
PG&E	Northwest Geothermal (Newberry)	Newberry Volcano, OR	20	20	20	9/1/2010
SCE	Coosa Clean Power	Little Lake	20	100	20	4/1/2010
SCE	Mountain View Power Partners	San Geronimo	20	114	20	4/1/2010
PG&E	IAE Truthayuan	Truthayuan	20	100	20	7/1/2010
SDG&E	Barnstable 2 - Bios Filips	Imperial County	20	100	20	10/1/2010
SDG&E	Stirling Solar Two	Imperial Valley	20	200	20	4/28/2010
SCE	California SF11	Teachapal	6	20	6	1/1/2011
SCE	California Midway #2	Mojave	6	20	6	1/1/2011
SCE	Windstar 1, Aero Energy	Teachapal	60	104	20	7/1/2011
SCE	Corona Energy - Strada	Teachapal	12	47	20	7/1/2011
SDG&E	Pacific Wind LLC	Teachapal	20	600	20	10/31/2011
SCE	Green Bertera Geothermal	Western NY	20	20	20	3/1/2015
PENDING APPROVAL AT THE CPUC						
SCE	Calpine Geysers	Midtown	205	1971	10	1/1/2008
PG&E	PPM Roundline III	Sherman County, OR	15	200	15	1/1/2008
SDG&E	Enviroval Vista	Vain	2	30	2	3/1/2008
SCE	County Sanitation, LA County	Rolling Hills	2	20	2	4/1/2008
PG&E	Green Vols	Byron	2	8	2	8/1/2008
SCE	Big Wind	Big, Mexico	20	20	20	12/1/2008
SCE	CA Sunter #1	California City	1	9	20	1/1/2009
SCE	Grands Wind	Apple Valley	42	18	40	1/1/2009
PG&E	California America	Merced	5	5	20	4/1/2009
PG&E	Western GeoPower	Sanoma County	20	20	20	4/1/2010
PG&E	Solar	Western Penn	50	100	20	3/1/2011
SCE	Alta	Teachapal	20	20	20	10/2015
SCE	Ornl #	Imperial County	20	20	20	10/2015
SCE	California Dixie Valley	Palmer, NY	20	20	20	10/2015



# **2007 STATUS REPORT ON RENEWABLE ENERGY AT SMUD**

May 10, 2007

This paper summarizes the 2007 status of SMUD’s efforts to increase its supply of renewable energy. It includes a description of SMUD’s renewable energy supply goals, a brief assessment of renewable energy supply programs, a description of key issues faced by the District in the near future, and an assessment of long-term prospects.

**SMUD Programs Supporting the Growth of Renewable Energy**

SMUD has created two separate programs to grow renewable energy supplies for its customers: 1) A Green Pricing Program called Greenergy, and; 2) A Renewables Portfolio Standard (RPS) Program. Both programs were begun by SMUD before the State created its RPS program. Accounting for SMUD's renewable energy supply is done separately for these two programs and aggregated as SMUD's total, non-large hydro renewable energy supply.

SMUD has had a green pricing program since 1997 called “Greenergy,” which allows customer choice in selecting renewable energy supply for 100% or 50% of their electricity based on a simple monthly fee of \$6 or \$3, respectively. Commercial Greenergy customers pay 1¢/kWh for 100% renewables and 0.5¢/kWh for 50% renewable energy, In 2006, there were about 36,000 participating customers in the Greenergy program, including about 34,000 residential customers. In addition, SMUD has an RPS program that was approved by SMUD’s elected Board one year before the State RPS program was approved by the Legislature and Governor.

**SMUD Renewable Energy Growth Targets and Status**

To meet its annual renewables goals, SMUD both contracts for renewable electricity from independent power producers and builds and owns renewable energy power plants. SMUD has renewable energy supply goals of 12% for 2006 and 23% for 2011 (10% RPS + 2.2% Greenergy in 2006 and 20% RPS +3% Greenergy in 2011, see Table 1 below). The final supply numbers compiled for 2006 show that SMUD provided about 13% of retail sales of eligible, non-large hydro renewable electricity supply.

Table 1. SMUD’s renewables goals and accomplishments.

Renewables Supply Programs	2006 Supply Goal	2006 Actual Supply	2011 Supply Goal
RPS	10%	10.90%	20%
Greenergy	2.20%	2.20%	3%
Total	12.2%	13.1%	23%

Figure 1 shows SMUD's 2006 renewable energy supply by type of renewable energy resource. It shows a good utility mix of baseload renewable energy supplies (geothermal, biomass) and intermittent renewables (wind, small hydro, and solar).

Figure 1. SMUD's 2006 renewables distribution.

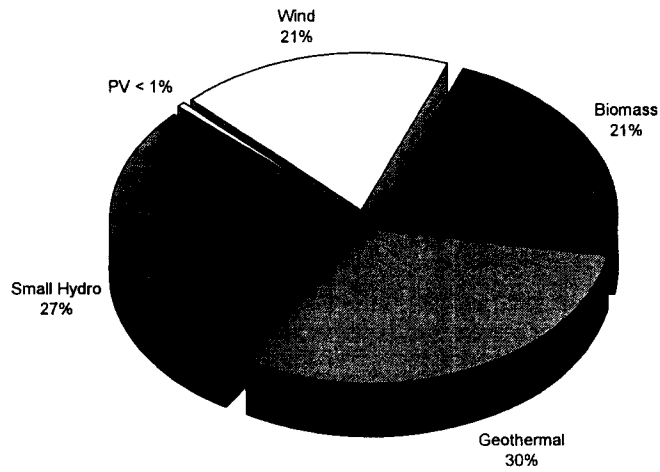
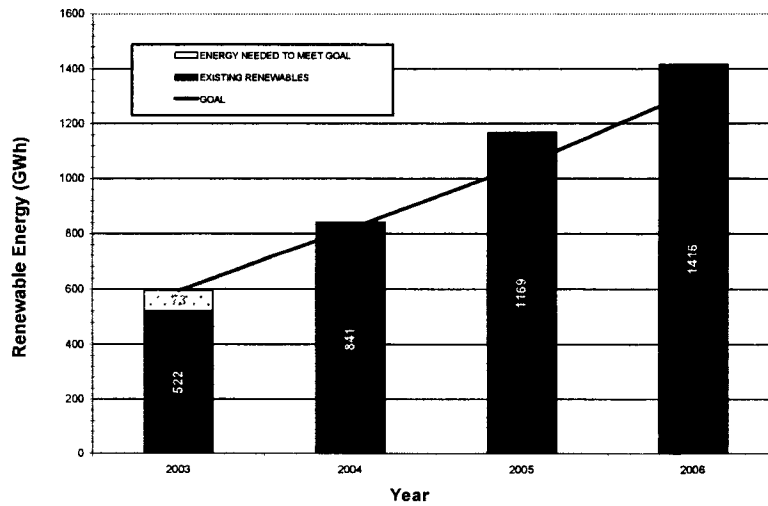


Figure 2 displays the growth in renewable energy supply for SMUD from 2003 to 2006. It shows almost a tripling of renewable energy supply in three years. While SMUD is very pleased with our current status of renewable energy supply, SMUD will be seriously challenged to meet the 23% supply target for 2011.

Figure 2. SMUD's renewables growth, 2003 - 2006



### NEW Power Plants Supplying Renewable Energy to SMUD Customers

SMUD has supported several new renewables projects that have begun providing electricity to the grid since 2002. The SMUD-owned Solano wind project has installed 39 MWs since 2002,

and an additional 63 MWs is being installed in 2007. This wind project is expected to have over 200 MWs installed by 2011. SMUD also recently signed a Power Purchase Agreement (PPA) contract for the second phase of the Kiefer landfill gas-to-electricity project for 5.7 MW, which is now online. Further, SMUD also signed a PPA several years ago for a California wind project that came online in phases from 2003 to 2007, and it now totals 75 MW.

In addition, SMUD has programs to provide local benefits and to solve local environmental problems, such as our solar PV program and our local biomass program to convert problem organic wastes to green electricity (e.g., dairy digesters, grease waste to electricity, and food waste to electricity). SMUD also expects a number of new local projects in the near future, including two or three dairy digesters to begin generating electricity this year, hopefully some food & grease waste-to-energy projects in the next several years, and significantly more solar projects to come online based on SB 1 and the California Solar Initiative.

SMUD also conducts annual solicitations to procure renewable power from independent power producers, and builds and operates renewable energy facilities. SMUD continuously is in negotiations, based on earlier solicitations, for additional new wind, biomass and solar thermal electric renewable energy resources that are proposed to come online by 2011.

### **What are the Challenges Facing SMUD in Growing Renewable Energy?**

Four primary problems affect SMUD's ability to meet its 23% renewable energy supply target for 2011: 1) lack of transmission; 2) the supply of renewable energy projects is small and declining, while price is increasing; 3) eligibility rules are stringent, complex, and restraining; 4) incentives are needed for "emerging" technologies such as solar thermal electric, advanced biomass technologies, etc. so that the "next generation" of lower cost renewables become market-ready, mitigating transmission issues.

**Transmission.** There are plenty of renewable energy resources in the West, but transmission is not available to access these resources. While there has been some progress on transmission construction beginning in Southern California, there has been very little progress expanding transmission access to renewable energy resources in Northern California. Transmission takes many years to plan, permit, and build, and new facilities require high capital expenses.

**Renewable Project Supply/Price.** SMUD has seen the available supply of renewable energy projects from independent power producers decline significantly in the past two years, and prices of renewable energy have increased. As an example for comparison purposes, SMUD conducted a solicitation for renewables projects in 2004 and in 2006. SMUD received 42 proposals in 2004, and received only 8 proposals in 2006. This is an 83% decline in the number of proposals received by SMUD in only two years. Further, the average price quoted for the renewable energy proposals received has increased by 15% in SMUD's 2006 solicitation. As a subset of proposals received, wind projects alone increased prices by an average of 17%.

**RPS Eligibility Rules.** Publicly-owned utilities currently are not required to follow the detailed and complex renewable energy eligibility rules for investor-owned utilities. However, for publicly-owned utilities that require close compliance with California's RPS eligibility rules such as SMUD, it is a complex maze of requirements that is daunting to most small, publicly-owned utilities. As examples, what are the definitions and requirements for the important terms "baseline" and "bundling" (e.g., does the energy and the REC need to be bundled only in the same contract, or from the same facility? Are there hourly, daily, weekly, monthly or annual bundling requirements?)? In addition, Renewable Energy Credits (RECs), sometimes called "Green Tags," alone are not eligible for the RPS according to the basic bundling requirement. If



RECs were eligible for the RPS as now allowed by SB 107 and pending CPUC rules, important transmission issues may be mitigated to promote further California renewable energy growth. Also, the eligibility rules include inequities in the treatment of Publicly Owned Utilities (POU) vs. "Retail Sellers." As an example, a small hydro facility that meets the eligibility criteria of SB 107 can get full CEC certification for RPS eligibility if it sold electricity to an investor-owned utility on 12/31/05, but if the same facility instead served only a Publicly Owned Utility on 12/31/05, the facility cannot get full certification for RPS eligibility. This is clearly unfair. (Note: the RPS statute defines eligible small hydro using the term "retail seller" and defining this latter term to not include POU's. Thus, the CEC has determined that, while they strongly encourage POU's to meet their renewables targets from CEC "Certified" renewables facilities, they cannot according to the statute fully certify small hydro for POU's)

***Emerging Technologies.*** SMUD believes that California should be planning for renewables growth beyond 2010 and that a better structure of incentives should be developed for "emerging technologies." These are technologies that are moving out of Research, Development, and Demonstration and into the marketplace, and they face difficult market barriers to entry. Incentives are needed to bridge what is sometimes called the "valley of death" for new technologies. These technologies will be the next generation of renewable energy supply for CA. Bridging this R&D-to-market gap will open up other diverse renewable resources for electricity generation. Solar and biomass gasification technologies, as examples, rely on energy resources that are more widespread and available throughout California, in comparison to wind, geothermal and small hydro resources that are confined to specific locations. Thus, the development of these emerging technologies will help address transmission barriers to renewables market growth in the state. Emerging renewable energy technologies include solar thermal electric, concentrating photovoltaics, biomass anaerobic digestion, biomass thermochemical conversion, fuel cells supplied with biogas, ocean & tidal energy, and others. Solar photovoltaics overall (not just concentrating PV) would be listed as an "emerging technology," but SB-1 approval last year provides special incentives that address the "valley of death" for this technology. All of these technologies NEED to be market-ready for California to meet a 33% Renewable energy supply target for 2020.

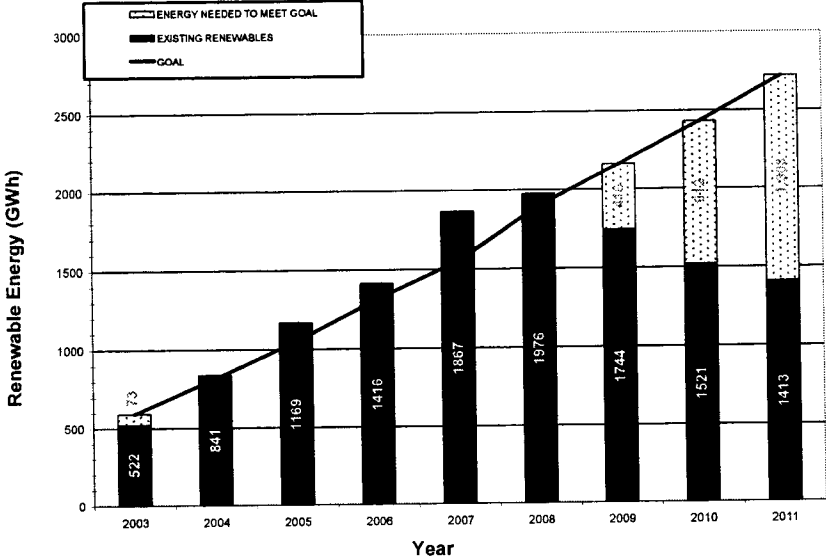
### **Future Prospects For Renewable Energy Growth**

The long-term prospects for SMUD renewable energy growth looks promising. SMUD has rights to develop two new renewable energy resource sites (primarily wind, but some geothermal possible also) in CA and Oregon, and is evaluating these sites to determine the potential for future development. Resource assessments, environmental evaluations, and transmission studies are underway that SMUD staff expects will lead to promising future development. However, transmission likely will need to be built to access these renewable resources. New transmission lines require many years to plan, permit and to build so these new renewable resources will not supply electricity to SMUD customers until after 2011. Another new, emerging renewable energy resource that SMUD is evaluating is solar thermal electric. SMUD is negotiating in partnership with other utilities for one or more large solar thermal power plants in the southwest desert. In addition, SMUD is evaluating possible solar thermal sites in the Sacramento region.

While the long-term is promising for new renewable energy for SMUD, the period between 2008 and 2011 poses major challenges to the District. Figure 3 shows that existing SMUD renewable resources meet or exceed our annual supply targets through 2008. However, SMUD has several renewable energy PPAs that end from 2008 through 2010 that reduce supply and results in a significant and growing gap beginning in 2009 compared to our growing renewable energy

supply targets. Figure 3 shows a worst-case scenario for SMUD renewable energy supply (it only includes existing projects) since it does not include projects currently in negotiation, and does not include current procurement plans. SMUD is hopeful that that the supply gap will be closed by signing additional PPAs for new renewable energy projects and/or from new SMUD-built and owned renewables facilities.

Figure 3. SMUD’s actual and estimated renewables growth, 2003 - 2011



**2009 BCAP**

**Winter Peak Day Demand for EG and Large Cogeneration**

**San Diego EG December Peak Day**

Scenarios	Gbtu/day	MMCFD
BCAP09	206.2	203
BCAP10	193.1	190
BCAP11	150.0	147
BCAP12	162.0	159
CGR15	155.2	<b>153</b>
CGR20	189.0	<b>186</b>
CGR23		199
CGR25	211.3	<b>208</b>

**SoCal December Peak Day**

Scenarios	Gbtu/day	MMCFD	ByPass * MMCFD	Total MMCFD
Base09	722.0	701	0	701
Base10	727.0	706	0	706
Base11	690.9	671	0	671
Base12	802.1	779	0	779
CGR15	570.8	<b>554</b>	145	699
CGR20	776.0	<b>753</b>	153	906
CGR23				1007
CGR25	950.1	<b>922</b>	151	1074

Blue color data are from 2006 CGR runs

\* In 2006 CGR filing, there were some bypass assumptions for some customers. Since that time, those customers have decided not to choose alternative service providers.

**SDG&E/SCE 2009 BCAP**

Data for graph in testimony of Robert Anderson

2009 BCAP  
SoCalGas/SDGE EG Throughput vs Western Hydro  
(BCF)

	Hydro	SoCalGas/SDGE EG (Non Cogen Load only)
1997	2351	204
1998	2071	194
1999	2187	233
2000	1856	379
2001	1322	449
2002	1686	259
2003	1629	219
2004	1647	228
2005	1717	179
2006	2015	204

1GWh = 10 Gbtu

**2009 BCAP**  
**Impact on Gas Volumes from Weather Uncertainty for Southern California**

GWHR of Weather Uncertainty	2,500	GWHR	Based on Data from CEC for 2002 and 2005 See Excel file weatheradjustmentstoenergy011008
Assumed heat rate	10,000	BTU/KWHR	
Gas to generate GWHR	25,000,000	MMBTU	
Change units	25.00	MMDThs	
Average Total SoCalGas/SDG&E EG*	294	MMDthms	
Percent of Forecast	8.5%		

\* 3-yr average (2009-2011)

**2009 BCAP**  
**Impact on Gas Volumes from Renewable Power Uncertainty for SCE and SDG&E**

<b>2009 Estimated Retail Sales</b>					
SDG&E		17,777	GWHR		
SCE		83,903			
<b>Total SCE and SDG&amp;E Sales</b>		<u>101,680</u>	<b>GWHR</b>		
<b>Renewable Uncertainty</b>		1.5%			State wide between High and low is about 3% for IOUs Used 1.5% since forecast is based on hitting about the middle of the range
<b>GWHR of Renewable Uncertainty</b>		1,525	<b>GWHR</b>		Assumes the range of risk state wide applies equally to SCE/SDG&E
<b>Assumed heat rate</b>		10,000	<b>BTU/KWHR</b>		
<b>Gas to generate GWHR</b>		15,252,000	<b>MMBTU</b>		
<b>Change units</b>		15.25	<b>MMDThs</b>		
<b>Average Total SoCalGas/SDG&amp;E EG*</b>		294	<b>MMDThs</b>		
<b>Percent of Forecast</b>		5.2%			

\* 3-yr average (2009-2011)

Weather Adjustments in the CEC Electricity Consumption Summary Model for the 2007 IEPR  
 Demand Forecast\*

Year	Sum of Heating Adjustment (Annual GWH)	Sum of Cooling Adjustment (Annual GWH)	Sum of Adjusted sales (GWH)	Total Weather Adjustment	Percentage Change in Annual Consumption
1980	(573.10)	(507.80)	88,809.70	(1,080.90)	-1.2%
1981	(749.16)	962.32	92,250.60	213.16	0.2%
1982	95.30	(594.48)	90,121.42	(499.18)	-0.6%
1983	(417.58)	847.73	93,744.70	430.15	0.5%
1984	(313.25)	1,743.37	100,400.51	1,430.13	1.4%
1985	328.03	(490.72)	102,327.54	(162.69)	-0.2%
1986	(707.54)	(1,572.35)	104,838.56	(2,279.89)	-2.2%
1987	73.93	(863.84)	109,830.14	(789.90)	-0.7%
1988	(412.67)	(476.22)	115,105.17	(888.89)	-0.8%
1989	(507.77)	(513.34)	117,750.12	(1,021.11)	-0.9%
1990	(74.22)	834.59	123,220.67	760.37	0.6%
1991	(126.68)	(1,384.37)	120,772.48	(1,511.05)	-1.3%
1992	(656.83)	1,568.57	124,250.68	911.74	0.7%
1993	(519.86)	(479.30)	122,817.09	(999.16)	-0.8%
1994	220.48	(4.78)	123,805.71	215.71	0.2%
1995	(413.76)	(1,057.79)	125,033.44	(1,471.55)	-1.2%
1996	(326.01)	68.82	128,516.58	(257.19)	-0.2%
1997	(616.42)	2,068.46	132,341.89	1,452.04	1.1%
1998	308.08	(619.99)	132,783.89	(311.91)	-0.2%
1999	442.47	(2,663.62)	135,811.56	(2,221.14)	-1.6%
2000	(148.16)	(299.68)	145,214.97	(447.83)	-0.3%
2001	927.46	(1,458.45)	134,566.85	(530.98)	-0.4%
2002	456.36	(2,824.15)	138,329.90	(2,367.79)	-1.7%
2003	(73.37)	(194.16)	141,299.45	(267.54)	-0.2%
2004	(1.20)	(493.18)	145,729.73	(494.38)	-0.3%
2005	(441.73)	(2,257.51)	147,202.83	(2,699.24)	-1.8%
2006	287.72	286.64	151,648.49	574.36	0.4%

\*California Energy Demand 2008 - 2018: Staff Revised Forecast, FINAL Staff Forecast, 2nd Edition, publication # CEC-200-2007-015-SF2.Nov. 2007.

Note: negative value mean weather was cooler than normal.