1

2016 CALIFORNIA GAS REPORT

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Workpapers

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Prepared By:

SoCalGas

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TABLE OF CONTENTS

2016 CALIFORNIA GAS REPORT

HISTORICAL DATA
JULY 2016

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND SENDOUT - MMCF/DAY
RECORDED YEARS 2011 TO 2015

Line	CAPACITY AVAILABLE		2011	2012	2013	2014	2015
1	California Source Gas						
	Out-of-State Gas						
2	California Offshore -POPCO / PIOC						
3	El Paso Natural Gas Co.						
4	Transwestern Pipeline Co.						
5	Kern / Mojave						
6	PGT / PG&E						
7	Other						
8	Total Out-of-State Gas						
9	TOTAL CAPACITY AVAILABLE						
	GAS SUPPLY TAKEN						
10	California Source Gas		175	148	153	143	122
	Out-of-State Gas						
11	Other Out-of-State		2,452	2,728	2,514	2,538	2,397
12	Total Out-of-State Gas		2,452	2,728	2,514	2,538	2,397
13	TOTAL SUPPLY TAKEN		2,627	2,876	2,667	2,681	2,519
14	Net Underground Storage Withdrawal		(4)	(42)	106	(63)	40
15	TOTAL THROUGHPUT (1)(2)		2,623	2,834	2,773	2,618	2,559
	DELIVERIES BY END-USE						
16	Core	Residential	696	644	646	541	548
17		Commercial	217	216	222	202	207
18		Industrial	61	61	62	58	58
19		NGV	28	29	31	33	35
20		Subtotal	1,002	950	961	834	848
21	Noncore	Commercial	60	60	60	53	52
22		Industrial	363	365	368	379	362
23		EOR Steaming	27	29	35	44	46
24		Electric Generation	726	922	848	863	795
25		Subtotal	1,176	1,376	1,311	1,339	1,255
26	Wholesale/International		407	477	465	410	428
27	Co. Use & LUAF		38	31	36	35	28
28	SYSTEM TOTAL-THROUGHPUT (1)(2)		2,623	2,834	2,773	2,618	2,559
	TRANSPORTATION AND EXCHANGE						
29	Core	All End Uses	29	35	45	49	52
30	Noncore	Commercial/Industrial	423	425	428	432	414
31		EOR Steaming	27	29	35	44	46
32		Electric Generation	726	922	848	863	795
33		Subtotal-Retail	1,205	1,411	1,356	1,388	1,307
34	Wholesale/International		407	477	465	410	428
35	TOTAL TRANSPORTATION & EXCHANGE		1,612	1,888	1,821	1,798	1,735
36	CURTAILMENT (3)						
37	REFUSAL						
38		Total BTU Factor (Dth/Mcf)	1.0209	1.021	1.0266	1.0300	1.0353

NOTES:
(1) The wholesale volumes only reflect natural gas supplied by SoCalGas; and, do not include supplies from other sources.
Refer to the supply source data provided in each utility's report for a complete accounting of their supply sources.
(2) Deliveries by end-use includes sales, transportation, and exchange volumes and data includes effect of prior period adjustments.
(3) The table does not explicitly show any curtailment numbers for the recorded years because, during some curtailment events, the estimate of the curtailed volume is not available. While the table does not explicitly show any curtailment numbers for the recorded years, the noncore customer usage data implicitly captures the effects of any curtailment events.

2016 CALIFORNIA GAS REPORT

FORECAST OF REQUIREMENTS
JULY 2016

2016 CALIFORNIA GAS REPORT

FORECAST OF REQUIREMENTS - AVERAGE TEMPERATURE YEAR
JULY 2016

TABLE 1-SCG

SOUTHERN CALIFORNIA GAS COMPAN

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DA
ESTIMATED YEARS 2016 THRU 2020

AVERAGE TEMPERATURE YEAR

LINE			2016	2017	2018	2019	2020	LINE
	CAPACITY AVAILABLE							
1	California Line 85 Zone (California Producers		160	160	160	160	160	1
2	California Coastal Zone (California Producers		150	150	150	150	150	2
	Out-of-State Gas							
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN							
8	California Source Gas		122	122	122	122	122	8
9	Out-of-State		2,559	2,527	2,485	2,459	2,436	9
10	TOTAL SUPPLY TAKEN		2,681	2,649	2,607	2,581	2,558	10
11	Net Underground Storage Withdrawa		0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		2,681	2,649	2,607	2,581	2,558	12
	REQUIREMENTS FORECAST BY END-USE [5/]							
13	CORE [6/]	Residential	652	652	650	647	641	13
14		Commercial	217	217	214	211	207	14
15		Industrial	56	57	56	55	55	15
16		NGV	37	38	40	42	43	16
17		Subtotal-CORE	961	964	960	955	947	17
18	NONCORE	Commercial	46	45	45	45	44	18
19		Industrial	371	367	366	363	361	19
20		EOR Steaming	46	46	46	46	46	20
21		Electric Generation (EG)	788	760	738	724	714	21
22		Subtotal-NONCORE	1,251	1,218	1,195	1,178	1,165	22
23	WHOLESALE &	Core	183	187	188	188	188	23
24	INTERNATIONAL	Noncore Excl. EG	48	47	47	48	48	24
25		Electric Generation (EG)	204	199	185	180	178	25
26		Subtotal-WHOLESALE & INTL.	435	434	420	415	414	26
27		Co. Use & LUAF	33	33	32	32	32	27
28	SYSTEM TOTAL THROUGHPUT [4/]		2,681	2,649	2,607	2,581	2,558	28
	TRANSPORTATION AND EXCHANGE							
29	CORE	All End Uses	56	57	57	57	56	29
30	NONCORE	Commercial/Industrial	417	412	411	408	405	30
31		EOR Steaming	46	46	46	46	46	31
32		Electric Generation (EG)	788	760	738	724	714	32
33		Subtotal-RETAIL	1,307	1,275	1,252	1,235	1,222	33
	WHOLESALE &							
34	INTERNATIONAL	All End Uses	435	434	420	415	414	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,742	1,709	1,671	1,650	1,636	35
	CURTAILMENT (RETAIL & WHOLESALE)							
36		Core	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.

4/ Excludes own-source gas supply of	0.8	0.7	0.7	0.7	0.6	
gas procurement by the City of Long Beach						
5/ Requirement forecast by end-use includes sales, transportation, and exchange volume						
6/ Core end-use demand exclusive of core aggregatio						
transportation (CAT) in MDth/d:	938	940	935	930	922	

TABLE 2-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED YEARS 2021 THRU 2035

AVERAGE TEMPERATURE YEAR

LINE			2021	2022	2025	2030	2035	LINE
	CAPACITY AVAILABLE							
1	California Line 85 Zone (California Producers		160	160	160	160	160	1
2	California Coastal Zone (California Producers		150	150	150	150	150	2
	Out-of-State Gas							
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN							
8	California Source Gas		122	122	122	122	122	8
9	Out-of-State		2,404	2,382	2,334	2,252	2,260	9
10	TOTAL SUPPLY TAKEN		2,526	2,504	2,456	2,374	2,382	10
11	Net Underground Storage Withdrawa		0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		2,526	2,504	2,456	2,374	2,382	12
	REQUIREMENTS FORECAST BY END-USE [5/]							
13	CORE [6/]	Residential	639	634	620	603	598	13
14		Commercial	204	199	189	175	177	14
15		Industrial	54	53	50	44	42	15
16		NGV	45	47	52	61	69	16
17		Subtotal-CORE	941	932	911	882	886	17
18	NONCORE	Commercial	44	43	42	40	40	18
19		Industrial	358	353	345	333	332	19
20		EOR Steaming	46	46	46	46	46	20
21		Electric Generation (EG)	692	684	671	636	636	21
22		Subtotal-NONCORE	1,139	1,126	1,104	1,055	1,054	22
23	WHOLESALE &	Core	189	189	189	192	197	23
24	INTERNATIONAL	Noncore Excl. EG	48	48	48	49	49	24
25		Electric Generation (EG)	178	178	174	166	165	25
26		Subtotal-WHOLESALE & INTL.	415	414	411	407	411	26
27		Co. Use & LUAF	31	31	31	30	30	27
28	SYSTEM TOTAL THROUGHPUT [4/]		2,526	2,504	2,456	2,374	2,382	28
	TRANSPORTATION AND EXCHANGE							
29	CORE	All End Uses	56	56	55	55	58	29
30	NONCORE	Commercial/Industrial	401	396	387	373	372	30
31		EOR Steaming	46	46	46	46	46	31
32		Electric Generation (EG)	692	684	671	636	636	32
33		Subtotal-RETAIL	1,195	1,182	1,159	1,110	1,112	33
	WHOLESALE &							
34	INTERNATIONAL	All End Uses	415	414	411	407	411	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,610	1,597	1,570	1,517	1,523	35
	CURTAILMENT (RETAIL & WHOLESALE)							
36		Core	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.6	0.6	0.5	0.4	0.4	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volume						
6/ Core end-use demand exclusive of core aggregatio transportation (CAT) in MDth/d:	916	907	885	856	858	

Work Paper: TABLE 1-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2016

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers Out-of-State Gas		150	150	150	150	150	150	150	150	150	150	150	150	150	2
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) 1/		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) 2/		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) 3/		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,064	2,914	2,699	2,496	2,237	2,212	2,388	2,389	2,527	2,271	2,503	3,014	2,559	9
10	TOTAL SUPPLY TAKEN		3,186	3,036	2,821	2,618	2,359	2,334	2,510	2,511	2,649	2,393	2,625	3,136	2,681	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT 4/		3,186	3,036	2,821	2,618	2,359	2,334	2,510	2,511	2,649	2,393	2,625	3,136	2,681	12
	REQUIREMENTS FORECAST BY END-USE 5/															
13	CORE 6/	Residential	1,048	1,007	814	697	476	388	362	362	368	453	740	1,122	652	13
14		Commercial	294	236	242	214	192	213	181	163	172	173	243	275	217	14
15		Industrial	58	63	62	60	50	56	52	49	53	55	56	58	56	15
16		NGV	36	38	36	37	36	37	36	36	37	36	37	36	37	16
17		Subtotal-CORE	1,436	1,345	1,154	1,009	754	695	632	609	630	717	1,077	1,491	961	17
22	NONCORE	Subtotal-NONCORE	1,212	1,161	1,182	1,161	1,195	1,189	1,424	1,445	1,541	1,268	1,118	1,113	1,251	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & IN	498	492	450	416	382	421	423	426	444	379	397	492	435	26
27		Co. Use & LUAF	40	38	35	33	29	29	31	31	33	30	33	39	33	27
28	SYSTEM TOTAL THROUGHPUT 4/		3,186	3,036	2,821	2,618	2,359	2,334	2,510	2,511	2,649	2,393	2,625	3,136	2,681	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	73	65	62	57	49	52	46	43	45	46	61	71	56	29
30	NONCORE	All End Uses	1,212	1,161	1,182	1,161	1,195	1,189	1,424	1,445	1,541	1,268	1,118	1,113	1,251	30
33		Subtotal-RETAIL	1,285	1,226	1,244	1,218	1,244	1,241	1,470	1,488	1,587	1,314	1,179	1,185	1,307	33
34	WHOLESALE & INTERNATIONAL	All End Uses	498	492	450	416	382	421	423	426	444	379	397	492	435	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,783	1,718	1,694	1,633	1,626	1,662	1,893	1,914	2,031	1,693	1,576	1,677	1,742	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,411	1,325	1,131	986	729	665	606	586	605	694	1,052	1,470	938	

Work Paper: TABLE 1-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2017

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		2,993	2,979	2,566	2,419	2,090	2,126	2,372	2,361	2,530	2,305	2,535	3,080	2,527	9
10	TOTAL SUPPLY TAKEN		3,115	3,101	2,688	2,541	2,212	2,248	2,494	2,483	2,652	2,427	2,657	3,202	2,649	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,115	3,101	2,688	2,541	2,212	2,248	2,494	2,483	2,652	2,427	2,657	3,202	2,649	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,044	1,040	812	695	475	387	361	361	367	451	738	1,119	652	13
14		Commercial	294	245	242	215	192	213	181	163	172	173	244	275	217	14
15		Industrial	59	66	63	60	50	57	53	49	53	55	57	58	57	15
16		NGV	38	42	38	39	38	39	38	38	39	38	39	38	38	16
17		Subtotal-CORE	1,435	1,392	1,154	1,009	755	696	633	611	631	717	1,077	1,490	964	17
22	NONCORE	Subtotal-NONCORE	1,154	1,171	1,082	1,101	1,078	1,102	1,405	1,413	1,539	1,294	1,124	1,153	1,218	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	487	499	419	399	352	423	425	429	449	386	423	518	434	26
27		Co. Use & LUAF	39	39	33	32	28	28	31	31	33	30	33	40	33	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,115	3,101	2,688	2,541	2,212	2,248	2,494	2,483	2,652	2,427	2,657	3,202	2,649	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	73	68	63	57	50	53	47	44	46	47	62	72	57	29
30	NONCORE	All End Uses	1,154	1,171	1,082	1,101	1,078	1,102	1,405	1,413	1,539	1,294	1,124	1,153	1,218	30
33		Subtotal-RETAIL	1,228	1,239	1,145	1,159	1,127	1,154	1,452	1,456	1,585	1,341	1,186	1,225	1,275	33
34	WHOLESALE & INTERNATIONAL	All End Uses	487	499	419	399	352	423	425	429	449	386	423	518	434	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,715	1,738	1,564	1,558	1,479	1,577	1,877	1,885	2,034	1,727	1,609	1,743	1,709	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,410	1,371	1,130	985	730	666	607	587	606	694	1,051	1,469	940	

Work Paper: TABLE 1-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2018

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,007	2,952	2,511	2,363	2,077	2,064	2,274	2,298	2,456	2,283	2,505	3,058	2,485	9
10	TOTAL SUPPLY TAKEN		3,129	3,074	2,633	2,485	2,199	2,186	2,396	2,420	2,578	2,405	2,627	3,180	2,607	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,129	3,074	2,633	2,485	2,199	2,186	2,396	2,420	2,578	2,405	2,627	3,180	2,607	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,041	1,036	809	693	473	386	360	359	366	450	735	1,115	650	13
14		Commercial	289	241	238	211	189	210	179	161	169	171	240	271	214	14
15		Industrial	58	65	62	60	50	56	52	49	53	55	56	58	56	15
16		NGV	39	44	39	41	39	41	39	39	41	39	41	39	40	16
17		Subtotal-CORE	1,428	1,386	1,148	1,004	751	692	630	608	628	714	1,072	1,483	960	17
22	NONCORE	Subtotal-NONCORE	1,158	1,140	1,033	1,049	1,063	1,089	1,362	1,408	1,526	1,270	1,100	1,136	1,195	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	505	510	419	401	358	377	374	374	392	391	422	521	420	26
27		Co. Use & LUAF	39	38	33	31	27	27	30	30	32	30	33	40	32	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,129	3,074	2,633	2,485	2,199	2,186	2,396	2,420	2,578	2,405	2,627	3,180	2,607	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	73	68	63	57	50	52	47	44	46	47	62	71	57	29
30	NONCORE	All End Uses	1,158	1,140	1,033	1,049	1,063	1,089	1,362	1,408	1,526	1,270	1,100	1,136	1,195	30
33		Subtotal-RETAIL	1,231	1,208	1,096	1,106	1,113	1,142	1,409	1,452	1,572	1,317	1,161	1,207	1,252	33
34	WHOLESALE & INTERNATIONAL	All End Uses	505	510	419	401	358	377	374	374	392	391	422	521	420	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,736	1,717	1,515	1,507	1,471	1,519	1,783	1,826	1,964	1,708	1,584	1,728	1,671	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,402	1,365	1,124	980	726	663	604	584	603	691	1,046	1,461	935	

Work Paper: TABLE 1-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2019

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		2,990	2,894	2,498	2,324	2,058	2,047	2,243	2,253	2,413	2,305	2,489	3,019	2,459	9
10	TOTAL SUPPLY TAKEN		3,112	3,016	2,620	2,446	2,180	2,169	2,365	2,375	2,535	2,427	2,611	3,141	2,581	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,112	3,016	2,620	2,446	2,180	2,169	2,365	2,375	2,535	2,427	2,611	3,141	2,581	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,036	1,032	805	690	471	384	359	358	364	448	732	1,110	647	13
14		Commercial	285	237	235	208	186	207	176	158	167	168	236	267	211	14
15		Industrial	58	65	61	59	49	56	51	48	52	54	56	57	55	15
16		NGV	41	45	41	42	41	42	41	41	42	41	42	41	42	16
17		Subtotal-CORE	1,420	1,379	1,143	999	748	689	627	605	626	711	1,066	1,475	955	17
22	NONCORE	Subtotal-NONCORE	1,151	1,112	1,031	1,026	1,055	1,076	1,336	1,366	1,486	1,292	1,090	1,110	1,178	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	501	486	414	391	350	377	373	373	391	394	422	517	415	26
27		Co. Use & LUAF	39	38	33	30	27	27	29	30	32	30	33	39	32	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,112	3,016	2,620	2,446	2,180	2,169	2,365	2,375	2,535	2,427	2,611	3,141	2,581	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	73	68	62	57	50	52	47	44	46	47	62	71	57	29
30	NONCORE	All End Uses	1,151	1,112	1,031	1,026	1,055	1,076	1,336	1,366	1,486	1,292	1,090	1,110	1,178	30
33		Subtotal-RETAIL	1,224	1,180	1,094	1,083	1,105	1,129	1,383	1,410	1,532	1,339	1,152	1,181	1,235	33
34	WHOLESALE & INTERNATIONAL	All End Uses	501	486	414	391	350	377	373	373	391	394	422	517	415	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,725	1,666	1,507	1,474	1,455	1,506	1,756	1,783	1,923	1,734	1,574	1,698	1,650	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,395	1,358	1,118	975	722	659	601	581	600	687	1,040	1,454	930	

Work Paper: TABLE 1-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2020

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		2,950	2,826	2,502	2,321	2,053	2,022	2,210	2,226	2,377	2,282	2,466	3,002	2,436	9
10	TOTAL SUPPLY TAKEN		3,072	2,948	2,624	2,443	2,175	2,144	2,332	2,348	2,499	2,404	2,588	3,124	2,558	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,072	2,948	2,624	2,443	2,175	2,144	2,332	2,348	2,499	2,404	2,588	3,124	2,558	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,030	990	800	686	468	382	356	356	362	445	728	1,103	641	13
14		Commercial	281	226	231	205	184	204	174	156	165	166	233	263	207	14
15		Industrial	57	62	61	58	49	55	51	48	51	54	55	57	55	15
16		NGV	43	46	43	44	43	44	43	43	44	43	44	43	43	16
17		Subtotal-CORE	1,411	1,323	1,135	993	743	685	624	602	622	707	1,059	1,466	947	17
22	NONCORE	Subtotal-NONCORE	1,122	1,113	1,039	1,029	1,059	1,054	1,306	1,344	1,456	1,273	1,077	1,106	1,165	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	502	474	416	390	347	378	373	373	390	393	420	514	414	26
27		Co. Use & LUAF	38	37	33	30	27	27	29	29	31	30	32	39	32	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,072	2,948	2,624	2,443	2,175	2,144	2,332	2,348	2,499	2,404	2,588	3,124	2,558	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	73	65	62	57	50	52	47	44	46	47	62	71	56	29
30	NONCORE	All End Uses	1,122	1,113	1,039	1,029	1,059	1,054	1,306	1,344	1,456	1,273	1,077	1,106	1,165	30
33		Subtotal-RETAIL	1,194	1,178	1,101	1,086	1,108	1,107	1,353	1,388	1,502	1,320	1,139	1,177	1,222	33
34	WHOLESALE & INTERNATIONAL	All End Uses	502	474	416	390	347	378	373	373	390	393	420	514	414	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,696	1,652	1,518	1,477	1,455	1,485	1,726	1,761	1,892	1,714	1,559	1,690	1,636	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,385	1,303	1,111	969	718	655	597	578	596	683	1,033	1,444	922	

Work Paper: TABLE 2-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2021

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		2,965	2,888	2,463	2,352	1,999	1,939	2,135	2,188	2,306	2,196	2,487	2,967	2,404	9
10	TOTAL SUPPLY TAKEN		3,087	3,010	2,585	2,474	2,121	2,061	2,257	2,310	2,428	2,318	2,609	3,089	2,526	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,087	3,010	2,585	2,474	2,121	2,061	2,257	2,310	2,428	2,318	2,609	3,089	2,526	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,023	1,018	795	681	465	379	354	353	359	442	722	1,096	639	13
14		Commercial	275	229	227	201	180	200	170	153	161	162	228	258	204	14
15		Industrial	56	63	60	57	48	54	50	47	51	53	54	56	54	15
16		NGV	44	49	44	46	44	46	44	44	46	44	46	44	45	16
17		Subtotal-CORE	1,398	1,360	1,126	985	737	679	619	597	617	701	1,051	1,453	941	17
22	NONCORE	Subtotal-NONCORE	1,155	1,110	1,005	1,055	1,007	1,018	1,260	1,299	1,388	1,209	1,089	1,073	1,139	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	496	503	422	404	352	338	350	384	393	378	438	524	415	26
27		Co. Use & LUAF	38	37	32	31	26	26	28	29	30	29	32	38	31	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,087	3,010	2,585	2,474	2,121	2,061	2,257	2,310	2,428	2,318	2,609	3,089	2,526	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	72	67	62	57	50	52	47	44	46	47	61	70	56	29
30	NONCORE	All End Uses	1,155	1,110	1,005	1,055	1,007	1,018	1,260	1,299	1,388	1,209	1,089	1,073	1,139	30
33		Subtotal-RETAIL	1,227	1,178	1,067	1,111	1,056	1,070	1,307	1,343	1,434	1,256	1,150	1,143	1,195	33
34	WHOLESALE & INTERNATIONAL	All End Uses	496	503	422	404	352	338	350	384	393	378	438	524	415	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,723	1,680	1,489	1,515	1,408	1,408	1,657	1,728	1,827	1,634	1,588	1,668	1,610	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,373	1,338	1,101	961	712	649	592	573	591	677	1,024	1,432	916	

Work Paper: TABLE 2-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2022

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		2,998	2,870	2,423	2,280	1,956	1,898	2,101	2,183	2,279	2,168	2,480	2,979	2,382	9
10	TOTAL SUPPLY TAKEN		3,120	2,992	2,545	2,402	2,078	2,020	2,223	2,305	2,401	2,290	2,602	3,101	2,504	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,120	2,992	2,545	2,402	2,078	2,020	2,223	2,305	2,401	2,290	2,602	3,101	2,504	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,015	1,010	788	675	461	376	351	350	357	438	717	1,087	634	13
14		Commercial	269	224	222	196	176	196	167	150	158	159	223	252	199	14
15		Industrial	55	62	59	56	47	53	49	46	50	52	53	55	53	15
16		NGV	46	51	46	48	46	48	46	46	48	46	48	46	47	16
17		Subtotal-CORE	1,385	1,347	1,115	976	730	672	613	592	612	695	1,040	1,439	932	17
22	NONCORE	Subtotal-NONCORE	1,185	1,107	979	1,007	987	987	1,217	1,301	1,361	1,185	1,095	1,101	1,126	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	511	501	419	389	335	337	365	384	399	381	435	521	414	26
27		Co. Use & LUAF	39	37	32	30	26	25	28	29	30	29	32	39	31	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,120	2,992	2,545	2,402	2,078	2,020	2,223	2,305	2,401	2,290	2,602	3,101	2,504	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	71	67	62	57	49	52	47	44	46	47	61	70	56	29
30	NONCORE	All End Uses	1,185	1,107	979	1,007	987	987	1,217	1,301	1,361	1,185	1,095	1,101	1,126	30
33		Subtotal-RETAIL	1,257	1,174	1,041	1,063	1,036	1,039	1,264	1,345	1,407	1,232	1,155	1,171	1,182	33
34	WHOLESALE & INTERNATIONAL	All End Uses	511	501	419	389	335	337	365	384	399	381	435	521	414	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,768	1,675	1,460	1,453	1,371	1,375	1,629	1,728	1,805	1,613	1,590	1,693	1,597	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,360	1,325	1,090	952	705	642	586	568	586	671	1,014	1,418	907	

Work Paper: TABLE 2-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2025

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		2,901	2,791	2,385	2,219	1,947	1,862	2,044	2,107	2,207	2,225	2,440	2,902	2,334	9
10	TOTAL SUPPLY TAKEN		3,023	2,913	2,507	2,341	2,069	1,984	2,166	2,229	2,329	2,347	2,562	3,024	2,456	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,023	2,913	2,507	2,341	2,069	1,984	2,166	2,229	2,329	2,347	2,562	3,024	2,456	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	993	988	771	661	451	368	343	343	349	429	701	1,064	620	13
14		Commercial	255	212	210	186	167	186	158	142	150	151	211	238	189	14
15		Industrial	52	58	55	53	44	50	46	43	47	49	50	51	50	15
16		NGV	51	57	51	53	51	53	51	51	53	51	53	51	52	16
17		Subtotal-CORE	1,350	1,315	1,088	953	714	656	599	579	598	679	1,015	1,405	911	17
22	NONCORE	Subtotal-NONCORE	1,131	1,058	962	962	973	962	1,187	1,261	1,327	1,262	1,086	1,070	1,104	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	503	503	426	398	356	341	353	360	375	378	429	512	411	26
27		Co. Use & LUAF	38	36	31	29	26	25	27	28	29	29	32	38	31	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,023	2,913	2,507	2,341	2,069	1,984	2,166	2,229	2,329	2,347	2,562	3,024	2,456	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	70	66	61	56	49	52	47	44	46	47	60	69	55	29
30	NONCORE	All End Uses	1,131	1,058	962	962	973	962	1,187	1,261	1,327	1,262	1,086	1,070	1,104	30
33		Subtotal-RETAIL	1,201	1,124	1,023	1,018	1,023	1,014	1,234	1,305	1,373	1,308	1,146	1,139	1,159	33
34	WHOLESALE & INTERNATIONAL	All End Uses	503	503	426	398	356	341	353	360	375	378	429	512	411	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,705	1,627	1,449	1,415	1,379	1,355	1,586	1,666	1,748	1,686	1,574	1,651	1,570	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,325	1,294	1,063	928	688	626	572	554	572	655	989	1,383	885	

Work Paper: TABLE 2-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2030

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		2,785	2,716	2,329	2,158	1,866	1,800	1,944	2,022	2,105	2,128	2,376	2,817	2,252	9
10	TOTAL SUPPLY TAKEN		2,907	2,838	2,451	2,280	1,988	1,922	2,066	2,144	2,227	2,250	2,498	2,939	2,374	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		2,907	2,838	2,451	2,280	1,988	1,922	2,066	2,144	2,227	2,250	2,498	2,939	2,374	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	965	961	750	643	439	358	334	333	339	417	682	1,034	603	13
14		Commercial	236	197	194	172	155	172	147	132	139	140	196	221	175	14
15		Industrial	46	52	49	47	39	44	41	38	41	43	44	46	44	15
16		NGV	59	66	59	61	59	61	59	59	61	59	61	59	61	16
17		Subtotal-CORE	1,306	1,275	1,053	923	692	636	581	563	581	659	983	1,360	882	17
22	NONCORE	Subtotal-NONCORE	1,067	1,018	949	942	938	924	1,113	1,200	1,249	1,183	1,045	1,024	1,055	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	498	510	417	386	333	339	345	354	368	380	439	519	407	26
27		Co. Use & LUAF	36	35	31	28	25	24	26	27	28	28	31	37	30	27
28	SYSTEM TOTAL THROUGHPUT [4/]		2,907	2,838	2,451	2,280	1,988	1,922	2,066	2,144	2,227	2,250	2,498	2,939	2,374	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	69	66	60	56	49	52	47	44	46	47	60	68	55	29
30	NONCORE	All End Uses	1,067	1,018	949	942	938	924	1,113	1,200	1,249	1,183	1,045	1,024	1,055	30
33		Subtotal-RETAIL	1,136	1,083	1,009	998	987	976	1,160	1,245	1,296	1,230	1,105	1,091	1,110	33
34	WHOLESALE & INTERNATIONAL	All End Uses	498	510	417	386	333	339	345	354	368	380	439	519	407	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,634	1,593	1,427	1,385	1,320	1,314	1,505	1,599	1,664	1,610	1,544	1,610	1,517	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,281	1,252	1,028	898	666	605	553	537	554	634	956	1,338	856	

Work Paper: TABLE 2-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2035

AVERAGE TEMPERATURE with BASE HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		2,793	2,723	2,336	2,166	1,873	1,809	1,951	2,030	2,113	2,135	2,385	2,826	2,260	9
10	TOTAL SUPPLY TAKEN		2,915	2,845	2,458	2,288	1,995	1,931	2,073	2,152	2,235	2,257	2,507	2,948	2,382	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		2,915	2,845	2,458	2,288	1,995	1,931	2,073	2,152	2,235	2,257	2,507	2,948	2,382	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	958	954	744	638	435	355	331	331	337	414	677	1,026	598	13
14		Commercial	239	199	197	175	157	174	149	134	141	142	198	223	177	14
15		Industrial	43	49	46	44	37	42	39	36	39	41	42	43	42	15
16		NGV	68	75	68	70	68	70	68	68	70	68	70	68	69	16
17		Subtotal-CORE	1,308	1,277	1,056	927	697	641	587	569	587	664	987	1,361	886	17
22	NONCORE	Subtotal-NONCORE	1,067	1,017	948	942	937	923	1,113	1,200	1,249	1,182	1,045	1,024	1,054	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	504	517	423	391	336	342	348	356	371	383	444	526	411	26
27		Co. Use & LUAF	36	35	31	28	25	24	26	27	28	28	31	37	30	27
28	SYSTEM TOTAL THROUGHPUT [4/]		2,915	2,845	2,458	2,288	1,995	1,931	2,073	2,152	2,235	2,257	2,507	2,948	2,382	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	72	68	63	58	52	54	49	47	49	50	62	70	58	29
30	NONCORE	All End Uses	1,067	1,017	948	942	937	923	1,113	1,200	1,249	1,182	1,045	1,024	1,054	30
33		Subtotal-RETAIL	1,139	1,085	1,011	1,000	989	978	1,162	1,246	1,298	1,232	1,108	1,095	1,112	33
34	WHOLESALE & INTERNATIONAL	All End Uses	504	517	423	391	336	342	348	356	371	383	444	526	411	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,643	1,602	1,434	1,391	1,325	1,319	1,510	1,603	1,669	1,615	1,551	1,620	1,523	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,280	1,251	1,028	899	668	608	556	540	557	636	957	1,336	858	

2016 CALIFORNIA GAS REPORT

FORECAST OF REQUIREMENTS - COLD TEMPERATURE YEAR
JULY 2016

TABLE 3-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED YEARS 2016 THRU 2020

COLD TEMPERATURE YEAR (1 IN 35 COLD YEAR EVENT) & DRY HYDRO YEAR

LINE			2016	2017	2018	2019	2020	LINE
	CAPACITY AVAILABLE							
1	California Line 85 Zone (California Producers)		160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	2
	Out-of-State Gas							
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN							
8	California Source Gas		122	122	122	122	122	8
9	Out-of-State		2,665	2,706	2,671	2,640	2,612	9
10	TOTAL SUPPLY TAKEN		2,787	2,828	2,793	2,762	2,734	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		2,787	2,828	2,793	2,762	2,734	12
	REQUIREMENTS FORECAST BY END-USE [5/]							
13	CORE [6/]	Residential	723	723	721	718	712	13
14		Commercial	230	230	227	223	220	14
15		Industrial	57	58	58	57	56	15
16		NGV	37	38	40	42	43	16
17		Subtotal-CORE	1,047	1,050	1,045	1,040	1,031	17
18	NONCORE	Commercial	47	47	46	46	45	18
19		Industrial	371	367	366	363	361	19
20		EOR Steaming	46	46	46	46	46	20
21		Electric Generation (EG)	788	825	807	788	775	21
22		Subtotal-NONCORE	1,252	1,285	1,265	1,244	1,228	22
23	WHOLESALE &	Core	200	205	205	206	206	23
24	INTERNATIONAL	Noncore Excl. EG	48	47	48	48	48	24
25		Electric Generation (EG)	204	206	195	191	187	25
26		Subtotal-WHOLESALE & INTL.	452	458	448	444	441	26
27		Co. Use & LUAF	35	35	35	34	34	27
28	SYSTEM TOTAL THROUGHPUT [4/]		2,787	2,828	2,793	2,762	2,734	28
	TRANSPORTATION AND EXCHANGE							
29	CORE	All End Uses	59	60	60	59	59	29
30	NONCORE	Commercial/Industrial	418	414	412	409	406	30
31		EOR Steaming	46	46	46	46	46	31
32		Electric Generation (EG)	788	825	807	788	775	32
33		Subtotal-RETAIL	1,311	1,344	1,325	1,303	1,287	33
34	WHOLESALE & INTERNATIONAL	All End Uses	452	458	448	444	441	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,764	1,802	1,772	1,748	1,728	35
	CURTAILMENT (RETAIL & WHOLESALE)							
36		Core	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.9	0.8	0.8	0.7	0.7	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.						
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,023	1,025	1,020	1,015	1,006	

TABLE 4-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED YEARS 2021 THRU 2035

COLD TEMPERATURE YEAR (1 IN 35 COLD YEAR EVENT) & DRY HYDRO YEAR

LINE			2021	2022	2025	2030	2035	LINE
	CAPACITY AVAILABLE							
1	California Line 85 Zone (California Producers)		160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	2
	Out-of-State Gas							
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN							
8	California Source Gas		122	122	122	122	122	8
9	Out-of-State		2,598	2,579	2,527	2,426	2,433	9
10	TOTAL SUPPLY TAKEN		2,720	2,701	2,649	2,548	2,555	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		2,720	2,701	2,649	2,548	2,555	12
	REQUIREMENTS FORECAST BY END-USE [5/]							
13	CORE [6/]	Residential	709	703	689	671	666	13
14		Commercial	216	211	200	185	188	14
15		Industrial	55	54	51	45	43	15
16		NGV	45	47	52	61	69	16
17		Subtotal-CORE	1,025	1,016	992	962	965	17
18	NONCORE	Commercial	45	44	43	41	42	18
19		Industrial	358	353	345	333	332	19
20		EOR Steaming	46	46	46	46	46	20
21		Electric Generation (EG)	768	763	748	696	697	21
22		Subtotal-NONCORE	1,217	1,207	1,183	1,117	1,117	22
23	WHOLESALE &	Core	206	206	206	210	215	23
24	INTERNATIONAL	Noncore Excl. EG	48	48	48	49	49	24
25		Electric Generation (EG)	189	189	186	178	177	25
26		Subtotal-WHOLESALE & INTL.	444	444	441	437	441	26
27		Co. Use & LUAF	34	34	33	32	32	27
28	SYSTEM TOTAL THROUGHPUT [4/]		2,720	2,701	2,649	2,548	2,555	28
	TRANSPORTATION AND EXCHANGE							
29	CORE	All End Uses	59	59	58	58	60	29
30	NONCORE	Commercial/Industrial	402	398	388	374	373	30
31		EOR Steaming	46	46	46	46	46	31
32		Electric Generation (EG)	768	763	748	696	697	32
33		Subtotal-RETAIL	1,276	1,265	1,241	1,175	1,177	33
34	WHOLESALE & INTERNATIONAL	All End Uses	444	444	441	437	441	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,720	1,710	1,682	1,611	1,618	35
	CURTAILMENT (RETAIL & WHOLESALE)							
36		Core	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.7	0.6	0.5	0.5	0.5	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.						
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,000	991	967	936	937	

Work Paper: TABLE 3-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2016

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,312	3,129	2,863	2,615	2,285	2,235	2,395	2,391	2,532	2,304	2,640	3,276	2,665	9
10	TOTAL SUPPLY TAKEN		3,434	3,251	2,985	2,737	2,407	2,357	2,517	2,513	2,654	2,426	2,762	3,398	2,787	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,434	3,251	2,985	2,737	2,407	2,357	2,517	2,513	2,654	2,426	2,762	3,398	2,787	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,213	1,162	923	779	505	396	364	363	371	476	832	1,305	723	13
14		Commercial	327	253	262	227	199	223	185	163	173	176	263	304	230	14
15		Industrial	60	66	65	62	50	58	53	49	53	56	58	60	57	15
16		NGV	36	38	36	37	36	37	36	36	37	36	37	36	37	16
17		Subtotal-CORE	1,636	1,519	1,287	1,105	790	714	638	611	634	744	1,189	1,705	1,047	17
22	NONCORE	Subtotal-NONCORE	1,215	1,164	1,183	1,162	1,196	1,189	1,424	1,445	1,541	1,268	1,119	1,117	1,252	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	540	528	478	436	391	424	424	426	445	384	420	534	452	26
27		Co. Use & LUAF	43	40	37	34	30	29	31	31	33	30	34	42	35	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,434	3,251	2,985	2,737	2,407	2,357	2,517	2,513	2,654	2,426	2,762	3,398	2,787	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	80	70	67	60	51	54	47	43	46	47	66	78	59	29
	NONCORE	All End Uses	1,215	1,164	1,183	1,162	1,196	1,189	1,424	1,445	1,541	1,268	1,119	1,117	1,252	
33		Subtotal-RETAIL	1,295	1,234	1,250	1,222	1,246	1,243	1,471	1,488	1,587	1,315	1,185	1,195	1,311	33
34	WHOLESALE & INTERNATIONAL	All End Uses	540	528	478	436	391	424	424	426	445	384	420	534	452	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,835	1,761	1,728	1,658	1,638	1,668	1,895	1,914	2,032	1,700	1,605	1,729	1,764	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,611	1,501	1,263	1,082	765	684	612	588	610	721	1,163	1,684	1,023	

Work Paper: TABLE 3-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2017

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,299	3,254	2,787	2,620	2,237	2,263	2,476	2,445	2,609	2,385	2,726	3,403	2,706	9
10	TOTAL SUPPLY TAKEN		3,421	3,376	2,909	2,742	2,359	2,385	2,598	2,567	2,731	2,507	2,848	3,525	2,828	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,421	3,376	2,909	2,742	2,359	2,385	2,598	2,567	2,731	2,507	2,848	3,525	2,828	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,209	1,200	921	777	503	395	363	362	370	474	829	1,302	723	13
14		Commercial	327	262	262	227	199	224	186	163	173	176	263	304	230	14
15		Industrial	61	69	66	62	51	58	53	49	54	57	58	61	58	15
16		NGV	38	42	38	39	38	39	38	38	39	38	39	38	38	16
17		Subtotal-CORE	1,635	1,573	1,287	1,105	791	716	639	612	636	745	1,189	1,704	1,050	17
22	NONCORE	Subtotal-NONCORE	1,206	1,210	1,136	1,172	1,164	1,210	1,495	1,490	1,608	1,335	1,174	1,212	1,285	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	536	551	451	431	375	429	431	434	453	396	450	566	458	26
27		Co. Use & LUAF	43	42	36	34	29	30	32	32	34	31	35	44	35	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,421	3,376	2,909	2,742	2,359	2,385	2,598	2,567	2,731	2,507	2,848	3,525	2,828	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	81	73	68	60	51	54	47	44	46	48	66	79	60	29
	NONCORE	All End Uses	1,206	1,210	1,136	1,172	1,164	1,210	1,495	1,490	1,608	1,335	1,174	1,212	1,285	
33		Subtotal-RETAIL	1,287	1,283	1,203	1,232	1,215	1,264	1,543	1,533	1,654	1,383	1,240	1,290	1,344	33
34	WHOLESALE & INTERNATIONAL	All End Uses	536	551	451	431	375	429	431	434	453	396	450	566	458	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,823	1,834	1,654	1,663	1,590	1,693	1,974	1,967	2,107	1,779	1,690	1,856	1,802	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,610	1,553	1,262	1,081	766	685	613	588	610	722	1,163	1,682	1,025	

Work Paper: TABLE 3-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2018

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,332	3,241	2,728	2,555	2,205	2,208	2,402	2,393	2,558	2,375	2,700	3,383	2,671	9
10	TOTAL SUPPLY TAKEN		3,454	3,363	2,850	2,677	2,327	2,330	2,524	2,515	2,680	2,497	2,822	3,505	2,793	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,454	3,363	2,850	2,677	2,327	2,330	2,524	2,515	2,680	2,497	2,822	3,505	2,793	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,205	1,197	918	774	502	393	362	361	369	473	827	1,297	721	13
14		Commercial	322	258	258	223	196	220	183	161	170	174	258	299	227	14
15		Industrial	60	68	65	62	50	58	53	49	53	56	58	60	58	15
16		NGV	39	44	39	41	39	41	39	39	41	39	41	39	40	16
17		Subtotal-CORE	1,627	1,566	1,281	1,100	787	712	637	610	633	742	1,183	1,696	1,045	17
22	NONCORE	Subtotal-NONCORE	1,226	1,199	1,075	1,109	1,122	1,201	1,473	1,492	1,616	1,325	1,150	1,188	1,265	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	558	557	459	435	389	388	384	382	398	399	453	577	448	26
27		Co. Use & LUAF	43	42	35	33	29	29	31	31	33	31	35	44	35	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,454	3,363	2,850	2,677	2,327	2,330	2,524	2,515	2,680	2,497	2,822	3,505	2,793	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	80	73	67	60	51	54	47	44	46	48	66	78	60	29
	NONCORE	All End Uses	1,226	1,199	1,075	1,109	1,122	1,201	1,473	1,492	1,616	1,325	1,150	1,188	1,265	
33		Subtotal-RETAIL	1,306	1,272	1,142	1,169	1,173	1,255	1,520	1,536	1,662	1,373	1,216	1,267	1,325	33
34	WHOLESALE & INTERNATIONAL	All End Uses	558	557	459	435	389	388	384	382	398	399	453	577	448	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,864	1,828	1,602	1,604	1,562	1,644	1,904	1,918	2,060	1,772	1,669	1,843	1,772	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,601	1,546	1,256	1,076	762	681	610	586	608	718	1,157	1,674	1,020	

Work Paper: TABLE 3-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2019

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,318	3,188	2,700	2,506	2,177	2,165	2,368	2,352	2,509	2,401	2,691	3,342	2,640	9
10	TOTAL SUPPLY TAKEN		3,440	3,310	2,822	2,628	2,299	2,287	2,490	2,474	2,631	2,523	2,813	3,464	2,762	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,440	3,310	2,822	2,628	2,299	2,287	2,490	2,474	2,631	2,523	2,813	3,464	2,762	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,201	1,192	914	771	500	392	360	359	368	471	824	1,292	718	13
14		Commercial	317	254	254	220	193	217	180	158	168	171	255	294	223	14
15		Industrial	60	67	65	61	50	57	52	48	53	56	57	59	57	15
16		NGV	41	45	41	42	41	42	41	41	42	41	42	41	42	16
17		Subtotal-CORE	1,619	1,559	1,274	1,095	784	708	634	607	631	739	1,178	1,687	1,040	17
22	NONCORE	Subtotal-NONCORE	1,218	1,159	1,061	1,076	1,109	1,163	1,444	1,456	1,572	1,351	1,145	1,160	1,244	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	560	551	451	425	377	388	381	380	396	403	455	573	444	26
27		Co. Use & LUAF	43	41	35	33	29	28	31	31	33	31	35	43	34	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,440	3,310	2,822	2,628	2,299	2,287	2,490	2,474	2,631	2,523	2,813	3,464	2,762	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	80	72	67	60	51	54	48	44	46	48	66	78	59	29
	NONCORE	All End Uses	1,218	1,159	1,061	1,076	1,109	1,163	1,444	1,456	1,572	1,351	1,145	1,160	1,244	
33		Subtotal-RETAIL	1,298	1,231	1,128	1,136	1,161	1,217	1,492	1,500	1,618	1,399	1,211	1,238	1,303	33
34	WHOLESALE & INTERNATIONAL	All End Uses	560	551	451	425	377	388	381	380	396	403	455	573	444	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,858	1,783	1,580	1,561	1,537	1,605	1,873	1,880	2,014	1,801	1,666	1,811	1,748	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,593	1,539	1,250	1,071	758	677	607	583	605	715	1,151	1,666	1,015	

Work Paper: TABLE 3-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2020

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,261	3,113	2,705	2,502	2,168	2,133	2,334	2,311	2,468	2,369	2,663	3,326	2,612	9
10	TOTAL SUPPLY TAKEN		3,383	3,235	2,827	2,624	2,290	2,255	2,456	2,433	2,590	2,491	2,785	3,448	2,734	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,383	3,235	2,827	2,624	2,290	2,255	2,456	2,433	2,590	2,491	2,785	3,448	2,734	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,194	1,144	909	767	497	390	358	357	365	468	819	1,285	712	13
14		Commercial	313	242	251	217	191	214	178	156	166	169	251	290	220	14
15		Industrial	59	64	64	60	49	57	52	48	52	55	57	59	56	15
16		NGV	43	46	43	44	43	44	43	43	44	43	44	43	43	16
17		Subtotal-CORE	1,608	1,496	1,266	1,088	779	704	630	604	627	735	1,170	1,676	1,031	17
22	NONCORE	Subtotal-NONCORE	1,179	1,169	1,072	1,080	1,116	1,135	1,415	1,420	1,536	1,323	1,125	1,160	1,228	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	554	531	454	423	366	388	381	379	395	402	454	569	441	26
27		Co. Use & LUAF	42	40	35	33	29	28	31	30	32	31	35	43	34	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,383	3,235	2,827	2,624	2,290	2,255	2,456	2,433	2,590	2,491	2,785	3,448	2,734	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	80	70	67	60	51	54	48	44	46	48	66	78	59	29
	NONCORE	All End Uses	1,179	1,169	1,072	1,080	1,116	1,135	1,415	1,420	1,536	1,323	1,125	1,160	1,228	
33		Subtotal-RETAIL	1,258	1,239	1,139	1,140	1,167	1,189	1,462	1,465	1,583	1,371	1,191	1,238	1,287	33
34	WHOLESALE & INTERNATIONAL	All End Uses	554	531	454	423	366	388	381	379	395	402	454	569	441	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,813	1,770	1,593	1,563	1,533	1,577	1,843	1,843	1,977	1,773	1,645	1,806	1,728	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.													
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,582	1,476	1,242	1,064	754	673	603	579	601	711	1,144	1,655	1,006

Work Paper: TABLE 4-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2021

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,283	3,193	2,704	2,558	2,135	2,092	2,283	2,276	2,382	2,295	2,684	3,324	2,598	9
10	TOTAL SUPPLY TAKEN		3,405	3,315	2,826	2,680	2,257	2,214	2,405	2,398	2,504	2,417	2,806	3,446	2,720	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,405	3,315	2,826	2,680	2,257	2,214	2,405	2,398	2,504	2,417	2,806	3,446	2,720	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,186	1,177	903	762	493	387	356	355	363	465	813	1,276	709	13
14		Commercial	306	245	246	212	187	210	174	153	162	165	246	284	216	14
15		Industrial	58	66	63	59	48	56	51	47	51	54	56	58	55	15
16		NGV	44	49	44	46	44	46	44	44	46	44	46	44	45	16
17		Subtotal-CORE	1,595	1,537	1,256	1,079	773	698	625	599	622	729	1,160	1,663	1,025	17
22	NONCORE	Subtotal-NONCORE	1,220	1,181	1,076	1,131	1,081	1,129	1,378	1,377	1,450	1,269	1,144	1,160	1,217	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	548	556	459	437	376	359	372	392	401	390	467	581	444	26
27		Co. Use & LUAF	42	41	35	33	28	28	30	30	31	30	35	43	34	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,405	3,315	2,826	2,680	2,257	2,214	2,405	2,398	2,504	2,417	2,806	3,446	2,720	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	79	72	67	60	51	54	47	44	46	48	65	77	59	29
	NONCORE	All End Uses	1,220	1,181	1,076	1,131	1,081	1,129	1,378	1,377	1,450	1,269	1,144	1,160	1,217	
33		Subtotal-RETAIL	1,299	1,253	1,142	1,190	1,132	1,183	1,425	1,422	1,496	1,317	1,209	1,237	1,276	33
34	WHOLESALE & INTERNATIONAL	All End Uses	548	556	459	437	376	359	372	392	401	390	467	581	444	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,847	1,809	1,601	1,628	1,507	1,541	1,797	1,813	1,897	1,706	1,676	1,818	1,720	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.													
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,569	1,517	1,231	1,055	747	667	598	575	596	705	1,134	1,641	1,000

Work Paper: TABLE 4-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2022

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,330	3,191	2,671	2,518	2,078	2,047	2,239	2,272	2,351	2,260	2,681	3,336	2,579	9
10	TOTAL SUPPLY TAKEN		3,452	3,313	2,793	2,640	2,200	2,169	2,361	2,394	2,473	2,382	2,803	3,458	2,701	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,452	3,313	2,793	2,640	2,200	2,169	2,361	2,394	2,473	2,382	2,803	3,458	2,701	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,177	1,168	896	756	490	384	353	352	360	461	807	1,266	703	13
14		Commercial	299	240	240	208	183	205	170	150	159	162	240	278	211	14
15		Industrial	57	64	62	58	47	54	50	46	50	53	54	57	54	15
16		NGV	46	51	46	48	46	48	46	46	48	46	48	46	47	16
17		Subtotal-CORE	1,579	1,523	1,244	1,069	766	691	619	594	617	722	1,149	1,647	1,016	17
22	NONCORE	Subtotal-NONCORE	1,265	1,194	1,050	1,113	1,045	1,090	1,333	1,379	1,420	1,240	1,155	1,193	1,207	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	565	555	464	425	362	361	380	391	406	390	464	575	444	26
27		Co. Use & LUAF	43	41	35	33	27	27	29	30	31	30	35	43	34	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,452	3,313	2,793	2,640	2,200	2,169	2,361	2,394	2,473	2,382	2,803	3,458	2,701	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	78	71	66	59	51	54	47	44	46	48	65	76	59	29
	NONCORE	All End Uses	1,265	1,194	1,050	1,113	1,045	1,090	1,333	1,379	1,420	1,240	1,155	1,193	1,207	
33		Subtotal-RETAIL	1,343	1,265	1,116	1,173	1,096	1,144	1,380	1,423	1,466	1,288	1,220	1,269	1,265	33
34	WHOLESALE & INTERNATIONAL	All End Uses	565	555	464	425	362	361	380	391	406	390	464	575	444	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,908	1,820	1,580	1,597	1,458	1,505	1,760	1,814	1,871	1,678	1,683	1,844	1,710	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,554	1,503	1,219	1,045	740	660	592	569	591	698	1,123	1,626	991	

Work Paper: TABLE 4-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2025

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,229	3,104	2,616	2,422	2,077	2,003	2,189	2,194	2,276	2,311	2,648	3,282	2,527	9
10	TOTAL SUPPLY TAKEN		3,351	3,226	2,738	2,544	2,199	2,125	2,311	2,316	2,398	2,433	2,770	3,404	2,649	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,351	3,226	2,738	2,544	2,199	2,125	2,311	2,316	2,398	2,433	2,770	3,404	2,649	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,152	1,144	877	740	479	376	346	345	353	452	790	1,240	689	13
14		Commercial	283	227	227	197	173	195	162	142	151	153	228	263	200	14
15		Industrial	54	61	58	55	45	51	47	43	47	50	51	53	51	15
16		NGV	51	57	51	53	51	53	51	51	53	51	53	51	52	16
17		Subtotal-CORE	1,541	1,488	1,214	1,045	749	675	606	582	603	706	1,122	1,608	992	17
22	NONCORE	Subtotal-NONCORE	1,218	1,146	1,024	1,036	1,043	1,061	1,303	1,335	1,381	1,304	1,151	1,183	1,183	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	551	551	466	431	380	363	374	370	383	393	463	572	441	26
27		Co. Use & LUAF	42	40	34	32	27	26	29	29	30	30	34	42	33	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,351	3,226	2,738	2,544	2,199	2,125	2,311	2,316	2,398	2,433	2,770	3,404	2,649	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	77	71	65	59	51	53	47	44	46	48	64	75	58	29
	NONCORE	All End Uses	1,218	1,146	1,024	1,036	1,043	1,061	1,303	1,335	1,381	1,304	1,151	1,183	1,183	
33		Subtotal-RETAIL	1,294	1,217	1,089	1,095	1,094	1,115	1,350	1,379	1,427	1,352	1,215	1,258	1,241	33
34	WHOLESALE & INTERNATIONAL	All End Uses	551	551	466	431	380	363	374	370	383	393	463	572	441	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,845	1,768	1,555	1,526	1,474	1,478	1,724	1,749	1,810	1,744	1,677	1,830	1,682	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,515	1,468	1,190	1,020	723	644	578	557	577	682	1,096	1,587	967	

Work Paper: TABLE 4-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2030

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,118	3,002	2,535	2,336	1,967	1,913	2,070	2,093	2,162	2,207	2,562	3,171	2,426	9
10	TOTAL SUPPLY TAKEN		3,240	3,124	2,657	2,458	2,089	2,035	2,192	2,215	2,284	2,329	2,684	3,293	2,548	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,240	3,124	2,657	2,458	2,089	2,035	2,192	2,215	2,284	2,329	2,684	3,293	2,548	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,122	1,114	854	721	467	366	337	336	343	440	770	1,208	671	13
14		Commercial	262	210	210	182	161	181	150	132	140	142	211	243	185	14
15		Industrial	48	54	52	49	40	46	42	38	42	44	46	47	45	15
16		NGV	59	66	59	61	59	61	59	59	61	59	61	59	61	16
17		Subtotal-CORE	1,491	1,444	1,176	1,013	727	654	588	566	587	686	1,087	1,558	962	17
22	NONCORE	Subtotal-NONCORE	1,150	1,082	994	996	980	1,000	1,214	1,255	1,292	1,226	1,096	1,112	1,117	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	559	560	454	418	356	357	363	366	377	388	468	582	437	26
27		Co. Use & LUAF	40	39	33	31	26	25	27	28	28	29	33	41	32	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,240	3,124	2,657	2,458	2,089	2,035	2,192	2,215	2,284	2,329	2,684	3,293	2,548	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	75	70	64	59	51	53	47	44	47	48	63	74	58	29
	NONCORE	All End Uses	1,150	1,082	994	996	980	1,000	1,214	1,255	1,292	1,226	1,096	1,112	1,117	
33		Subtotal-RETAIL	1,225	1,152	1,058	1,054	1,030	1,053	1,262	1,300	1,339	1,274	1,159	1,186	1,175	33
34	WHOLESALE & INTERNATIONAL	All End Uses	559	560	454	418	356	357	363	366	377	388	468	582	437	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,784	1,712	1,512	1,473	1,387	1,410	1,624	1,666	1,716	1,661	1,627	1,768	1,611	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,466	1,422	1,151	988	700	622	560	540	559	661	1,060	1,536	936	

Work Paper: TABLE 4-SCG

SOUTHERN CALIFORNIA GAS COMPANY

ANNUAL GAS SUPPLY AND REQUIREMENTS - MMCF/DAY
ESTIMATED FOR YEAR: 2035

COLD TEMPERATURE with DRY HYDRO YEAR

LINE			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg	LINE
	CAPACITY AVAILABLE															
1	California Line 85 Zone (California Producers)		160	160	160	160	160	160	160	160	160	160	160	160	160	1
2	California Coastal Zone (California Producers)		150	150	150	150	150	150	150	150	150	150	150	150	150	2
	Out-of-State Gas															
3	Wheeler Ridge Zone (KR, MP, PG&E, OEHI) [1/]		765	765	765	765	765	765	765	765	765	765	765	765	765	3
4	Southern Zone (EPN,TGN,NBP) [2/]		1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	1,210	4
5	Northern Zone (TW,EPN,QST, KR) [3/]		1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	1,590	5
6	Total Out-of-State Gas		3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	3,565	6
7	TOTAL CAPACITY AVAILABLE		3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	3,875	7
	GAS SUPPLY TAKEN															
8	California Source Gas		122	122	122	122	122	122	122	122	122	122	122	122	122	8
9	Out-of-State		3,126	3,009	2,542	2,343	1,974	1,921	2,078	2,100	2,170	2,214	2,571	3,179	2,433	9
10	TOTAL SUPPLY TAKEN		3,248	3,131	2,664	2,465	2,096	2,043	2,200	2,222	2,292	2,336	2,693	3,301	2,555	10
11	Net Underground Storage Withdrawal		0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	TOTAL THROUGHPUT [4/]		3,248	3,131	2,664	2,465	2,096	2,043	2,200	2,222	2,292	2,336	2,693	3,301	2,555	12
	REQUIREMENTS FORECAST BY END-USE [5/]															
13	CORE [6/]	Residential	1,113	1,105	848	715	463	363	334	333	341	437	764	1,198	666	13
14		Commercial	265	213	213	185	163	183	152	134	142	144	214	246	188	14
15		Industrial	45	51	49	46	37	43	39	36	40	42	43	45	43	15
16		NGV	68	75	68	70	68	70	68	68	70	68	70	68	69	16
17		Subtotal-CORE	1,492	1,444	1,178	1,016	731	659	593	571	592	690	1,090	1,557	965	17
22	NONCORE	Subtotal-NONCORE	1,149	1,082	993	995	979	999	1,214	1,254	1,292	1,226	1,096	1,113	1,117	22
26	WHOLESALE & INTERNATIONAL	Subtotal-WHOLESALE & INT	567	567	460	423	360	360	365	369	379	391	473	589	441	26
27		Co. Use & LUAF	40	39	33	31	26	25	27	28	29	29	34	41	32	27
28	SYSTEM TOTAL THROUGHPUT [4/]		3,248	3,131	2,664	2,465	2,096	2,043	2,200	2,222	2,292	2,336	2,693	3,301	2,555	28
	TRANSPORTATION AND EXCHANGE															
29	CORE	All End Uses	78	73	67	61	53	56	50	47	49	50	66	76	60	29
	NONCORE	All End Uses	1,149	1,082	993	995	979	999	1,214	1,254	1,292	1,226	1,096	1,113	1,117	
33		Subtotal-RETAIL	1,227	1,154	1,060	1,056	1,032	1,055	1,264	1,301	1,341	1,276	1,162	1,189	1,177	33
34	WHOLESALE & INTERNATIONAL	All End Uses	567	567	460	423	360	360	365	369	379	391	473	589	441	34
35	TOTAL TRANSPORTATION & EXCHANGE		1,794	1,721	1,520	1,480	1,392	1,415	1,629	1,670	1,720	1,667	1,635	1,779	1,618	35
	CURTAILMENT (RETAIL & WHOLESALE)															
36		Core	0	0	0	0	0	0	0	0	0	0	0	0	0	36
37		Noncore	0	0	0	0	0	0	0	0	0	0	0	0	0	37
38		TOTAL - Curtailment	0	0	0	0	0	0	0	0	0	0	0	0	0	38

NOTES:
1/ Wheeler Ridge Zone: KR & MP at Wheeler Ridge, PG&E at Kern Stn., OEHI at Gosford)
2/ Southern Zone (EPN at Ehrenberg, TGN at Otay Mesa, NBP at Blythe)
3/ Northern Zone (TW at No. Needles, EPN at Topok, QST at No. Needles, KR at Kramer Jct.)

4/ Excludes own-source gas supply of gas procurement by the City of Long Beach	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	
5/ Requirement forecast by end-use includes sales, transportation, and exchange volumes.														
6/ Core end-use demand exclusive of core aggregation transportation (CAT) in MDth/d:	1,464	1,420	1,150	988	702	625	563	543	562	663	1,060	1,533	937	

2016 CALIFORNIA GAS REPORT

FORECAST OF REQUIREMENTS
JULY 2016

The Gas Company

A Sempra Energy utility™

2016 CALIFORNIA GAS REPORT

CUSTOMER FORECAST
JULY 2016

The Gas Company

A Sempra Energy utility™

Year	Active SF	Active MF	Active MM	Active tot Res	Active Com	Active Ind	Active Total	Growth
2000	3,158,252	1,597,527	44,860	4,800,639	185,845	22,071	5,008,555	69,255
2001	3,210,899	1,604,796	44,487	4,860,183	187,676	21,859	5,069,718	61,163
2002	3,268,930	1,612,709	44,215	4,925,855	189,804	21,396	5,137,054	67,336
2003	3,322,120	1,621,230	43,861	4,987,211	190,114	20,848	5,198,173	61,119
2004	3,377,588	1,633,083	43,540	5,054,210	191,291	20,734	5,266,235	68,062
2005	3,434,786	1,637,608	43,177	5,115,570	192,270	20,590	5,328,430	62,195
2006	3,488,997	1,647,654	42,695	5,179,346	192,321	20,307	5,391,974	63,544
2007	3,524,381	1,665,905	42,386	5,232,672	192,862	20,257	5,445,791	53,817
2008	3,531,044	1,681,864	42,026	5,254,934	191,906	20,140	5,466,979	21,188
2009	3,547,653	1,681,251	41,710	5,270,615	190,000	19,699	5,480,314	13,335
2010	3,570,361	1,697,335	41,485	5,309,182	188,141	19,346	5,516,668	36,354
2011	3,585,183	1,716,280	41,242	5,342,705	187,337	19,135	5,549,177	32,509
2012	3,598,669	1,730,663	41,038	5,370,370	186,996	18,989	5,576,355	27,178
2013	3,614,927	1,743,855	40,895	5,399,678	187,544	18,891	5,606,113	29,758
2014	3,632,903	1,759,544	40,689	5,433,136	187,321	18,704	5,639,161	33,048
2015	3,648,669	1,773,721	40,506	5,462,895	187,844	17,528	5,668,267	29,106
2016	3,671,900	1,783,846	40,355	5,496,102	189,393	17,388	5,702,883	34,616
2017	3,684,884	1,799,002	40,150	5,524,036	189,925	17,445	5,731,406	28,524
2018	3,699,742	1,814,486	39,945	5,554,173	190,111	17,521	5,761,805	30,398
2019	3,714,537	1,830,153	39,741	5,584,431	190,229	17,598	5,792,257	30,452
2020	3,729,228	1,845,813	39,538	5,614,579	190,325	17,653	5,822,557	30,301
2021	3,744,147	1,861,471	39,337	5,644,955	190,334	17,714	5,853,004	30,446
2022	3,759,223	1,877,080	39,136	5,675,439	190,352	17,757	5,883,547	30,543
2023	3,771,869	1,892,608	38,937	5,703,413	190,389	17,778	5,911,580	28,033
2024	3,789,618	1,908,145	38,738	5,736,501	190,433	17,795	5,944,728	33,149
2025	3,804,853	1,923,711	38,540	5,767,105	190,445	17,800	5,975,350	30,622
2026	3,820,082	1,939,371	38,344	5,797,797	190,462	17,791	6,006,050	30,700
2027	3,835,340	1,955,188	38,148	5,828,677	190,483	17,786	6,036,946	30,896
2028	3,850,754	1,971,119	37,954	5,859,827	190,459	17,766	6,068,053	31,107
2029	3,866,260	1,987,149	37,760	5,891,170	190,429	17,743	6,099,342	31,289
2030	3,881,652	2,003,281	37,568	5,922,500	190,435	17,721	6,130,656	31,314
2031	3,896,969	2,019,490	37,376	5,953,834	190,420	17,704	6,161,958	31,303
2032	3,912,315	2,035,736	37,185	5,985,237	190,422	17,687	6,193,346	31,388
2033	3,927,646	2,051,980	36,996	6,016,622	190,428	17,670	6,224,720	31,374
2034	3,942,963	2,068,234	36,807	6,048,004	190,444	17,655	6,256,102	31,383
2035	3,958,272	2,084,517	36,619	6,079,408	190,465	17,637	6,287,510	31,407

2016 CALIFORNIA GAS REPORT

EUFORECASTER
JULY 2016

The Gas Company

A Sempra Energy utility™

I. Introduction

End Use Forecaster is a market-segmentation and modeling framework that forecasts the impacts of competitive strategies and market scenarios on sales, revenues, and market shares. **EUForecaster is used to prepare the demand forecasts for the residential, core commercial and industrial, and noncore commercial and industrial markets.**

The object of this chapter is to familiarize you with the overall End Use Forecaster modeling structure and to describe how the system relates to common business issues concerning demand forecasting and market assessment. This chapter also serves to explain how the various modules within End Use Forecaster relate to one another. Subsequent chapters define the contents and features of each individual module.

End Use Forecaster: An Overview

End Use Forecaster, formerly known as Quant.sim, is a market segmentation, competitive assessment, and sales projection application developed to respond to market needs and overcome the limitations of existing demand forecasting and market planning tools. The application, originally developed in 1993, is constructed using SAS software.

We have found that each utility's market structure and competitive environment is unique and that a major shortcoming of other tools has been an inability to accurately capture this diversity. End Use Forecaster's Market Segmentation module provides the ability to update the model to reflect new strategies without writing SAS programming code. Unique market conditions translate into an inherently flexible, dynamic modeling framework that can rapidly adapt to new market conditions.

This flexibility is afforded through a model development approach that separates specific market issues from theoretical modeling constructs:

- ***Logic and theory***, the portion of the system comprised of the programming code and data structures, is stored and managed in one location
- ***Market data***, which are unique for every company and strategy, are stored in a separate location

This structure makes market segmentation and analyses relatively easy tasks compared to adapting spreadsheet models or rewriting "black box" programming code. As an example, consider the "DSM planning" and "competitive assessment" market dimensions in the Table 1 below. The DSM dimensions show a standard end-use forecast model design for the utility industry, while the competitive assessment dimensions illustrate another way to set up End Use Forecaster to analyze new retail competition if retail choice is present in the jurisdiction.

Table 1. Alternative Market Segmentation Designs – Utility Industry Example

Market Dimension	DSM Planning	Competitive Assessment
Dimension 1	Market sector (residential, commercial, industrial, agricultural)	Risk of switching
Dimension 2	Customer type (dwelling, building, industry segments)	Customer value (to energy provider)
Dimension 3	End uses	Products and services
Dimension 4	Fuel types	Provider choices
Dimension 5	Efficiency levels	Product choices

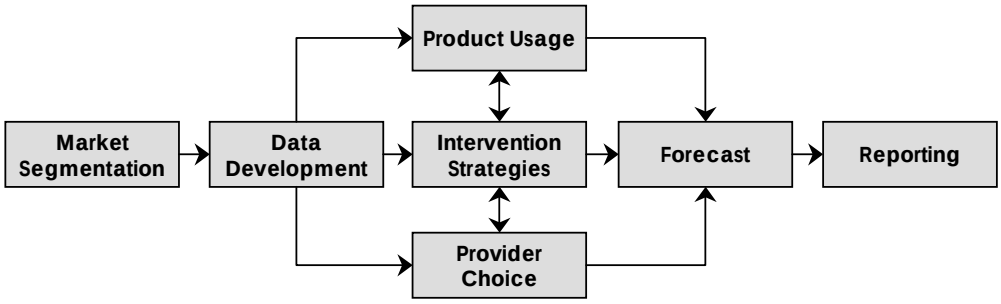
End Use Forecaster has other dimensions that capture factors affecting product demands. Perhaps the most important of these is End Use Forecaster's "vintaging" capability. Vintaging refers to product or service turnover that is a function of either physical lives or contract period. Accurate assessments of product turnover are crucial to obtaining accurate forecasts for any product where purchases are derived from a fraction of the population in the market at a moment of time. An example of vintaging would be accounting for energy-consuming equipment such as motors, boilers, water heaters, chillers, etc., where demand over a given time interval is the sum of demands from new customers plus those customers replacing existing equipment.

The effective use of the inherent multidimensionality of most business forecasting issues is a key strength of the End Use Forecaster framework. Critical dimensions of business issues (e.g., geography, customers, products, competitors, equipment lives, etc.) are included in every forecast, along with dimensions users can modify to resolve a variety of business issues. For example, forecasters may be interested in the price elasticity of demand, marketing staff may want to study market shares across various scenarios, and corporate finance may need the bottom line revenue forecast. All these (and more) are immediately available in every forecast due to the concentration of rich and flexible dimensionality.

Seven primary modules form the heart of the End Use Forecaster framework: Market Segmentation, Data Development, Product Usage, Provider Choice, Intervention Strategies, Forecasting, and Reporting. .

Figure 1 depicts the relationships between these modules. Each is summarized below and in the remaining chapters of this Reference Guide.

Figure 1. End Use Forecaster Modules and Structure



Interface Design

The user interface to the End Use Forecaster model is constructed using SAS/AF (Applications Facility). SAS/AF software provides dozens of predefined "classes" that enabled the development of End Use Forecaster. These classes include a wide selection of both visual and non-visual aspects. The visual classes, or widgets, define objects that are placed on the screen, including icons, push buttons, text boxes tables, etc. The non-visual classes use screen control language (SCL) that define the objects controlling End Use Forecaster behind the scenes. Figure 2 and Figure 3 show the first two screens users see after starting End Use Forecaster.

Figure 2. Welcome Screen

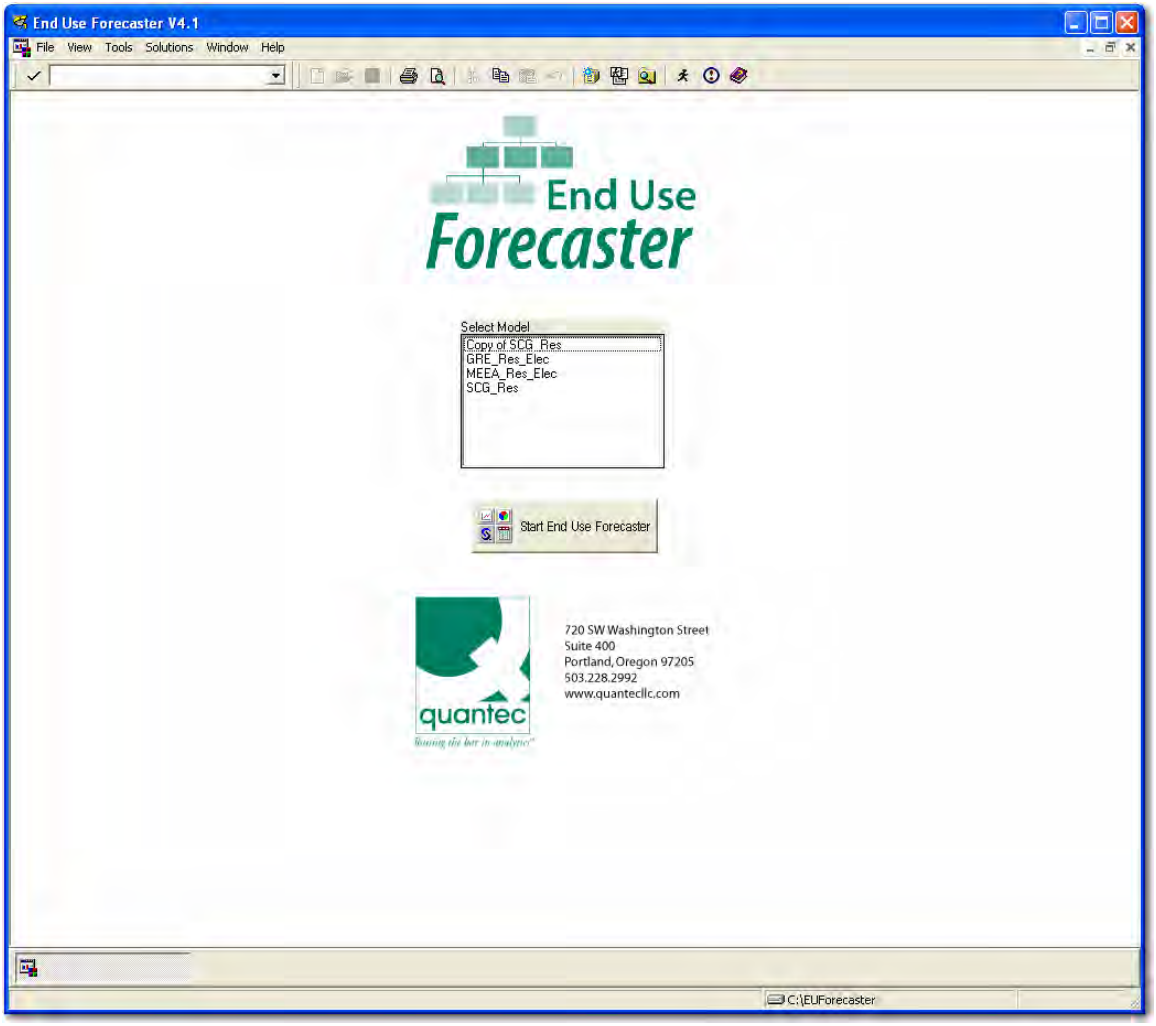
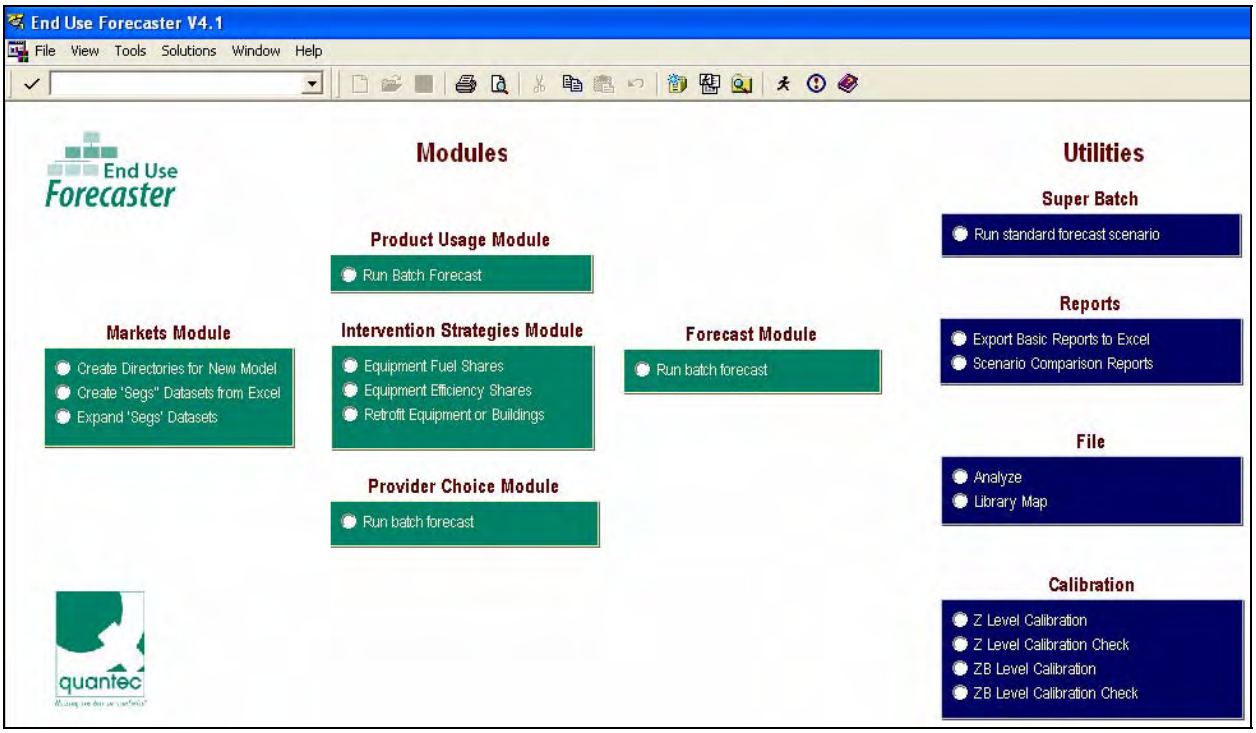


Figure 3. Main Dashboard



The interface is the only part of the End Use Forecaster framework that is compiled. All of the mathematical operations are in open SAS code, and End Use Forecaster's SAS/AF interface can also be edited and recompiled. This is a true "open architecture" design that allows users to modify and extend the End Use Forecaster framework.

In addition to End Use Forecaster's customized sets of tools, there is also a wide variety of data management, analysis, and reporting tools that are packaged with the SAS System.

Data Exchange

End Use Forecaster uses SAS/ACCESS software to provide direct and transparent access to various databases such as:

- DB2 Under UNIX and PC Hosts
- ORACLE
- SYBASE
- SQL/DS
- ODBC
- PC File Formats (Excel, Access)
- SYSTEM 2000 software

Since data access functions are separated from End Use Forecaster's logic, underlying data sources may change, but the model's capabilities will not be affected.

Market Segmentation

Market Segments

The primary goal of any market segmentation design in End Use Forecaster is to disaggregate the overall market into meaningful portions of customer types that behave similarly in terms of product demands and the set of choices they face. These disaggregations are arranged hierarchically, with Dimension 1 at the top of the "tree." Each Dimension 1 class can have one or more Dimension 2 classes, each Dimension 2 class can have one or more Dimension 3 classes, and so on.

Strategic Information Needs

A secondary goal of the market segmentation design is to designate groups of customers and products for which sufficient data are available to be fed into End Use Forecaster's forecasting framework. It may not be desirable to disaggregate the market into segments for which little or no data are available or where there is little distinction between two or more groups. Every new market segment requires additional disk storage space and more time to assemble the required End Use Forecaster data inputs. The objective should be to ***optimize*** the number of market segments: create enough market sectors to provide differentiation on answers to important questions but not so many that they become a burden to the overall process.

Data Development and Entry

Successful implementation of the End Use Forecaster model relies on highly integrated sets of information. Data entry is closely related to the market segmentation process, and both are addressed in this Reference Guide. Each set of input data uses different dimensions, so highly structured templates were designed to minimize redundancy and eliminate error at the same time.

End Use Forecaster uses market segmentation information and templates to set up all the required SAS datasets such that they are entirely consistent with the segmentation design.

Data Entry Formats

End Use Forecaster's datasets can be populated in several ways. The most common methods are:

- Exporting/importing data using SAS/ACCESS for PC file formats
- Programmatic data entry through simple SAS programs

As users gradually increase the number of distinct market segments from dozens to hundreds to thousands, it is anticipated that they will take advantage of SAS/ACCESS links to other company databases. Such links would allow for real-time forecast updates as database information is updated.

Product Usage Module: Modeling Equipment Consumption

End Use Forecaster tracks consumption of resources (such as natural gas, electricity, water, minutes of telephone or Internet use, gasoline, etc.) through the Product Usage module. This module is only used when there are secondary, derived demands from customers' product choices. For example, a utility would be interested in the use of energy from appliances to generate natural gas or electricity forecasts, but other types of manufacturers may not need this information to develop sales forecasts. If certain parts of the model are not needed in a given application, you may assign default values (usually a 0 or 1) that essentially turn off that portion of the model.

Product usage can vary with a variety of factors such as weather, non-weather seasonal factors, customer characteristics, prices, and other product attributes. Several modeling techniques explain and predict product usage, including scalars (exogenous estimates), econometric functions, and other statistical models.

Regardless of the approach taken, the Product Usage module provides a forecast of the predicted consumption by combining (1) a forecast of consumption factors or drivers (i.e., independent or exogenous variables) and (2) a set of coefficients associated with each exogenous variable.

Provider Choice Module: Modeling Customer Service and Purchase Decisions

Types of Choices: The Provider Choice module analyzes customer choice decisions among competitors and product options. For example, a commercial building operator chooses between fuel (provider) types for HVAC systems, and then from various equipment efficiency levels (product options) within the fuel type. Purchase decisions are represented by a nested structure of provider and product option choices.

Modes of Choice Modeling

The Provider Choice module is designed for two types of modeling: (1) the estimation of choice parameters, and (2) the forecast of market shares given these choice parameters. More specifically, the Provider Choice Module:[1]

- ***Simulates parameter estimates*** relating to customer choice in markets where micro-(customer) level information is not available, but aggregate cost and market share figures are known, or
- ***Uses parameter estimates*** from the application of logistic regression, or other models of customer choice, to micro-level customer data.

[1] The Provider Choice Module can be bypassed in some applications such as DSM potential analysis. In this type of framework, the base line fuel and efficiency shares are held constant and are determined outside the model. The Intervention Strategies Module is then used to view alternate market shares associated with, for example, technical and achievable DSM potential.

If primary market research is used to develop the micro data necessary for parameter estimates, the Provider Choice module essentially transforms a "static" market research report into a dynamic what-if analysis structure. This can significantly extend the usefulness and life of company market research resources.

After model parameters are simulated or input into the Provider Choice Module, it then forecasts the market share associated with each product and service alternative over the planning horizon.

Average versus Marginal Shares

The comparison of average versus marginal shares and associated trends is a key result of incorporating dynamic choice functions in the End Use Forecaster forecasting framework.

For example, the infusion of new energy consumption technologies (such as condensing furnaces) may be reaching 35% of new construction buildings, but if new construction in a given year only represents 2% of the total market, then the total impact on the market is merely 0.7%. As these rates of change accelerate and decelerate through the future, and as simulated what-if scenarios impact these forecasts of consumer choice, markedly different forecasts are possible over the longer term, while at the same time maintaining a realistic short-term profile.

Intervention Strategies Module: Analyzing Marketing Scenarios and DSM Potential

The Intervention Strategies module – a generic term to apply to activities typically associated with demand-side management (DSM) – is intended to capture the impacts of marketing, energy efficiency potential, and other programs designed to influence customer behavior. This module makes available a series of program designs that simulate the "what-if" impacts on the market shares, usage, and the resulting demand forecast. Three general types of program designs are available:

- ***Provider (fuel) substitution scenarios***. These scenarios modify the forecasted choices or market shares among provider (fuel) sources. Separate sets of assumptions apply to existing buildings and new construction buildings, permitting different types of programs to be designed.
- ***Product option (equipment efficiency) scenarios***. These scenarios modify efficiency or product option shares. For example, an efficiency program usually favors the highest available efficiency level for each market sector. These impacts affect choices at the point of new construction or replacement of existing end uses, and different assumptions can apply to each market. A technical potential scenario normally assigns a 100% share to the most efficient option. An achievable potential scenario assigns less than a 100% share to the most efficient option, with the level determined by experience with similar program designs or market research.
- ***Usage retrofit program scenarios***. These programs encourage consumers to change their product usage given the equipment they already have (e.g., improve the efficiency of existing equipment by installing efficiency measures or through better O&M procedures).

Examples include measures to tighten residential and commercial building envelopes, industrial process changes, and pipe and duct insulation.

Intervention strategies are incorporated directly into the relevant Product Usage or Provider Choice forecasts.

Forecast Module: Putting It All Together

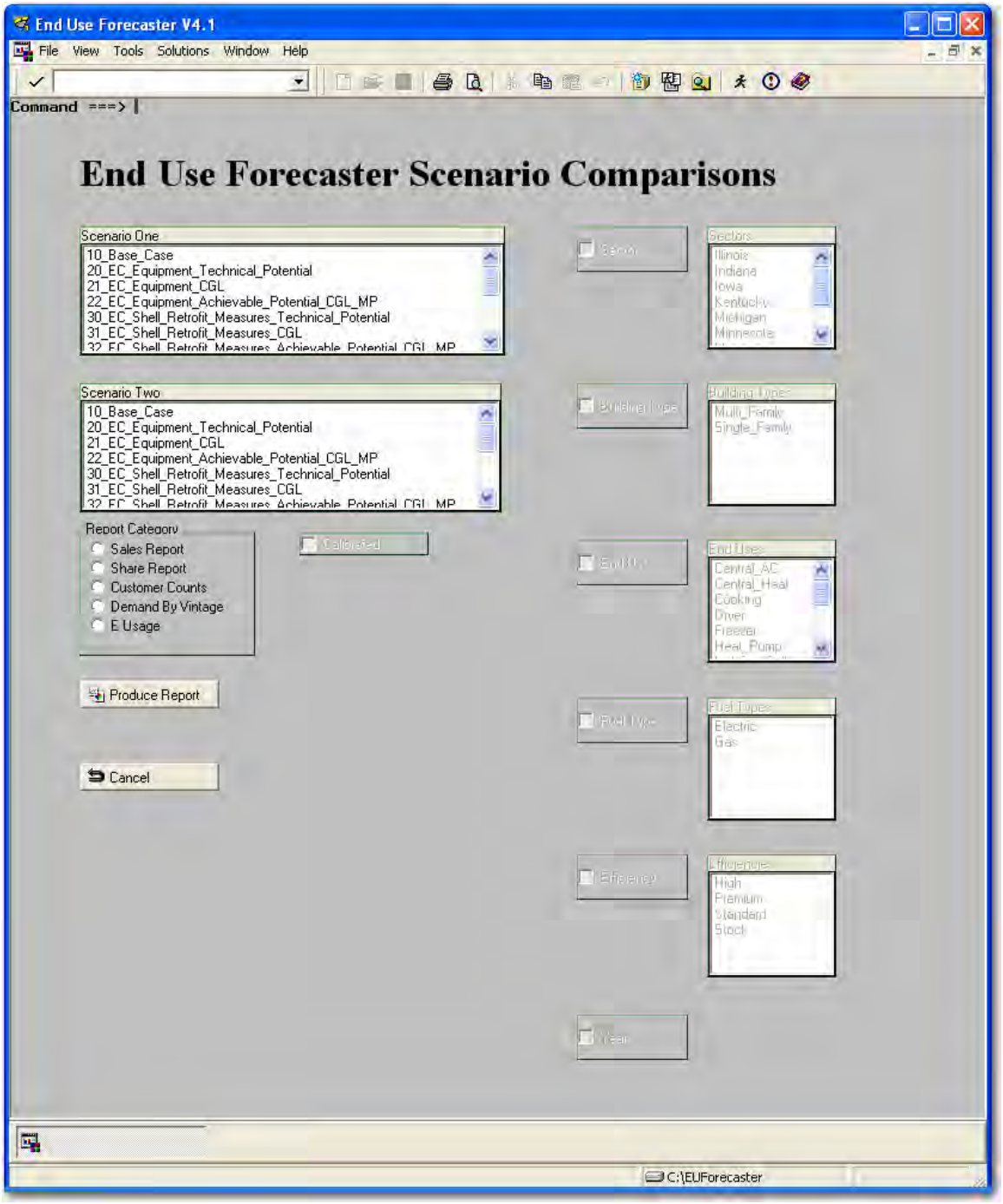
The Forecast Module incorporates all the information compiled from the other modules – Usage, Choice, and Intervention Strategies – related to the overall economic growth of the market segment and equipment lifetime (decay) functions to create the final forecast for a given scenario.

This module produces sales and market share reports that provide quick access to all forecast details. The reports produce forecast outputs in a "flat" matrix format, providing the ability to review the data for reasonability before pronouncing the forecast final.

Reporting: Getting the Projections Out to Decision-Makers

End Use Forecaster also produces reports that can be customized based upon the user's choice of segmentation combinations to analyze. These reports summarize and/or compare forecasts for two forecast scenarios specified by the user in the Scenario Comparison interface, as shown in Figure 4.

Figure 4. Report Customization



The user specifies the Report Category (sales, market share, customer counts or demand by vintage) and, based on the category selected, the user is given the option of selecting different combinations of segments to summarize and/or compare. Additionally, the user is given the option of summarizing the forecast data across all years within the forecast horizon or generating results on a year-by-year basis.

II. Application Structure

A solid understanding of how End Use Forecaster is organized will help users to understand the logic of the model and greatly improve the efficiency with which they use the application. The latest revisions to End Use Forecaster focused almost exclusively on consolidating libraries and datasets to make the model easier to use; the model's logic, repeatedly validated over its history, was left intact. Underlying the updates was an emphasis on consistency in the naming and organization of datasets and variables so as to maximize the intuitiveness of the model. This Chapter describes the model's organization with the intent of helping the user be a more effective modeler.

Hardware and Software

End Use Forecaster is a Windows application developed in PC-SAS. The code and datasets can easily be migrated to other platforms (UNIX, etc.), should the user desire, but the interfaces will not provide the same functionality on other systems. If a user desires a non-PC hardware/software solution, The Cadmus Group, formerly known as Quantec, will work with the SAS Institute to ensure compatibility and develop a customized solution.

Hardware

The minimum recommended hardware configuration slightly exceeds SAS Institute requirements to ensure that forecast simulations can be performed in a timely manner. The vast majority of PCs purchased since 2000 exceed these recommendations:

- Pentium 866 MHZ CPU
- 512 MB RAM
- SVGA compatible color monitor
- 10 GB hard disk drive of free space
- CD-ROM drive (for installation purposed only)

End Use Forecaster's performance (i.e., speed) increases significantly if the system is equipped with more advanced processors (e.g., Pentium III or better), additional RAM (1 GB RAM or more), and additional disk space (for storage).

Software

End Use Forecaster is designed for the Microsoft Windows operating system (compatible with Windows 95 and 98, Windows NT Workstation 4.0, Windows XP, and Windows 2000 Professional). It is currently configured for SAS version 9.1 and version 8.2. Seven SAS software products are required:

- Base SAS

- Full Screen Product (SAS/FSP)
- Econometrics and Time Series (SAS/ETS)
- Statistics (SAS/STAT)
- High-Resolution Graphics (SAS/GRAPH)
- Interactive Data Analysis (SAS/INSIGHT)
- Direct Database Access (SAS/ACCESS)

An additional module, Applications Facility (SAS/AF), is used in developing End Use Forecaster's graphical user interface. These modules are based on a special SAS code subset called SAS Control Language (SCL). This portion of End Use Forecaster is stored (compiled) within the model and does not require user modification.

If any of the required SAS products are missing from the site license, the software can be added for little additional cost. For organizations that do not yet have SAS, The Cadmus Group (Quantec) will be happy to work with the SAS Institute to ensure that you obtain a solution that will allow End Use Forecaster to run smoothly and cost effectively.

Installation of End Use Forecaster is site-specific because it is dependent on the location of SAS on your PCs. However, there is minimal customization. For each user we only need to modify two files in the End Use Forecaster\Config directory: autoexec.sas and EUForecaster.cfg. These files 'point' End Use Forecaster to your SAS installation and take advantage of the hard drive on your computer with the most disk space. These customized files are developed during installation, consistent with the installation of SAS on individual workstations.

Conventions

The majority of the nomenclature in this documentation comes directly from the SAS application in which End Use Forecaster was developed. The various components of SAS and the conventions used in referring to them throughout the documentation are:

- ***SAS libraries***, the logical names that refer to the physical locations where SAS datasets are stored, are referred to using all uppercase letters (CONFIG, MODELCODE, etc.).
- ***SAS code***, which contain the routines for End Use Forecaster's modules, are referred to in normal text using the 'camelBack' syntax with the .sas suffix appended, such as choiceBatch.sas.
- ***SAS datasets*** are referred to using bold-face type using the 'camelBack' syntax, such as **equipmentAge_10**.
- ***SAS variables*** are referred to in italic type using the 'camelBack' syntax, such as *usageEquationStatus*.

End Use Forecaster's modules run user-specified scenarios. To differentiate among these scenarios, scenario-specific datasets have a numeric suffix, such as **priceForecast_10**. In general

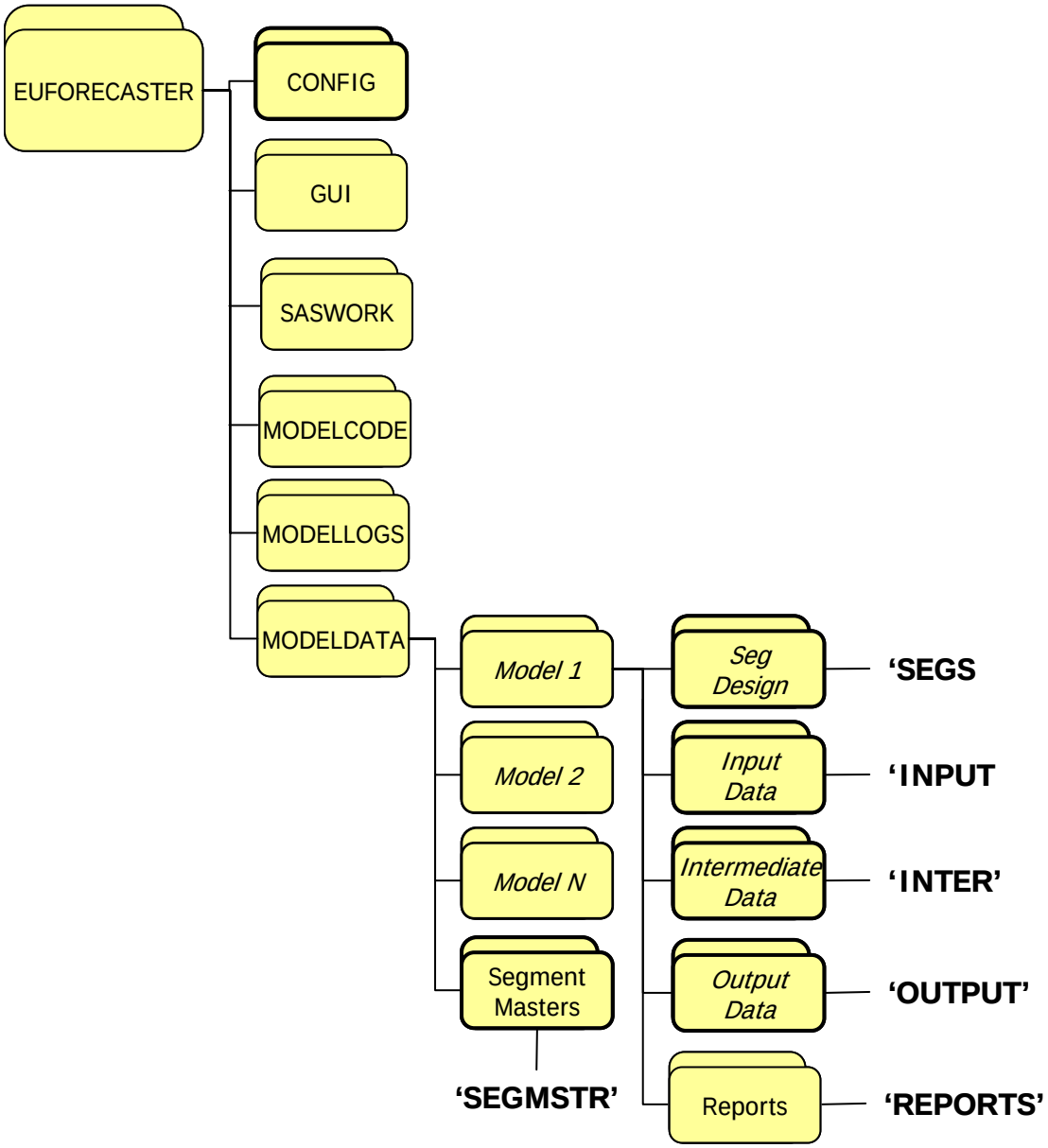
cases, where the documentation does not refer to a specific scenario, datasets are referred to with an **"_xx**" suffix, such as **saturations_xx**.

Model Organization

The logic and theory underlying End Use Forecaster are separated from the data, which vary by individual segmentation design (model). This differentiation drives the structural organization of the model as well, and these two components are stored in different physical locations. The initial organization takes place in the underlying Windows folder structure, which serves as the basis for the SAS libraries that hold both the datasets and catalogs that dictate the model logic and data structure, as well as those datasets specific to individual segmentation designs.

As shown in Figure 5, the folder hierarchy begins with the folder 'EUFORECASTER.' With the exception of the SAS application itself, the entire model – all code, interfaces, and datasets – resides within this folder. Folders with bold outlines represent the physical locations of SAS libraries, the names of which are designated in single quotes. The folders with names in italics – note that they are all within the data folder – represent those libraries that will vary by individual model. The 'MODELDATA' folder will contain individual folders for every model created by a user. Each of these individual model folders will also contain the same set of subfolders as those shown within 'Model 1.' Because these folder serve as SAS libraries, the group of folders that will serve as 'Segs,' 'Input,' etc., will depend on which model the operator happens to be working with in a given session. The data for individual models will not be available at the same time.

Figure 5. End Use Forecaster Folder Structure



This organization can have implications for the user. For example, if a user has a data source that applies to more than one model, the 'MODELCODE' library can serve as a good place to store the raw data to avoid keeping copies in each of the model-specific libraries. Detailed descriptions of these folders and their contents are provided in Table 2.

Table 2. End Use Forecaster Folders

Folder	Full Path	SAS Library	Description
EUFORECASTER	EUFORECASTER	N/A	Root application folder.
GUI	EUFORECASTER\ GUI	App	Folder containing all the underlying application catalogs and GUIs.
MODELLOGS	EUFORECASTER\ MODELLOGS	N/A	Directory where logs of model operations are stored.
MODELCODE	EUFORECASTER\ MODELCODE	N/A	Contains all the SAS code underlying the different End Use Forecaster modules.
CONFIG	EUFORECASTER\ CONFIG	N/A	Contains SAS configuration files in which site-specific modifications are established.
MODELDATA	EUFORECASTER\ MODELDATA	N/A	Contains data for all of the user-created segmentation designs.
"Model_Name"	EUFORECASTER\ MODELDATA \ "Model_Name"	N/A	A folder with all data for a model based on a user-defined name.
SegDesign	EUFORECASTER\ MODELDATA \ "Model_Name" \ segDesign	SEGS	For each model, contains the SAS datasets that establish the specific segmentation design.
InputData	EUFORECASTER \MODELDATA\ "Model_Name"\ inputData	INPUT	For each model, contains all of the user-populated datasets that are necessary to run the different modules.
IntermediateData	EUFORECASTER\ MODELDATA \ "Model_Name"\ intermediateData	INTER	For each model, contains all of the intermediate, model-generated outputs from the usage and choice modules that are necessary to run other modules.
OutputData	EUFORECASTER\ MODELDATA \ "Model_Name"\ outputData	OUTPUT	For each model, contains the various final output sets generated by the forecast module.
Reports	EUFORECASTER\ MODELDATA \ "Model_Name"\ Reports	N/A	Contains the reports and excel files created by End Use Forecaster's Reporting Engine.
SegmentMasters	EUFORECASTER\ MODELDATA \ segmentMasters	SEGMSTR	Contains datasets with all of the necessary variables and structure for every model dataset. A SAS program combines these datasets with a specific segmentation design to generate all the datasets (unpopulated) necessary for a given model.

III. Market Segmentation and Data Entry Modules

End Use Forecaster's Market Segmentation module governs two distinct tasks: 1) the development of customized market segmentation designs; and 2) the population of the model with the necessary data. While the first consists of formal, specific steps, the nature of the second depends on a number of factors, including the complexity of the segmentation design, the format of the various data sources, as even as the technical skills of the operator. This chapter provides extensive detail on the first followed by a brief discussion of issues surrounding the second.

Development of Market Segmentation Design

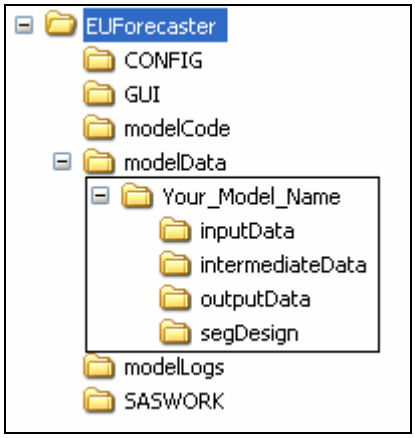
The execution of the first task – creation of a customized market segmentation design – is based on four steps, listed briefly below and then described in greater detail.

1) ***Creation of Model Data Folders*** – Creation of a specific directory structure for each model is necessary to perform subsequent steps.
2) ***Population of the Excel workbook*** **Seg_Design_Template.xls** – A step to define the various segments and their relationship with one another.
3) ***Creation of the Segs Library Datasets*** – This takes the Excel workbook and populates the "segs" library with the necessary segmentation design data sets.
4) ***Expansion of the Segmentation Design*** – This takes the segmentation design data sets in the "segs" library and merges them with the data set templates in the "segmstr" library, expanding them to create all the necessary – but still unpopulated! – data sets to run the basecase ("10") scenario in End Use Forecaster.

Creation of Model Data Folders

A prerequisite to setting up a new model is the creation of the necessary folders to contain the model-specific segmentation design and data. This means that within the c:\EUForecaster\modelData directory, you must have a folder with your model's name and within that folder you must have four folders called "inputData," "intermediateData," "outputData," and "segDesign," as shown in the interior boxed portion of Figure 6 below.

Figure 6. Data Folder Structure



There are multiple ways to create these folders. First, the user can manually create them in Windows Explorer. Alternately, one can copy the folder for an existing model and rename the root data folder to the preferred name, in which case subsequent steps will overwrite the existing datasets for the from model that was copied. Finally, the interface has an option in the Markets Module called "Create Directories for New Model." Selection of this option will prompt the user to enter the name for the new model and End Use Forecaster will create the desired folders.

Population of Seg_Design_Template.xls

The file ***Seg_Design_Template.xls***, a read-only file located in the root directory for End Use Forecaster (generally C:\EUForecaster) is the starting point for creating a custom segmentation design. It is here where you define the levels for the five primary dimensions that must exist in every segmentation design. While the experienced user will be very familiar with these dimensions, they deserve detailed discussion here. Starting at the top of the hierarchy, Dimensions 1 through 3 identify unique market segments. Dimensions 4 and 5 refer to the available product/service suppliers competing in the marketplace and product/service options, respectively. Although the actual use of these dimensions can vary, in and energy model the general use is as follows:

- Dimension 1: geographic region or sector
- Dimension 2: customer segment (home type, business type, or SIC)
- Dimension 3: end use
- Dimension 4: fuel type
- Dimension 5: efficiency level

In all designs, the first three dimensions define the basic market segmentation structure.

Dimension 1 always refers to geography, customer size, customer behavior, customer class, and/or any other features that separate groups of customers. Note that all of the aforementioned

factors can be used within Dimension 1 (e.g., north-residential, north-commercial, south-residential, south-commercial, etc.).

Dimension 2 is reserved for factors that affect a particular group of customers in a similar manner, such as an exogenous rate of economic growth, building lives, or contract lives. In an end-use model, for example, this dimension might include various types of residential (single family, duplexes, multifamily, etc.) and commercial (office buildings, restaurants, hospitals, etc.) customers.

Dimension 3 refers to the products and services being marketed to each customer type, such as heating, cooling, or water heating. In a telecom model, this dimension would refer to basic service, Internet service, custom calling features, etc. As with the second dimension, each third dimension level has an associated physical or contract life. In an end-use energy model, each equipment type has a life span.

Dimensions 4 and 5 describe the product/competitive options within the major market categories that are defined by Dimensions 1 – 3. In an end-use model, fuel types are typically represented as Dimension 4 and various efficiency levels are represented by Dimension 5. In a competitive energy market, the fifth dimension could be used to represent various levels of retail services such as power quality or equipment maintenance offered by a provider.

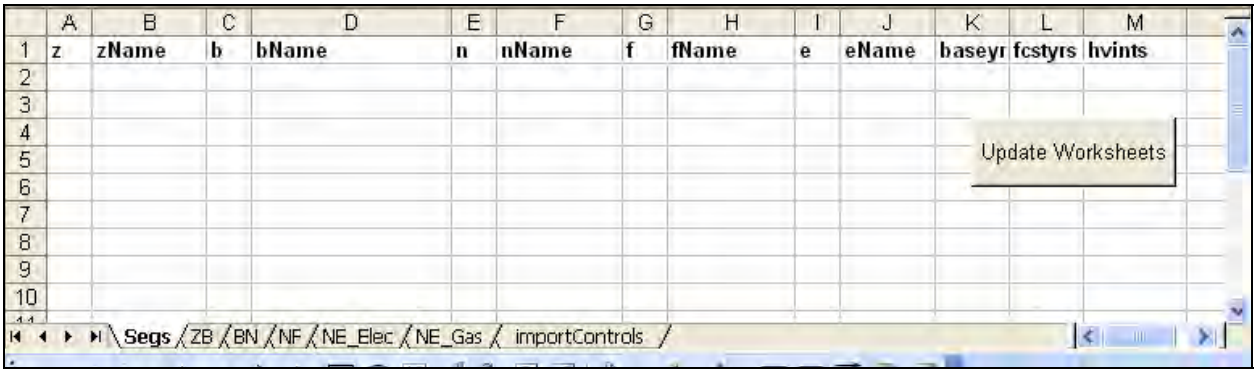
Table 3 summarizes the intended use of each of these dimensions. Note that while the model must include all five dimension, you are not required to use all of them. For example, suppose you want a design with alternative providers at Dimension 4 and do not wish to complicate the model with product/service options. In this case, you would assign only one alternative to Dimension 5, which effectively eliminates this dimension from the analysis. You could assign the same name to the single Dimension 5 alternative as that of the Dimension 4 to signify that in the design, this dimension has essentially been eliminated.

Table 3. End Use Forecaster Dimension Use Summary

Dimension	End Use Forecaster Dimension Name	End Use Forecaster Descriptive Name	End Use Forecaster Function	Special Features	No. Segment Levels in End Use Forecaster
One	z	zName	Factors that separate groups of customers		999
Two	b	bName	Additional factors that separate groups of customers	Building or contract life can be used to allow existing customers to decay over time	999
Three	n	nName	Equipment, products, services potentially purchased by Dimensions 1 – 2	Equipment or contract life can be used to allow existing equipment to decay over time	999
Four	f	fName	Providers of Dimension 3	Provider Choice module forecasts market shares	4
Five	e	eName	Service Options within Dimension 4	Provider Choice module forecasts product option shares	4

Open ***Seg_Design_Template.xls***. Excel will prompt you to either enable or disable macros and ***you will want to enable the macros***. Of the workbooks seven tabs, the first of interest is called "Segs," which is used for the definition of the different dimensions (z, b, n, f, and e) as well as the base year and years in the forecast horizon. That sheet should look like the image below, with no values for any of the dimensions:

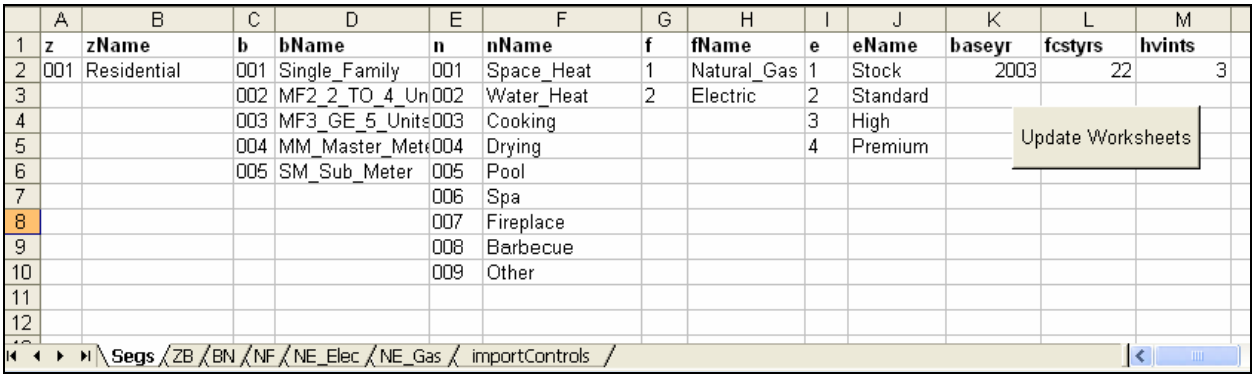
Figure 7. Empty "Segs" Tab in Seg_Design_Template.xls



On this tab, first establish the base year of the forecast, the number of forecast years, and the number of historical vintages in columns K, L, and M below the headers baseyr, fcstyrs, and hvints, respectively. Next, the recommended first step is to fill in the columns for zName, bName, nName, fName, and eName with whatever zones, segments, end uses, fuels, and efficiency levels (or however you want to define the dimensions) that you want to include in the segmentation design. Once you have filled in the desired descriptive names, they then need to have their corresponding model values. ***These format for these is critical***. For z, b, and n the format is three-character numeric values. That is, they are a numeric values from 1 to 999 with leading zeros for all values below 100. In Excel, it is necessary to type an apostrophe (" ' ") prior to entering the value or else Excel will convert the cell to a numeric value and you will lose the leading zeros. For f and e, these are one-character numeric values. That is, they will have value of 1, 2, 3, or 4, but they must be in a character format. Again, a leading apostrophe will tell Excel to make these character. Figure 8 shows a fully populated "Segs" tab.

A Note on Naming Conventions – It is best to restrict the names of the different levels in each dimension used in the segmentation design to valid SAS variable names. According to SAS documentation, these names "can be up to 32 characters long. The first character must be a letter (A, B, C, . . . , Z) or underscore (_). Other characters can be letters, numbers (0, 1, . . . , 9), or underscores. Blanks cannot appear in SAS names, and special characters (for example, $, @, #), except underscores, are not allowed." While it is not an explicit requirement, using these names will greatly facilitate the process of model population because it will allow for the import and manipulation of data using names that need no modification to be applied directly to the model.

Figure 8. Example of Populated "Segs" Tab in Seg_Design_Template.xls



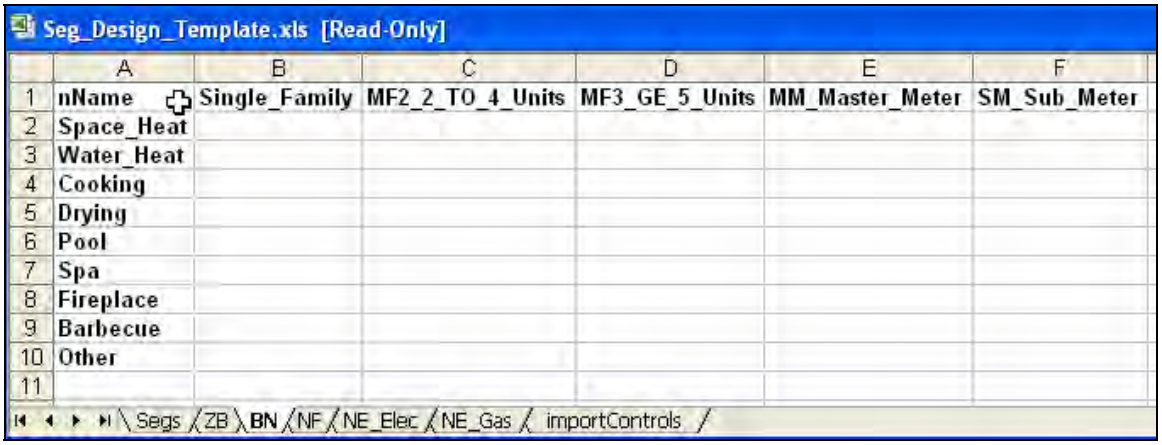
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**z**	**zName**	**b**	**bName**	**n**	**nName**	**f**	**fName**	**e**	**eName**	**baseyr**	**fcstyrs**	**hvints**
2	001	Residential	001	Single_Family	001	Space_Heat	1	Natural_Gas	1	Stock	2003	22	3
3			002	MF2_2_TO_4_Un	002	Water_Heat	2	Electric	2	Standard			
4			003	MF3_GE_5_Units	003	Cooking			3	High			
5			004	MM_Master_Met	004	Drying			4	Premium			
6			005	SM_Sub_Meter	005	Pool							
7					006	Spa							
8					007	Fireplace							
9					008	Barbecue							
10					009	Other							
11													
12													

Update Worksheets

Segs | ZB | BN | NF | NE_Elec | NE_Gas | importControls

Once you have completed the "Segs" tab, selecting the Update Worksheets button will then populate the tabs "ZB," "BN," "NF," "NE_Elec," and "NE_Gas" with the desired segments in the correct format for the user to then fill out. For example, Figure 9 shows the "BN" tab as it will appear after activation of the Update Worksheets button.

Figure 9. Example of Unpopulated "BN" Tab in Seg_Design_Template.xls



Seg_Design_Template.xls [Read-Only]

	A	B	C	D	E	F
1	**nName**	**Single_Family**	**MF2_2_TO_4_Units**	**MF3_GE_5_Units**	**MM_Master_Meter**	**SM_Sub_Meter**
2	**Space_Heat**					
3	**Water_Heat**					
4	**Cooking**					
5	**Drying**					
6	**Pool**					
7	**Spa**					
8	**Fireplace**					
9	**Barbecue**					
10	**Other**					
11						

Segs | ZB | BN | NF | NE_Elec | NE_Gas | importControls

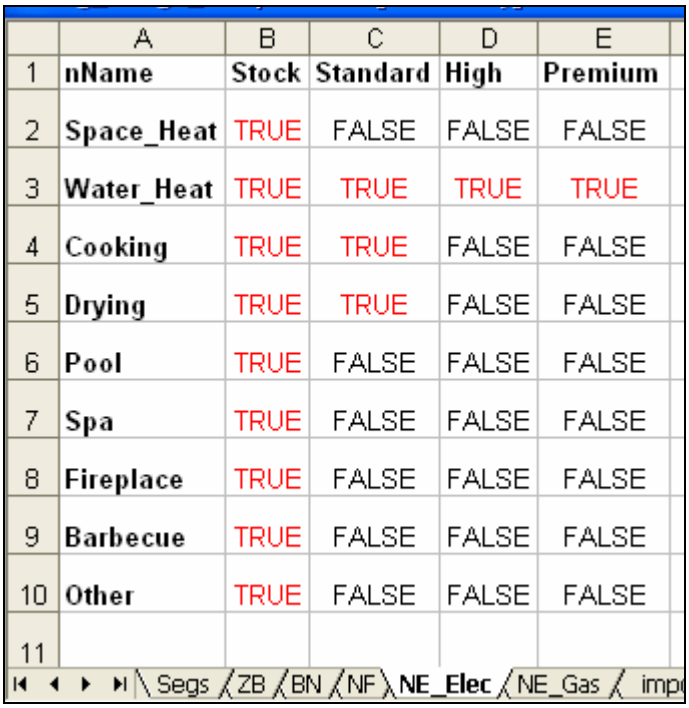
Again, the segmentation is hierarchical. The purpose of the newly-populated tabs ("ZB," "BN," "NF," "NE_Elec," and "NE_Gas") is to allow the specification of which dimensions belong together – starting at the top of the hierarchy and moving down – in the segmentation design. For example, with the ZB tab, the purpose might be to define which building belong in each geographic area. The key here is that the design need not be symmetrical. You might have Z represent two geographic areas, one extremely urban that would not have manufactured housing and rural that would need this home type.

The population of these tabs is based on filling the relevant cells with "TRUE" or "FALSE," with the former indicating where the dimensional relationship should exist in the segmentation design. The relationships defined in these tabs is as follows:

- **ZB –** Define which levels of the second (b) dimension belong in each level of the first (z) dimension.
- **BN –** Define which levels of the third (n) dimension belong in each level of the second (b) dimension.
- **NF –** Define which levels of the fourth (f) dimension belong in each level of the third (n) dimension.
- **NE_Elec –** Define which levels of the fifth (e) dimension belong in each level of the third (n) dimension for the electric fuel type.
- **NE_Gas –** Define which levels of the fifth (e) dimension belong in each level of the third (n) dimension for the gas fuel type.

Figure 10 presents a fully-populated "NE_Elec" tab. Note the pattern of "TRUE" and "FALSE" indicating which of the efficiency levels apply to the different end uses.

Figure 10. Example of Populated "NE_Elec" Tab in Seg_Design_Template.xls



	A	B	C	D	E
1	nName	Stock	Standard	High	Premium
2	Space_Heat	TRUE	FALSE	FALSE	FALSE
3	Water_Heat	TRUE	TRUE	TRUE	TRUE
4	Cooking	TRUE	TRUE	FALSE	FALSE
5	Drying	TRUE	TRUE	FALSE	FALSE
6	Pool	TRUE	FALSE	FALSE	FALSE
7	Spa	TRUE	FALSE	FALSE	FALSE
8	Fireplace	TRUE	FALSE	FALSE	FALSE
9	Barbecue	TRUE	FALSE	FALSE	FALSE
10	Other	TRUE	FALSE	FALSE	FALSE
11					

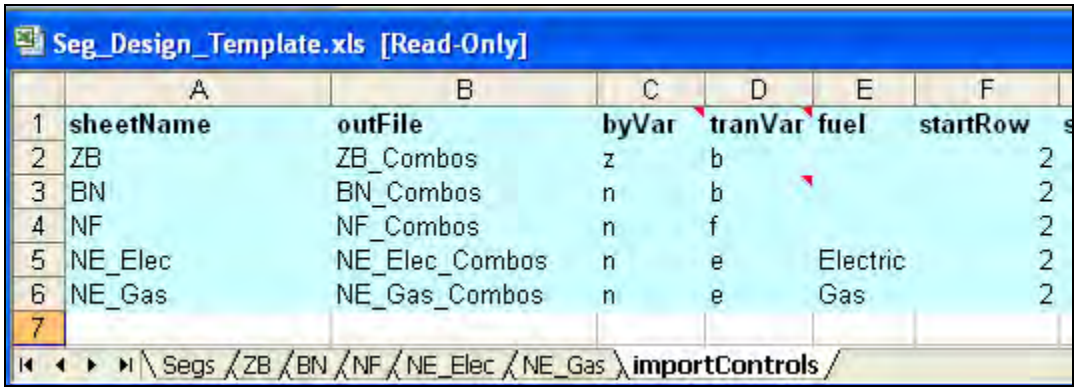
Segs | ZB | BN | NF | NE_Elec | NE_Gas | impo

Note that in filling in all of these sheets, make every effort to keep the data "clean." That is, there can be no data in adjoining rows or columns that is extraneous to the segmentation design. If there has been any work done in cells, it might be best to delete all the rows to the right of the last relevant column and all the rows below the last relevant row.

Finally, the last tab - importControls – tells SAS in the next step how to bring in the data contained on various tabs in the segmentation design workbook. Other than two cells, this entire workbook will populated itself dynamically based on the other tabs. Those two cells are E5 and

E6 – shown in Figure 11 with the values "Electric" and "Gas," respectively – and the values the contain must be identical to whatever you have specified on the original "Segs" tab. That is, if you've called your fuels "Electricity" and "Natural Gas," the values in those cells must be identical.

Figure 11. A portion of the importControls Tab in Seg_Design_Template.xls



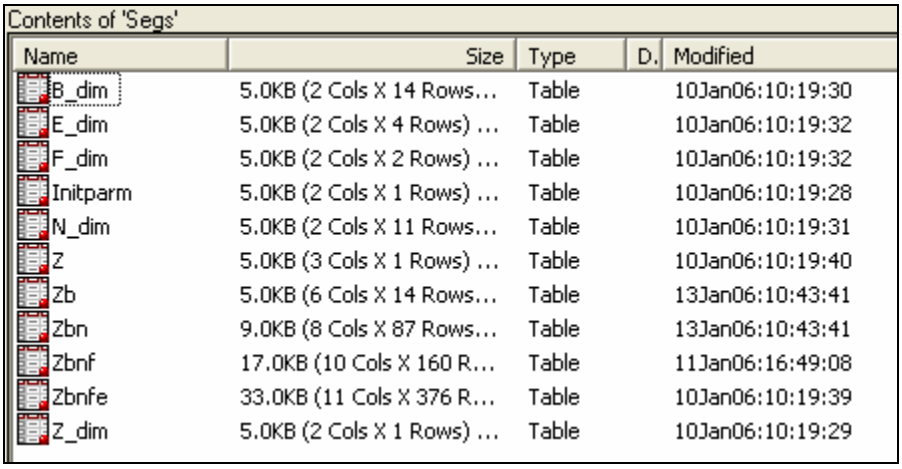
	A	B	C	D	E	F
1	**sheetName**	**outFile**	**byVar**	**tranVar**	**fuel**	**startRow**
2	ZB	ZB_Combos	z	b		2
3	BN	BN_Combos	n	b		2
4	NF	NF_Combos	n	f		2
5	NE_Elec	NE_Elec_Combos	n	e	Electric	2
6	NE_Gas	NE_Gas_Combos	n	e	Gas	2
7						

Once you are done populating Seg_Design_Template.xls, you will have to save the workbook with a very specific name in the data folder for the model under creation (C:\EUForecaster\modelData*yourModelname*). That name must be whatever your model name is with "_Segments" appended at the end. For example, if you've created the a model for small commercial customers for a utililty's end-use model, you might call the model "Small_Com." Accordingly, you'd save the workbook as "Small_Com_Segments.xls." Again, the file is read-only, so it will prompt you to save it under another name should you try to save it normally.

Creation of the Segs Library Datasets

After completing the Seg_Design_Template.xls and workbook and saving it under another name, the next step is convert this information into the various Segs library datasets. To do this, under the Market Module on the main dashboard, select the "Create 'Segs' Datasets from Excel" option. The interface will prompt you to say 'OK' or to cancel. If you are confident in your segmentation design, select 'OK." To check that this code has run correctly, you should see the all of the segmentation design datasets in the "Segs" library, as shown in Figure 12, and they should all have a modified date reflecting the time when the code was submitted.

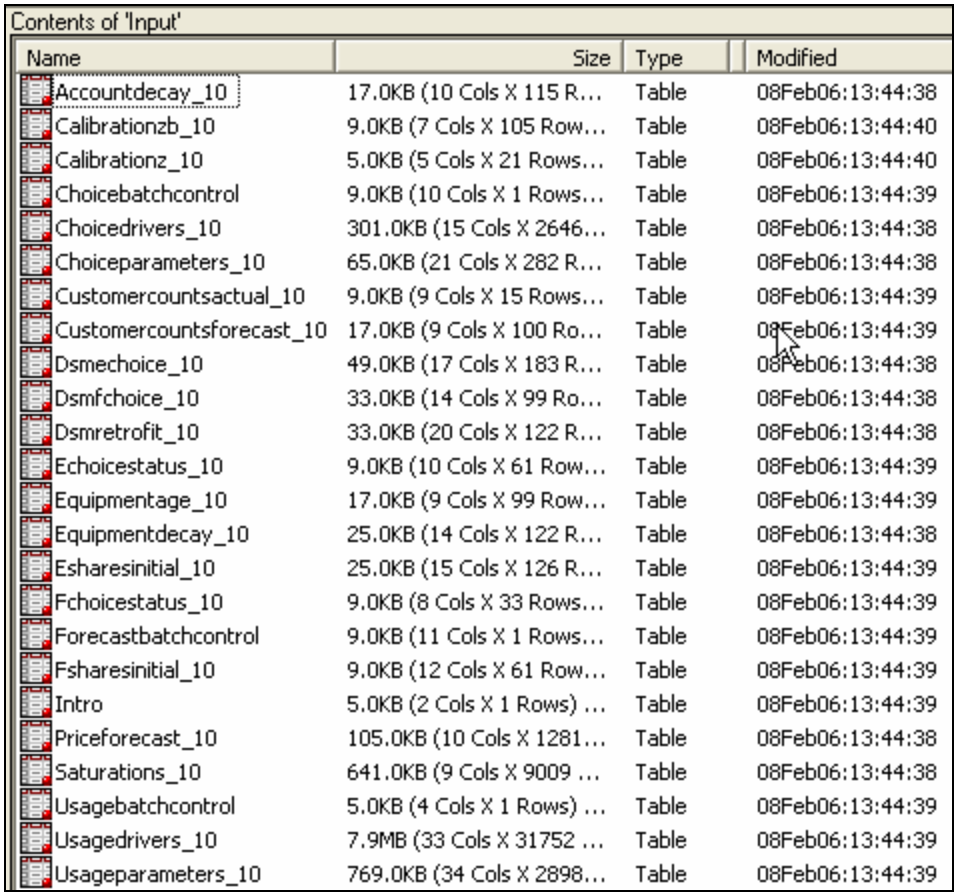
Figure 12. Contents of Segs Library



Expansion on the Segmentation Design

Once the Segs library is populated with the desired segmentation design, the next step is to expand the Segs library datasets to create all of datasets necessary to run the model. Select "Expand 'Segs' Datasets" under the Markets Module on the main dashboard and say 'OK." Once this code has run, you should be able to look in the "Input" library and see datasets it has created, as shown in Figure 13.

Figure 13. Contents of the Input Library



Note that this step will often be used more than once, as it also serves as a means of "refreshing" the model. Throughout the process of populating the model, any number of operator error-based issues can corrupt the structure of these input data sets, which will lead to questionable results during operation of the model. For example, necessary rows might be lost during an incorrect merge or a typo will lead to an incorrect variable name. When this happens, the easiest to way to recover is to perform this step, which will re-create all the datasets in the required structure.

Model Population

Once the starting datasets in the Input library have been created, you must enter data into the SAS datasets that were automatically created by building the segment master. Table 4 shows all the datasets that are created in the INPUT library and the module with which they are associated. The table also provides a brief outline of the information to be entered in each dataset with more detailed information provided in subsequent chapters.

Table 4. Starting Datasets in INPUT Library

Module	Dataset	Contents
Usage	usageBatchControl	See Batch Control Usage below
Usage	usageDrivers_10	Equipment usage equation forecast drivers
Usage	usageParameters_10	Coefficients describing how usage varies by weather, customer characteristics, prices, and other variables
Choice	choiceBatchControl	See Batch Control Usage below
Choice	choiceDrivers_10	Choice forecast drivers, including capital costs for equipment in existing, conversion, and new construction buildings, plus future availability of each equipment type
Choice	choiceParameters_10	Provider Choice function initialization parameters for Dimension 4 and 5 purchase choices
Choice	eChoiceStatus_10	A status variable that tells the Choice Module how to model shares for Dimension 5. Set this variable to "1" to hold the initial market shares constant over the forecast horizon.
Choice	eSharesInitial_10	Average and marginal market shares for existing, conversion, and new customers for Dimension 5
Choice	fChoiceStatus_10	A status variable that tells the Choice Module how to model shares for Dimension 4. Set this variable to "1" to hold the initial market shares constant over the forecast horizon.
Choice	fSharesInitial_10	Average and marginal market shares for existing, conversion, and new customers for Dimension 4
Choice	priceForecast_10	Fuel, product, or service price forecasts in native units (e.g., therms, kWh, gallons, cubic meters)
Forecast	ForecastBatchControl	See Batch Control Usage below
Forecast	accountDecay_10	Decay functional form indicator and parameters for existing, conversion, and new accounts
Forecast	customerCountsActual_10	Number of existing accounts, non-accounts on main, and non-accounts off main
Forecast	customerCountsForecast_10	Forecast of new construction (economic activity driving demand), capture rates, units per account, and number of units (i.e., units are a scale of measurement consistent with results of the usage forecast, such as buildings, square footage, apartments, etc.)
Forecast	equipmentAge_10	Mean age of end uses by historical vintage in the baseline (i.e., 0th) year of the forecast, used to initialize the age dimension in the turnover/vintage module
Forecast	equipmentDecay_10	Decay functional form indicator and parameters for equipment (end-uses) in existing, conversion, and new buildings
Forecast	saturations_10	Saturation (percentage of accounts that have the equipment) independent of fourth dimension market shares
N/A	calibrationZ_10	Total actual sales in base year for Dimension 1
N/A	calibrationZB_10	Total actual sales in base year for Dimension 2
Intervention Strategies	dsmEChoice_10	Exogenous parameters that change Dimension 5 market shares for existing, conversion, and/or new customers through 'what if' intervention strategies
Intervention Strategies	dsmFChoice_10	Exogenous parameters that change Dimension 4 market shares for existing, conversion, and/or new customers through 'what if'' intervention strategies
Intervention Strategies	dsmRetrofit_10	Exogenous parameters that adjust product usage through 'what if' convention strategies

The method for populating these datasets, however, depends on the interaction of several factors. If the operators SAS skills are limited and the overall segmentation design is simple enough that that datasets do not exceed Excel's row limits, the data can be exported, populated manually, and then re-imported. If the data that will go into the model already exist in an electronic format and the operator has SAS skills that cover basic merges and data manipulation, the datasets can be populated via SAS code. Another option is to create data entry templates that conform to the format of the various data sources that will then be imported into SAS, manipulated to take on the correct format for the model, and then used to populate the datasets via SAS code. The final and best solution will often be a combination of multiple methods.

Batch Control Usage

The INPUT library includes three "batch processing" datasets that describe how various datasets (input scenarios, or the "**_xx**" suffix) are jointly processed within End Use Forecaster forecast output scenarios. These datasets are:

- **usageBatchControl**: selects input scenarios for each set of input files for forecasting equipment purchase choices
- **choiceBatchControl**: "packages" sets of expected market shares as a result of customer service programs with those segments that are unaffected by these activities into one cohesive group
- **forecastBatchControl**: combines chosen product usage equations, usage drivers, and historical vintage adjustment scenarios

End Use Forecaster automatically creates the base case scenario, denoted by "_10," for each of these datasets. Additional scenarios can be designated in each batch dataset by:

- Adding a new row worksheet in each dataset through SAS/FSP and changing the relevant scenario indicators
- Writing SAS code to create the datasets with the desired scenario inputs
- Managing the batch controls in an Excel workbook and importing them via SAS

Batch processing datasets allow the user to specify all the input datasets for a given scenario. The strength of this approach is that it allows the analyst to mix and match datasets from different scenarios, which avoids having to keep identical datasets for different scenarios. Figure 14 presents a hypothetical **choiceBatchControl** dataset. In the example, the user has set up three different scenarios (10, 20, and 30), which pull mostly the same datasets, with a couple of exceptions. First, Scenario 20 pulls an alternate price forecast, ostensibly one with high gas prices. Second, Scenario 30 utilizes the price forecast produced for Scenario 20 and also pulls in an alternate usage forecast.

Figure 14. Example choiceBatchControl Dataset

scenario	choiceDrivers	priceForecast	choiceParameters	usageAnnual	eSharesInitial	fSharesInitial	eChoiceStatus	fChoiceStatus	scenarioName
10	10	10	10	10	10	10	10	10	Base Case
20	10	20	10	10	10	10	10	10	High Gas Price Forecast
30	10	20	10	30	10	10	10	10	Low Usage

Scenario 20 pulls a different price scenario.

Scenario 30 pulls different usage and price forecasts, but utilizes the same dataset used for Scenario20.

IV. Product Usage Module

End Use Forecaster tracks consumption of resources (natural gas, electricity, etc.) through the Product Usage module. The module provides a forecast of the predicted consumption by combining (1) a monthly forecast of consumption factors or drivers (i.e., independent or exogenous variables), stored in the SAS dataset **usageDrivers_xx**, and (2) a set of coefficients associated with each exogenous variable, stored in **usageParameters_xx**.

The Product Usage module merges the **usageParameters_xx** dataset with the usage forecast drivers (**usageDrivers_xx**) and sums the results over all variables in order to obtain usage forecasts at the unit level (e.g., per customer, per square foot). The results then become inputs into the Provider Choice and Forecast modules.

If the *usageEquationStatus* variable in **usageParameters_xx** equals 1, usage is a linear combination of the coefficients and forecast drivers:

(1) $$usageMonthly\_xx_m = \Sigma_c\ usageParameters\_xx_c * usageDrivers\_xx_{cm}$$

where:

- **usageParameters_xx** $_c$ = usage coefficients c, where the default has 21 slots (B0 through B20)
- **usageDrivers_xx** $_{cm}$ is the monthly forecast (m) of each forecast driver (independent variable) associated with coefficient c (X0 through X20)

If *usageEquationStatus* is set equal to 2, then the Product Usage Module assigns a log-log function:

(2) $$usageMonthly\_xx_m = exp(\Sigma_c\ usageParameters\_xx_c * log(usageDrivers\_xx_{cm}))$$

The default structure is a linear model with *usageEquationStatus* equal to 1.[2]

The final step in this module is to aggregate usage to an annual figure (usageAnnual_xx). Both monthly and annual forecasts for a given scenario are stored in the INTER library.

The **usageBatchControl** dataset in the INPUT library has the following variables that define the input datasets associated with each output scenario:

- *scenario*: The Product Usage module output scenario
- *usageParameters*: The input scenario associated with the product usage equations (**usageParameters_xx**)

[2] As discussed further below under Calibration, End Use Forecaster's automatic sales calibration routine is designed to work with the linear model where *usageEquationStatus* is set equal to 1. Calibration routines for more complex usage equation structures defined by the log-log or other status indicators (3, 4, etc.) can be developed by The Cadmus Group (Quantec) on request.

- *usageDrivers*: The input scenario associated with the product usage drivers (**usageDrivers_xx**)

Figure 15 shows the program flow, including input and output datasets. Table 5 describes the data sets and their key attributes in more detail.

Figure 15. Product Usage Module Program Flow for "usageBatch.sas"

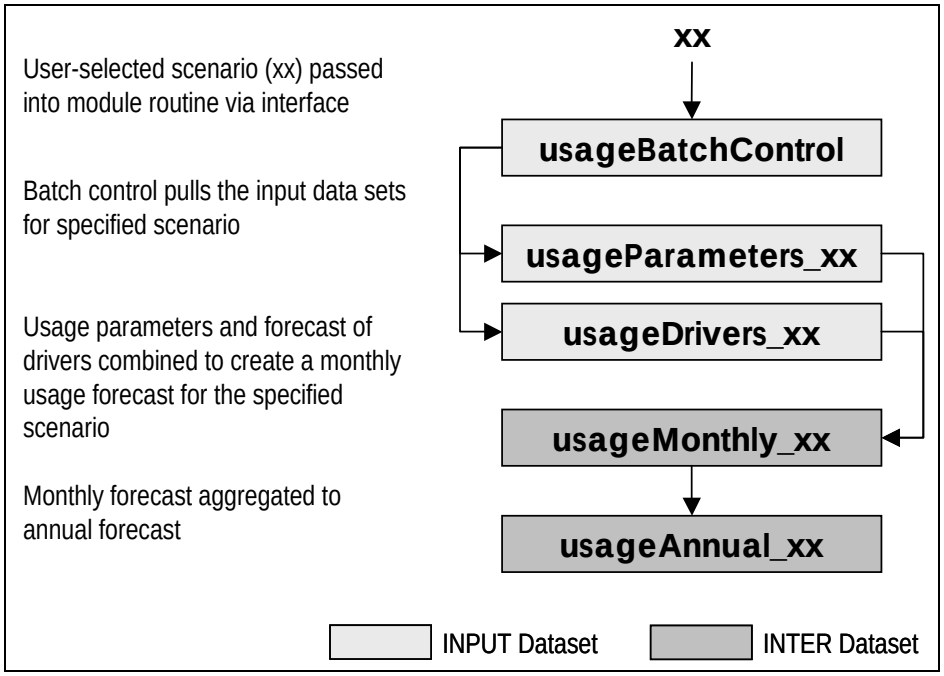


Table 5. Product Usage Module Data Library

Library	Dataset	Description	File/Record Dimensions	Variables/Attributes
INPUT	usageBatchControls	Usage forecast input scenarios	1 record per Output scenario	Usage equation input scenario, forecast driver input scenario, vintage adjustment input scenario, output scenario
INPUT	UsageParameters_xx	Usage forecast equation parameters	Dimensions 1, 2, 3, 4, 5, and vintage	Usage equation parameters B0 through B0 for input scenario Sxx
INPUT	usageDrivers_xx	Usage forecast drivers	Dimensions 1, 2, 3, 4, and 5, year, month	Usage forecast drivers X0 through X0 for input scenario Sxx

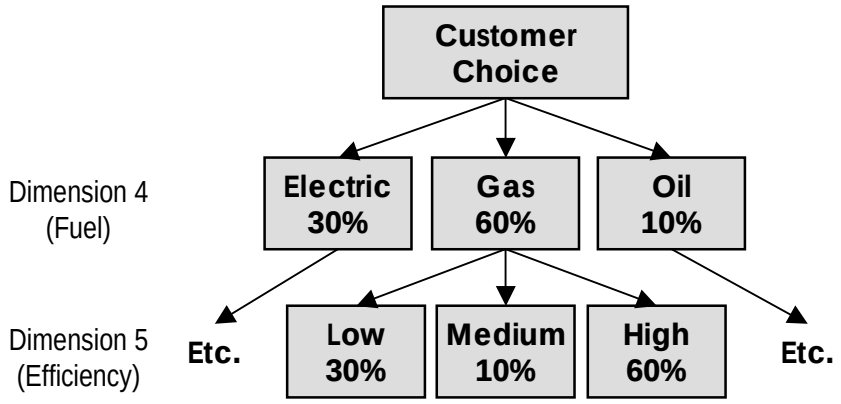
V. Provider Choice Module

The Provider Choice module analyzes customer choice decisions among competitors and product options. For example, customers choose their end-use equipment from various fuel types and efficiency levels. Purchase decisions are represented by a nested structure of provider (fuel) and product (efficiency) option choices.

The nested structure of the Provider Choice module is illustrated in Figure 16 below. This figure represents fourth and fifth dimension choices. The customer in this example faces a choice of gas vs. electricity vs. oil at the fourth dimension, and low vs. medium vs. high efficiency at the fifth dimension. Analysts often think of this problem as "efficiency choice conditional on fuel choice," hence the downward arrows in the figure. But customer choice theory and the Provider Choice Module actually work in the opposite direction, with the fourth dimension conditional upon fifth dimension choices. In reality, the customer makes a simultaneous choice across these dimensions, and the model structure shown in Figure 16 is just a convenient way of modeling this behavior.

The Provider Choice module first estimates the fifth dimension (efficiency) parameters and forecasts its market shares. The model then calculates the weighted average operating and capital costs for each fourth dimension (fuel) alternative, estimates the choice equation coefficients, and then produces a forecast for the fourth dimension.

Figure 16. Provider Choice Module Example



Note that the structure of the tree need not be symmetric. For example, single fuel energy companies and water utilities may want to focus on multiple efficiency levels for customers using their products. A single efficiency level can be specified for the remaining fuels.

The application of choice coefficients and forecast drivers form a discrete choice-type model that is applied to individual customer data. These models are analogous to regression models for equipment usage. The estimated discrete choice model parameters describe how equipment costs, operating costs, equipment characteristics, and customer characteristics affect equipment

choices. For each choice level there are capital and operating cost parameters (called betas) and alternative-specific intercepts (called alphas).

The alphas and betas are developed through one or more of the available Provider Choice algorithms in End Use Forecaster:

1. Using individual customer level survey and equipment usage data, discrete choice models consistent with the segmentation design are estimated. Note that like usage equation modeling, this estimation is conducted outside of End Use Forecaster, but may be conducted using the same SAS procedures as those used by End Use Forecaster.
2. If individual customer data are not available for discrete choice modeling, End Use Forecaster can use aggregate market data to simulate a simple choice model from equipment capital costs and operating costs.
3. If individual customer data are not available for discrete choice modeling, End Use Forecaster can calculated use apply approximate, solutions calculated using Mathematica. [Note: this feature is not currently available, but will be added by May 2006]

These alternatives are summarized in Table 6.

Table 6. Provider Choice Equation Status Variable Definitions

Status Variable	Description	Beta Parameters	Alpha (Intercept) Parameters	Potential Applicability to Choice Model
1	Exogenous Market Shares Specified	N/A	N/A	Yes
2	Logit: estimated	Estimated Outside End Use Forecaster	Estimated Outside End Use Forecaster	Yes
3	Logit: estimated	Estimated	Starting values: to be calibrated	Yes
4	Logit: simulated	Starting values: to be estimated & calibrated	Starting values: to be estimated & calibrated	Yes
5	Logit: calculated	Calculated	Calculated	Yes

Model Parameterization

Estimation Mode (Status 2 and 3)

Customer choice parameters can be estimated when sufficient micro-level customer choice data are available to estimate regression coefficients for actual consumer decisions. The Cadmux Group (Quantec**)** customizes and estimates choice equations for companies who request this approach or uses choice model parameters from previous research conduct by the company.

The choice equation status variables are set equal to 2 or 3 if this approach is used. If status equals 2, all parameters have been estimated outside the model, and no further calibration is necessary. If status equals 3, a logit functional form has been used to estimate operating and

capital cost parameters and the model is being calibrated to base year market shares by adjusting the intercept terms.

Simulation Mode (Status 4)

The simulation of consumer choice is useful when customer-level data are not available. Most users of End Use Forecaster find themselves in this position before they can conduct primary market research. In simulation mode, this module estimates parameters of the choice function based on available data for:

- Operating and capital costs
- Marginal (most recent) equipment market shares
- Customer discount rates
- An estimate of the proportion of customer preferences or "utility" that is related to non-price factors

Provider Choice module coefficients are developed by solving a system of equations within the SAS Model procedure.

Exogenous Mode (Status 1)

If neither micro-level customer choice data nor aggregate data are available, or if poor data quality prevents choice equations from being estimated (simulated), the status variable can be set equal to 1 in order to bypass the Provider Choice Module. In such a cases, market shares are set equal to the values in **fSharesInitial_xx** and **eSharesInitial_xx**.

Forecasting

The Provider Choice model produces forecasts over the planning horizon by applying a forecast of equipment capital costs, equipment energy consumption (from the Product Usage module), and fuel price forecasts to the estimated (simulated) choice parameters.

If modes 2 through 4 are used, these variables will affect market shares over the forecast horizon. If the exogenous mode (status 1) is used, market shares are held constant at their base year values over the forecasting horizon. Exogenous forecasts can also be modified via alternative market share forecast scenarios that are specified in the Intervention Strategies module (see Chapter VI).

Market Availability

End Use Forecaster can adjust forecasted efficiency market shares to reflect changes in regulations by removing the market availability of specified alternatives in the future. In this adjustment procedure, End Use Forecaster shifts any market shares designated for efficiency alternatives to be removed from the market to the remaining alternatives, proportional to their *a priori* market shares. This approach to market availability can also be adapted to situations where

an efficiency level has become obsolescent in the market, such as the market availability of alternatives of superior consumer value at lower cost.

End Use Forecaster includes a variable called *available* that is entered in the **choiceDrivers_xx** dataset. *Available* is equal to 1 when the configuration is available on the market and zero when it is no longer available. When the choice model finds an unavailable configuration, it will reassign that configuration's shares (at the efficiency level) to the remaining configurations.

Provider Choice Module Analysis and Data Flow

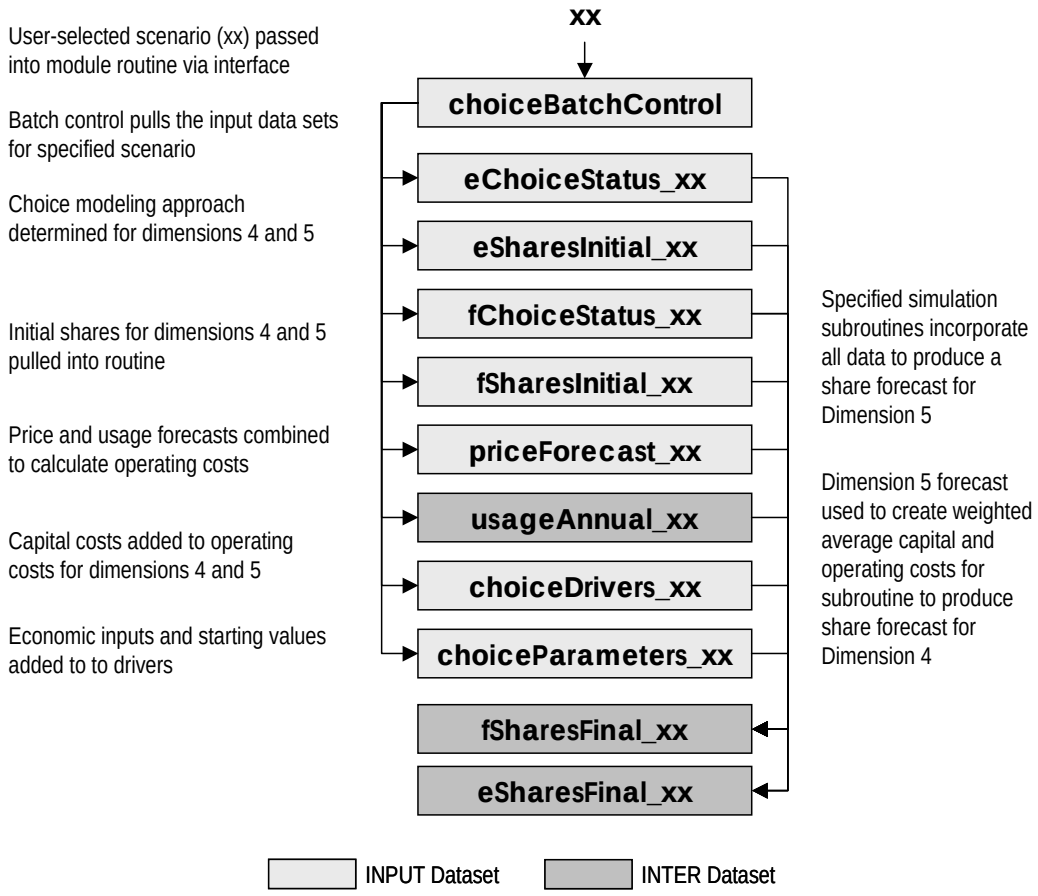
Figure 17 shows the data and analysis flow through the Provider Choice Module.

The dataset **choiceBatchControl** in the input library describes any scenario in terms of the following:

- Equipment capital costs and future availability (**choiceDrivers_xx**)
- Initial simulation (or estimation) parameters (**choiceParameters_xx**)
- Forecasted energy prices (**priceForecast_xx**)
- Product Usage output forecast scenario (**usageAnnual_xx**)
- Initial base-year efficiency (dimension 5) shares (**eSharesInitial_xx**)
- Initial base-year fuel (dimension 4) shares (**fSharesInitial_xx**)
- Indicator for efficiency (dimension 5) choice simulation (**eChoiceStatus_xx**)
- Indicator for fuel (dimension 4) choice simulation (**fChoiceStatus_xx**)

The simulation subroutines in choiceBatch.sas calibrate Provider Choice module coefficients to the baseline market shares in **fSharesInitial_xx** and **eSharesInitial_xx**. The program derives a simultaneous solution for all the qualitative choice coefficients using PROC MODEL from SAS/ETS. The first step in this subroutine is to integrate usage module information (consumption per configuration) with forecasted prices per unit of use to generate forecasted operating costs. Along with forecasted capital costs and other variables used in the qualitative choice models, this information serves as the forecast dataset for choice for each market segment. End Use Forecaster's default choice structure considers up to four alternatives at each level of the nest. The Cadmus Group (Quantec) can customize and modify the code if more than four alternatives are needed.

Figure 17. Provider Choice Module Program Flow for "choiceBatch.sas"



Initial Values

The initial value datasets from **choiceParameters_xx** are merged with the other datasets described above. Initial values and other parameters include:

- Equipment life
- Customer discount rate
- Share of customer preferences ("utility") associated with non-price attributes
- Initial values for alternative-specific constants and model coefficients

In some cases, the subroutine can be sensitive to the initial values, particularly for capital and operating cost coefficients. This problem can generally be mitigated by using initial values that are very small numbers, such as $1E^{-8}$.

Single-Alternative Choices

Choice estimation is not required for one-alternative situations; the choice forecasting routine assigns a 100% market share to these single alternative situations in the choice nest.

Confirming Calibration Results (Status 3 or 4)

A final step in the choice calibration process is to confirm that all equation coefficients have been solved correctly and that the coefficient values are reasonable. The nature of "solving" each choice equation for the appropriate coefficients requires an iterative process, where PROC MODEL begins with user-specified starting values of each coefficient and iterates toward a solution based on the input assumptions.

If the coefficient starting values are inappropriate, the calibration process may not reach a solution or it may reach one that is not in an economically feasible region. For example, starting values of coefficients need to be sufficiently low, such that, when they are multiplied by the independent variables, the result is not "out of the ballpark." Additionally, if the relative comparison of operating costs and capital costs are contrary to the user-specified discount rate, the calibration routine may find a solution where one of the coefficients may be positive (i.e., indicating that as costs rise, so do purchases, which is a clearly non-economic decision).

To check calibration results:

Certain files require inspecting as part of the forecasting process. Missing values in these forecasted market shares indicate a calibration problem.

- Look for the problem segment(s) in the EUFORECASTER\MODELLOGS directory. The choiceBatch.log file will let you know whether the model was ever "in the ballpark" by noting at what point in the solution-seeking process the SAS/ETS MODEL procedure failed.
- If there is a problem with the scale of a variable, the model will fail at iteration zero and the "hill climbing" optimization never begins.
- If the model fails during subsequent iterations, a systematic change in the initial parameters in **choiceDrivers_xx** is recommended until convergence is achieved. Using the final parameter values from another, similar, segment can help in the calibration process.

Table 7 summarizes the Provider Choice Module along with a description of the data and libraries.

Table 7. Provider Choice Module Data Libraries and Files

Library	Dataset	Description
INPUT	choiceBatchControl	Choice parameter input scenario, choice forecast driver input scenario, fuel price input scenario, output scenario
INPUT	choiceDrivers_xx	Capital cost equipment replacement, capital cost equipment conversion, capital cost new construction equipment, availability
INPUT	priceForecast_xx	Price forecast
INPUT	choiceParameters_xx	Description, NumAlternatives, Lifetime, Discount Rate, PriceShare, Alpha, A1-A4, B1-B2
INTER	usageAnnual_xx	Usage forecast
INPUT	eSharesInitial_xx	Dimension 5 base year average stock share, base year marginal share existing/replacement, base year marginal share conversion, base year marginal share new construction
INPUT	fSharesInitial_xx	Dimension 4 base year average stock share, base year marginal share existing/replacement, base year marginal share conversion, base year marginal share new construction
INPUT	fChoiceStatus_xx	Indicator for method of estimation/simulation for dimension 4 (fuel).
INPUT	eChoiceStatus_xx	Indicator for method of estimation/simulation for dimension 5 (efficiency)
INTER	fSharesFinal_xx	Shares forecast for dimension 4 (fuel) for existing, conversion, and new customers
INTER	eSharesFinal_xx	Shares forecast for dimension 5 (efficiency) for existing, conversion, and new customers

VI. Intervention Strategies Module

The Intervention Strategies module is intended to capture the impacts of a customer rebate or marketing program. These strategies are modeled as "what-if" scenarios. Depending upon the design of the service or program, these impacts combine specified market acceptance patterns with equipment characteristics to estimate impacts on forecasted choices and per-unit usage.

Substitution Programs

Provider (fuel) substitution strategies encourage consumers to purchase equipment from one provider over other providers. For existing equipment, this change can be done either immediately (early replacement) or at the point of existing equipment retirement (normal replacement). The **dsmFChoice_xx** dataset in the input directory controls how a market intervention will affect shares for a given scenario. The inputs in this dataset, summarized in Table 8, vary by the first, second, and third dimensions and can apply differently to existing, conversion, and new customers.

Table 8. Provider (Fuel) Substitution Program Drivers

Variable	Description	Minimum Value	Maximum Value
yearIntroduced	Year of program introduction activity	1	Last year of forecast horizon
programLife	Duration of program (years)	1	Years in forecast horizon
adoptionPath	Years to Full Adoption	1	7
applicability	Percent of customers to which the program applies	0*	1
marketShare	Percent of market share (%)	0*	1
earlyReplacement	Binary flag for whether early adoption applies to program	0	1
description	Program Description	{text}	{text}

* A zero value implies that the program will have no market impact, so the smallest practical value is 0.01 (1%).

** Early adoption applies to existing buildings only. A value of 1 implies that all applicable consumers (applicability * market share * adoption path %) switch immediately, whether or not the equipment fails. A zero implies that all adoption follows the normal equipment and/or building retirement schedule.

Equipment Efficiency Programs

Product (efficiency) option strategies encourage consumers to purchase a particular option (e.g., equipment with a certain efficiency rating). Either early or normal replacement may apply to existing equipment. Table 9 presents the drivers of purchasing programs and their usage.

Table 9. Product (Efficiency) Program Drivers

Variable	Description	Minimum Value	Maximum Value
yearIntroduced	Year of program introduction activity	1	Last year of forecast horizon
programLife	Duration of program (years)	1	Years in forecast horizon
adoptionPath	Years to Full Adoption	1	7
applicability	Percent of customers to which the program applies	0*	1
eLevel	Efficiency level to which program applies	1	4
marketShare	Percent of market share (%)	0*	1
earlyReplacement	Binary flag for whether early adoption applies to program	0	1
description	Program Description	{text}	{text}

* A zero value implies that the program will have no market impact, so the smallest practical value is 0.01 (1%).

** This represents the maximum efficiency level affected by the program for each end use, and is a supplementary type of applicability factor. The variable EL should be specified to be less than or equal to the maximum number of efficiency levels available for that market sector.

*** This represents the maximum vintage level affected by the program for each end use, and is a supplementary type of applicability factor. The variable V should be specified to be less than or equal to the maximum number of vintages for that market sector. Usually it is set equal to zero to denote an existing building or equipment retrofit strategy.

Equipment Retrofit and Operating & Maintenance (O&M) Service Programs

Usage retrofit strategies encourage consumers to change their product usage given the equipment they already have (e.g., improve the efficiency of existing equipment by installing measures such as weatherization or water heater retrofit kits). Table 10 presents the drivers of these programs.

Table 10. Equipment Efficiency Retrofit and O&M Program Drivers

Variable Name	Description	Minimum Value	Maximum Value
yearIntroduced	Year of program introduction activity	1	Last year of forecast horizon
programLife	Duration of program (years)	1	Years in forecast horizon
adoptionPath	Years to full adoption	1	7
applicability	Percent of customers to which the program applies	0*	1
eLevel	Lowest efficiency level to which program applies	1	4
marketShare	Percent of market share (%)	0*	1
eImprovement	Efficiency improvement (%)	0*	1
MeasureLife	Measure life (years)	1	Years in forecast horizon
vintageApplicability	Applicable vintages***	Lowest vintage	Years (vintages) in forecast horizon
description	Program Description	{text}	{text}

* A zero value implies that the program will have no market impact, so the smallest practical value is 0.01 (1%).

** This represents the maximum efficiency level affected by the program for each end use, and is a supplementary type of applicability factor. The variable EL should be specified to be less than or equal to the maximum number of efficiency levels available for that market sector.

*** This represents the maximum vintage level affected by the program for each end use, and is a supplementary type of applicability factor. The variable V should be specified to be less than or equal to the maximum number of vintages for that market sector. Usually it is set equal to zero to denote an existing building or equipment retrofit strategy.

Intervention Strategies Module Operations

You can create many types of Intervention Strategies programs for all market sectors sequentially and automatically, rather than creating each one manually. This batch processing is done via the following datasets, where the scenario indicator "yy" denotes a scenario that differs from "xx."

- **dsmFChoice_yy** – Dimension 4 (fuel) choice substitution for existing, conversion, and/or new customers, based on user specifications
- **dsmEChoice_yy** – Dimension 5 (efficiency) choice substitution for existing, conversion, and/or new customers, based on user specifications
- **dsmRetrofit_yy** – Equipment retrofit or O&M programs

Each of these files contains a row for each Dimension 1 – 3 combination and data inputs associated with Table 24 (**dsmFChoice_xx**), Table 23 (**dsmEChoice_xx**), or Table 25 (**dsmRetrofit_xx**).

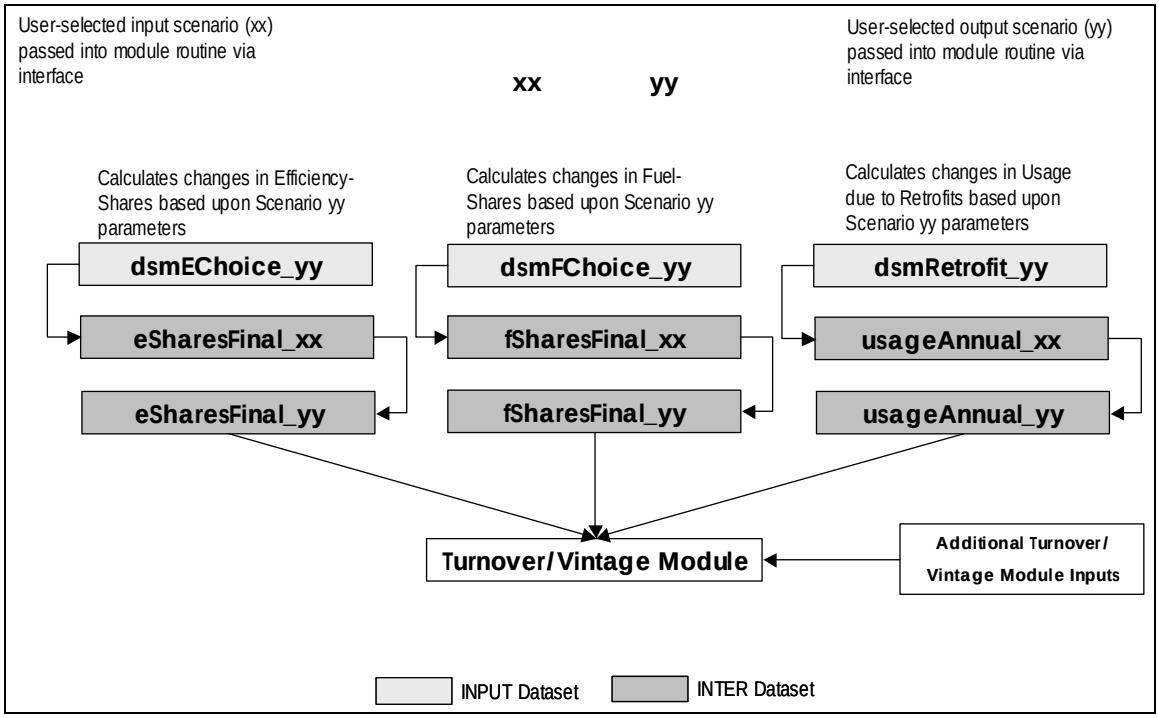
The Market Segmentation module creates base case files ("_10" files) where there is no intervention for each of these program categories. These files serve as templates that allow the user to create different scenarios of interest. To create strategies, you must copy these files to another scenario number and then make changes consistent with the desired intervention strategy over the forecast horizon. It is recommended that these designs be completed by individuals with marketing or demand-side management experience. Alternatively, The Cadmus Group (Quantec**)** can assist with the development of the first set of intervention strategies.

Figure 18 illustrates how the Intervention Strategies module modifies the Product Usage and/or Provider Choice output files and how these outputs are then used to develop an alternative forecast. Table 11 summarizes the data files used by this module.

Table 11. Intervention Strategies Module Data Library and Files

Directory	File Name	Description	File/Record Dimensions	Variables/Attributes
INPUT	dsmEChoice_xx	Existing/New Dimension 5 (efficiency) program parameters	Dimensions 1-4	Year introduced, program life, applicability, market share, adoption path, early adoption
INPUT	dsmFChoice_xx	Existing/New Dimension 4 (fuel choice) program parameters	Dimensions 1-4	Year introduced, program life, applicability, market share, adoption path, early adoption
INPUT	dsmRetrofit_xx	Product Usage retrofit parameters	Dimensions 1-4	Year introduced, program life, applicability, market share, adoption path, measure life, efficiency improvement, efficiency levels affected, vintages affected

Figure 18. Intervention Strategies Module System Diagram



VII. Forecast Module

The Forecast module serves several analytical and system functions, including forecasts of new construction and conversion accounts, decay or turnover of buildings and equipment, integration of Product Usage, Provider Choice and Intervention Strategies module results, and "internal" forecast reports for use by the End Use Forecaster analyst. Other reports from End Use Forecaster are described in Chapter 8.

The analytical portion of this module uses information on equipment saturation, average and marginal market shares, building and equipment decay, building account stocks and decay, customer conversions, and new construction to determine changes in the usage mix over time. The final forecast is equal to the number of units [indexed by year, building vintage, equipment age, fuel (provider), and efficiency (product)] multiplied by the consumption per the indexed equipment configuration.

Forecast Inputs

There are several sets of inputs in each Turnover/Vintage module forecast, which are described in Table 12 below. Alternative forecast scenarios using new estimates (scenarios) for new construction, account conversion, usage, choice, account decay, building decay, and any combinations of these can be conducted using the Turnover/Vintage module.

Table 12. Turnover/Vintage Forecast Inputs

Input Type	Dataset
Account Decay Parameters	accountDecay_xx
Equipment Decay Parameters	equipmentDecay_xx
Existing Equipment Age	equipmentAge_xx
Dimension 3 (End Use) Saturation	saturations_xx
Historical Accounts	customerCountsActual_xx
Account Forecast	customerCountsForecast_xx
Product Usage Forecast	usageAnnual_xx
Dimension 4 (Fuel) Shares Forecast	fSharesFinal_xx
Dimension 5 (Efficiency) Shares Forecast	eSharesFinal_xx

Historical and New Construction Building Stocks

Historical accounts are segmented into the number of total accounts in the base year and their distribution among the historical vintages as determined by the user in the segmentation design. Accounts are defined in terms of both buildings and building units (i.e., accounts, apartments, square feet, etc.). Building units are the level of measurement at which the Product Usage module estimates are rendered.

The total building stock in any forecast year is not the simple difference between the total building stock in the current year and the previous year because some buildings will have been

destroyed, completely gutted, or removed from the system in the course of a year. The number of existing buildings replaced each year is dependent on the stock of vintages and the overall decay rate.

Forecasting Equipment Stocks

Dimension 3 (i.e., end use) equipment stocks are forecasted through similar methods as buildings. Initial base year equipment stock levels are estimated utilizing equipment saturation estimates for existing and new construction building vintages in the **saturations_xx** dataset. Market shares of new equipment over the forecast horizon are generated in the Provider Choice or Intervention Strategies module and passed to the Turnover/Vintage module via the series of market share forecasts in the **eSharesInitial_xx** and **fSharesInitial_xx** datasets. You may provide the average age of equipment in existing buildings in the base year in order to initialize the equipment age dimension (**equipmentAge_xx**). Generally, this average age is specified as the mean technical lifetime of the equipment.

The forecast simulation then estimates equipment stocks for Dimensions 3-5 (i.e., end use, fuel, and efficiency level) for each Dimension 1-2 combination. The new equipment stock installed each year is dependent on the growth and decay of building stocks, the natural replacement cycle of the equipment, the saturation rates of the end use in new construction, and the market shares of technology types.

End Use Forecaster contains a vintage hierarchy where Dimension 2 (buildings) dominates Dimension 3 (end uses). For example, an older dwelling may have a relatively new furnace and water heater, but these end uses effectively "disappear" if the building is demolished or undergoes a major renovation.

Building and Equipment Decay Functions

The user may specify decay rates of existing stocks of buildings and equipment, as well as new stock constructed or installed in subsequent years. Decay functions and parameters can differ for the existing and new stocks. Some analysts specify different decay functions for existing and new building stocks as the existing base year building stock is an amalgam of unknown vintages and new building stock is tracked as discreet homogenous annual blocks.

There are two datasets with decay rate data for each market segmentation design (**accountDecay_xx** and **equipmentDecay_xx**). In each of these decay data files, there are two sets of information to be entered: decay functions and decay parameters.

A numeric indicator ranging from 1 to 3 indicates the selected function. Available functions include exponential (1), logistic (2), and Weibull (3). Exponential functions have one parameter, logistic functions have four, and Weibull functions have two.[3] The logistic and exponential functions tend to be the most popular and are described in more detail below. The

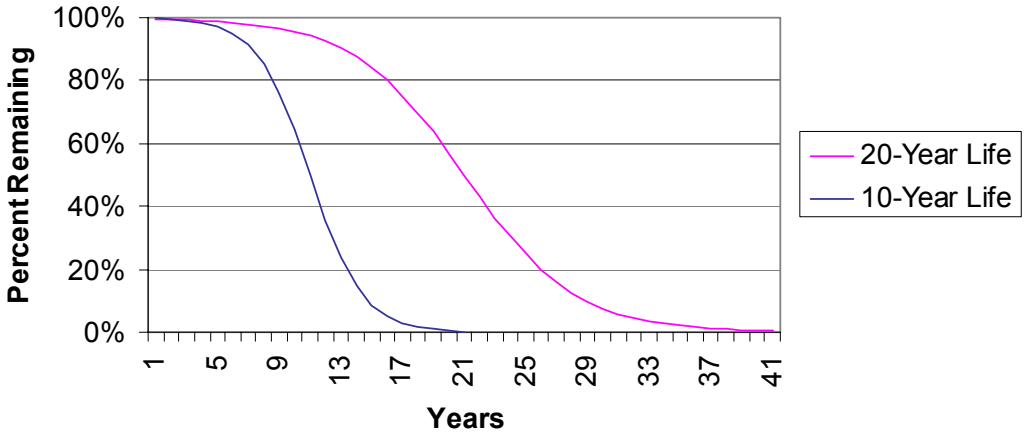
[3] These are discrete analogs to the continuous time distributions.

equipmentAge_xx dataset describes the average age of existing equipment in existing facilities. It tells the model where to start the equipment decay function.

Logistic Decay Function

End Use Forecaster uses the logistic function as the recommended decay mechanism for equipment decay construction, as shown in Figure 19. The logistic function is an S-shaped curve that results in a small decay rate for the first years, then increases over time before tapering off.

Figure 19. End Use Forecaster End Use Decay Functions



You may specify the periods and percentages of stock remaining for any two years in the appropriate SAS dataset. For example, to specify that 99% of the building stock remains 20 years after construction and that, 100 years after construction, only 50% of the buildings remain:

- In the SAS dataset, set the functional form indicator to 2
- Set the first parameter to the percent remaining after year X (0.99)
- Set the second parameter to year X (20)
- Set the third parameter to the percent remaining after year Y (0.50)
- Set the fourth parameter to year Y (100)

Exponential Decay Function

An exponential decay function can be used to represent a constant percentage decline for customers, buildings, or equipment. For example, a decay rate of 0.05 would cause 5% of the remaining stock to be removed each year. Since the base becomes progressively smaller, so does the absolute level of decay. If you choose an exponential decay rate:

- Set the functional form indicator equal to 1
- Set the first parameter equal to the specified decay rate
- Set the remaining three parameters equal to zero

Zero Decay

In some cases, decay rates may not be relevant information. This can occur in non end-use End Use Forecaster representations or in certain markets such as "miscellaneous consumption." In these instances, choose the exponential function and set all parameters to zero.

Early Replacement

In some instances, you may specify the "early replacement" of existing equipment within an Intervention Strategies scenario. In these situations, the variable *earadop*, contained in **eChoiceFinal_xx** dataset, will effectively override the equipment decay functions if it is set equal to 1. The default value for *earadop* is zero (no early adoption).

Forecast Operations

The heart of this module is a SAS program called forecastBatch.sas, which completes the following tasks:

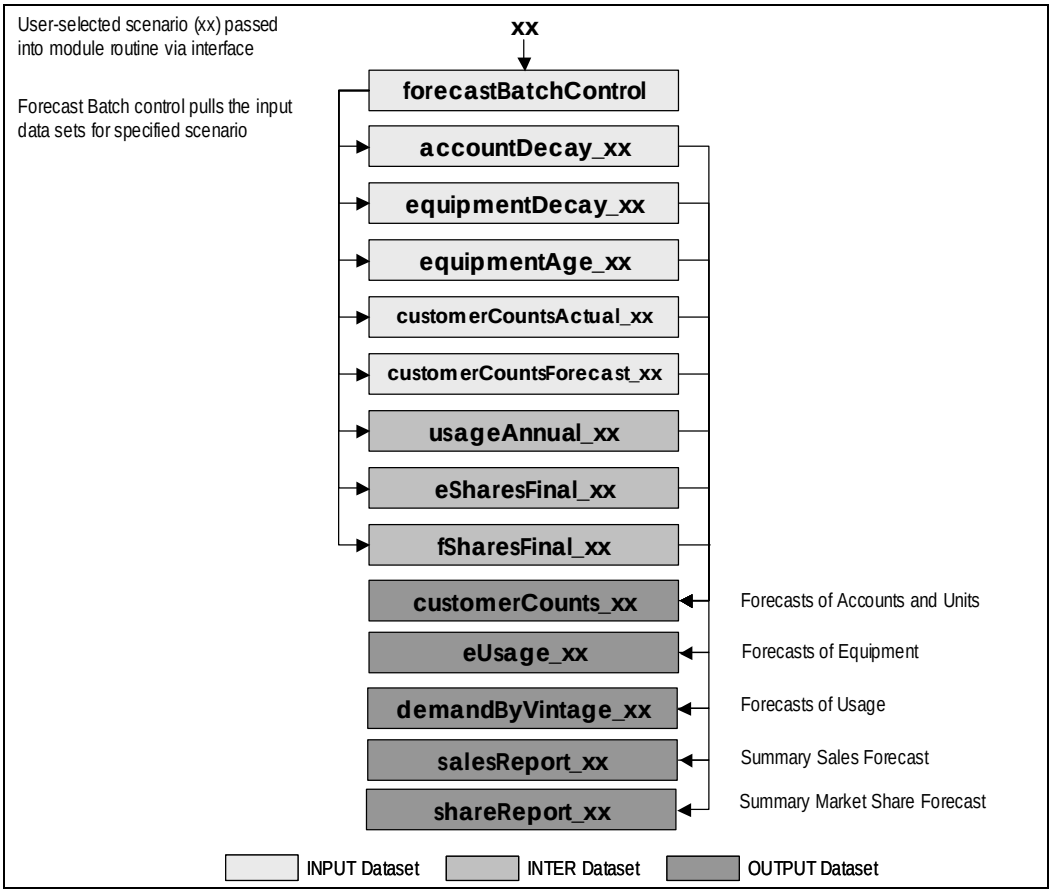
1. Merges all input data across Dimensions 1-3, including:
   - Existing accounts, plus a distribution of accounts across historical building vintages
   - New construction forecast, plus capture rates for new and conversion buildings
   - Dimension 3 saturation, equal to the number of Dimension 2 customers with Dimension 3 divided by total Dimension 2 customers
   - Decay rates for buildings (indexed by year and building vintage) and equipment (indexed by Dimension 4 and equipment age)
   - Product usage forecast (potentially modified by an intervention strategies scenario)
   - Provider choice forecast (potentially modified by an intervention strategies scenario)
2. Solves for output arrays that contain information on number of market segments units per year, indexed by the specified dimensions (e.g., building vintage, equipment age, fuel, and efficiency)
3. Stores the results in datasets of varying dimensions
4. Multiplies the number of units by the respective consumption estimate per unit, again indexed by the appropriate dimension.
5. Summarizes these results in standard report formats

Figure 20 illustrates how the operation of the Turnover module. Table 13 summarizes the programs developed for the Turnover/Vintage module, and Table 13 summarizes the data files used in this module.

Table 13. Forecast Module Data Library and Files

Library	Dataset Name	Description	Record Dimensions	Attributes/Variables
INPUT	ForecastBatchControl	Forecast module input control	One record per output scenario	Account history, distribution and new construction scenarios; decay scenarios; usage scenario, saturation scenarios, and equipment mean age scenario.
INPUT	accountDecay_xx	Decay parameters for Dimension 2	Dimensions 1 and 2, forecast vintages	Decay Function, Decay Parameters 1-4
INPUT	equipmentDecay_xx	New construction Dimension 3 (end use) decay	Dimensions 1, 2, 3 and 4	Decay Function, Decay Parameters 1-4
INPUT	saturations_xx	Existing Dimension 3 (end use) saturation	Dimensions 1, 2, and 3 Year, historical vintages	Saturation
INPUT	customerCountsActual_xx	Base year accounts and non-accounts (potential customers)	Dimensions 1 and 2	Accounts, non accounts
INPUT	equipmentAge_xx	Dimension 3 (end use) mean age in base year	Dimensions 1, 2, and 3, historical vintage	Dimension 3 (end use) mean age in base year
INPUT	customerCountsForecast_xx	New construction / economic driver forecast	Dimensions 1 and 2, Year	Forecasted new construction, capture rate, conversion rate, units per account,
INTER	usageAnnual_xx	Product Usage module output	Dimensions 1, 2, 3, 4 and 5, year, vintage	Annual usage
INTER	eSharesFinal_xx	Provider Choice module output – existing Dimension 5 market share forecast	Dimensions 1, 2, 3, 4 and 5, year	Market share for replacement, early replacement indicator
INTER	fSharesFinal_xx	Provider Choice module output – existing Dimension 4 market share forecast	Dimensions 1, 2, 3 and 4, year	Market share for replacement, early replacement indicator
OUTPUT	customerCounts_xx	Forecast of accounts and units (square footage)	Dimensions 1 and 2, year, vintage	(E/C/N) Accounts, (E/C/N) units, units per account, remaining nonconversion potential
OUTPUT	eUsage__xx	Forecast of equipment (end-uses)	Dimensions 1, 2, 3, 4 and 5, year, vintage	Total number of Dimension 3 (end uses)
OUTPUT	demandByVintage_xx	Forecast of usage (e.g., kWh, therms)	Dimensions 1, 2, 3, 4 and 5, year, vintage	(E/C/N) Accounts, (E/C/N) units, units per account, remaining nonconversion potential; Total number of Dimension 3 (end uses); Break out of dimension 3 by replacement, conversion, and new construction.
OUTPUT	salesReport_xx	Summary Sales Forecast	Dimensions 1, 2, 3 and 4, year	Total usage and equipment sales by Dimension 5
OUTPUT	shareReport_xx	Summary Market Share Forecast	Dimensions 1, 2, 3 and 4, year	Market shares for Dimensions 4 and 5, by existing, conversion, and new construction

Figure 20. Turnover (Vintage) Module System Diagram



VIII. End Use Forecaster Utilities

The main End Use Forecaster analysis modules – Product Usage, Provider Choice, Intervention Strategies, and Forecast – are typically run separately during the calibration and testing phase of any market segmentation and forecasting process. Once this process is complete, however, you can run these modules jointly and generate all relevant analyses with a single click of the mouse (after data are prepared, of course).

This chapter describes the various utilties available in End Use Forecaster: Super Batch, Calibration, Analysis of Data Files, and Reporting.

Super Batch Processing

Some forecasting scenarios lend themselves to super batch processing. When the Product Usage, Provider Choice, and Forecast modules all have the same scenario indicator value, the that scenario can be run across all modules by selecting it in the Super Batch frame.

Calibration

End Use Forecaster can be calibrated to base year energy usage data for the "primary" fuel of interest in the model (f='1'). Calibration may proceed at the Z-Level, or at the Z-B-Level. Base year sales data must be available in the \INPUT**calibrationZ_xx or calibrationZB_xx** datasets. To calibrate the model apply the following procedure:

- Select the level at which the forecasts will be calibrated (the Z-Level vs. the Z-B-Level) from the Calibration Utility
- Select the scenario to be calibrated and the percent of usage to be assigned to the miscellaneous usage category.

The calibration routine works as follows:

1. Residual energy is attributed to the miscellaneous end use. This value should be greater than or equal to zero but generally does not exceed 10% of forecasted energy sales. In fact, the upper limit available through the model interface is 10%. Errors larger than this generally indicate a more fundamental data problem where an investigation of data inputs is required rather than this automated calibration process
2. When non-calibrated total usage is on the high side (miscellaneous would then be negative), the next step is to reduce the per-unit energy usage (i.e., customer or square foot) for each market segment, end use, and efficiency combination. Note that the *relative* energy usage across efficiency levels is unchanged. Conversely, when non-calibrated total usage is on the low side, simply let miscellaneous equal zero (the default value). All other end uses will be adjusted proportionately. Again, we recommend avoiding this procedure if the adjustment is larger than 10%.

The relative size of the calibration adjustment which is ultimately applied to the \INPUT**usageParameters_xx** datasetc can be found in \INTER**initialCalibrationRatio**.[4] The variable (*Zfratio* (*ZBfratio*) shows the percent error results, and how much End Use Forecaster had to change parameters through the calibration routine to match base year sales.

If additional calibration is needed beyond the base year to, for example, match an external econometric forecast over the duration of the forecast horizon, a post-processing adjustment using either SAS or Excel can be applied.[5]

After running the calibration routine, it is necessary to run the Usage, Choice, and Forecast modules (or Super Batch) and produce a new forecast. One can then click on the appropriate "Calibration: Calibration Check" routine to make sure the calibration worked as intended.

Analysis of Data Files

All SAS datasets in across End Use Forecaster libraries can be accessed directly from End Use Forecaster for further analysis in real time by following these steps:

- Click on "File: Analyze" to access SAS/INSIGHT
- Select the library and dataset of interest and perform desired analysis

  OR
- SAS/FSP software tools can also be used to browse the SAS datasets via the pull-down menu item "File: Library Map"

Reporting

Five default SAS output dataset reports are created in the OUTPUT directory by the Forecast module:

- A summary sales report (**salesReport_xx**)
- A summary market share report (**shareReport_xx**)
- Detailed account stock forecast (**customerCounts_xx**)
- Detailed market segment/end use equipment sales forecast (**eUsage_xx**)
- Detailed sales projections (**demandByVintage_xx**)

These reports can be browsed directly as described above, or exported to Excel. To accomplish the latter simply click on "Reports: Export Basic Reports to Excel" and select the Forecast module scenario to export.

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[4] Notice that there is no scenario indicator on the **initialCalibrationRatio** dataset. This is because only one scenario per Model should be calibrated; all other scenarios within that model can then be developed from the calibrated **usageParameters_xx** or successor datasets.

[5] Please contact The Cadmus Group (Quantec) for more information or to obtain a customized calibration routine

End Use Forecaster also produces reports that can be customized based upon the user's choice of segmentation combinations to analyze. These reports summarize and/or compare forecasts for two forecast scenarios specified by clicking on "Reports: Scenario Comparison Reports." The user specifies the Report Category (sales, market share, customer counts or demand by vintage) and, based on the category selection, is given the option of selecting different combinations of segments to summarize and/or compare.

Appendix: Variable Glossary

This glossary provides definitions for each End Use Forecaster SAS variable, and is organized by the model's libraries and datasets as defined in Chapter III.

Table 14. INPUT\accountDecay_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
vintage	Building vintage
accountDecayIndicator	Account decay indicator
accountDecayParm1	Account decay parameter 1
accountDecayParm2	Account decay parameter 2
accountDecayParm3	Account decay parameter 3
accountDecayParm4	Account decay parameter 4

Table 15. INPUT\calibrationZ

Variable Name	Description
z	The indicator for Dimension 1
year	Year of forecast (0 to rorecast horizon)
actualSales	Actual sales in base year

Table 16. INPUT\calibrationZB

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
year	Year
actualSales	Actual sales in base year

Table 17. INPUT\choiceBatchControl

Variable Name	Description
scenarioName	Descriptive name of the scenario
scenario	Output scenario number
choiceDrivers	Scenario to select for the choiceDrivers_xx dataset
priceForecast	Scenario to select for the priceForecast_xx dataset
choiceParameters	Scenario to select for the choiceParameters_xx dataset
usageAnnual	Scenario to select for the usageAnnual_xx dataset
eSharesInitial	Scenario to select for the eSharesInitial_xx dataset
fSharesInitial	Scenario to select for the fSharesInitial_xx dataset
eChoiceStatus	Scenario to select for the eChoiceStatus_xx dataset
fChoiceStatus	Scenario to select for the fChoiceStatus_xx dataset

Table 18. INPUT\choiceDrivers_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
e	The indicator for Dimension 5
year	Year
available	Binary switch to indicate availability of the alternative in any given year of the forecast
capitalCostExisting	Capitial cost for equipment in existing (replacement) construction
capitalCostConversion	Capital cost for equipment for conversion customers
capitalCostNew	Capital costs for equipment for new construction

Table 19. INPUT\choiceParameters_xx

Variable Name	Description
Z	The indicator for Dimension 1
B	The indicator for Dimension 2
N	The indicator for Dimension 3
f	The indicator for Dimension 4
eIndicator	Binary switch for choice modeling to indicate the dimension modeled (0 = Dimension 4 and 1 = Dimension 5)
conType	Type of construction or customer (new, existing, or conversion)
lifetime	Equipment or measure lifetime (years)
alpha	Constant
description	Description of Choice
discountRate	Implicit discount rate
priceShare	Price share of customer utility function
a1	Intercept for alternative 1
a2	Intercept for alternative 2
a3	Intercept for alternative 3
a4	Intercept for alternative 4
b1	Operating cost coefficient
b2	Capital cost coefficient

Table 20. INPUT\customerAccountsActual_xx

Variable Name	Description
Z	The indicator for Dimension 1
B	The indicator for Dimension 2
vintage	Building vintage
unitsPerAccount	Units per Dimension 1-2 and vintage combination (square footage, number of apartments, etc.). This should be set to 1 if the unit is the customer
accounts	Number of accounts.
onMainAccounts	Number of accounts on main.
offMainAccounts	Number of accounts off main.

Table 21. INPUT\customerAccountsForecast_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
year	Year
unitsPerAccount	Units per Dimension 1-2 and vintage combination (square footage, number of apartments, etc.). This should be set to 1 if the unit is the customer
newConstructionAccounts	New Construction accounts.
newConstructionCaptureRate	The “capture” rate of NEWCONST = the share of new buildings that are customers
conversionCaptureRate	The share (%) of existing non-customers converting or becoming a customer each year

Table 22. INPUT\dimens

Variable Name	Description
DIM	Dimension
DIMNAME	Dimension Name
DIMNUM	Starting Levels

Table 23. INPUT\dsmEChoice_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
conType	Type of construction or customer (new, existing, or conversion)
yearIntroduced	Year of Program Introduction
programLife	Duration of Program (Years)
adoptionPath	Years to Full Adoption
applicability	Percent of Customers Applicable
eLevel	e Level to Which Program Applies
marketShare	Market Share Percent
earlyReplacement	Early Replacement (binary)
description	Program Description

Table 24. INPUT\dsmFChoice_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
conType	Type of construction or customer (new, existing, or conversion)
yearIntroduced	Year of Program Introduction
programLife	Duration of Program (Years)
adoptionPath	Years to Full Adoption
applicability	Percent of Customers Applicable
marketShare	Market Share Percent
earlyReplacement	Early Replacement (binary)
description	Program Description

Table 25. INPUT\dsmRetrofit_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
yearIntroduced	Year of Program Introduction
programLife	Duration of Program (Years)
measureLife	The average life of Dimension 3 equipment
eImprovement	The efficiency improvement (%) as reflected by the reduction in equipment energy usage.
adoptionPath	Years to Full Adoption
vintageApplicability	Vintages to Which Programs Apply
applicability	Percent of Customers Applicable
marketShare	Market Share Percent
earlyReplacement	Early Replacement (binary)
eLevel	Lowest e Level to Which Program Applies
description	Program Description

Table 26. INPUT\eChoiceStatus_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
eChoiceStatus	This is a “status” variable for Dimension 5. It tells the Provider Choice module which of several possible equation/modeling processing should be followed.
eAlternatives	The number of choice alternatives for Dimension 5, which ranges from 1-4

Table 27. INPUT\eSharesInitial_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
e	The indicator for Dimension 5
baseAvgEShare	The average market share in the historical stock at Dimension 5
baseMargEShareExisting	The marginal (i.e., most recent) market share associated with the replacement of the product or service option by existing customers
baseMargEShareConversion	The marginal market share associated with conversion customers
baseMargEShareNew	The marginal market share associated with the new construction customers
peakDayLoadFactor	The peak demand or peak day load factor associated with annual usage for each Dimension 1-5 combination.

Table 28. INPUT\equipmentAge_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
equipmentMaxAge	The maximum age of existing equipment for each Dimension 1-3 combination regardless of the historical vintage
equipmentMeanAge	The average age of existing equipment for each Dimension 1-3 combination and each historical vintage
vintage	Building vintage

Table 29. INPUT\equipmentDecay_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
conType	Type of construction or customer (new, existing, or conversion)
equipmentDecayIndicator	Equipment decay indicator
equipmentDecayParm1	Equipment decay paramater 1
equipmentDecayParm2	Equipment decay paramater 2
equipmentDecayParm3	Equipment decay paramater 3
equipmentDecayParm4	Equipment decay paramater 4

Table 30. INPUT\fChoiceStatus_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
fChoiceStatus	This is a "status" variable for Dimension 4. It tells the Provider Choice module which of several possible equation/modeling processing should be followed.
fAlternatives	The number of choice alternatives for Dimension 4, which ranges from 1-4

Table 31. INPUT\forecastBatchControl

Variable Name	Description
scenarioName	Descriptive name of the output scenario
scenario	Output scenario number
accountDecay	Scenario to select for the accountDecay_xx dataset
equipmentDecay	Scenario to select for the equipmentDecay_xx dataset
equipmentAge	Scenario to select for the equipmentAge_xx dataset
saturations	Scenario to select for the saturations_xx dataset
customerCountsActual	Scenario to select for the customerCountsActual_xx dataset
customerCountsForecast	Scenario to select for the customerCountsForecast_xx dataset
usageAnnual	Scenario to select for the usageAnnual_xx dataset
eSharesFinal	Scenario to select for the eSharesFinal_xx dataset
fSharesFinal	Scenario to select for the fSharesFinal_xx dataset

Table 32. INPUT\fsharesInitial_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
baseAvgFShare	The average market share in the historical stock at Dimension 4.
baseMargFShareExisting	The marginal (i.e., most recent) market share associated with the replacement of the product or service by existing customers
baseMargFShareConversion	The marginal market share associated with the conversion customers
baseMargFShareNew	The marginal market share associated with the new construction customers

Table 33. INPUT\initParm

Variable Name	Description
BASEYR	Base Year
FCSTYRS	Forecast Years

Table 34. INPUT\priceForecast_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
year	Year
price	Price (Native Units)

Table 35. INPUT\saturations_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
year	Year
vintage	Building vintage
saturation	Presence of End Use (Percent)

Table 36. INPUT\scenarioDescriptions

Variable Name	Description
scenario	Output scenario number
scenarioName	Descriptive name of the scenario

Table 37INPUT\usageBatchControl

Variable Name	Description
scenarioName	Descriptive name of the scenario
scenario	Output scenario number
usageParameters	Scenario to select for the usageParameters_xx dataset
usageDrivers	Scenario to select for the usageDrivers_xx dataset

Table 38. INPUT\usageDrivers_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
e	The indicator for Dimension 5
year	Year
month	Month
X0 - X20	Product Usage module forecast drivers

Table 39. INPUT\usageParameters_xx

Variable Name	Description
Z	The indicator for Dimension 1
B	The indicator for Dimension 2
N	The indicator for Dimension 3
F	The indicator for Dimension 4
E	The indicator for Dimension 5
Vintage	Building vintage
B0 - B20	Product Usage module coefficients
usageEquationStatus	This is a “status” variable for the Product Usage module.

Table 40. INTER\eSharesFinal_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
e	The indicator for Dimension 5
year	Year
eshare	Share for Dimension 5
earadop	A 0/1 binary variable where a value of 1 indicates that the marginal market shares apply to all existing customers, not just those who need to replace retired equipment. The default value is 0; a one will be used if specified in the Intervention Strategies CSFUELE\Sxx dataset.
conType	Type of construction or customer (new, existing, or conversion)

Table 41. INTER\fSharesFinal_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
year	Year
fshare	Fuel Share
earadop	A 0/1 binary variable where a value of 1 indicates that the marginal market shares apply to all existing customers, not just those who need to replace retired equipment. The default value is 0; a one will be used if specified in the Intervention Strategies CSFUELE\Sxx dataset.
conType	Type of construction or customer (new, existing, or conversion)

Table 42. INTER\usageAnnual_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
year	Year
vintage	Building vintage
f	The indicator for Dimension 4
e	The indicator for Dimension 5
use	Annual usage from the usage module for each Dimension 1-5 combination by year and vintage

Table 43. INTER\usageMonthly_xx

Variable Name	Description
vintage	Building vintage
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
e	The indicator for Dimension 5
year	Year
month	Month
use	Monthly usage from the usage module for each Dimension 1-5 combination by year and vintage

Table 44. OUTPUT\customerCounts_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
year	Year
unitsPerAccount	Units per Dimension 1-2 and vintage combination (square footage, number of apartments, etc.). This should be set to 1 if the unit is the customer
vintage	Building vintage
remain	All customers and non-customers remaining for each vintage
totalAccounts	The sum of existing, conversion, and new construction customers
cAccounts	Conversion customers
nAccounts	New construction customers
totalUnits	totalAccounts * units per account
cUnits	cAccounts * units per account
nUnits	nAccounts * units per account

Table 45. OUTPUT\demandByVintage_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
vintage	Building vintage
year	Year
n	The indicator for Dimension 3
f	The indicator for Dimension 4
e	The indicator for Dimension 5
fuelSpecificUnits	The energy usage associated with a single unit at the full dimension 1 through 5 (zbnfe) level.
unitsPerAccount	Units per Dimension 1-2 and vintage combination (square footage, number of apartments, etc.). This should be set to 1 if the unit is the customer
use	Annual usage from the usage module for each Dimension 1-5 combination by year and vintage
peakDayLoadFactor	The peak demand or peak day load factor associated with annual usage for each Dimension 1-5 combination.
ereplcs	The total number of new Dimension 3 equipment sales from existing customers (who are replacing retired equipment) by year and vintage for each Dimension 1-5 combination
ceus	The total number of new Dimension 3 equipment sales from conversion customers by year and vintage for each Dimension 1-5 combination
neus	The total number of new Dimension 3 equipment sales from new construction customers by year and vintage for each Dimension 1-5 combination
totalUsage	Annual usage from the usage module for each Dimension 1-5 combination by year and vintage
cUsage	The total number of new Dimension 3 equipment sales from conversion customers by year and vintage for each Dimension 1-5 combination
nUsage	The total number of new Dimension 3 equipment sales from new construction customers by year and vintage for each Dimension 1-5 combination
usagePerUnit	Total usage per unit (e.g., square foot, customer, apartment, etc.) for each Dimension 1-5 combination by year and vintage = USE * EEUS
cuseunit	Total conversion usage per unit (e.g., square foot, customer, apartment, etc.) for each Dimension 1-5 combination by year and vintage = USE * CEUS
nuseunit	Total new construction usage per unit (e.g., square foot, customer, apartment, etc.) for each Dimension 1-5 combination by year and vintage = USE * NEUS

Table 46. OUTPUT\eUsage_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
vintage	Building vintage
year	Year
n	The indicator for Dimension 3
f	The indicator for Dimension 4
e	The indicator for Dimension 5
fuelSpecificUnits	The energy usage associated with a single unit at the full dimension 1 through 5 (zbnfe) level.

Table 47. OUTPUT\salesReport_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
year	Year
totalAccounts	The sum of existing, conversion, and new construction customers
totalUnits	totalAccounts * units per account
fuelSpecificUnits	The energy usage associated with a single unit at the full dimension 1 through 5 (zbnfe) level.
totalUsage	Annual usage from the usage module for each Dimension 1-5 combination by year and vintage
peakUsage	Annual peak usage from the usage module for each Dimension 1-5 combination by year and vintage
effeeus1 - effeeus4	This is the average number of fuel specific end-uses (FEUS) across the possible Dimension 5 (efficiency) levels, and is identical to AVGEU(1-4) in VNTFMKSH\Sxx
effuec1 - effuec4	The annual usage for each Dimension 5 level associated with each Dimension 1-4 combination. These estimates come directly from USE is USEANN\Sxx
effuse1 - effuse4	The total usage for each Dimension 1-5 combination by year and vintage. These estimates come directly from EUSE in VNTFDEMD\\Sxx
unitsPerAccount	Units per Dimension 1-2 and vintage combination (square footage, number of apartments, etc.). This should be set to 1 if the unit is the customer
uec	Sales per End Use Unit
fuelSpecificUnitsPerAccount	Fuel-Specific End-Use Units per Account
totalUsagePerAccount	Sales per Account

Table 48. OUTPUT\shareReport_xx

Variable Name	Description
z	The indicator for Dimension 1
b	The indicator for Dimension 2
n	The indicator for Dimension 3
f	The indicator for Dimension 4
year	Year
totalAccounts	The sum of existing, conversion, and new construction customers
totalUnits	totalAccounts * units per account
fuelSpecificUnits	The energy usage associated with a single unit at the full dimension 1 through 5 (zbnfe) level.
effeeus1 - effeeus4	This is the average number of fuel specific end-uses (FEUS) across the possible Dimension 5 (efficiency) levels, and is identical to AVGEU(1-4) in VNTFMKSH\Sxx
averageShareEff1 - averageShareEff4	The average stock share of Dimension 5 for each Dimension 1-4 combination
fshareExisting	The fourth dimension (fuel) market share for existing (replacement equipment) customers
fshareNew	The fourth dimension (fuel) market share for new construction customers
fshareConversion	The fourth dimension (fuel) market share for conversion customers
marginalShareExisting1 - marginalShareExisting4	The marginal (existing equipment) share of Dimension 5 for each Dimension 1-4 combination
marginalShareNew1 - marginalShareNew4	The marginal (new equipment) share of Dimension 5 for each Dimension 1-4 combination
marginalShareConversion1 - marginalShareConversion4	The marginal (conversion equipment) share of Dimension 5 for each Dimension 1-4 combination

The End Use Forecaster's data requirements are extensive and diverse; in practically every case, the set of sources necessary to fulfill them are equally varied. For the five Gas Company models, the data sources fell into four categories.

- Company-specific primary research – Studies conducted by or for the Gas Company help to characterize the market for different segments.
- Company databases – The Gas Company's MAS, for example, and other internal data sources have indispensable historical data on the customer counts and consumption patterns.
- Secondary data sources – Recent state projects by CALMAC, for example, have information on baseline end-use consumption and equipment costs.
- Assumptions – Professional judgment or assumptions based on previous model inputs are necessary to fill in those areas where other data sources are insufficient.

For nearly every input, more than one source was considered during the process of populating the model. The principal criterion for selection of the final source was the "reasonableness" of the results. In cases where alternative source produced similar results, preference was given to more recent and company-specific data. In some cases, multiple sources were used where one complemented another. The specific sources for each individual input are documented in Excel workbooks used during data development or in the SAS code used to populate the model. The final values used in the model are available in the SAS data sets for the various modules.

Residential Model

The residential model had the most consistent and robust set of sources. An analysis of raw data from the Gas Company's most recent RASS provided customized inputs for many of the customer characteristics. Data from CALMAC were available for unit energy consumption and equipment costs for the primary end uses. Gas Company data on customer counts, consumption, and meter forecasts were easily produced in a format consistent with the chosen segmentation design.

Usage Module - Residential

Data Set	Variable	Source	Notes
Input.UsageParameters_10	B0 (UEC)	CALMAC California Statewide Residential Sector Energy Efficiency Potential Study, Volume II: Appendices	Stock or standard efficiency UECs taken from "Base Tech UEC" inputs. UECs for higher efficiencies based on "Energy Savings" inputs.
	B1 (Price Elasticity)	SoCal Gas econometric model outputs	
Input.UsageDrivers_10	X0 (UEC)	Default values.	Forecast drivers
	X1 (Price)	SoCal Gas price forecasts	Marginal price forecast applied in usage module.
Input.UsageParameters_10	ADJUST	SoCal Gas historical customer data	Adjustment to UECs by vintage based on SoCal Gas historical use per customer.

Choice Module - Residential

Data Set	Variable	Source	Notes
Input.ChoiceParameters_10	Lifetime	SoCal Gas RASS	
	DiscountRate	Default	
	PriceShare	Default	
	A1, A2, A3, B1, B2	Default Starting Values	Some initial parameters changed during operation of choice module to allow calibration.
Input.ChoiceDrivers_10	CapitalCostExisting, CapitalCostNew, CapitalCostConversion	CALMAC California Statewide Residential Sector Energy Efficiency Potential Study, Volume II: Appendices	Where costs were not available from CALMAC, values from previous SoCal Gas residential model were adapted to accommodate additional efficiency level in current version
	Available	Assumptions	Stock efficiency level assumed unavailable after base year.
Input.FSharesInitial_10	BaseAvgFShare, BaseMargFShareExisting, BaseMargFShareConversion, BaseMargFShareNew	SoCal Gas RASS	
Input.ESharesInitial_10	BaseAvgEShare, BaseMargEShareExisting, BaseMargEShareConversion, BaseMargEShareNew	Assumptions, previous residential model, and CALMAC *California Statewide Residential Sector Energy Efficiency Potential Study, Volume II: Appendices*	

Forecast Module - Residential

Data Set	Variable	Source	Notes
Input.CustomerCountsActual_10	ACCTSY0	SoCal Gas historical customer data	
Input.CustomerCountsForecast_10	NEWCONST	SoCal Gas residential meter forecasts	
	UPA	Default	Units Per Account: set to one for single- and multi-family dwellings. Master- and sub-metered adjusted to account for customer counts per meter.
Input.AccountDecay_10	AccountDecayIndicator, AccountDecayParm1-4	SoCal Gas	No decay applied to new construction.
Input.EquipmentDecay_10	EquipmentDecayIndicator, EquipmentDecayParm1-4	Assumptions	Exponential decay function applied based on measure life assumptions. Logistic decay function applied based on measure life assumptions.
Input.EquipmentAge_10	EquipmentMeanAge, EquipmentMaxAge	SoCal Gas RASS	
Input.Saturations_10	SAT	SoCal Gas RASS	

Commercial Core and Non-Core Models

The Core and Non-Core Commercial models share the same sources for data. For most of the inputs, these sources provide identical values for both models. That is the sources for data do not show any distinction in the end use intensity (EUI) values, end-use saturations, and fuel and efficiency shares for the two models. The fundamental difference in the models is the Gas Company's customer counts for the different building types. Less significantly, price forecasts, which have an influence on both usage and choice modules, are also different for the two models.

Usage Module – Commercial Core and Noncore

End Use Forecaster's Library and Data Set	End Use Forecaster Variable(s)	Source	Notes
Input.UsageParameters_10	B0 (EUI)	SDG&E 2000 Commercial EUI Study, CALMAC *California Statewide Commercial Sector Natural Gas Energy Efficiency Potential Study, Volume II: Appendices*	Stock efficiency EUIs taken from SDG&E study. EUIs for higher efficiencies based on "Energy Savings" inputs from CALMAC.
	B1 (Price Elasticity)	SoCal Gas econometric model outputs	
Input.UsageDrivers_10	X0 (EUI)	Default values	Forecast drivers
	X1 (Price)	SoCal Gas price forecasts	Marginal price forecast applied in usage module.

Choice Module – Commercial Core and Noncore

Data Set	Variable	Source	Notes
Input. ChoiceParameters_10	Lifetime	So Cal Gas MAS, Assumptions	
	DiscountRate	Default Assumptions – 25%	The 25% customer discount rate stems from the implicit discount rate literature.
	PriceShare	Default Assumptions – 50%	The 50% price share assumption on previous Cadmus Group (formerly Quantec) research on how customers trade off price vs. non price attributes
	A1, A2, A3, B1, B2	Default Starting Values	Some initial parameters changed during operation of choice module to allow calibration.
Input. ChoiceDrivers_10	CapitalCostExisting, CapitalCostConversion, CapitalCostNew	So Cal Gas Average Price Forecast, Assumptions	Operating costs based on equipment usage data and SoCal Gas price forecast, with capital costs calculated based on assumed ratios of operating to capital costs.
	Available	Assumptions	Stock efficiency level assumed unavailable after base year.
Input. FSharesInitial_10	BaseAvgFShare, BaseMargFShareExisting, BaseMargFShareConversion, BaseMargFShareNew	SDG&E 2000 Commercial EUI Study, 1996 SoCal Gas Commercial & Industrial Energy Equipment Market Share Study	
Input. ESharesInitial_10	BaseAvgEShare, BaseMargEShareExisting, BaseMargEShareConversion, BaseMargEShareNew	Assumptions	10% high efficiency share(s) based on professional judgment and DSM free ridership literature.

Forecast Module – Commercial Core and Noncore

Data Set	Variable	Source	Notes
Input.CustomerCountsActual_10	ACCTSY0	SoCal Gas historical customer data	Base year accounts data.
Input.CustomerCountsForecast_10	NEWCONST	SoCal Gas historical customer data, SoCal Gas employment forecasts, and SoCal Gas employment elasticity from econometric model	New Construction.
	UPA	MAS	Units Per Account.
Input.AccountDecay_10	AccountDecayIndicator, AccountDecayParm1-4	Assumptions	No decay applied to existing accounts. No decay applied to new construction.
Input.EquipmentDecay_10	EquipmentDecayIndicator, EquipmentDecayParm1-4	Assumptions	Exponential decay function applied based on measure life assumptions. Logistic decay function applied based on measure life assumptions
Input.EquipmentAge_10	EquipmentMaxAge, EquipmentMeanAge	SoCal Gas MAS	
Input.Saturations_10	SAT	SDG&E 2000 Commercial EUI Study	

Industrial Core and Non-Core Models

The Core and Non-Core Industrial models also share the same data sources. Unlike the sources for the commercial models, the data from the Gas Company's MAS – one of the primary inputs into to calculation of the UECs – are different for core and non-core sectors. Consequently, the final UEC for a given building's end use can vary significantly between the models. As with the commercial models, the Gas Company's historical customer counts also drive differences in the forecasts.

Usage Module – Industrial Core and Noncore

Data Set	Variable	Source	Notes
Input.UsageParameters_10	B0 (EUI)	SoCal Gas MAS, SoCal Gas Commercial & Industrial Energy Equipment Market Share Study	UECs based on a top-down calculation based on historical use per customer, end-use saturations, and fuel shares.
	B1 (Price Elasticity)	SoCal Gas econometric model outputs	
Input.UsageDrivers_10	X0 (EUI)	Default values.	Forecast drivers
	X1 (Price)	SoCal Gas price forecasts	Marginal price forecast applied in usage module.

Choice Module – Industrial Core and Noncore

Data Set	Variable	Source	Notes
Input.ChoiceParameters_10	Lifetime	So Cal Gas MAS, Assumptions	
	DiscountRate	Default	
	PriceShare	Default	
	A1, A2, A3, B1, B2	Default Starting Values	Some initial parameters changed during operation of choice module to allow calibration.
Input.ChoiceDrivers_10	CapitalCostExisting, CapitalCostNew, CapitalCostConversion	So Cal Gas Average Price Forecast, Assumptions	Operating costs based on equipment usage data and SoCal Gas price forecast, with capital costs calculated based on assumed ratios of operating to capital costs.
	Available	Assumptions	Stock efficiency level assumed unavailable after base year.
Input.FSharesInitial_10	BaseAvgFShare, BaseMargFShareExisting, BaseMargFShareConversion, BaseMargFShareNew	SoCal Gas Commercial & Industrial Energy Equipment Market Share Study	
Input.ESharesInitial_10	BaseAvgEShare, BaseMargEShareExisting, BaseMargEShareConversion, BaseMargEShareNew	Assumptions.	

Forecast Module – Industrial Core and Noncore

Data Set	Variable	Source	Notes
Input.CustomerCountsActual_10	ACCTSY0	SoCal Gas historical customer data	
Input.CustomerCountsForecast_10	NEWCONST	SoCal Gas historical customer data, SoCal Gas employment forecasts, and SoCal Gas employment elasticity from econometric model	
	UPA	MAS	Units Per Account
Input.AccountDecay_10	AccountDecayIndicator, AccountDecayParm1-4	Assumptions	No decay applied to existing accounts.
Input.EquipmentDecay_10	EquipmentDecayIndicator, EquipmentDecayParm1-4	Assumptions	Exponential decay function applied based on measure life assumptions. Logistic decay function applied based on measure life assumptions.
Input.EquipmentAge_10	EquipmentMaxAge, EquipmentMeanAge	SoCal Gas MAS	
Input.Saturations_10	SAT	SoCalGas RASS	

2016 CALIFORNIA GAS REPORT

RESIDENTIAL

Southern California Gas Residential End-Use Model

I. Residential End-Use Model Description

Introduction:

SoCalGas used the End Use Forecaster model to generate annual gas demand forecasts for the residential market. The software's market segmentation and end-use modeling framework analyzes the impacts of competitive strategies (gas vs. electricity) and market scenarios on gas demand and market shares. The model separates the residential market into five building types (B-level).

These groups are identified by the premise code classification found in the company billing files. The five residential groups are:

- Single-Family(SF);
- Multi-Family <= 4 units (MF2);
- Multi-Family > 4 units (MF3);
- Master Metered (MM); and
- Sub-Metered (SM).

The residential model identifies eight end-uses (N-level) that are the primary drivers of natural gas demand:

- Space heating;
- Water heating;
- Cooking;
- Drying;
- Pool heating;
- Spa heating;
- Fireplace; and
- Barbeque.

The model assumes two fuel choices (F-level) for end-uses:

- Natural gas; and
- Electricity.

The model assumes up to four efficiency levels (E-level) for the various end-uses. In general, the efficiency levels are:

- Stock;
- Standard;
- High efficiency; and
- Premium efficiency.

See Figure 1 for a classification of the number of efficiency levels for each end-use by customer segment type.

A set of post-model adjustments were applied to the model's annual demand forecast. The first adjustment calibrates to the recorded 2015 weather-adjusted demand. Next, the annual forecast was parceled out to a series of monthly forecasts by a process which involves two steps. These two steps consist of (1) using the fitted equation for customer demand to generate a forecast of use per customer that varies with the number of calendar days and heating degree days in a given month and (2) calculating a series of weights based on the customer's predicted monthly usage share in total annual consumption. The shares obtained from the latter step were then applied to annual totals to derive the stream of monthly forecasts which are conditional on the particular weather design specification for the entire year. An adjustment to the forecast offsets the throughput by the energy efficiency savings. Annual conservation benefits associated with AMI are estimated by SoCalGas to represent 1% of the core gas throughput in the post deployment period which starts after 2016. The residential load was reduced by the AMI expected energy savings.

Figures 2-5 illustrate the monthly forecasts for each weather scenario.

Data Sources:

The information used to perform the modeling and to generate the forecast includes historical 2015 consumption and customer counts; meter counts, growth, and decay; use per customer by vintage and unit energy consumption (UEC) values; fuel costs and price elasticity; equipment capital costs and availability; building and equipment lives and decay. The historical 2015 data is in Figure 6.

Meter Counts, Growth and Decay:

Regression equations were developed for each of the 5 building types. The meter count forecast is a company-specific forecast based on actual meter counts within the SoCalGas service territory. Data on meter decay rates were obtained from the Energy Information Administration (EIA). See Figure 7 for the meter forecast.

Use Per Customer by Vintage and UEC:

Use per customer and Unit Energy Consumption (UEC) data were based on company marketing data and the California Measurement Advisory Council. See Figure 8 for the appliance UEC's.

Fuel Costs and Price Elasticity:

Average and marginal gas prices ($/therm) were calculated from forecasts of the residential rate components. Residential rates have two consumption tiers. We used the simple average of the second tiers' projected monthly prices for each forecast year as the marginal rate. The marginal rate was used for each housing segment type.

For a given housing segment type, the average gas commodity rate was calculated using a pair of weights for the two consumption tiers applied to the simple average of each tier's monthly rate. The average commodity rate in each forecast year was developed using the same consumption tier weights, but with the forecasts of rates for each residential rate tier. The average gas price each year was then calculated by including the non-volumetric customer charges with the year's average gas commodity price. Figure 9 illustrates the gas price forecasts.

Electric Price Data:

Both average prices (cents/kWh) and marginal prices (cents/kWh) were developed as electricity price inputs. Forecasts for the SCE residential customer class were developed based on the California Energy Commission's December 2015 updated forecast rates for California energy demand (forecast for the SCE planning area, under "Mid-Case" demand for electricity) for the SCE service area through our forecast time horizon.

To impute average electricity prices to each residential housing type, we simply calculated the ratio of the housing type's average gas price to the overall residential gas price for each housing type, then multiplied by the overall average electricity price.

The marginal prices for each residential housing type were calculated by multiplying each year's respective average price by a ratio. These ratios were 1.513 for the SF, MF2 and MF3 housing types, 1.034 for the MM housing type and 1.125 for the SM housing type. These various ratios ware estimated from analyses of SCE Schedule D rate schedule for housing types SF, MF2 and MF3; SCE Schedule DM for housing type MM; and SCE Schedule D as applied to sub-metered buildings for housing type SM. Copies of these rate schedules were obtained from the SCE web-site in March 2006.

Equipment Capital Costs and Availability:

Data on equipment capital costs and availability were from EIA, the Residential Appliance Saturation Survey (RASS), Energy Star (EPA & DOE), and SoCalGas company data. See Figures 11 and 12 for gas and electric appliance equipment
cost.

Building and Equipment Lives and Decay:

Building decay rates are based on the building shell lifetimes, where the lifetime is defined as the length of time it takes for either a demolition or a major renovation to occur. For single-family residential buildings, an exponential rate of decay of 0.3% per year was assumed. See Figure 13 for the building decay rates.
Data on equipment lives and decay rates are based on EIA, RASS, Energy Star, and SoCalGas company data. See Figure 14 for the average lifetimes of gas appliances.

Saturations, Fuel and Efficiency Shares:

Saturation values, fuel shares, and efficiency shares were extracted from SoCalGas company data files and the most recent the RASS survey. Please see Figures 15-18 for saturations, fuel, and efficiency shares.

AMI:
Mass deployment of AMI gas modules began in 2011. The conservation benefits estimated by SoCalGas represent approximately 1% of core gas throughput in post-2016 (post deployment year). The conservation benefits were incorporated in the forecast as a post-model adjustment.

II. Residential End-Use Model Data

Southern California Gas Company
2016 California Gas Report
Figure 1: Number of Efficiency Levels by End Use by Customer Segment

	Space Heating		Water Heating		Cooking		Drying		Pool		Spa		Fireplace		BBQ	
	Gas	Electric	Gas	Electric	Gas	Electric	Gas	Electric	Gas	Electric	Gas	Electric	Gas	Electric	Gas	Electric
Single Family	4	4	4	4	2	2	2	2	1	1	1	1	1	1	1	1
Multi-Family <= 4 Units	4	4	4	4	2	2	2	2	0	0	0	0	0	0	1	1
Multi-Family > 4 Units	4	4	4	4	2	2	2	2	0	0	0	0	0	0	1	1
Master Meter	4	4	4	4	2	2	2	2	0	0	0	0	0	0	1	1
Sub-Meter	4	4	4	4	2	2	2	2	0	0	0	0	0	0	1	1

Southern California Gas Company
2016 California Gas Report
Figure 2: Average Temperature Year Demand Forecast (MDth)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2015	33,725	30,322	26,204	21,725	15,321	12,092	11,666	11,641	11,471	14,567	23,054	36,127	247,915
2016	33,628	30,235	26,129	21,663	15,277	12,057	11,632	11,607	11,438	14,525	22,988	36,023	247,201
2017	33,521	30,139	26,046	21,594	15,229	12,019	11,595	11,570	11,402	14,479	22,915	35,909	246,418
2018	33,400	30,030	25,952	21,516	15,174	11,975	11,553	11,528	11,361	14,426	22,832	35,779	245,529
2019	33,265	29,908	25,847	21,429	15,112	11,927	11,507	11,482	11,315	14,368	22,740	35,634	244,534
2020	33,056	29,720	25,684	21,294	15,017	11,852	11,434	11,410	11,244	14,278	22,597	35,410	242,997
2021	32,826	29,514	25,506	21,147	14,913	11,770	11,355	11,330	11,166	14,179	22,440	35,165	241,310
2022	32,567	29,280	25,304	20,979	14,795	11,676	11,265	11,241	11,077	14,066	22,262	34,886	239,399
2023	32,279	29,022	25,081	20,794	14,664	11,573	11,166	11,141	10,979	13,942	22,066	34,578	237,286
2024	32,068	28,832	24,917	20,658	14,569	11,498	11,093	11,069	10,908	13,851	21,922	34,352	235,736
2025	31,867	28,652	24,761	20,529	14,477	11,426	11,023	10,999	10,839	13,764	21,784	34,137	234,258
2026	31,667	28,471	24,605	20,399	14,386	11,354	10,954	10,930	10,771	13,678	21,647	33,922	232,785
2027	31,497	28,319	24,473	20,290	14,309	11,293	10,895	10,871	10,713	13,604	21,531	33,740	231,535
2028	31,330	28,169	24,343	20,182	14,233	11,233	10,837	10,814	10,657	13,532	21,417	33,562	230,309
2029	31,155	28,011	24,207	20,070	14,154	11,170	10,777	10,753	10,597	13,456	21,297	33,374	229,020
2030	30,984	27,857	24,074	19,959	14,076	11,109	10,717	10,694	10,539	13,383	21,180	33,191	227,764
2031	30,936	27,815	24,037	19,929	14,054	11,092	10,701	10,678	10,523	13,362	21,148	33,140	227,415
2032	30,881	27,765	23,995	19,894	14,029	11,072	10,682	10,659	10,504	13,338	21,110	33,081	227,012
2033	30,833	27,722	23,957	19,863	14,008	11,055	10,665	10,642	10,488	13,318	21,078	33,030	226,659
2034	30,789	27,682	23,923	19,834	13,987	11,039	10,650	10,627	10,472	13,298	21,047	32,982	226,329
2035	30,749	27,646	23,892	19,808	13,969	11,025	10,636	10,613	10,459	13,281	21,020	32,939	226,040

Southern California Gas Company
2016 California Gas Report
Figure 3: Cold Temperature Year Demand Forecast (MDth)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2015	39,025	34,988	29,713	24,255	16,237	12,326	11,710	11,679	11,558	15,302	25,900	42,000	274,693
2016	38,926	34,899	29,637	24,193	16,196	12,295	11,681	11,649	11,528	15,264	25,835	41,893	273,995
2017	38,816	34,800	29,553	24,125	16,150	12,260	11,647	11,616	11,496	15,220	25,761	41,774	273,218
2018	38,687	34,685	29,455	24,045	16,096	12,219	11,609	11,578	11,458	15,170	25,676	41,636	272,316
2019	38,543	34,555	29,345	23,955	16,036	12,174	11,566	11,535	11,415	15,113	25,580	41,481	271,299
2020	38,313	34,349	29,170	23,812	15,940	12,101	11,496	11,466	11,347	15,023	25,427	41,233	269,677
2021	38,057	34,120	28,976	23,653	15,834	12,020	11,420	11,390	11,271	14,923	25,258	40,958	267,881
2022	37,767	33,860	28,754	23,473	15,713	11,929	11,333	11,303	11,185	14,809	25,065	40,645	265,835
2023	37,444	33,570	28,509	23,272	15,579	11,827	11,236	11,206	11,089	14,682	24,851	40,298	263,562
2024	37,210	33,360	28,330	23,127	15,482	11,753	11,166	11,136	11,020	14,591	24,696	40,046	261,915
2025	36,987	33,160	28,161	22,988	15,389	11,682	11,099	11,069	10,954	14,503	24,548	39,806	260,347
2026	36,765	32,961	27,992	22,850	15,296	11,612	11,032	11,003	10,888	14,416	24,400	39,567	258,784
2027	36,578	32,794	27,850	22,734	15,219	11,553	10,976	10,947	10,833	14,343	24,276	39,366	257,469
2028	36,395	32,630	27,710	22,620	15,143	11,495	10,921	10,892	10,779	14,271	24,155	39,169	256,180
2029	36,202	32,457	27,563	22,500	15,062	11,434	10,863	10,834	10,722	14,195	24,027	38,961	254,821
2030	36,014	32,288	27,420	22,383	14,984	11,375	10,807	10,778	10,666	14,122	23,902	38,759	253,498
2031	35,957	32,237	27,376	22,348	14,960	11,357	10,790	10,761	10,649	14,099	23,864	38,697	253,094
2032	35,891	32,177	27,326	22,307	14,933	11,336	10,770	10,741	10,629	14,073	23,820	38,626	252,629
2033	35,833	32,126	27,282	22,271	14,909	11,318	10,752	10,724	10,612	14,051	23,782	38,564	252,223
2034	35,778	32,077	27,241	22,237	14,886	11,301	10,736	10,707	10,596	14,029	23,746	38,505	251,839
2035	35,730	32,034	27,204	22,207	14,866	11,285	10,722	10,693	10,582	14,010	23,714	38,454	251,501

Southern California Gas Company
2016 California Gas Report
Figure 4: Hot Temperature Year Demand Forecast (MDth)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2015	28,426	25,657	22,696	19,196	14,406	11,857	11,621	11,601	11,384	13,831	20,208	30,256	221,138
2016	28,332	25,572	22,621	19,133	14,358	11,818	11,582	11,563	11,347	13,785	20,142	30,156	220,408
2017	28,230	25,480	22,540	19,064	14,307	11,776	11,541	11,522	11,306	13,736	20,070	30,048	219,619
2018	28,117	25,379	22,450	18,988	14,249	11,728	11,495	11,476	11,261	13,681	19,989	29,928	218,741
2019	27,992	25,266	22,350	18,903	14,186	11,676	11,444	11,425	11,211	13,620	19,900	29,794	217,768
2020	27,806	25,097	22,201	18,777	14,091	11,598	11,367	11,349	11,136	13,529	19,768	29,596	216,316
2021	27,603	24,914	22,039	18,640	13,989	11,514	11,284	11,266	11,055	13,430	19,624	29,380	214,738
2022	27,375	24,708	21,857	18,486	13,873	11,419	11,191	11,173	10,963	13,319	19,461	29,137	212,963
2023	27,124	24,482	21,657	18,317	13,746	11,314	11,088	11,070	10,863	13,197	19,283	28,870	211,010
2024	26,937	24,313	21,508	18,191	13,651	11,236	11,012	10,994	10,788	13,106	19,150	28,671	209,558
2025	26,759	24,152	21,365	18,070	13,561	11,162	10,939	10,921	10,717	13,020	19,023	28,481	208,169
2026	26,581	23,992	21,223	17,950	13,471	11,087	10,866	10,849	10,646	12,933	18,897	28,292	206,786
2027	26,428	23,854	21,102	17,847	13,393	11,024	10,804	10,786	10,585	12,859	18,789	28,130	205,602
2028	26,279	23,719	20,982	17,746	13,318	10,962	10,743	10,725	10,525	12,786	18,682	27,971	204,438
2029	26,122	23,578	20,857	17,641	13,238	10,896	10,679	10,661	10,462	12,710	18,571	27,804	203,219
2030	25,969	23,440	20,735	17,537	13,161	10,832	10,617	10,599	10,401	12,636	18,462	27,641	202,029
2031	25,932	23,406	20,705	17,512	13,142	10,817	10,601	10,584	10,386	12,617	18,435	27,601	201,737
2032	25,888	23,366	20,670	17,482	13,119	10,798	10,583	10,566	10,368	12,596	18,404	27,554	201,394
2033	25,849	23,331	20,639	17,456	13,100	10,782	10,567	10,550	10,352	12,577	18,377	27,513	201,094
2034	25,814	23,299	20,611	17,432	13,082	10,768	10,553	10,535	10,338	12,560	18,351	27,475	200,818
2035	25,783	23,271	20,586	17,411	13,066	10,755	10,540	10,523	10,326	12,545	18,330	27,443	200,579

Southern California Gas Company
2016 California Gas Report
Figure 5: Base Temperature Year Demand Forecast (MDth)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2015	11,471	10,731	11,471	11,101	11,471	11,101	11,471	11,471	11,101	11,471	11,101	11,471	135,434
2016	11,405	10,669	11,405	11,037	11,405	11,037	11,405	11,405	11,037	11,405	11,037	11,405	134,652
2017	11,336	10,605	11,336	10,971	11,336	10,971	11,336	11,336	10,971	11,336	10,971	11,336	133,843
2018	11,265	10,539	11,265	10,902	11,265	10,902	11,265	11,265	10,902	11,265	10,902	11,265	133,004
2019	11,189	10,467	11,189	10,828	11,189	10,828	11,189	11,189	10,828	11,189	10,828	11,189	132,103
2020	11,089	10,374	11,089	10,731	11,089	10,731	11,089	11,089	10,731	11,089	10,731	11,089	130,922
2021	10,985	10,276	10,985	10,631	10,985	10,631	10,985	10,985	10,631	10,985	10,631	10,985	129,693
2022	10,871	10,170	10,871	10,521	10,871	10,521	10,871	10,871	10,521	10,871	10,521	10,871	128,351
2023	10,749	10,056	10,749	10,403	10,749	10,403	10,749	10,749	10,403	10,749	10,403	10,749	126,911
2024	10,653	9,965	10,653	10,309	10,653	10,309	10,653	10,653	10,309	10,653	10,309	10,653	125,770
2025	10,559	9,878	10,559	10,219	10,559	10,219	10,559	10,559	10,219	10,559	10,219	10,559	124,669
2026	10,467	9,791	10,467	10,129	10,467	10,129	10,467	10,467	10,129	10,467	10,129	10,467	123,574
2027	10,384	9,714	10,384	10,049	10,384	10,049	10,384	10,384	10,049	10,384	10,049	10,384	122,597
2028	10,302	9,638	10,302	9,970	10,302	9,970	10,302	10,302	9,970	10,302	9,970	10,302	121,634
2029	10,218	9,559	10,218	9,889	10,218	9,889	10,218	10,218	9,889	10,218	9,889	10,218	120,640
2030	10,135	9,482	10,135	9,808	10,135	9,808	10,135	10,135	9,808	10,135	9,808	10,135	119,663
2031	10,126	9,472	10,126	9,799	10,126	9,799	10,126	10,126	9,799	10,126	9,799	10,126	119,549
2032	10,113	9,461	10,113	9,787	10,113	9,787	10,113	10,113	9,787	10,113	9,787	10,113	119,403
2033	10,102	9,451	10,102	9,776	10,102	9,776	10,102	10,102	9,776	10,102	9,776	10,102	119,272
2034	10,094	9,442	10,094	9,768	10,094	9,768	10,094	10,094	9,768	10,094	9,768	10,094	119,169
2035	10,087	9,436	10,087	9,761	10,087	9,761	10,087	10,087	9,761	10,087	9,761	10,087	119,087

Southern California Gas Company
2016 California Gas Report
Figure 6: 2015 Historical Data

Segment	2015 Therm Sales	2015 Meter Count	2015 Meter Count: Pre-1979 Customers	2015 Meter Count: 1979-2014 Customers	2015 Meter Count: 2015 "New" Customers	Avg Annual Consumption: Pre-1979 Customers	Avg Annual Consumption: 1979-2014 Customers	Avg Annual Consumption: 2015 "New" Customers	Price Elasticity
Single Family	1,729,654,810	3,648,669	2,378,983	1,255,521	14,164	474	476	380	-0.1053
Multi-Family <= 4 Units	185,236,671	561,406	416,813	142,877	1,717	335	317	285	-0.11171
Multi-Family > 4 Units	368,824,033	1,212,315	718,772	484,673	8,870	311	295	272	-0.07145
Master Meter	144,841,338	38,615	34,574	3,980	61	3,369	6,941	12,086	-0.0688
Sub-Meter	50,596,576	1,891	1,780	111	0	26,482	31,199	0	-0.1053

Southern California Gas Company
2016 California Gas Report
Figure 7: Meter Count Forecast

Year	Single Family	Multi-Family <= 4 Units	Multi-Family > 4 Units	Master Meter	Sub-Meter
2015	3,648,669	561,406	1,212,315	38,615	1,891
2016	3,671,900	564,611	1,219,235	38,615	1,891
2017	3,684,884	569,408	1,229,594	38,615	1,891
2018	3,699,742	574,309	1,240,177	38,615	1,891
2019	3,714,537	579,268	1,250,885	38,615	1,891
2020	3,729,228	584,224	1,261,589	38,615	1,891
2021	3,744,147	589,180	1,272,290	38,615	1,891
2022	3,759,223	594,121	1,282,959	38,615	1,891
2023	3,774,352	599,036	1,293,572	38,615	1,891
2024	3,789,503	603,953	1,304,192	38,615	1,891
2025	3,804,739	608,880	1,314,831	38,615	1,891
2026	3,819,967	613,837	1,325,534	38,615	1,891
2027	3,835,226	618,843	1,336,345	38,615	1,891
2028	3,850,640	623,885	1,347,234	38,615	1,891
2029	3,866,146	628,959	1,358,190	38,615	1,891
2030	3,881,537	634,065	1,369,216	38,615	1,891
2031	3,896,854	639,195	1,380,294	38,615	1,891
2032	3,912,201	644,338	1,391,398	38,615	1,891
2033	3,927,532	649,479	1,402,501	38,615	1,891
2034	3,942,848	654,624	1,413,611	38,615	1,891
2035	3,958,157	659,777	1,424,739	38,615	1,891

Southern California Gas Company
2016 California Gas Report
Figure 8: Appliance Unit Energy Consumption (Gas in Therms, Electric in Kwh)

		Single Family		Multi-Family <= 4 Units		Multi-Family > 4 Units		Master Meter		Sub-Meter	
End-Use	Efficiency	Gas	Electric	Gas	Electric	Gas	Electric	Gas	Electric	Gas	Electric
Space Heating	Stock	270	4,110	150	730	110	730	130	730	270	1,340
	Standard	250	3,730	140	670	100	670	120	670	250	1,210
	High	230	3,450	130	620	100	620	110	620	230	1,120
	Premium	210	3,170	120	570	90	570	100	570	210	1,030
Water Heating	Stock	170	2,440	130	2,440	100	2,440	120	2,440	170	2,010
	Standard	150	2,220	120	2,220	100	2,220	110	2,220	150	1,830
	High	140	2,110	110	2,110	100	2,110	100	2,110	140	1,740
	Premium	140	2,050	110	2,050	90	2,050	100	2,050	140	1,690
Cooking	Stock	28	574	26	465	26	465	26	465	28	514
	Standard	24	488	22	395	22	395	22	395	24	437
Drying	Stock	41	1,442	35	1,442	30	1,442	33	1,442	41	873
	Standard	39	1,370	33	1,370	28	1,370	31	1,370	39	830
Pool	Stock	123	3,431	-	-	-	-	-	-	-	-
Spa	Stock	100	290	-	-	-	-	-	-	-	-
Fireplace	Stock	17	0	-	-	-	-	-	-	-	-
BBQ	Stock	16	0	15	0	13	0	14	0	16	0

Southern California Gas Company
2016 California Gas Report
Figure 9: Average and Marginal Gas Prices ($/therm)

Year	Res Price Deflator	R SF Average Price	R SF Marginal Price	R MF2 Average Price	R MF2 Marginal Price	R MF3 Average Price	R MF3 Marginal Price	R MM Average Price	R MM Marginal Price	R SM Average Price	R SM Marginal Price
2015	100.0	0.8878	0.9195	0.8789	0.9195	0.8576	0.9195	0.8602	0.9195	0.8883	0.9195
2016	101.0	0.8706	0.9023	0.8617	0.9023	0.8404	0.9023	0.8430	0.9023	0.8711	0.9023
2017	103.4	0.8508	0.8826	0.8420	0.8826	0.8207	0.8826	0.8233	0.8826	0.8514	0.8826
2018	106.1	0.8535	0.8852	0.8447	0.8852	0.8233	0.8852	0.8259	0.8852	0.8540	0.8852
2019	108.9	0.8626	0.8943	0.8538	0.8943	0.8325	0.8943	0.8351	0.8943	0.8631	0.8943
2020	111.7	0.8966	0.9283	0.8877	0.9283	0.8664	0.9283	0.8690	0.9283	0.8971	0.9283
2021	114.7	0.9428	0.9745	0.9339	0.9745	0.9126	0.9745	0.9152	0.9745	0.9433	0.9745
2022	117.7	1.0019	1.0336	0.9931	1.0336	0.9718	1.0336	0.9744	1.0336	1.0024	1.0336
2023	120.6	1.0735	1.1052	1.0646	1.1052	1.0433	1.1052	1.0459	1.1052	1.0740	1.1052
2024	123.6	1.1222	1.1539	1.1133	1.1539	1.0920	1.1539	1.0946	1.1539	1.1227	1.1539
2025	126.5	1.1691	1.2008	1.1603	1.2008	1.1390	1.2008	1.1416	1.2008	1.1696	1.2008
2026	129.4	1.2178	1.2495	1.2089	1.2495	1.1876	1.2495	1.1902	1.2495	1.2183	1.2495
2027	132.3	1.2582	1.2899	1.2493	1.2899	1.2280	1.2899	1.2306	1.2899	1.2587	1.2899
2028	135.4	1.3000	1.3317	1.2912	1.3317	1.2699	1.3317	1.2725	1.3317	1.3005	1.3317
2029	138.5	1.3473	1.3791	1.3385	1.3791	1.3172	1.3791	1.3198	1.3791	1.3479	1.3791
2030	141.6	1.3947	1.4264	1.3859	1.4264	1.3645	1.4264	1.3671	1.4264	1.3952	1.4264
2031	144.9	1.4398	1.4715	1.4310	1.4715	1.4097	1.4715	1.4123	1.4715	1.4403	1.4715
2032	148.2	1.4897	1.5214	1.4808	1.5214	1.4595	1.5214	1.4621	1.5214	1.4902	1.5214
2033	151.7	1.5377	1.5694	1.5288	1.5694	1.5075	1.5694	1.5101	1.5694	1.5382	1.5694
2034	155.2	1.5892	1.6210	1.5804	1.6210	1.5591	1.6210	1.5617	1.6210	1.5898	1.6210
2035	158.9	1.6403	1.6720	1.6314	1.6720	1.6101	1.6720	1.6127	1.6720	1.6408	1.6720

Southern California Gas Company
2016 California Gas Report
Figure 10: Average and Marginal Electricity Prices (Cents/KWh)

Year	R SF Average Price	R SF Marginal Price	R MF2 Average Price	R MF2 Marginal Price	R MF3 Average Price	R MF3 Marginal Price	R MM Average Price	R MM Marginal Price	R SM Average Price	R SM Marginal Price
2015	17.62	26.67	17.45	26.40	17.02	25.76	17.08	17.66	17.63	19.84
2016	17.50	26.48	17.32	26.21	16.89	25.56	16.94	17.52	17.51	19.70
2017	18.39	27.83	18.20	27.54	17.74	26.84	17.79	18.40	18.40	20.71
2018	19.09	28.88	18.89	28.58	18.41	27.86	18.47	19.10	19.10	21.49
2019	20.11	30.43	19.90	30.12	19.41	29.37	19.47	20.13	20.12	22.65
2020	21.03	31.83	20.83	31.51	20.33	30.76	20.39	21.08	21.04	23.68
2021	21.91	33.16	21.71	32.85	21.21	32.10	21.27	22.00	21.93	24.67
2022	22.37	33.85	22.18	33.56	21.70	32.84	21.76	22.50	22.38	25.19
2023	23.04	34.87	22.85	34.58	22.39	33.89	22.45	23.21	23.05	25.94
2024	23.94	36.22	23.75	35.94	23.30	35.25	23.35	24.15	23.95	26.95
2025	24.54	37.13	24.35	36.85	23.91	36.17	23.96	24.78	24.55	27.63
2026	25.52	38.61	25.33	38.33	24.89	37.66	24.94	25.79	25.53	28.73
2027	26.15	39.57	25.97	39.29	25.52	38.62	25.58	26.45	26.16	29.44
2028	26.80	40.55	26.62	40.28	26.18	39.61	26.23	27.13	26.81	30.17
2029	27.46	41.55	27.28	41.28	26.84	40.62	26.90	27.81	27.47	30.91
2030	28.12	42.55	27.94	42.28	27.51	41.63	27.57	28.50	28.13	31.66
2031	28.82	43.62	28.65	43.35	28.22	42.70	28.27	29.24	28.83	32.45
2032	29.53	44.69	29.36	44.43	28.94	43.79	28.99	29.98	29.54	33.25
2033	30.27	45.80	30.10	45.54	29.68	44.91	29.73	30.74	30.28	34.07
2034	31.04	46.97	30.86	46.70	30.45	46.07	30.50	31.54	31.05	34.94
2035	31.82	48.15	31.65	47.89	31.23	47.26	31.29	32.35	31.83	35.82

Southern California Gas Company
2016 California Gas Report
Figure 11: Gas Appliance Equipment Cost (Nominal $)

End-Use	Customer Class	Stock Efficiency	Standard Efficiency	High Efficiency	Premium Efficiency
Space Heating	Single Family	4,000	4,600	4,800	5,000
	Multi-Family 2-4 Units	2,000	2,300	2,400	2,500
	Multi-Family > 4 Units	1,600	1,840	1,920	1,980
	Master Meter	1,000	1,150	1,200	1,250
	Sub-metered	1,600	1,840	1,920	1,980
Water Heating	Single Family	550	650	700	750
	Multi-Family 2-4 Units	330	390	420	450
	Multi-Family > 4 Units	330	390	420	450
	Master Meter	330	390	420	450
	Sub-metered	330	390	420	450
Cooking	Single Family	500	1,400	-	-
	Multi-Family 2-4 Units	300	1,400	-	-
	Multi-Family > 4 Units	250	1,400	-	-
	Master Meter	250	1,400	-	-
	Sub-metered	250	1,400	-	-
Drying	Single Family	328	482	-	-
	Multi-Family 2-4 Units	328	482	-	-
	Multi-Family > 4 Units	328	482	-	-
	Master Meter	328	482	-	-
	Sub-metered	328	482	-	-
Pool	Single Family	1,200	-	-	-
Spa	Single Family	2,000	-	-	-
Fireplace	Single Family	150	-	-	-
Barbecue	Single Family	1,000	-	-	-
	Multi-Family 2-4 Units	600	-	-	-
	Multi-Family > 4 Units	600	-	-	-
	Master Meter	600	-	-	-
	Sub-metered	600	-	-	-

Southern California Gas Company
2016 California Gas Report
Figure 12: Electric Appliance Equipment Cost (Nominal $)

End-Use	Customer Class	Stock Efficiency	Standard Efficiency	High Efficiency	Premium Efficiency
Space Heating	Single Family	4,100	999	999	999
	Multi-Family 2-4 Units	2,050	999	999	999
	Multi-Family > 4 Units	1,640	999	999	999
	Master Meter	1,025	999	999	999
	Sub-metered	1,640	999	999	999
Water Heating	Single Family	550	650	700	750
	Multi-Family 2-4 Units	330	390	420	450
	Multi-Family > 4 Units	330	390	420	450
	Master Meter	330	390	420	450
	Sub-metered	330	390	420	450
Cooking	Single Family	500	1,400	999	999
	Multi-Family 2-4 Units	300	1,400	999	999
	Multi-Family > 4 Units	250	1,400	999	999
	Master Meter	250	1,400	999	999
	Sub-metered	250	1,400	999	999
Drying	Single Family	328	482	999	999
	Multi-Family 2-4 Units	328	482	999	999
	Multi-Family > 4 Units	328	482	999	999
	Master Meter	328	482	999	999
	Sub-metered	328	482	999	999
Pool	Single Family	1,200	999	999	999
Spa	Single Family	2,000	999	999	999
Fireplace	Single Family	150	999	999	999
Barbecue	Single Family	1,000	999	999	999
	Multi-Family 2-4 Units	600	999	999	999
	Multi-Family > 4 Units	600	999	999	999
	Master Meter	600	999	999	999
	Sub-metered	600	999	999	999

Southern California Gas Company
Figure 13: Building Lives and Decay Rate

Building Type	Building decay Rate
Single Family	0.003
Multi-Family 2-4 Units	0.006
Multi-Family > 4 Units	0.006
Master Meter	0.008
Sub-Meter	0.008

Southern California Gas Company
2016 California Gas Report
Figure 14: Gas Appliance Age (Years)

		Single Family		Multi-Family 2-4 Units		Multi-Family > 4 Units		Master Meter		Sub-metered	
End-Use	**Vintage**	**Average**	**Max**	**Average**	**Max**	**Average**	**Max**	**Average**	**Max**	**Average**	**Max**
Space Heating	Pre-1979	16	16	18	18	23	23	20	20	16	16
	1979-2004	15	16	15	18	16	23	15	20	15	16
	2005-Current	5	16	4	18	4	23	4	20	5	16
Water Heating	Pre-1979	9	9	9	9	12	12	10	10	9	9
	1979-2004	9	9	9	9	10	12	10	10	9	9
	2005-Current	5	9	4	9	4	12	4	10	5	9
Cooking	Pre-1979	9	9	9	9	9	9	9	9	9	9
	1979-2004	9	9	8	9	9	9	8	9	9	9
	2005-Current	4	9	4	9	4	9	4	9	4	9
Drying	Pre-1979	7	7	7	7	6	7	7	7	7	7
	1979-2004	6	7	7	7	7	7	7	7	6	7
	2005-Current	4	7	3	7	3	7	3	7	4	7
Pool	Pre-1979	13	13	-	-	-	-	-	-	-	-
	1979-2004	9	13	-	-	-	-	-	-	-	-
	2005-Current	3	13	-	-	-	-	-	-	-	-
Spa	Pre-1979	11	11	-	-	-	-	-	-	-	-
	1979-2004	8	11	-	-	-	-	-	-	-	-
	2005-Current	3	11	-	-	-	-	-	-	-	-
Fireplace	Pre-1979	15	15	-	-	-	-	-	-	-	-
	1979-2004	15	15	-	-	-	-	-	-	-	-
	2005-Current	15	15	-	-	-	-	-	-	-	-
Barbecue	Pre-1979	7	7	6	6	5	7	5	6	7	7
	1979-2004	6	7	6	6	7	7	6	6	6	7
	2005-Current	4	7	4	6	3	7	4	6	4	7
Other	Pre-1979	15	15	15	15	15	15	15	15	15	15
	1979-2004	15	15	15	15	15	15	15	15	15	15
	2005-Current	15	15	15	15	15	15	15	15	15	15

Southern California Gas Company
2016 California Gas Report
Figure 15: End-Use Saturations

End-Use	Vintage	Single Family	Multi-Family 2-4 Units	Multi-Family > 4 Units	Master Meter	Sub-metered
Space Heating	Pre-1979	1.00000	1.00000	1.00000	1.00000	1.00000
	1979-2004	1.00000	1.00000	1.00000	1.00000	1.00000
	2005-Current	1.00000	1.00000	1.00000	1.00000	0.00000
Water Heating	Pre-1979	1.00000	1.00000	1.00000	1.00000	1.00000
	1979-2004	1.00000	1.00000	1.00000	1.00000	1.00000
	2005-Current	1.00000	1.00000	1.00000	1.00000	0.00000
Cooking	Pre-1979	1.00000	1.00000	0.99633	1.00000	1.00000
	1979-2004	1.00000	1.00000	1.00000	1.00000	1.00000
	2005-Current	1.00000	1.00000	1.00000	1.00000	0.00000
Drying	Pre-1979	0.85795	0.63122	0.20040	0.47158	0.47158
	1979-2004	0.89516	0.69314	0.42764	0.57182	0.57182
	2005-Current	0.92508	0.75324	0.74161	0.74768	0.00000
Pool	Pre-1979	0.15644	-	-	-	-
	1979-2004	0.17913	-	-	-	-
	2005-Current	0.16916	-	-	-	-
Spa	Pre-1979	0.12651	-	-	-	-
	1979-2004	0.21695	-	-	-	-
	2005-Current	0.19134	-	-	-	-
Fireplace	Pre-1979	0.22973	-	-	-	-
	1979-2004	0.27252	-	-	-	-
	2005-Current	0.26269	-	-	-	-
Barbecue	Pre-1979	0.13716	0.09015	0.04723	0.07424	0.07424
	1979-2004	0.25180	0.13557	0.06165	0.10179	0.10179
	2005-Current	0.31442	0.23862	0.07818	0.16198	0.00000
Other	Pre-1979	1.00000	1.00000	1.00000	1.00000	1.00000
	1979-2004	1.00000	1.00000	1.00000	1.00000	1.00000
	2005-Current	1.00000	1.00000	1.00000	1.00000	N/A

Southern California Gas Company
2016 California Gas Report
Figure 16: Gas Fuel Shares (average)

End-Use	Single Family	Multi-Family 2-4 Units	Multi-Family > 4 Units	Master Meter	Sub-metered
Space Heating	0.98200	0.94116	0.91179	0.92461	0.92461
Water Heating	0.97630	0.95244	0.89871	0.92997	0.92997
Cooking	0.83890	0.80100	0.82622	0.81058	0.81058
Drying	0.80258	0.74410	0.59654	0.70306	0.70306
Pool	0.49003	-	-	-	-
Spa	0.60804	-	-	-	-
Fireplace	0.56361	-	-	-	-
Barbecue	0.95008	0.90406	0.85803	0.89234	0.89234
Other	1.00000	1.00000	1.00000	1.00000	1.00000

Southern California Gas Company
2016 California Gas Report
Figure 17: Gas Efficiency Shares

End-Use	Customer Class	Stock Existing	Stock New	Standard Existing	Standard New	High Existing	High New	Premium Existing	Premium New
Space Heating	Single Family	0.06	0.06	0.78	0.78	0.14	0.14	0.02	0.02
	Multi-Family 2-4 Units	0.02	0.02	0.83	0.83	0.12	0.12	0.03	0.03
	Multi-Family > 4 Units	0.41	0.41	0.46	0.46	0.01	0.01	0.04	0.04
	Master Meter	0.17	0.17	0.69	0.69	0.11	0.11	0.03	0.03
	Sub-metered	0.06	0.06	0.78	0.78	0.14	0.14	0.02	0.02
Water Heating	Single Family	0.00	0.00	0.64	0.64	0.34	0.34	0.02	0.02
	Multi-Family 2-4 Units	0.00	0.00	0.55	0.55	0.44	0.44	0.01	0.01
	Multi-Family > 4 Units	0.00	0.00	0.61	0.61	0.37	0.37	0.02	0.02
	Master Meter	0.00	0.00	0.59	0.59	0.39	0.39	0.02	0.02
	Sub-metered	0.00	0.00	0.64	0.64	0.34	0.34	0.02	0.02
Cooking	Single Family	0.17	0.17	0.83	0.83	-	-	-	-
	Multi-Family 2-4 Units	0.16	0.16	0.84	0.84	-	-	-	-
	Multi-Family > 4 Units	0.18	0.18	0.82	0.82	-	-	-	-
	Master Meter	0.17	0.17	0.83	0.83	-	-	-	-
	Sub-metered	0.17	0.17	0.83	0.83	-	-	-	-
Drying	Single Family	0.07	0.07	0.93	0.93	-	-	-	-
	Multi-Family 2-4 Units	0.06	0.06	0.94	0.94	-	-	-	-
	Multi-Family > 4 Units	0.06	0.06	0.94	0.94	-	-	-	-
	Master Meter	0.06	0.06	0.94	0.94	-	-	-	-
	Sub-metered	0.07	0.07	0.93	0.93	-	-	-	-
Pool	Single Family	1.00	1.00	-	-	-	-	-	-
Spa	Single Family	1.00	1.00	-	-	-	-	-	-
Fireplace	Single Family	1.00	1.00	-	-	-	-	-	-
Barbecue	Single Family	1.00	1.00	-	-	-	-	-	-
	Multi-Family 2-4 Units	1.00	1.00	-	-	-	-	-	-
	Multi-Family > 4 Units	1.00	1.00	-	-	-	-	-	-
	Master Meter	1.00	1.00	-	-	-	-	-	-
	Sub-metered	1.00	1.00	-	-	-	-	-	-
Other	Single Family	1.00	1.00	-	-	-	-	-	-
	Multi-Family 2-4 Units	1.00	1.00	-	-	-	-	-	-
	Multi-Family > 4 Units	1.00	1.00	-	-	-	-	-	-
	Master Meter	1.00	1.00	-	-	-	-	-	-
	Sub-metered	1.00	1.00	-	-	-	-	-	-

Southern California Gas Company
2016 California Gas Report
Figure 18: Electric Efficiency Shares

End-Use	Customer Class	Stock Existing	Stock New	Standard Existing	Standard New	High Existing	High New	Premium Existing	Premium New
Space Heating	Single Family	1.00	1.00	-	-	-	-	-	-
	Multi-Family 2-4 Units	1.00	1.00	-	-	-	-	-	-
	Multi-Family > 4 Units	1.00	1.00	-	-	-	-	-	-
	Master Meter	1.00	1.00	-	-	-	-	-	-
	Sub-metered	1.00	1.00	-	-	-	-	-	-
Water Heating	Single Family	0.10	0.10	0.68	0.68	0.21	0.21	0.01	0.01
	Multi-Family 2-4 Units	0.22	0.22	0.61	0.61	0.16	0.16	0.01	0.01
	Multi-Family > 4 Units	0.13	0.13	0.76	0.76	0.10	0.10	0.01	0.01
	Master Meter	0.13	0.13	0.76	0.76	0.10	0.10	0.01	0.01
	Sub-metered	0.10	0.10	0.68	0.68	0.21	0.21	0.01	0.01
Cooking	Single Family	0.90	0.90	0.10	0.10	-	-	-	-
	Multi-Family 2-4 Units	0.95	0.95	0.05	0.05	-	-	-	-
	Multi-Family > 4 Units	0.95	0.95	0.05	0.05	-	-	-	-
	Master Meter	0.95	0.95	0.05	0.05	-	-	-	-
	Sub-metered	0.95	0.95	0.05	0.05	-	-	-	-
Drying	Single Family	0.75	0.75	0.25	0.25	-	-	-	-
	Multi-Family 2-4 Units	0.75	0.75	0.25	0.25	-	-	-	-
	Multi-Family > 4 Units	0.75	0.75	0.25	0.25	-	-	-	-
	Master Meter	0.75	0.75	0.25	0.25	-	-	-	-
	Sub-metered	0.75	0.75	0.25	0.25	-	-	-	-
Pool	Single Family	1.00	1.00	-	-	-	-	-	-
Spa	Single Family	1.00	1.00	-	-	-	-	-	-
Fireplace	Single Family	1.00	1.00	-	-	-	-	-	-
Barbecue	Single Family	1.00	1.00	-	-	-	-	-	-
	Multi-Family 2-4 Units	1.00	1.00	-	-	-	-	-	-
	Multi-Family > 4 Units	1.00	1.00	-	-	-	-	-	-
	Master Meter	1.00	1.00	-	-	-	-	-	-
	Sub-metered	1.00	1.00	-	-	-	-	-	-

2016 CALIFORNIA GAS REPORT

CORE COMMERCIAL & INDUSTRIAL

Core Commercial and Industrial End Use Model
2016 California Gas Report

Introduction

The G10 commercial and industrial gas demand forecast used the EUForecaster model to generate annual gas demand forecasts for the years 2016 through 2035.

The model segments the G-10 commercial and industrial markets into 14 sectors and 11 sectors by type of business activity, respectively. Business activity is determined by the NAICS code assigned to the customer and carried on the customer's billing record. A second segmentation within each specific business type involved further disaggregation into end-uses.

The gas demand forecast that results from the EUForecaster model is at the annual design HDD total of 1,340 for an Average Year. The gas demand forecasts under Cold, Hot and Base temperature were then constructed based on Cold Year (Hdd = 1,659), Hot Year (Hdd=1,021) and Base Year (Hdd=0) annual assumptions.

This *end use* forecasts under the above four temperature scenarios are then adjusted for a set of *post-model* adjustments. These adjustments consist of *reductions* for the EE/DSM savings provided by the EE/DSM group. An addition to load associated with (existing) G10 commercial and industrial customers who install electric self-generation equipment was included. This program was established initially by the State of California through AB970 and is now known as SGIP. Other adjustments to the load consist of the anticipated core to noncore migration expected and a reduction in load for the City of Vernon customers. The final adjustment adds both the Gas AC and Gas Engine demand forecasts into commercial G10 forecast. All of these post-model adjustments are summarized in tables that follow.

Data Sources

The key set of information used to perform the modeling and to generate the forecast includes historical year 2015 consumption and customer counts, employment forecasts, gas and electric energy use intensity (EUI) values, end-use saturations, fuel and efficiency shares, gas and electric price forecasts, equipment age, use per meter for existing and new customers, and equipment cost. A description of each component follows.

A. Historical Year 2015 Sales:

The historical data are extracted from the billing tables in the Customer Information System (CIS). The gas consumption by business type was adjusted to our 1,340 average year HDD.

B. Employment Data:

The level of employment in each business type is used as a measure of economic activity in the G-10 commercial and industrial demand forecast models. The employment data series matches the NAICS categories used to develop the historical consumption data. The employment data were compiled and totaled for the 12 counties comprising SoCalGas' service territory. The forecast data comes from Global Insight's Regional forecast released in 2016 and based on Global Insight's latest US Economic Forecast. The historical 2015 data comes from the California Employment Development Department.

Data Sources

The key set of information used to perform the modeling and to generate the forecast includes historical year 2015 consumption and customer counts, employment forecasts, gas and electric energy use intensity (EUI) values, end-use saturations, fuel and efficiency shares, gas and electric price forecasts, equipment age, use per meter for existing and new customers, and equipment cost. A description of each component follows.

A. Historical Year 2015 Sales:

The historical data are extracted from the billing tables in the Customer Information System (CIS). The gas consumption by business type was adjusted to our 1,340 average year HDD.

B. Employment Data:

The level of employment in each business type is used as a measure of economic activity in the G-10 commercial and industrial demand forecast models. The employment data series matches the NAICS categories used to develop the historical consumption data. The employment data were compiled and totaled for the 12 counties comprising SoCalGas' service territory. The forecast data is based on Global Insight's Regional forecast.

Gas Price Data:

Average and marginal gas prices ($/therm) were calculated from forecasts of the G-10 rate components. We used detailed consumption data on our core G-10 C&I, customers, to separate monthly consumption for customers by each respective C&I business type into the respective G-10 consumption tiers. (The most recent 12-month calendar period, January 2015 through December 2015, was used.)

For a given business type, the average gas commodity rate for the 12-month period was calculated for each year. The average commodity rate in each forecast year was developed using the same monthly consumption pattern, but with the forecasts of rates for each G-10 rate tier. The average gas price each year was then calculated by including the non-volumetric customer charges with the year's average gas commodity rate.

Each respective business type's marginal gas commodity rate (for each month) was calculated by "pricing" the entire month's consumption at the G-10 rate's tier that was the last tier with non-zero consumption, the marginal consumption tier, for the customers of the given business type. The marginal gas price was then calculated as the simple average of the 12 monthly marginal commodity rates. The forecasts for each year used the same monthly consumption pattern, but used the projected G-10 price of the marginal consumption tier.

Electric Price Data:

Both average prices (cents/kWh) and marginal prices (cents/kWh) were developed as electricity price inputs. Forecasts for the SCE commercial and industrial customer classes were developed based on the California Energy Commission's December 2015 updated forecast rates for California energy demand (forecast for the SCE planning area, under "Mid-Case" demand for electricity) for the SCE service area through our forecast time horizon.

For the G-10 core commercial market, the average electricity prices were set equal to 112% of the CEC's projections for the SCE commercial class. The marginal prices were calculated by multiplying each year's respective average price by a ratio. This ratio, 1.000, was estimated from an analysis of the SCE GS-2 rate schedule posted on their web-site in March 2006. (These customers were assumed to be small non-self-generation customers who also were *not* on time-of-use rates.)

For the G-10 core industrial market, the retail price for this group was assumed to be at 88% of the retail price projected for SCE's commercial customer class. The marginal prices were calculated by multiplying each year's respective average price by a ratio. This ratio, 0.789, was estimated from an analysis of the SCE GS-2 rate schedule posted on their web-site in March 2006. (These customers were assumed to be large non-self-generation customers who also were on time-of-use rates.)

To impute, in each year, average and marginal electricity prices to each core commercial (industrial) business type, we simply calculated the ratio of the average (or marginal) gas price to the overall core commercial (industrial) gas price for each business type, then multiplied by the overall average (or marginal) electricity price.

E. Building and Equipment Decay Rates:

Building decay rates are based on buildings' lifetimes, where the lifetime is defined as the length of time it takes for either a demolition or a major renovation in which major systems are replaced. For existing core buildings and facilities, an exponential rate of decay of 1% per year was assumed, consistent with an average remaining life for existing buildings of 100 years. (A building decay rate concept is not relevant to non-core large gas transport customers. In both the commercial and industrial non-core models the existing building decay rate was set equal to zero.)

All new construction decay rates were assumed to be zero over the forecast horizon. This assumption was required because the growth of new buildings and facilities was tied directly to the econometric models.

End-Use lifetimes were derived from a variety of sources.

Commercial:

Space heat: 25 years
Water heat: 15 years
AC/compressor: 20 years
All other commercial end-uses: 15 years

Industrial:

Fire-tube boiler: 25 years
Water-tube boiler: 25 years
Engine (motors): 25 years
All other industrial end-uses: 20 years

F. Equipment Saturations, Fuel Shares, and Efficiency Shares:

EUForecaster defines saturation as the percentage of customers in any segment that has a particular end use, independent of fuel shares. EUForecaster adjusted core commercial fuel shares according to a set of fuel-choice equations over the forecast horizon.

End-use saturations in the industrial model were initially set equal to 100%. Industrial end-use gas fuel shares were initially approximated. We then used an iterative procedure to further adjust industrial saturation and fuel shares such that the EUForecaster sales totals matched SoCalGas industrial sales figures, and our estimates of electric usage by SoCalGas customers. Finally, all commercial and industrial fuel shares were held constant over the forecast horizon.

Energy efficiency varied within the major gas end-uses/processes, including all boilers, space heat, and water heat. Four levels of efficiency were assigned to gas equipment: low, medium (standard) high, and premium for core commercial and three levels of efficiency were assigned to gas equipment: low, medium (standard), and high for core industrial market. California and federal standards have effectively eliminated the lowest efficiency alternatives for several gas end-uses from being purchased as new or replacement equipment. The lowest efficiency alternative for these end uses is, therefore, allowed to exist in the base year stock, but the customer must then purchase either medium (e.g., equipment that just meets Government standards), high or premium efficiency equipment as these units decay.

For existing equipment stock, the low efficiency share was set to 50%, whereas the medium efficiency share ranges from 40 to 45%, and the high efficiency share ranges from 5 to 10%.

EUForecaster's choice module prorates the low share to the medium, high and premium alternatives in proportion to their shares noted above. Therefore, replacement and new construction efficiency shares for medium range from 80% to 90%, and high ranges from 10% to 20%.

G. DSM Forecast:

The end-use gas demand forecast developed with EUForecaster does not capture the effects of SoCalGas' EE/DSM programs. Energy savings goals from the CPUC's mandated energy efficiency/energy conservation programs for the core commercial and industrial were provided by SoCalGas' DSM department. These savings are subtracted from the forecast generated by the core commercial and industrial forecasts generated by EUForecaster.

Gas Air Conditioning and Gas Engines

A special tariff for gas air-conditioning rates went into effect at the end of 1993, while a special tariff for gas engine rates started in early 1995. The forecasts of core gas air conditioning and gas engine demand are based on the latest information provided by customers. Both segments are forecasted based on the expected number of customers in each market times their usage per customer.

AMI

Annual conservation benefits associated with AMI are estimated by SoCalGas to represent 1% of core gas throughput in the post-deployment period.

The Core Commercial and the Core Industrial loads were reduced by AMI's projected savings

G10 COMMERCIAL DATA TABLES

Sector	Space Heater	Water Heater	Cooktop	Griddle	Fryer	Other Cooking Equipment	Kitchen Equipment	AC	Dryer	Engine	Other	
Office	1987	1983	1984	1977	1984	1983	1973	2000	1984	1988		1975
Restaurant	1987	1988	1987	1986	1986	1989	1981	1993	1985	1978		1980
Retail	1993	1983	1992	1985	1988	1992	1973	1976	1990	1994		1975
Laundry	1985	1999	2008	1995	1979	1979	1939	1975	1991	.		2006
Warehouse	1987	1984	1983	1983	2002	1995	1974	1975	1989	1996		1976
School	1993	1982	1981	1974	1979	1979	1968	1973	1980	1986		1973
College	1994	1988	1978	1980	1968	1986	1971	1979	1989	1981		1974
Health	1985	1984	1980	1976	1979	1981	1974	1975	1980	1981		1974
Lodging	1993	1990	1992	1979	1990	1991	1973	1975	1985	1984		1977
Misc	1982	1980	1982	1973	1981	1987	1970	1974	1982	1989		1971
Government	1987	1983	1981	1975	1981	1984	1986	1975	1986	1989		1973
TCU	1982	1980	1984	1982	1984	1986	1980	1975	1979	1979		1974
Construction	1986	1983	1988	1974	1993	1987	1972	1973	1993	1980		1974
Agriculture	1992	1989	1982	1965	1978	1978	1978	1976	1981	1998		1988

Southern California Gas Company
2016 California Gas Report
Average Electric Prices (Cents/KWh)

Year	C Agriculture Average Price	C College Average Price	C Construction Average Price	C Government Average Price	C Health Average Price	C Laundry Average Price	C Lodging Average Price	C Misc Average Price	C Office Average Price	C Restaurant Average Price	C Retail Average Price	C School Average Price	C TCU Average Price	C Warehouse Average Price
2015	18.57	17.64	18.18	16.12	15.89	17.28	14.92	15.33	15.80	18.34	15.77	15.50	16.74	13.60
2016	18.13	17.33	17.80	15.89	15.60	16.97	14.72	15.12	15.58	17.92	15.54	15.26	16.39	13.47
2017	19.25	18.31	18.86	16.63	16.32	17.89	15.29	15.75	16.27	19.01	16.23	15.91	17.23	13.84
	19.80	18.86	19.41	17.15	16.79	18.43	15.76	16.23	16.78	19.55	16.72	16.39	17.72	14.28
2018	20.66	19.72	20.27	17.99	17.63	19.28	16.59	17.07	17.61	20.41	17.56	17.22	18.57	15.09
2019	21.52	20.58	21.13	18.80	18.40	20.12	17.34	17.83	18.41	21.26	18.34	17.98	19.35	15.80
2020	22.22	21.34	21.85	19.58	19.15	20.87	18.13	18.62	19.19	21.97	19.12	18.75	20.08	16.61
2021	22.42	21.61	22.08	19.94	19.50	21.16	18.54	19.01	19.56	22.19	19.48	19.13	20.37	17.08
2022	22.96	22.22	22.65	20.52	20.02	21.74	19.09	19.56	20.13	22.74	20.04	19.66	20.88	17.61
2023	23.70	22.98	23.40	21.27	20.74	22.49	19.80	20.29	20.87	23.47	20.77	20.38	21.59	18.32
2024	24.12	23.43	23.83	21.73	21.18	22.93	20.27	20.75	21.33	23.89	21.22	20.83	22.02	18.79
2025	24.90	24.24	24.63	22.53	21.95	23.73	21.04	21.53	22.12	24.68	22.01	21.61	22.79	19.55
2026	25.38	24.74	25.11	23.00	22.39	24.22	21.49	21.98	22.59	25.16	22.47	22.05	23.23	19.98
2027	25.87	25.24	25.61	23.49	22.85	24.71	21.95	22.45	23.07	25.65	22.94	22.51	23.69	20.42
2028	26.34	25.74	26.09	23.98	23.31	25.20	22.42	22.92	23.55	26.12	23.42	22.98	24.15	20.88
2029	26.82	26.24	26.57	24.47	23.78	25.69	22.90	23.40	24.03	26.60	23.89	23.45	24.61	21.35
2030	27.34	26.78	27.10	24.98	24.26	26.21	23.38	23.90	24.54	27.12	24.39	23.94	25.09	21.81
2031	27.85	27.31	27.62	25.50	24.76	26.73	23.88	24.40	25.06	27.63	24.90	24.44	25.59	22.30
2032	28.39	27.87	28.17	26.04	25.26	27.28	24.39	24.91	25.58	28.17	25.42	24.94	26.09	22.78
2033	28.95	28.45	28.74	26.60	25.79	27.84	24.92	25.45	26.13	28.73	25.96	25.47	26.62	23.30
2034	29.54	29.06	29.33	27.16	26.31	28.43	25.44	25.98	26.68	29.32	26.50	26.00	27.16	23.78
2035														

Southern California Gas Company
2016 California Gas Report
Average Electric Prices (Cents/KWh)

Year	C Agriculture Average Price	C College Average Price	C Construction Average Price	C Government Average Price	C Health Average Price	C Laundry Average Price	C Lodging Average Price	C Misc Average Price	C Office Average Price	C Restaurant Average Price	C Retail Average Price	C School Average Price	C TCU Average Price	C Warehouse Average Price
2015	18.57	17.64	18.18	16.12	15.89	17.28	14.92	15.33	15.80	18.34	15.77	15.50	16.74	13.60
2016	18.13	17.33	17.80	15.89	15.60	16.97	14.72	15.12	15.58	17.92	15.54	15.26	16.39	13.47
2017	19.25	18.31	18.86	16.63	16.32	17.89	15.29	15.75	16.27	19.01	16.23	15.91	17.23	13.84
	19.80	18.86	19.41	17.15	16.79	18.43	15.76	16.23	16.78	19.55	16.72	16.39	17.72	14.28
2018	20.66	19.72	20.27	17.99	17.63	19.28	16.59	17.07	17.61	20.41	17.56	17.22	18.57	15.09
2019	21.52	20.58	21.13	18.80	18.40	20.12	17.34	17.83	18.41	21.26	18.34	17.98	19.35	15.80
2020	22.22	21.34	21.85	19.58	19.15	20.87	18.13	18.62	19.19	21.97	19.12	18.75	20.08	16.61
2021	22.42	21.61	22.08	19.94	19.50	21.16	18.54	19.01	19.56	22.19	19.48	19.13	20.37	17.08
2022	22.96	22.22	22.65	20.52	20.02	21.74	19.09	19.56	20.13	22.74	20.04	19.66	20.88	17.61
2023	23.70	22.98	23.40	21.27	20.74	22.49	19.80	20.29	20.87	23.47	20.77	20.38	21.59	18.32
2024	24.12	23.43	23.83	21.73	21.18	22.93	20.27	20.75	21.33	23.89	21.22	20.83	22.02	18.79
2025	24.90	24.24	24.63	22.53	21.95	23.73	21.04	21.53	22.12	24.68	22.01	21.61	22.79	19.55
2026	25.38	24.74	25.11	23.00	22.39	24.22	21.49	21.98	22.59	25.16	22.47	22.05	23.23	19.98
2027	25.87	25.24	25.61	23.49	22.85	24.71	21.95	22.45	23.07	25.65	22.94	22.51	23.69	20.42
2028	26.34	25.74	26.09	23.98	23.31	25.20	22.42	22.92	23.55	26.12	23.42	22.98	24.15	20.88
2029	26.82	26.24	26.57	24.47	23.78	25.69	22.90	23.40	24.03	26.60	23.89	23.45	24.61	21.35
2030	27.34	26.78	27.10	24.98	24.26	26.21	23.38	23.90	24.54	27.12	24.39	23.94	25.09	21.81
2031	27.85	27.31	27.62	25.50	24.76	26.73	23.88	24.40	25.06	27.63	24.90	24.44	25.59	22.30
2032	28.39	27.87	28.17	26.04	25.26	27.28	24.39	24.91	25.58	28.17	25.42	24.94	26.09	22.78
2033	28.95	28.45	28.74	26.60	25.79	27.84	24.92	25.45	26.13	28.73	25.96	25.47	26.62	23.30
2034	29.54	29.06	29.33	27.16	26.31	28.43	25.44	25.98	26.68	29.32	26.50	26.00	27.16	23.78
2035														

Southern California Gas Company
2016 California Gas Report
Average Gas Prices ($/Therm)

Year	Com Price Deflator	C Agriculture Marginal Price	C College Marginal Price	C Construction Marginal Price	C Government Marginal Price	C Health Marginal Price	C Laundry Marginal Price	C Lodging Marginal Price	C Misc Marginal Price	C Office Marginal Price	C Restaurant Marginal Price	C Retail Marginal Price	C School Marginal Price	C TCU Marginal Price	C Warehouse Marginal Price
2015	100.00	0.6669	0.6813	0.6720	0.6402	0.5956	0.6383	0.5755	0.5994	0.6101	0.6644	0.5997	0.5907	0.6077	0.5409
2016	101.05	0.7397	0.7552	0.7452	0.7108	0.6625	0.7087	0.6408	0.6667	0.6782	0.7370	0.6670	0.6572	0.6756	0.6033
2017	103.39	0.6562	0.6715	0.6616	0.6277	0.5802	0.6257	0.5588	0.5843	0.5957	0.6535	0.5846	0.5750	0.5930	0.5219
2018	106.10	0.6768	0.6925	0.6823	0.6474	0.5986	0.6454	0.5765	0.6027	0.6145	0.6740	0.6030	0.5932	0.6118	0.5385
2019	108.86	0.7046	0.7203	0.7101	0.6752	0.6264	0.6732	0.6043	0.6305	0.6423	0.7018	0.6309	0.6210	0.6396	0.5664
2020	111.74	0.7333	0.7495	0.7390	0.7030	0.6525	0.7008	0.6297	0.6568	0.6689	0.7304	0.6571	0.6469	0.6661	0.5905
2021	114.71	0.7975	0.8142	0.8034	0.7662	0.7140	0.7640	0.6905	0.7185	0.7310	0.7945	0.7188	0.7083	0.7281	0.6500
2022	117.68	0.8752	0.8925	0.8813	0.8429	0.7890	0.8406	0.7647	0.7936	0.8066	0.8722	0.7940	0.7831	0.8036	0.7229
2023	120.60	0.9388	0.9572	0.9453	0.9044	0.8471	0.9020	0.8213	0.8520	0.8658	0.9355	0.8524	0.8409	0.8626	0.7768
2024	123.57	0.9887	1.0076	0.9953	0.9533	0.8943	0.9508	0.8677	0.8993	0.9135	0.9853	0.8997	0.8878	0.9102	0.8219
2025	126.47	1.0410	1.0605	1.0479	1.0046	0.9440	1.0021	0.9166	0.9491	0.9637	1.0376	0.9495	0.9373	0.9603	0.8695
2026	129.36	1.0969	1.1170	1.1040	1.0595	0.9972	1.0569	0.9690	1.0025	1.0175	1.0934	1.0029	0.9903	1.0140	0.9207
2027	132.35	1.1318	1.1523	1.1390	1.0933	1.0292	1.0906	1.0003	1.0347	1.0501	1.1281	1.0351	1.0222	1.0465	0.9506
2028	135.41	1.1685	1.1896	1.1759	1.1290	1.0631	1.1262	1.0334	1.0687	1.0846	1.1647	1.0692	1.0559	1.0809	0.9823
2029	138.50	1.2167	1.2384	1.2243	1.1761	1.1085	1.1732	1.0779	1.1142	1.1305	1.2128	1.1147	1.1010	1.1267	1.0255
2030	141.62	1.2639	1.2861	1.2717	1.2222	1.1527	1.2192	1.1214	1.1587	1.1754	1.2599	1.1591	1.1451	1.1715	1.0675
2031	144.91	1.3028	1.3257	1.3109	1.2600	1.1886	1.2570	1.1565	1.1947	1.2119	1.2987	1.1952	1.1808	1.2079	1.1011
2032	148.23	1.3518	1.3753	1.3600	1.3078	1.2345	1.3047	1.2015	1.2408	1.2584	1.3476	1.2413	1.2265	1.2543	1.1446
2033	151.65	1.3943	1.4185	1.4028	1.3492	1.2739	1.3460	1.2400	1.2804	1.2984	1.3900	1.2809	1.2657	1.2943	1.1816
2034	155.23	1.4422	1.4670	1.4509	1.3958	1.3185	1.3925	1.2836	1.3251	1.3436	1.4378	1.3256	1.3100	1.3393	1.2236
2035	158.87	1.4735	1.4990	1.4824	1.4258	1.3464	1.4224	1.3105	1.3532	1.3722	1.4689	1.3537	1.3377	1.3678	1.2489

Southern California Gas Company
2016 California Gas Report
Marginal Gas Prices ($/Therm)

Year	Com Price Deflator	C Agriculture Marginal Price	C College Marginal Price	C Construction Marginal Price	C Government Marginal Price	C Health Marginal Price	C Laundry Marginal Price	C Lodging Marginal Price	C Misc Marginal Price	C Office Marginal Price	C Restaurant Marginal Price	C Retail Marginal Price	C School Marginal Price	C TCU Marginal Price	C Warehouse Marginal Price
2015	100.00	0.6669	0.6813	0.6720	0.6402	0.5956	0.6383	0.5755	0.5994	0.6101	0.6644	0.5997	0.5907	0.6077	0.5409
2016	101.05	0.7397	0.7552	0.7452	0.7108	0.6625	0.7087	0.6408	0.6667	0.6782	0.7370	0.6670	0.6572	0.6756	0.6033
2017	103.39	0.6562	0.6715	0.6616	0.6277	0.5802	0.6257	0.5588	0.5843	0.5957	0.6535	0.5846	0.5750	0.5930	0.5219
2018	106.10	0.6768	0.6925	0.6823	0.6474	0.5986	0.6454	0.5765	0.6027	0.6145	0.6740	0.6030	0.5932	0.6118	0.5385
2019	108.86	0.7046	0.7203	0.7101	0.6752	0.6264	0.6732	0.6043	0.6305	0.6423	0.7018	0.6309	0.6210	0.6396	0.5664
2020	111.74	0.7333	0.7495	0.7390	0.7030	0.6525	0.7008	0.6297	0.6568	0.6689	0.7304	0.6571	0.6469	0.6661	0.5905
2021	114.71	0.7975	0.8142	0.8034	0.7662	0.7140	0.7640	0.6905	0.7185	0.7310	0.7945	0.7188	0.7083	0.7281	0.6500
2022	117.68	0.8752	0.8925	0.8813	0.8429	0.7890	0.8406	0.7647	0.7936	0.8066	0.8722	0.7940	0.7831	0.8036	0.7229
2023	120.60	0.9388	0.9572	0.9453	0.9044	0.8471	0.9020	0.8213	0.8520	0.8658	0.9355	0.8524	0.8409	0.8626	0.7768
2024	123.57	0.9887	1.0076	0.9953	0.9533	0.8943	0.9508	0.8677	0.8993	0.9135	0.9853	0.8997	0.8878	0.9102	0.8219
2025	126.47	1.0410	1.0605	1.0479	1.0046	0.9440	1.0021	0.9166	0.9491	0.9637	1.0376	0.9495	0.9373	0.9603	0.8695
2026	129.36	1.0969	1.1170	1.1040	1.0595	0.9972	1.0569	0.9690	1.0025	1.0175	1.0934	1.0029	0.9903	1.0140	0.9207
2027	132.35	1.1318	1.1523	1.1390	1.0933	1.0292	1.0906	1.0003	1.0347	1.0501	1.1281	1.0351	1.0222	1.0465	0.9506
2028	135.41	1.1685	1.1896	1.1759	1.1290	1.0631	1.1262	1.0334	1.0687	1.0846	1.1647	1.0692	1.0559	1.0809	0.9823
2029	138.50	1.2167	1.2384	1.2243	1.1761	1.1085	1.1732	1.0779	1.1142	1.1305	1.2128	1.1147	1.1010	1.1267	1.0255
2030	141.62	1.2639	1.2861	1.2717	1.2222	1.1527	1.2192	1.1214	1.1587	1.1754	1.2599	1.1591	1.1451	1.1715	1.0675
2031	144.91	1.3028	1.3257	1.3109	1.2600	1.1886	1.2570	1.1565	1.1947	1.2119	1.2987	1.1952	1.1808	1.2079	1.1011
2032	148.23	1.3518	1.3753	1.3600	1.3078	1.2345	1.3047	1.2015	1.2408	1.2584	1.3476	1.2413	1.2265	1.2543	1.1446
2033	151.65	1.3943	1.4185	1.4028	1.3492	1.2739	1.3460	1.2400	1.2804	1.2984	1.3900	1.2809	1.2657	1.2943	1.1816
2034	155.23	1.4422	1.4670	1.4509	1.3958	1.3185	1.3925	1.2836	1.3251	1.3436	1.4378	1.3256	1.3100	1.3393	1.2236
2035	158.87	1.4735	1.4990	1.4824	1.4258	1.3464	1.4224	1.3105	1.3532	1.3722	1.4689	1.3537	1.3377	1.3678	1.2489

Southern California Gas Company
2016 California Gas Report
2015 Historical Data

Segment	Therm Sales	Meter Count	Meter Count, Existing/Old customers	Meter Count New Customers	Avg Use Per Meter Existing Customers	Avg Use Per Meter New Customers	Price Elasticity
Office	66,704,316	41,683	41,326	357	1,593	2,465	-0.135376
Restaurant	263,791,034	38,499	38,142	357	6,847	7,412	-0.091877
Retail	56,013,979	24,193	24,092	101	2,307	4,206	-0.265060
Laundry	62,141,533	4,192	4,174	18	14,725	37,744	-0.122795
Warehouse	19,880,191	7,488	7,461	27	2,650	3,882	-0.043035
School	32,344,507	6,738	6,717	21	4,759	18,081	-0.000001
College	23,741,252	2,794	2,769	25	8,539	3,920	-0.037179
Health	59,012,643	7,118	7,096	22	8,296	6,420	-0.096826
Lodging	59,962,769	4,816	4,803	13	12,444	14,962	-0.105697
Misc	73,293,140	34,442	34,108	334	2,093	5,755	-0.000001
Government	24,498,160	3,642	3,629	13	6,648	28,787	-0.095709
TCU	25,935,449	6,398	6,374	24	4,029	10,601	-0.129301
Construction	9,784,961	5,493	5,449	44	1,700	11,876	-0.161076
Agriculture	37,443,918	1,448	1,438	10	25,830	29,976	-0.315282

Southern California Gas Company
2016 California Gas Report
Core Commercial Use Per Meter for New Customers (therms)

Sector	Space Heater	Water Heater	Cooktop	Griddle	Fryer	Other Cooking Equipment	Kitchen Equipment	AC	Dryer	Engine	Other	Total Building
Office	198	737	149	61	43	24	1	1	37	27	129	1406
Restaurant	171	1585	864	1377	274	517	1	1	1	1	430	5220
Retail	1889	607	303	4	12	211	1	1	1	1	1	3025
Laundry	1	9511	1	1	1	1	1	1	14889	1	1	24400
Warehouse	2526	537	1	11	1	1	1	1	1	1	1	3073
School	772	5667	24	60	3	32	1	1	2	1	1	6560
College	189	2034	1	1	1	1	1	1	1	1	516	2739
Health	2173	1739	4	1	1	1	1	1	1	1	1	3919
Lodging	2239	10609	1	7	0	1	1	1	306	1	139	13300
Misc	411	2808	161	247	46	90	1	1	37	97	236	4133
Government	1086	14687	1	1	1	1	1	1	1	5	1	15777
TCU	2	1	1	1	1	1	1	1	1	2138	5596	7736
Construction	2530	1445	1441	343	996	1	1	1	1	1	1	6754
Agriculture	1	1	1	1	1	1	1	1	379	28059	1	28439

Southern California Gas Company
2016 California Gas Report - Commercial G10
UEC, Equipment Cost and Efficiency Shares

Where Fuel = 1 (gas) and = 2 (electric), and
Efficiency =1 (stock), =2 (standard), =3 (high) and =4 (premium)

Business Types	End Use	Fuel	Efficiency	uec (therm/SqFt)	Equipment Cost	efficiency shares
Office	Space_Heat	1	1	0.3046	4.3149	0.65
Office	Space_Heat	1	2	0.2742	4.7464	0.3
Office	Space_Heat	1	3	0.2495	5.1779	0.04
Office	Space_Heat	1	4	0.2248	5.6094	0.01
Office	Space_Heat	2	1	6.2481	3.4519	1
Office	Space_Heat	2	2	5.6233	3.7971	0
Office	Space_Heat	2	3	5.1172	4.1423	0
Office	Space_Heat	2	4	4.6111	4.4875	0
Office	Water_Heat	1	1	0.0474	0.6712	0.4
Office	Water_Heat	1	2	0.0427	0.7384	0.5
Office	Water_Heat	1	3	0.0373	0.8055	0.08
Office	Water_Heat	1	4	0.032	0.8726	0.02
Office	Water_Heat	2	1	0.972	0.537	0.4
Office	Water_Heat	2	2	0.8748	0.5907	0.5
Office	Water_Heat	2	3	0.7654	0.6444	0.08
Office	Water_Heat	2	4	0.6561	0.6981	0.02
Office	Cooking	1	1	0.0346	0.4899	0.65
Office	Cooking	1	2	0.0311	0.5389	0.35
Office	Cooking	2	1	0.7094	0.3919	0.65
Office	Cooking	2	2	0.6385	0.4311	0.35
Office	AC_Compressor	1	1	0.1043	1.4773	0.65
Office	AC_Compressor	1	2	0.0939	1.6251	0.35
Office	AC_Compressor	2	1	2.1392	1.1819	0.65
Office	AC_Compressor	2	2	1.9253	1.3	0.35
Office	Other	1	1	0	0	1
Office	Other	2	1	0	0	0
Restaurant	Space_Heat	1	1	0.1177	1.5841	0.65
Restaurant	Space_Heat	1	2	0.1059	1.7425	0.3
Restaurant	Space_Heat	1	3	0.0964	1.9009	0.04
Restaurant	Space_Heat	1	4	0.0868	2.0593	0.01
Restaurant	Space_Heat	2	1	2.4134	1.2673	1
Restaurant	Space_Heat	2	2	2.1721	1.394	0
Restaurant	Space_Heat	2	3	1.9766	1.5207	0
Restaurant	Space_Heat	2	4	1.7811	1.6474	0
Restaurant	Water_Heat	1	1	0.8666	11.666	0.4
Restaurant	Water_Heat	1	2	0.7799	12.8326	0.5
Restaurant	Water_Heat	1	3	0.6824	13.9992	0.08
Restaurant	Water_Heat	1	4	0.5849	15.1658	0.02
Restaurant	Water_Heat	2	1	17.7736	9.3328	0.4
Restaurant	Water_Heat	2	2	15.9962	10.2661	0.5
Restaurant	Water_Heat	2	3	13.9967	11.1994	0.08
Restaurant	Water_Heat	2	4	11.9972	12.1327	0.02
Restaurant	Cook_top	1	1	1.1985	16.1343	0.65

Business Types	End Use	Fuel	Efficiency	(therm/SqFt)	Equipment Cost	efficiency shares
Restaurant	Cook_top	1	2	1.0787	17.7477	0.35
Restaurant	Cook_top	2	1	24.5811	12.9074	0.65
Restaurant	Cook_top	2	2	22.123	14.1981	0.35
Restaurant	Fryer	1	1	1.0791	14.5274	0.65
Restaurant	Fryer	1	2	0.9712	15.9802	0.35
Restaurant	Fryer	2	1	22.133	11.622	0.65
Restaurant	Fryer	2	2	19.9197	12.7841	0.35
Restaurant	Griddle	1	1	0.9107	12.2603	0.65
Restaurant	Griddle	1	2	0.8197	13.4863	0.35
Restaurant	Griddle	2	1	18.6789	9.8082	0.65
Restaurant	Griddle	2	2	16.8111	10.789	0.35
Restaurant	Other_Cooking	1	1	0.9712	13.0747	0.65
Restaurant	Other_Cooking	1	2	0.8741	14.3822	0.35
Restaurant	Other_Cooking	2	1	19.9197	10.4598	0.65
Restaurant	Other_Cooking	2	2	17.9278	11.5057	0.35
Restaurant	AC_Compressor	1	1	0.2028	2.7306	0.65
Restaurant	AC_Compressor	1	2	0.1826	3.0036	0.35
Restaurant	AC_Compressor	2	1	4.1601	2.1844	0.65
Restaurant	AC_Compressor	2	2	3.7441	2.4029	0.35
Restaurant	Other	1	1	0	0	1
Restaurant	Other	2	1	0	0	0
Retail	Space_Heat	1	1	0.2455	3.5122	0.65
Retail	Space_Heat	1	2	0.221	3.8634	0.3
Retail	Space_Heat	1	3	0.2011	4.2146	0.04
Retail	Space_Heat	1	4	0.1812	4.5658	0.01
Retail	Space_Heat	2	1	5.0356	2.8097	1
Retail	Space_Heat	2	2	4.532	3.0907	0
Retail	Space_Heat	2	3	4.1241	3.3717	0
Retail	Space_Heat	2	4	3.7163	3.6527	0
Retail	Water_Heat	1	1	0.1093	1.563	0.4
Retail	Water_Heat	1	2	0.0983	1.7193	0.5
Retail	Water_Heat	1	3	0.086	1.8756	0.08
Retail	Water_Heat	1	4	0.0738	2.0319	0.02
Retail	Water_Heat	2	1	2.2409	1.2504	0.4
Retail	Water_Heat	2	2	2.0168	1.3754	0.5
Retail	Water_Heat	2	3	1.7647	1.5004	0.08
Retail	Water_Heat	2	4	1.5126	1.6255	0.02
Retail	Cooking	1	1	0.3079	4.4039	0.65
Retail	Cooking	1	2	0.2771	4.8443	0.35
Retail	Cooking	2	1	6.3142	3.5231	0.65
Retail	Cooking	2	2	5.683	3.875	0.35
Retail	Other	1	1	0	0	1
Retail	Other	2	1	0	0	0
Laundry	Space_Heat	1	1	0.147	1.836	0.65
Laundry	Space_Heat	1	2	0.132	2.02	0.3
Laundry	Space_Heat	1	3	0.12	2.203	0.04
Laundry	Space_Heat	1	4	0.108	2.387	0.01
Laundry	Space_Heat	2	1	3.012	1.469	1
Laundry	Space_Heat	2	2	2.711	1.616	0
Laundry	Space_Heat	2	3	2.467	1.763	0
Laundry	Space_Heat	2	4	2.223	1.909	0
Laundry	Water_Heat	1	1	2.76	34.512	0.4
Laundry	Water_Heat	1	2	2.484	37.963	0.5
Laundry	Water_Heat	1	3	2.174	41.414	0.08

Business Types	End Use	Fuel	Efficiency	(therm/SqFt)	Equipment Cost	efficiency shares
Laundry	Water_Heat	1	4	1.863	44.865	0.02
Laundry	Water_Heat	2	1	56.617	27.609	0.4
Laundry	Water_Heat	2	2	50.955	30.37	0.5
Laundry	Water_Heat	2	3	44.586	33.131	0.08
Laundry	Water_Heat	2	4	38.216	35.892	0.02
Laundry	Drying	1	1	14.937	186.738	0.65
Laundry	Drying	1	2	13.443	205.412	0.35
Laundry	Drying	2	1	306.348	149.39	0.65
Laundry	Drying	2	2	275.713	164.329	0.35
Laundry	Other	1	1	0	0	1
Laundry	Other	2	1	0	0	0
Warehouse	Space_Heat	1	1	0.621	7.909	0.65
Warehouse	Space_Heat	1	2	0.559	8.7	0.3
Warehouse	Space_Heat	1	3	0.509	9.491	0.04
Warehouse	Space_Heat	1	4	0.458	10.282	0.01
Warehouse	Space_Heat	2	1	12.739	6.327	1
Warehouse	Space_Heat	2	2	11.465	6.96	0
Warehouse	Space_Heat	2	3	10.433	7.593	0
Warehouse	Space_Heat	2	4	9.401	8.225	0
Warehouse	Water_Heat	1	1	0.205	2.608	0.4
Warehouse	Water_Heat	1	2	0.184	2.869	0.5
Warehouse	Water_Heat	1	3	0.161	3.13	0.08
Warehouse	Water_Heat	1	4	0.138	3.39	0.02
Warehouse	Water_Heat	2	1	4.2	2.086	0.4
Warehouse	Water_Heat	2	2	3.78	2.295	0.5
Warehouse	Water_Heat	2	3	3.308	2.504	0.08
Warehouse	Water_Heat	2	4	2.835	2.712	0.02
Warehouse	Engine	1	1	8.884	113.127	0.65
Warehouse	Engine	1	2	7.995	124.44	0.35
Warehouse	Engine	2	1	182.207	90.502	0.65
Warehouse	Engine	2	2	163.986	99.552	0.35
Warehouse	Other	1	1	0	0	1
Warehouse	Other	2	1	0	0	0
School	Space_Heat	1	1	0.092	1.225	0.65
School	Space_Heat	1	2	0.083	1.348	0.3
School	Space_Heat	1	3	0.076	1.471	0.04
School	Space_Heat	1	4	0.068	1.593	0.01
School	Space_Heat	2	1	1.895	0.98	1
School	Space_Heat	2	2	1.705	1.078	0
School	Space_Heat	2	3	1.552	1.176	0
School	Space_Heat	2	4	1.398	1.274	0
School	Water_Heat	1	1	0.123	1.635	0.4
School	Water_Heat	1	2	0.111	1.799	0.5
School	Water_Heat	1	3	0.097	1.962	0.08
School	Water_Heat	1	4	0.083	2.126	0.02
School	Water_Heat	2	1	2.528	1.308	0.4
School	Water_Heat	2	2	2.276	1.439	0.5
School	Water_Heat	2	3	1.991	1.57	0.08
School	Water_Heat	2	4	1.707	1.701	0.02
School	Cook_top	1	1	0.046	0.61	0.65
School	Cook_top	1	2	0.041	0.671	0.35
School	Cook_top	2	1	0.943	0.488	0.65
School	Cook_top	2	2	0.849	0.537	0.35
School	Fryer	1	1	0.046	0.612	0.65

Business Types	End Use	Fuel	Efficiency	(therm/SqFt)	Equipment Cost	efficiency shares
School	Fryer	1	2	0.041	0.673	0.35
School	Fryer	2	1	0.946	0.489	0.65
School	Fryer	2	2	0.851	0.538	0.35
School	Griddle	1	1	0.046	0.612	0.65
School	Griddle	1	2	0.041	0.673	0.35
School	Griddle	2	1	0.946	0.489	0.65
School	Griddle	2	2	0.851	0.538	0.35
School	Other_Cooking	1	1	0.046	0.61	0.65
School	Other_Cooking	1	2	0.041	0.671	0.35
School	Other_Cooking	2	1	0.943	0.488	0.65
School	Other_Cooking	2	2	0.849	0.537	0.35
School	AC_Compressor	1	1	0.065	0.866	0.65
School	AC_Compressor	1	2	0.059	0.953	0.35
School	AC_Compressor	2	1	1.339	0.693	0.65
School	AC_Compressor	2	2	1.205	0.762	0.35
School	Other	1	1	0	0	1
School	Other	2	1	0	0	0
College	Space_Heat	1	1	0.26643	3.14441	0.65
College	Space_Heat	1	2	0.23979	3.45885	0.3
College	Space_Heat	1	3	0.21821	3.77329	0.04
College	Space_Heat	1	4	0.19663	4.08773	0.01
College	Space_Heat	2	1	5.46443	2.51553	1
College	Space_Heat	2	2	4.91799	2.76708	0
College	Space_Heat	2	3	4.47537	3.01863	0
College	Space_Heat	2	4	4.03275	3.27018	0
College	Water_Heat	1	1	0.28715	3.38894	0.4
College	Water_Heat	1	2	0.25844	3.72784	0.5
College	Water_Heat	1	3	0.22613	4.06673	0.08
College	Water_Heat	1	4	0.19383	4.40563	0.02
College	Water_Heat	2	1	5.88939	2.71116	0.4
College	Water_Heat	2	2	5.30045	2.98227	0.5
College	Water_Heat	2	3	4.6379	3.25339	0.08
College	Water_Heat	2	4	3.97534	3.5245	0.02
College	Cook_top	1	1	0.0486	0.57358	0.65
College	Cook_top	1	2	0.04374	0.63093	0.35
College	Cook_top	2	1	0.99678	0.45886	0.65
College	Cook_top	2	2	0.8971	0.50475	0.35
College	Fryer	1	1	0.04857	0.57322	0.65
College	Fryer	1	2	0.04371	0.63055	0.35
College	Fryer	2	1	0.99616	0.45858	0.65
College	Fryer	2	2	0.89655	0.50444	0.35
College	Griddle	1	1	0.04857	0.57322	0.65
College	Griddle	1	2	0.04371	0.63055	0.35
College	Griddle	2	1	0.99616	0.45858	0.65
College	Griddle	2	2	0.89655	0.50444	0.35
College	Other_Cooking	1	1	0.0486	0.57358	0.65
College	Other_Cooking	1	2	0.04374	0.63093	0.35
College	Other_Cooking	2	1	0.99678	0.45886	0.65
College	Other_Cooking	2	2	0.8971	0.50475	0.35
College	AC_Compressor	1	1	0.11819	1.3949	0.65
College	AC_Compressor	1	2	0.10637	1.53439	0.35
College	AC_Compressor	2	1	2.4241	1.11592	0.65
College	AC_Compressor	2	2	2.18169	1.22752	0.35
College	Other	1	1	0	0	1

Business Types	End Use	Fuel	Efficiency	(therm/SqFt)	Equipment Cost	efficiency shares
College	Other	2	1	0	0	0
Health	Space_Heat	1	1	0.06894	0.8825	0.65
Health	Space_Heat	1	2	0.06205	0.97075	0.3
Health	Space_Heat	1	3	0.05646	1.059	0.04
Health	Space_Heat	1	4	0.05088	1.14725	0.01
Health	Space_Heat	2	1	1.41395	0.706	1
Health	Space_Heat	2	2	1.27255	0.7766	0
Health	Space_Heat	2	3	1.15802	0.8472	0
Health	Space_Heat	2	4	1.04349	0.9178	0
Health	Water_Heat	1	1	0.41709	5.33917	0.4
Health	Water_Heat	1	2	0.37538	5.87309	0.5
Health	Water_Heat	1	3	0.32846	6.407	0.08
Health	Water_Heat	1	4	0.28154	6.94092	0.02
Health	Water_Heat	2	1	8.55444	4.27134	0.4
Health	Water_Heat	2	2	7.699	4.69847	0.5
Health	Water_Heat	2	3	6.73662	5.1256	0.08
Health	Water_Heat	2	4	5.77425	5.55274	0.02
Health	Cook_top	1	1	0.26358	3.37409	0.65
Health	Cook_top	1	2	0.23722	3.7115	0.35
Health	Cook_top	2	1	5.40598	2.69927	0.65
Health	Cook_top	2	2	4.86538	2.9692	0.35
Health	Fryer	1	1	0.26358	3.37409	0.65
Health	Fryer	1	2	0.23722	3.7115	0.35
Health	Fryer	2	1	5.40598	2.69927	0.65
Health	Fryer	2	2	4.86538	2.9692	0.35
Health	Griddle	1	1	0.26358	3.37409	0.65
Health	Griddle	1	2	0.23722	3.7115	0.35
Health	Griddle	2	1	5.40598	2.69927	0.65
Health	Griddle	2	2	4.86538	2.9692	0.35
Health	Other_Cooking	1	1	0.02636	0.33743	0.65
Health	Other_Cooking	1	2	0.02372	0.37118	0.35
Health	Other_Cooking	2	1	0.54064	0.26995	0.65
Health	Other_Cooking	2	2	0.48657	0.29694	0.35
Health	Drying	1	1	0.14598	1.86871	0.65
Health	Drying	1	2	0.13138	2.05558	0.35
Health	Drying	2	1	2.99405	1.49497	0.65
Health	Drying	2	2	2.69465	1.64446	0.35
Health	AC_Compressor	1	1	0.11386	1.45749	0.65
Health	AC_Compressor	1	2	0.10247	1.60324	0.35
Health	AC_Compressor	2	1	2.3352	1.16599	0.65
Health	AC_Compressor	2	2	2.10168	1.28259	0.35
Health	Other	1	1	0	0	1
Health	Other	2	1	0	0	0
Lodging	Space_Heat	1	1	0.38698	4.85892	0.65
Lodging	Space_Heat	1	2	0.3483	5.3448	0.3
Lodging	Space_Heat	1	3	0.3169	5.8307	0.04
Lodging	Space_Heat	1	4	0.2856	6.3166	0.01
Lodging	Space_Heat	2	1	7.9369	3.8871	1
Lodging	Space_Heat	2	2	7.1432	4.2759	
Lodging	Space_Heat	2	3	6.5003	4.6646	
Lodging	Space_Heat	2	4	5.8574	5.0533	
Lodging	Water_Heat	1	1	0.6901	8.6651	0.4
Lodging	Water_Heat	1	2	0.6211	9.5317	0.5
Lodging	Water_Heat	1	3	0.5435	10.3982	0.08

Business Types	End Use	Fuel	Efficiency	(therm/SqFt)	Equipment Cost	efficiency shares
Lodging	Water_Heat	1	4	0.4658	11.2647	0.02
Lodging	Water_Heat	2	1	14.1542	6.9321	0.4
Lodging	Water_Heat	2	2	12.7388	7.6253	0.5
Lodging	Water_Heat	2	3	11.1465	8.3185	0.08
Lodging	Water_Heat	2	4	9.5541	9.0118	0.02
Lodging	Cook_top	1	1	0.321	4.0305	0.65
Lodging	Cook_top	1	2	0.2889	4.4335	0.35
Lodging	Cook_top	2	1	6.5837	3.2244	0.65
Lodging	Cook_top	2	2	5.9253	3.5468	0.35
Lodging	Fryer	1	1	0.4183	5.2524	0.65
Lodging	Fryer	1	2	0.3765	5.7777	0.35
Lodging	Fryer	2	1	8.5797	4.2019	0.65
Lodging	Fryer	2	2	7.7217	4.6221	0.35
Lodging	Griddle	1	1	0.4183	5.2524	0.65
Lodging	Griddle	1	2	0.3765	5.7777	0.35
Lodging	Griddle	2	1	8.5797	4.2019	0.65
Lodging	Griddle	2	2	7.7217	4.6221	0.35
Lodging	Other_Cooking	1	1	0.041	0.5148	0.65
Lodging	Other_Cooking	1	2	0.0369	0.5663	0.35
Lodging	Other_Cooking	2	1	0.8409	0.4118	0.65
Lodging	Other_Cooking	2	2	0.7568	0.453	0.35
Lodging	Drying	1	1	0.1725	2.1663	0.65
Lodging	Drying	1	2	0.1553	2.3829	0.35
Lodging	Drying	2	1	3.5386	1.733	0.65
Lodging	Drying	2	2	3.1847	1.9063	0.35
Lodging	AC_Compressor	1	1	0.057	0.7157	0.65
Lodging	AC_Compressor	1	2	0.0513	0.7872	0.35
Lodging	AC_Compressor	2	1	1.169	0.5725	0.65
Lodging	AC_Compressor	2	2	1.0521	0.6298	0.35
Lodging	Other	1	1	0	0	1
Lodging	Other	2	1	0	0	0
Misc	Space_Heat	1	1	0.1469	2.1455	0.65
Misc	Space_Heat	1	2	0.1322	2.36	0.3
Misc	Space_Heat	1	3	0.1203	2.5746	0.04
Misc	Space_Heat	1	4	0.1084	2.7891	0.01
Misc	Space_Heat	2	1	3.0121	1.7164	1
Misc	Space_Heat	2	2	2.7109	1.888	0
Misc	Space_Heat	2	3	2.4669	2.0597	0
Misc	Space_Heat	2	4	2.2229	2.2313	0
Misc	Water_Heat	1	1	0.2013	2.9412	0.4
Misc	Water_Heat	1	2	0.1812	3.2354	0.5
Misc	Water_Heat	1	3	0.1585	3.5295	0.08
Misc	Water_Heat	1	4	0.1359	3.8236	0.02
Misc	Water_Heat	2	1	4.1292	2.353	0.4
Misc	Water_Heat	2	2	3.7163	2.5883	0.5
Misc	Water_Heat	2	3	3.2518	2.8236	0.08
Misc	Water_Heat	2	4	2.7872	3.0589	0.02
Misc	Cook_top	1	1	0.043	0.6282	0.65
Misc	Cook_top	1	2	0.0387	0.691	0.35
Misc	Cook_top	2	1	0.8819	0.5025	0.65
Misc	Cook_top	2	2	0.7937	0.5528	0.35
Misc	Fryer	1	1	0.043	0.6285	0.65
Misc	Fryer	1	2	0.0387	0.6913	0.35
Misc	Fryer	2	1	0.8823	0.5028	0.65

Business Types	End Use	Fuel	Efficiency	(therm/SqFt)	Equipment Cost	efficiency shares
Misc	Fryer	2	2	0.7941	0.5531	0.35
Misc	Griddle	1	1	0.043	0.6285	0.65
Misc	Griddle	1	2	0.0387	0.6913	0.35
Misc	Griddle	2	1	0.8823	0.5028	0.65
Misc	Griddle	2	2	0.7941	0.5531	0.35
Misc	Other_Cooking	1	1	0.043	0.6282	0.65
Misc	Other_Cooking	1	2	0.0387	0.691	0.35
Misc	Other_Cooking	2	1	0.8819	0.5025	0.65
Misc	Other_Cooking	2	2	0.7937	0.5528	0.35
Misc	AC_Compressor	1	1	0.1322	1.9306	0.65
Misc	AC_Compressor	1	2	0.1189	2.1237	0.35
Misc	AC_Compressor	2	1	2.7104	1.5445	0.65
Misc	AC_Compressor	2	2	2.4394	1.6989	0.35
Misc	Other	1	1	0	0	1
Misc	Other	2	1	0	0	0
Government	Space_Heat	1	1	0.3046	3.815	0.65
Government	Space_Heat	1	2	0.2742	4.1965	0.3
Government	Space_Heat	1	3	0.2495	4.578	0.04
Government	Space_Heat	1	4	0.2248	4.9595	0.01
Government	Space_Heat	2	1	6.2481	3.052	1
Government	Space_Heat	2	2	5.6233	3.3572	0
Government	Space_Heat	2	3	5.1172	3.6624	0
Government	Space_Heat	2	4	4.6111	3.9676	0
Government	Water_Heat	1	1	0.0474	0.5935	0.4
Government	Water_Heat	1	2	0.0427	0.6528	0.5
Government	Water_Heat	1	3	0.0373	0.7122	0.08
Government	Water_Heat	1	4	0.032	0.7715	0.02
Government	Water_Heat	2	1	0.972	0.4748	0.4
Government	Water_Heat	2	2	0.8748	0.5222	0.5
Government	Water_Heat	2	3	0.7654	0.5697	0.08
Government	Water_Heat	2	4	0.6561	0.6172	0.02
Government	Cook_top	1	1	0.0346	0.4333	0.65
Government	Cook_top	1	2	0.0311	0.4766	0.35
Government	Cook_top	2	1	0.7096	0.3466	0.65
Government	Cook_top	2	2	0.6387	0.3813	0.35
Government	Fryer	1	1	0.0346	0.4332	0.65
Government	Fryer	1	2	0.0311	0.4765	0.35
Government	Fryer	2	1	0.7094	0.3465	0.65
Government	Fryer	2	2	0.6385	0.3812	0.35
Government	Griddle	1	1	0.0346	0.4332	0.65
Government	Griddle	1	2	0.0311	0.4765	0.35
Government	Griddle	2	1	0.7094	0.3465	0.65
Government	Griddle	2	2	0.6385	0.3812	0.35
Government	Other_Cooking	1	1	0.0346	0.4333	0.65
Government	Other_Cooking	1	2	0.0311	0.4766	0.35
Government	Other_Cooking	2	1	0.7096	0.3466	0.65
Government	Other_Cooking	2	2	0.6387	0.3813	0.35
Government	AC_Compressor	1	1	0.1043	1.3062	0.65
Government	AC_Compressor	1	2	0.0939	1.4368	0.35
Government	AC_Compressor	2	1	2.1392	1.0449	0.65
Government	AC_Compressor	2	2	1.9253	1.1494	0.35
Government	Other	1	1	0	0	1
Government	Other	2	1	0	0	0
TCU	Space_Heat	1	1	0.1469	1.8457	0.65

Business Types	End Use	Fuel	Efficiency	(therm/SqFt)	Equipment Cost	efficiency shares
TCU	Space_Heat	1	2	0.1322	2.0303	0.3
TCU	Space_Heat	1	3	0.1203	2.2149	0.04
TCU	Space_Heat	1	4	0.1084	2.3995	0.01
TCU	Space_Heat	2	1	3.0121	1.4766	1
TCU	Space_Heat	2	2	2.7109	1.6242	0
TCU	Space_Heat	2	3	2.4669	1.7719	0
TCU	Space_Heat	2	4	2.2229	1.9196	0
TCU	Water_Heat	1	1	0.2013	2.5303	0.4
TCU	Water_Heat	1	2	0.1812	2.7833	0.5
TCU	Water_Heat	1	3	0.1585	3.0364	0.08
TCU	Water_Heat	1	4	0.1359	3.2894	0.02
TCU	Water_Heat	2	1	4.1292	2.0243	0.4
TCU	Water_Heat	2	2	3.7163	2.2267	0.5
TCU	Water_Heat	2	3	3.2518	2.4291	0.08
TCU	Water_Heat	2	4	2.7872	2.6315	0.02
TCU	Engine	1	1	2.4409	30.6768	0.65
TCU	Engine	1	2	2.1968	33.7445	0.35
TCU	Engine	2	1	50.0617	24.5415	0.65
TCU	Engine	2	2	45.0556	26.9956	0.35
TCU	Other	1	1	0	0	1
TCU	Other	2	1	0	0	0
Construction	Space_Heat	1	1	0.1469	2.2951	0.65
Construction	Space_Heat	1	2	0.1322	2.5246	0.3
Construction	Space_Heat	1	3	0.1203	2.7542	0.04
Construction	Space_Heat	1	4	0.1084	2.9837	0.01
Construction	Space_Heat	2	1	3.0121	1.8361	1
Construction	Space_Heat	2	2	2.7109	2.0197	0
Construction	Space_Heat	2	3	2.4669	2.2033	0
Construction	Space_Heat	2	4	2.2229	2.3869	0
Construction	Water_Heat	1	1	0.2013	3.1464	0.4
Construction	Water_Heat	1	2	0.1812	3.461	0.5
Construction	Water_Heat	1	3	0.1585	3.7757	0.08
Construction	Water_Heat	1	4	0.1359	4.0903	0.02
Construction	Water_Heat	2	1	4.1292	2.5171	0.4
Construction	Water_Heat	2	2	3.7163	2.7688	0.5
Construction	Water_Heat	2	3	3.2518	3.0205	0.08
Construction	Water_Heat	2	4	2.7872	3.2722	0.02
Construction	Other	1	1	0	0	1
Construction	Other	2	1	0	0	0
Agriculture	Space_Heat	1	1	0.1469	1.6583	0.65
Agriculture	Space_Heat	1	2	0.1322	1.8242	0.3
Agriculture	Space_Heat	1	3	0.1203	1.99	0.04
Agriculture	Space_Heat	1	4	0.1084	2.1558	0.01
Agriculture	Space_Heat	2	1	3.0121	1.3267	1
Agriculture	Space_Heat	2	2	2.7109	1.4593	0
Agriculture	Space_Heat	2	3	2.4669	1.592	0
Agriculture	Space_Heat	2	4	2.2229	1.7247	0
Agriculture	Water_Heat	1	1	0.2013	2.2734	0.4
Agriculture	Water_Heat	1	2	0.1812	2.5008	0.5
Agriculture	Water_Heat	1	3	0.1585	2.7281	0.08
Agriculture	Water_Heat	1	4	0.1359	2.9554	0.02
Agriculture	Water_Heat	2	1	4.1292	1.8187	0.4
Agriculture	Water_Heat	2	2	3.7163	2.0006	0.5
Agriculture	Water_Heat	2	3	3.2518	2.1825	0.08

Business Types	End Use	Fuel	Efficiency	(therm/SqFt)	Equipment Cost	efficiency shares
Agriculture	Water_Heat	2	4	2.7872	2.3644	0.02
Agriculture	Drying	1	1	0.2013	2.2734	0.65
Agriculture	Drying	1	2	0.1812	2.5008	0.35
Agriculture	Drying	2	1	4.1292	1.8187	0.65
Agriculture	Drying	2	2	3.7163	2.0006	0.35
Agriculture	Engine	1	1	0.8657	9.7757	0.65
Agriculture	Engine	1	2	0.7791	10.7533	0.35
Agriculture	Engine	2	1	17.7557	7.8206	0.65
Agriculture	Engine	2	2	15.9802	8.6026	0.35
Agriculture	Other	1	1	0	0	1
Agriculture	Other	2	1	0	0	0

Southern California Gas Company
2016 California Gas Report - Commercial G10
Fuel Market Share

Where Fuel = 1 (gas) and 2 (electric)

Business Types	End Use	Fuel	Share
Office	Space_Heat	1	0.8555
Office	Space_Heat	2	0.1445
Office	Water_Heat	1	0.16581
Office	Water_Heat	2	0.83419
Office	Cooking	1	0.02069
Office	Cooking	2	0.97931
Office	AC_Compressor	1	0.06
Office	AC_Compressor	2	0.94
Office	Other	1	1
Restaurant	Space_Heat	1	0.59046
Restaurant	Space_Heat	2	0.40954
Restaurant	Water_Heat	1	0.90204
Restaurant	Water_Heat	2	0.09796
Restaurant	Cook_top	1	0.97733
Restaurant	Cook_top	2	0.02267
Restaurant	Fryer	1	0.90535
Restaurant	Fryer	2	0.09465
Restaurant	Griddle	1	0.97038
Restaurant	Griddle	2	0.02962
Restaurant	Other_Cooking	1	0.66
Restaurant	Other_Cooking	2	0.34
Restaurant	AC_Compressor	1	0.06
Restaurant	AC_Compressor	2	0.94
Restaurant	Other	1	1
Retail	Space_Heat	1	0.51751
Retail	Space_Heat	2	0.48249
Retail	Water_Heat	1	0.31008
Retail	Water_Heat	2	0.68992
Retail	Cooking	1	0.09367
Retail	Cooking	2	0.90633
Retail	Other	1	1
Laundry	Space_Heat	1	0.57692
Laundry	Space_Heat	2	0.42308
Laundry	Water_Heat	1	0.67647
Laundry	Water_Heat	2	0.32353
Laundry	Drying	1	0.6
Laundry	Drying	2	0.4
Laundry	Other	1	1
Warehouse	Space_Heat	1	0.43723
Warehouse	Space_Heat	2	0.56277
Warehouse	Water_Heat	1	0.07159
Warehouse	Water_Heat	2	0.92841
Warehouse	Engine	1	0.06

Business Types	End Use	Fuel	Share
Warehouse	Engine	2	0.94
Warehouse	Other	1	1
School	Space_Heat	1	0.75284
School	Space_Heat	2	0.24716
School	Water_Heat	1	0.75843
School	Water_Heat	2	0.24157
School	Cook_top	1	0.42857
School	Cook_top	2	0.57143
School	Fryer	1	0.42857
School	Fryer	2	0.57143
School	Griddle	1	0.42857
School	Griddle	2	0.57143
School	Other_Cooking	1	0.42857
School	Other_Cooking	2	0.57143
School	AC_Compressor	1	0.06
School	AC_Compressor	2	0.94
School	Other	1	1
College	Space_Heat	1	0.33028
College	Space_Heat	2	0.66972
College	Water_Heat	1	0.81675
College	Water_Heat	2	0.18325
College	Cook_top	1	0.04801
College	Cook_top	2	0.95199
College	Fryer	1	0.04801
College	Fryer	2	0.95199
College	Griddle	1	0.04801
College	Griddle	2	0.95199
College	Other_Cooking	1	0.04801
College	Other_Cooking	2	0.95199
College	AC_Compressor	1	0.06
College	AC_Compressor	2	0.94
College	Other	1	1
Health	Space_Heat	1	0.66026
Health	Space_Heat	2	0.33974
Health	Water_Heat	1	0.8242
Health	Water_Heat	2	0.1758
Health	Cook_top	1	0.09487
Health	Cook_top	2	0.90513
Health	Fryer	1	0.09487
Health	Fryer	2	0.90513
Health	Griddle	1	0.09487
Health	Griddle	2	0.90513
Health	Other_Cooking	1	0.66
Health	Other_Cooking	2	0.34
Health	Drying	1	0.6
Health	Drying	2	0.4
Health	AC_Compressor	1	0.06
Health	AC_Compressor	2	0.94
Health	Other	1	1
Lodging	Space_Heat	1	0.27151
Lodging	Space_Heat	2	0.72849
Lodging	Water_Heat	1	0.98948

Business Types	End Use	Fuel	Share
Lodging	Water_Heat	2	0.01052
Lodging	Cook_top	1	0.44958
Lodging	Cook_top	2	0.55042
Lodging	Fryer	1	0.44958
Lodging	Fryer	2	0.55042
Lodging	Griddle	1	0.44958
Lodging	Griddle	2	0.55042
Lodging	Other_Cooking	1	0.44958
Lodging	Other_Cooking	2	0.55042
Lodging	Drying	1	0.6
Lodging	Drying	2	0.4
Lodging	AC_Compressor	1	0.06
Lodging	AC_Compressor	2	0.94
Lodging	Other	1	1
Misc	Space_Heat	1	0.54964
Misc	Space_Heat	2	0.45036
Misc	Water_Heat	1	0.55691
Misc	Water_Heat	2	0.44309
Misc	Cook_top	1	0.97733
Misc	Cook_top	2	0.02267
Misc	Fryer	1	0.90535
Misc	Fryer	2	0.09465
Misc	Griddle	1	0.97038
Misc	Griddle	2	0.02962
Misc	Other_Cooking	1	0.66
Misc	Other_Cooking	2	0.34
Misc	AC_Compressor	1	0.06
Misc	AC_Compressor	2	0.94
Misc	Other	1	1
Government	Space_Heat	1	0.8555
Government	Space_Heat	2	0.1445
Government	Water_Heat	1	0.16581
Government	Water_Heat	2	0.83419
Government	Cook_top	1	0.97733
Government	Cook_top	2	0.02267
Government	Fryer	1	0.90535
Government	Fryer	2	0.09465
Government	Griddle	1	0.97038
Government	Griddle	2	0.02962
Government	Other_Cooking	1	0.66
Government	Other_Cooking	2	0.34
Government	AC_Compressor	1	0.06
Government	AC_Compressor	2	0.94
Government	Other	1	1
TCU	Space_Heat	1	0.57692
TCU	Space_Heat	2	0.42308
TCU	Water_Heat	1	0.67647
TCU	Water_Heat	2	0.32353
TCU	Engine	1	0.06
TCU	Engine	2	0.94
TCU	Other	1	1
Construction	Space_Heat	1	0.57692

Business Types	End Use	Fuel	Share
Construction	Space_Heat	2	0.42308
Construction	Water_Heat	1	0.67647
Construction	Water_Heat	2	0.32353
Construction	Other	1	1
Agriculture	Space_Heat	1	0.57692
Agriculture	Space_Heat	2	0.42308
Agriculture	Water_Heat	1	0.67647
Agriculture	Water_Heat	2	0.32353
Agriculture	Drying	1	1
Agriculture	Drying	2	0
Agriculture	Engine	1	0.06
Agriculture	Engine	2	0.94
Agriculture	Other	1	1
Grocery	Space_Heat	1	0.74652
Grocery	Space_Heat	2	0.25348
Grocery	Water_Heat	1	0.70846
Grocery	Water_Heat	2	0.29154
Grocery	Cook_top	1	0.35627
Grocery	Cook_top	2	0.64373
Grocery	Fryer	1	0.35627
Grocery	Fryer	2	0.64373
Grocery	Griddle	1	0.35627
Grocery	Griddle	2	0.64373
Grocery	Other_Cooking	1	0.35627
Grocery	Other_Cooking	2	0.64373
Grocery	AC_Compressor	1	0.06
Grocery	AC_Compressor	2	0.94
Grocery	Other	1	1

Southern California Gas Company

2016 California Gas Report - Commercial G10

Efficiency Shares

bname	nname	fname	Stock	Standard	High	Premium
Agriculture	Drying	Electric	0.65	0.35	N/A	N/A
Agriculture	Drying	Natural_Gas	0.65	0.35	N/A	N/A
Agriculture	Engine	Electric	0.65	0.35	N/A	N/A
Agriculture	Engine	Natural_Gas	0.65	0.35	N/A	N/A
Agriculture	Other	Natural_Gas	1	N/A	N/A	N/A
Agriculture	Space_Heat	Electric	1	N/A	N/A	N/A
Agriculture	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Agriculture	Water_Heat	Electric	0.4	0.5	0.08	0.02
Agriculture	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
College	AC_Compressor	Electric	0.65	0.35	N/A	N/A
College	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
College	Cook_top	Electric	0.65	0.35	N/A	N/A
College	Cook_top	Natural_Gas	0.65	0.35	N/A	N/A
College	Fryer	Electric	0.65	0.35	N/A	N/A
College	Fryer	Natural_Gas	0.65	0.35	N/A	N/A
College	Griddle	Electric	0.65	0.35	N/A	N/A
College	Griddle	Natural_Gas	0.65	0.35	N/A	N/A
College	Other	Natural_Gas	1	N/A	N/A	N/A
College	Other_Cooking	Electric	0.65	0.35	N/A	N/A
College	Other_Cooking	Natural_Gas	0.65	0.35	N/A	N/A
College	Space_Heat	Electric	1	N/A	N/A	N/A
College	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
College	Water_Heat	Electric	0.4	0.5	0.08	0.02
College	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Construction	Other	Natural_Gas	1	N/A	N/A	N/A
Construction	Space_Heat	Electric	1	N/A	N/A	N/A
Construction	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Construction	Water_Heat	Electric	0.4	0.5	0.08	0.02
Construction	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Government	AC_Compressor	Electric	0.65	0.35	N/A	N/A
Government	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
Government	Cook_top	Electric	0.65	0.35	N/A	N/A

bname	nname	fname	Stock	Standard	High	Premium
Government	Cook_top	Natural_Gas	0.65	0.35	N/A	N/A
Government	Fryer	Electric	0.65	0.35	N/A	N/A
Government	Fryer	Natural_Gas	0.65	0.35	N/A	N/A
Government	Griddle	Electric	0.65	0.35	N/A	N/A
Government	Griddle	Natural_Gas	0.65	0.35	N/A	N/A
Government	Other	Natural_Gas	1	N/A	N/A	N/A
Government	Other_Cooking	Electric	0.65	0.35	N/A	N/A
Government	Other_Cooking	Natural_Gas	0.65	0.35	N/A	N/A
Government	Space_Heat	Electric	1	N/A	N/A	N/A
Government	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Government	Water_Heat	Electric	0.4	0.5	0.08	0.02
Government	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Grocery	AC_Compressor	Electric	0.65	0.35	N/A	N/A
Grocery	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
Grocery	Cook_top	Electric	0.65	0.35	N/A	N/A
Grocery	Cook_top	Natural_Gas	0.65	0.35	N/A	N/A
Grocery	Fryer	Electric	0.65	0.35	N/A	N/A
Grocery	Fryer	Natural_Gas	0.65	0.35	N/A	N/A
Grocery	Griddle	Electric	0.65	0.35	N/A	N/A
Grocery	Griddle	Natural_Gas	0.65	0.35	N/A	N/A
Grocery	Other	Natural_Gas	1	N/A	N/A	N/A
Grocery	Other_Cooking	Electric	0.65	0.35	N/A	N/A
Grocery	Other_Cooking	Natural_Gas	0.65	0.35	N/A	N/A
Grocery	Space_Heat	Electric	1	N/A	N/A	N/A
Grocery	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Grocery	Water_Heat	Electric	0.4	0.5	0.08	0.02
Grocery	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Health	AC_Compressor	Electric	0.65	0.35	N/A	N/A
Health	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
Health	Cook_top	Electric	0.65	0.35	N/A	N/A
Health	Cook_top	Natural_Gas	0.65	0.35	N/A	N/A
Health	Drying	Electric	0.65	0.35	N/A	N/A
Health	Drying	Natural_Gas	0.65	0.35	N/A	N/A
Health	Fryer	Electric	0.65	0.35	N/A	N/A
Health	Fryer	Natural_Gas	0.65	0.35	N/A	N/A
Health	Griddle	Electric	0.65	0.35	N/A	N/A

bname	nname	fname	Stock	Standard	High	Premium
Health	Griddle	Natural_Gas	0.65	0.35	N/A	N/A
Health	Other	Natural_Gas	1	N/A	N/A	N/A
Health	Other_Cooking	Electric	0.65	0.35	N/A	N/A
Health	Other_Cooking	Natural_Gas	0.65	0.35	N/A	N/A
Health	Space_Heat	Electric	1	N/A	N/A	N/A
Health	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Health	Water_Heat	Electric	0.4	0.5	0.08	0.02
Health	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Laundry	Drying	Electric	0.65	0.35	N/A	N/A
Laundry	Drying	Natural_Gas	0.65	0.35	N/A	N/A
Laundry	Other	Natural_Gas	1	N/A	N/A	N/A
Laundry	Space_Heat	Electric	1	N/A	N/A	N/A
Laundry	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Laundry	Water_Heat	Electric	0.4	0.5	0.08	0.02
Laundry	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Lodging	AC_Compressor	Electric	0.65	0.35	N/A	N/A
Lodging	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
Lodging	Cook_top	Electric	0.65	0.35	N/A	N/A
Lodging	Cook_top	Natural_Gas	0.65	0.35	N/A	N/A
Lodging	Drying	Electric	0.65	0.35	N/A	N/A
Lodging	Drying	Natural_Gas	0.65	0.35	N/A	N/A
Lodging	Fryer	Electric	0.65	0.35	N/A	N/A
Lodging	Fryer	Natural_Gas	0.65	0.35	N/A	N/A
Lodging	Griddle	Electric	0.65	0.35	N/A	N/A
Lodging	Griddle	Natural_Gas	0.65	0.35	N/A	N/A
Lodging	Other	Natural_Gas	1	N/A	N/A	N/A
Lodging	Other_Cooking	Electric	0.65	0.35	N/A	N/A
Lodging	Other_Cooking	Natural_Gas	0.65	0.35	N/A	N/A
Lodging	Space_Heat	Electric	1	N/A	N/A	N/A
Lodging	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Lodging	Water_Heat	Electric	0.4	0.5	0.08	0.02
Lodging	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Misc	AC_Compressor	Electric	0.65	0.35	N/A	N/A
Misc	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
Misc	Cook_top	Electric	0.65	0.35	N/A	N/A
Misc	Cook_top	Natural_Gas	0.65	0.35	N/A	N/A

bname	nname	fname	Stock	Standard	High	Premium
Misc	Fryer	Electric	0.65	0.35	N/A	N/A
Misc	Fryer	Natural_Gas	0.65	0.35	N/A	N/A
Misc	Griddle	Electric	0.65	0.35	N/A	N/A
Misc	Griddle	Natural_Gas	0.65	0.35	N/A	N/A
Misc	Other	Natural_Gas	1	N/A	N/A	N/A
Misc	Other_Cooking	Electric	0.65	0.35	N/A	N/A
Misc	Other_Cooking	Natural_Gas	0.65	0.35	N/A	N/A
Misc	Space_Heat	Electric	1	N/A	N/A	N/A
Misc	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Misc	Water_Heat	Electric	0.4	0.5	0.08	0.02
Misc	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Office	AC_Compressor	Electric	0.65	0.35	N/A	N/A
Office	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
Office	Cooking	Electric	0.65	0.35	N/A	N/A
Office	Cooking	Natural_Gas	0.65	0.35	N/A	N/A
Office	Other	Natural_Gas	1	N/A	N/A	N/A
Office	Space_Heat	Electric	1	N/A	N/A	N/A
Office	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Office	Water_Heat	Electric	0.4	0.5	0.08	0.02
Office	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Restaurant	AC_Compressor	Electric	0.65	0.35	N/A	N/A
Restaurant	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
Restaurant	Cook_top	Electric	0.65	0.35	N/A	N/A
Restaurant	Cook_top	Natural_Gas	0.65	0.35	N/A	N/A
Restaurant	Fryer	Electric	0.65	0.35	N/A	N/A
Restaurant	Fryer	Natural_Gas	0.65	0.35	N/A	N/A
Restaurant	Griddle	Electric	0.65	0.35	N/A	N/A
Restaurant	Griddle	Natural_Gas	0.65	0.35	N/A	N/A
Restaurant	Other	Natural_Gas	1	N/A	N/A	N/A
Restaurant	Other_Cooking	Electric	0.65	0.35	N/A	N/A
Restaurant	Other_Cooking	Natural_Gas	0.65	0.35	N/A	N/A
Restaurant	Space_Heat	Electric	1	N/A	N/A	N/A
Restaurant	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Restaurant	Water_Heat	Electric	0.4	0.5	0.08	0.02
Restaurant	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Retail	Cooking	Electric	0.65	0.35	N/A	N/A

bname	nname	fname	Stock	Standard	High	Premium
Retail	Cooking	Natural_Gas	0.65	0.35	N/A	N/A
Retail	Other	Natural_Gas	1	N/A	N/A	N/A
Retail	Space_Heat	Electric	1	N/A	N/A	N/A
Retail	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Retail	Water_Heat	Electric	0.4	0.5	0.08	0.02
Retail	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
School	AC_Compressor	Electric	0.65	0.35	N/A	N/A
School	AC_Compressor	Natural_Gas	0.65	0.35	N/A	N/A
School	Cook_top	Electric	0.65	0.35	N/A	N/A
School	Cook_top	Natural_Gas	0.65	0.35	N/A	N/A
School	Fryer	Electric	0.65	0.35	N/A	N/A
School	Fryer	Natural_Gas	0.65	0.35	N/A	N/A
School	Griddle	Electric	0.65	0.35	N/A	N/A
School	Griddle	Natural_Gas	0.65	0.35	N/A	N/A
School	Other	Natural_Gas	1	N/A	N/A	N/A
School	Other_Cooking	Electric	0.65	0.35	N/A	N/A
School	Other_Cooking	Natural_Gas	0.65	0.35	N/A	N/A
School	Space_Heat	Electric	1	N/A	N/A	N/A
School	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
School	Water_Heat	Electric	0.4	0.5	0.08	0.02
School	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
TCU	Engine	Electric	0.65	0.35	N/A	N/A
TCU	Engine	Natural_Gas	0.65	0.35	N/A	N/A
TCU	Other	Natural_Gas	1	N/A	N/A	N/A
TCU	Space_Heat	Electric	1	N/A	N/A	N/A
TCU	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
TCU	Water_Heat	Electric	0.4	0.5	0.08	0.02
TCU	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02
Warehouse	Engine	Electric	0.65	0.35	N/A	N/A
Warehouse	Engine	Natural_Gas	0.65	0.35	N/A	N/A
Warehouse	Other	Natural_Gas	1	N/A	N/A	N/A
Warehouse	Space_Heat	Electric	1	N/A	N/A	N/A
Warehouse	Space_Heat	Natural_Gas	0.65	0.3	0.04	0.01
Warehouse	Water_Heat	Electric	0.4	0.5	0.08	0.02
Warehouse	Water_Heat	Natural_Gas	0.4	0.5	0.08	0.02

2016 California Gas Report - Commercial G10
Saturation Rate

Where Fuel = 1 (gas) and 2 (electric), and

Business Type	End Use	saturation
Office	Space_Heat	0.872
Office	Water_Heat	0.7
Office	Cooking	0.082
Office	AC_Compressor	0.931
Office	Other	1
Restaurant	Space_Heat	0.818
Restaurant	Water_Heat	0.96
Restaurant	Cook_top	0.75
Restaurant	Fryer	0.729
Restaurant	Griddle	0.574
Restaurant	Other_Cooking	0.9
Restaurant	AC_Compressor	0.871
Restaurant	Other	1
Retail	Space_Heat	0.771
Retail	Water_Heat	0.62
Retail	Cooking	0.245
Retail	Other	1
Laundry	Space_Heat	0.72
Laundry	Water_Heat	1
Laundry	Drying	1
Laundry	Other	1
Warehouse	Space_Heat	0.231
Warehouse	Water_Heat	0.88
Warehouse	Engine	0.25
Warehouse	Other	1
School	Space_Heat	0.967
School	Water_Heat	0.9
School	Cook_top	0.147
School	Fryer	0.147
School	Griddle	0.147
School	Other_Cooking	0.147
School	AC_Compressor	0.885
School	Other	1
College	Space_Heat	0.763
College	Water_Heat	0.955
College	Cook_top	0.147
College	Fryer	0.147
College	Griddle	0.147
College	Other_Cooking	0.147
College	AC_Compressor	0.885
College	Other	1
Health	Space_Heat	0.936
Health	Water_Heat	1
Health	Cook_top	0.102
Health	Fryer	0.102
Health	Griddle	0.102
Health	Other_Cooking	0.102
Health	Drying	0.82
Health	AC_Compressor	0.792
Health	Other	1
Lodging	Space_Heat	0.895
Lodging	Water_Heat	1
Lodging	Cook_top	0.084
Lodging	Fryer	0.084
Lodging	Griddle	0.084
Lodging	Other_Cooking	0.084
Lodging	Drying	0.82
Lodging	AC_Compressor	0.795
Lodging	Other	1
Misc	Space_Heat	0.695
Misc	Water_Heat	0.69
Misc	Cook_top	0.021
Misc	Fryer	0.021
Misc	Griddle	0.021
Misc	Other_Cooking	0.021

Misc	Other	1
Government	Space_Heat	0.872
Government	Water_Heat	0.7
Government	Cook_top	0.196
Government	Fryer	0.196
Government	Griddle	0.196
Government	Other_Cooking	0.196
Government	AC_Compressor	0.888
Government	Other	1
TCU	Space_Heat	0.72
TCU	Water_Heat	0.69
TCU	Engine	0.5
TCU	Other	1
Construction	Space_Heat	0.72
Construction	Water_Heat	0.69
Construction	Other	1
Agriculture	Space_Heat	0.72
Agriculture	Water_Heat	0.69
Agriculture	Drying	1
Agriculture	Engine	0.5
Agriculture	Other	1
Grocery	Space_Heat	0.647
Grocery	Water_Heat	0.93
Grocery	Cook_top	0.245
Grocery	Fryer	0.245
Grocery	Griddle	0.245
Grocery	Other_Cooking	0.245
Grocery	AC_Compressor	0.856
Grocery	Other	1

2016 California Gas Report - Commercial G10

Equipment Cost Data

b	n	f	e	bname	nname	EQcost
1	1	1	1	Office	Space_Heat	4.3149
1	1	1	2	Office	Space_Heat	4.7464
1	1	1	3	Office	Space_Heat	5.1779
1	1	1	4	Office	Space_Heat	5.6094
1	1	2	1	Office	Space_Heat	3.4519
1	1	2	2	Office	Space_Heat	3.7971
1	1	2	3	Office	Space_Heat	4.1423
1	1	2	4	Office	Space_Heat	4.4875
1	2	1	1	Office	Water_Heat	0.6712
1	2	1	2	Office	Water_Heat	0.7384
1	2	1	3	Office	Water_Heat	0.8055
1	2	1	4	Office	Water_Heat	0.8726
1	2	2	1	Office	Water_Heat	0.537
1	2	2	2	Office	Water_Heat	0.5907
1	2	2	3	Office	Water_Heat	0.6444
1	2	2	4	Office	Water_Heat	0.6981
1	3	1	1	Office	Cooking	0.4899
1	3	1	2	Office	Cooking	0.5389
1	3	2	1	Office	Cooking	0.3919
1	3	2	2	Office	Cooking	0.4311
1	10	1	1	Office	AC_Compressor	1.4773
1	10	1	2	Office	AC_Compressor	1.6251
1	10	2	1	Office	AC_Compressor	1.1819
1	10	2	2	Office	AC_Compressor	1.3
1	11	1	1	Office	Other	0
1	11	2	1	Office	Other	0
2	1	1	1	Restaurant	Space_Heat	1.5841
2	1	1	2	Restaurant	Space_Heat	1.7425
2	1	1	3	Restaurant	Space_Heat	1.9009
2	1	1	4	Restaurant	Space_Heat	2.0593
2	1	2	1	Restaurant	Space_Heat	1.2673
2	1	2	2	Restaurant	Space_Heat	1.394
2	1	2	3	Restaurant	Space_Heat	1.5207
2	1	2	4	Restaurant	Space_Heat	1.6474
2	2	1	1	Restaurant	Water_Heat	11.666
2	2	1	2	Restaurant	Water_Heat	12.8326
2	2	1	3	Restaurant	Water_Heat	13.9992
2	2	1	4	Restaurant	Water_Heat	15.1658
2	2	2	1	Restaurant	Water_Heat	9.3328
2	2	2	2	Restaurant	Water_Heat	10.2661
2	2	2	3	Restaurant	Water_Heat	11.1994
2	2	2	4	Restaurant	Water_Heat	12.1327
2	4	1	1	Restaurant	Cook_top	16.1343
2	4	1	2	Restaurant	Cook_top	17.7477
2	4	2	1	Restaurant	Cook_top	12.9074
2	4	2	2	Restaurant	Cook_top	14.1981
2	5	1	1	Restaurant	Fryer	14.5274
2	5	1	2	Restaurant	Fryer	15.9802
2	5	2	1	Restaurant	Fryer	11.622
2	5	2	2	Restaurant	Fryer	12.7841
2	6	1	1	Restaurant	Griddle	12.2603
2	6	1	2	Restaurant	Griddle	13.4863
2	6	2	1	Restaurant	Griddle	9.8082
2	6	2	2	Restaurant	Griddle	10.789
2	7	1	1	Restaurant	Other_Cooking	13.0747
2	7	1	2	Restaurant	Other_Cooking	14.3822
2	7	2	1	Restaurant	Other_Cooking	10.4598
2	7	2	2	Restaurant	Other_Cooking	11.5057
2	10	1	1	Restaurant	AC_Compressor	2.7306
2	10	1	2	Restaurant	AC_Compressor	3.0036
2	10	2	1	Restaurant	AC_Compressor	2.1844
2	10	2	2	Restaurant	AC_Compressor	2.4029
2	11	1	1	Restaurant	Other	0
2	11	2	1	Restaurant	Other	0
3	1	1	1	Retail	Space_Heat	3.5122
3	1	1	2	Retail	Space_Heat	3.8634
3	1	1	3	Retail	Space_Heat	4.2146
3	1	1	4	Retail	Space_Heat	4.5658
3	1	2	1	Retail	Space_Heat	2.8097
3	1	2	2	Retail	Space_Heat	3.0907

3	1	2	4	Retail	Space_Heat	3.6527
3	2	1	1	Retail	Water_Heat	1.563
3	2	1	2	Retail	Water_Heat	1.7193
3	2	1	3	Retail	Water_Heat	1.8756
3	2	1	4	Retail	Water_Heat	2.0319
3	2	2	1	Retail	Water_Heat	1.2504
3	2	2	2	Retail	Water_Heat	1.3754
3	2	2	3	Retail	Water_Heat	1.5004
3	2	2	4	Retail	Water_Heat	1.6255
3	3	1	1	Retail	Cooking	4.4039
3	3	1	2	Retail	Cooking	4.8443
3	3	2	1	Retail	Cooking	3.5231
3	3	2	2	Retail	Cooking	3.875
3	11	1	1	Retail	Other	0
3	11	2	1	Retail	Other	0
4	1	1	1	Laundry	Space_Heat	1.836
4	1	1	2	Laundry	Space_Heat	2.02
4	1	1	3	Laundry	Space_Heat	2.203
4	1	1	4	Laundry	Space_Heat	2.387
4	1	2	1	Laundry	Space_Heat	1.469
4	1	2	2	Laundry	Space_Heat	1.616
4	1	2	3	Laundry	Space_Heat	1.763
4	1	2	4	Laundry	Space_Heat	1.909
4	2	1	1	Laundry	Water_Heat	34.512
4	2	1	2	Laundry	Water_Heat	37.963
4	2	1	3	Laundry	Water_Heat	41.414
4	2	1	4	Laundry	Water_Heat	44.865
4	2	2	1	Laundry	Water_Heat	27.609
4	2	2	2	Laundry	Water_Heat	30.37
4	2	2	3	Laundry	Water_Heat	33.131
4	2	2	4	Laundry	Water_Heat	35.892
4	8	1	1	Laundry	Drying	186.738
4	8	1	2	Laundry	Drying	205.412
4	8	2	1	Laundry	Drying	149.39
4	8	2	2	Laundry	Drying	164.329
4	11	1	1	Laundry	Other	0
4	11	2	1	Laundry	Other	0
5	1	1	1	Warehouse	Space_Heat	7.909
5	1	1	2	Warehouse	Space_Heat	8.7
5	1	1	3	Warehouse	Space_Heat	9.491
5	1	1	4	Warehouse	Space_Heat	10.282
5	1	2	1	Warehouse	Space_Heat	6.327
5	1	2	2	Warehouse	Space_Heat	6.96
5	1	2	3	Warehouse	Space_Heat	7.593
5	1	2	4	Warehouse	Space_Heat	8.225
5	2	1	1	Warehouse	Water_Heat	2.608
5	2	1	2	Warehouse	Water_Heat	2.869
5	2	1	3	Warehouse	Water_Heat	3.13
5	2	1	4	Warehouse	Water_Heat	3.39
5	2	2	1	Warehouse	Water_Heat	2.086
5	2	2	2	Warehouse	Water_Heat	2.295
5	2	2	3	Warehouse	Water_Heat	2.504
5	2	2	4	Warehouse	Water_Heat	2.712
5	9	1	1	Warehouse	Engine	113.127
5	9	1	2	Warehouse	Engine	124.44
5	9	2	1	Warehouse	Engine	90.502
5	9	2	2	Warehouse	Engine	99.552
5	11	1	1	Warehouse	Other	0
5	11	2	1	Warehouse	Other	0
6	1	1	1	School	Space_Heat	1.225
6	1	1	2	School	Space_Heat	1.348
6	1	1	3	School	Space_Heat	1.471
6	1	1	4	School	Space_Heat	1.593
6	1	2	1	School	Space_Heat	0.98
6	1	2	2	School	Space_Heat	1.078
6	1	2	3	School	Space_Heat	1.176
6	1	2	4	School	Space_Heat	1.274
6	2	1	1	School	Water_Heat	1.635
6	2	1	2	School	Water_Heat	1.799
6	2	1	3	School	Water_Heat	1.962
6	2	1	4	School	Water_Heat	2.126
6	2	2	1	School	Water_Heat	1.308
6	2	2	2	School	Water_Heat	1.439
6	2	2	3	School	Water_Heat	1.57
6	2	2	4	School	Water_Heat	1.701
6	4	1	1	School	Cook_top	0.61
6	4	1	2	School	Cook_top	0.671

6	4	2	1	School	Cook_top	0.488
6	4	2	2	School	Cook_top	0.537
6	5	1	1	School	Fryer	0.612
6	5	1	2	School	Fryer	0.673
6	5	2	1	School	Fryer	0.489
6	5	2	2	School	Fryer	0.538
6	6	1	1	School	Griddle	0.612
6	6	1	2	School	Griddle	0.673
6	6	2	1	School	Griddle	0.489
6	6	2	2	School	Griddle	0.538
6	7	1	1	School	Other_Cooking	0.61
6	7	1	2	School	Other_Cooking	0.671
6	7	2	1	School	Other_Cooking	0.488
6	7	2	2	School	Other_Cooking	0.537
6	10	1	1	School	AC_Compressor	0.866
6	10	1	2	School	AC_Compressor	0.953
6	10	2	1	School	AC_Compressor	0.693
6	10	2	2	School	AC_Compressor	0.762
6	11	1	1	School	Other	0
6	11	2	1	School	Other	0
7	1	1	1	College	Space_Heat	3.14441
7	1	1	2	College	Space_Heat	3.45885
7	1	1	3	College	Space_Heat	3.77329
7	1	1	4	College	Space_Heat	4.08773
7	1	2	1	College	Space_Heat	2.51553
7	1	2	2	College	Space_Heat	2.76708
7	1	2	3	College	Space_Heat	3.01863
7	1	2	4	College	Space_Heat	3.27018
7	2	1	1	College	Water_Heat	3.38894
7	2	1	2	College	Water_Heat	3.72784
7	2	1	3	College	Water_Heat	4.06673
7	2	1	4	College	Water_Heat	4.40563
7	2	2	1	College	Water_Heat	2.71116
7	2	2	2	College	Water_Heat	2.98227
7	2	2	3	College	Water_Heat	3.25339
7	2	2	4	College	Water_Heat	3.5245
7	4	1	1	College	Cook_top	0.57358
7	4	1	2	College	Cook_top	0.63093
7	4	2	1	College	Cook_top	0.45886
7	4	2	2	College	Cook_top	0.50475
7	5	1	1	College	Fryer	0.57322
7	5	1	2	College	Fryer	0.63055
7	5	2	1	College	Fryer	0.45858
7	5	2	2	College	Fryer	0.50444
7	6	1	1	College	Griddle	0.57322
7	6	1	2	College	Griddle	0.63055
7	6	2	1	College	Griddle	0.45858
7	6	2	2	College	Griddle	0.50444
7	7	1	1	College	Other_Cooking	0.57358
7	7	1	2	College	Other_Cooking	0.63093
7	7	2	1	College	Other_Cooking	0.45886
7	7	2	2	College	Other_Cooking	0.50475
7	10	1	1	College	AC_Compressor	1.3949
7	10	1	2	College	AC_Compressor	1.53439
7	10	2	1	College	AC_Compressor	1.11592
7	10	2	2	College	AC_Compressor	1.22752
7	11	1	1	College	Other	0
7	11	2	1	College	Other	0
8	1	1	1	Health	Space_Heat	0.8825
8	1	1	2	Health	Space_Heat	0.97075
8	1	1	3	Health	Space_Heat	1.059
8	1	1	4	Health	Space_Heat	1.14725
8	1	2	1	Health	Space_Heat	0.706
8	1	2	2	Health	Space_Heat	0.7766
8	1	2	3	Health	Space_Heat	0.8472
8	1	2	4	Health	Space_Heat	0.9178
8	2	1	1	Health	Water_Heat	5.33917
8	2	1	2	Health	Water_Heat	5.87309
8	2	1	3	Health	Water_Heat	6.407
8	2	1	4	Health	Water_Heat	6.94092
8	2	2	1	Health	Water_Heat	4.27134
8	2	2	2	Health	Water_Heat	4.69847
8	2	2	3	Health	Water_Heat	5.1256
8	2	2	4	Health	Water_Heat	5.55274
8	4	1	1	Health	Cook_top	2.37409
8	4	1	2	Health	Cook_top	3.7115
8	4	2	1	Health	Cook_top	269927
8	4	2	2	Health	Cook_top	2.9692

8	5	1	1	Health	Fryer	3.37409
8	5	1	2	Health	Fryer	3.7115
8	5	2	1	Health	Fryer	2.69927
8	5	2	2	Health	Fryer	2.9692
8	6	1	1	Health	Griddle	3.37409
8	6	1	2	Health	Griddle	3.7115
8	6	2	1	Health	Griddle	2.69927
8	6	2	2	Health	Griddle	2.9692
8	7	1	1	Health	Other_Cooking	0.33743
8	7	1	2	Health	Other_Cooking	0.37118
8	7	2	1	Health	Other_Cooking	0.26995
8	7	2	2	Health	Other_Cooking	0.29694
8	8	1	1	Health	Drying	1.86871
8	8	1	2	Health	Drying	2.05558
8	8	2	1	Health	Drying	1.49497
8	8	2	2	Health	Drying	1.64446
8	10	1	1	Health	AC_Compressor	1.45749
8	10	1	2	Health	AC_Compressor	1.60324
8	10	2	1	Health	AC_Compressor	1.16599
8	10	2	2	Health	AC_Compressor	1.28259
8	11	1	1	Health	Other	0
8	11	2	1	Health	Other	0
9	1	1	1	Lodging	Space_Heat	4.85892
9	1	1	2	Lodging	Space_Heat	5.3448
9	1	1	3	Lodging	Space_Heat	5.8307
9	1	1	4	Lodging	Space_Heat	6.3166
9	1	2	1	Lodging	Space_Heat	3.8871
9	1	2	2	Lodging	Space_Heat	4.2759
9	1	2	3	Lodging	Space_Heat	4.6646
9	1	2	4	Lodging	Space_Heat	5.0533
9	2	1	1	Lodging	Water_Heat	8.6651
9	2	1	2	Lodging	Water_Heat	9.5317
9	2	1	3	Lodging	Water_Heat	10.3982
9	2	1	4	Lodging	Water_Heat	11.2647
9	2	2	1	Lodging	Water_Heat	6.9321
9	2	2	2	Lodging	Water_Heat	7.6253
9	2	2	3	Lodging	Water_Heat	8.3185
9	2	2	4	Lodging	Water_Heat	9.0118
9	4	1	1	Lodging	Cook_top	4.0305
9	4	1	2	Lodging	Cook_top	4.4335
9	4	2	1	Lodging	Cook_top	3.2244
9	4	2	2	Lodging	Cook_top	3.5468
9	5	1	1	Lodging	Fryer	5.2524
9	5	1	2	Lodging	Fryer	5.7777
9	5	2	1	Lodging	Fryer	4.2019
9	5	2	2	Lodging	Fryer	4.6221
9	6	1	1	Lodging	Griddle	5.2524
9	6	1	2	Lodging	Griddle	5.7777
9	6	2	1	Lodging	Griddle	4.2019
9	6	2	2	Lodging	Griddle	4.6221
9	7	1	1	Lodging	Other_Cooking	0.5148
9	7	1	2	Lodging	Other_Cooking	0.5663
9	7	2	1	Lodging	Other_Cooking	0.4118
9	7	2	2	Lodging	Other_Cooking	0.453
9	8	1	1	Lodging	Drying	2.1663
9	8	1	2	Lodging	Drying	2.3829
9	8	2	1	Lodging	Drying	1.733
9	8	2	2	Lodging	Drying	1.9063
9	10	1	1	Lodging	AC_Compressor	0.7157
9	10	1	2	Lodging	AC_Compressor	0.7872
9	10	2	1	Lodging	AC_Compressor	0.5725
9	10	2	2	Lodging	AC_Compressor	0.6298
9	11	1	1	Lodging	Other	0
9	11	2	1	Lodging	Other	0
10	1	1	1	Misc	Space_Heat	2.1455
10	1	1	2	Misc	Space_Heat	2.36
10	1	1	3	Misc	Space_Heat	2.5746
10	1	1	4	Misc	Space_Heat	2.7891
10	1	2	1	Misc	Space_Heat	1.7164
10	1	2	2	Misc	Space_Heat	1.888
10	1	2	3	Misc	Space_Heat	2.0597
10	1	2	4	Misc	Space_Heat	2.2313
10	2	1	1	Misc	Water_Heat	2.9412
10	2	1	2	Misc	Water_Heat	3.2354
10	2	1	3	Misc	Water_Heat	3.5295
10	2	1	4	Misc	Water_Heat	3.8236
10	2	2	1	Misc	Water_Heat	2.353
10	2	2	2	Misc	Water_Heat	2.5883

b	f	e	bname	nname	EQcost
10	2	3	Misc	Water_Heat	2.8236
10	2	4	Misc	Water_Heat	3.0589
10	1	1	Misc	Cook_top	0.6282
10	1	2	Misc	Cook_top	0.691
10	2	1	Misc	Cook_top	0.5025
10	2	2	Misc	Cook_top	0.5528
10	1	1	Misc	Fryer	0.6285
10	1	2	Misc	Fryer	0.6913
10	2	1	Misc	Fryer	0.5028
10	2	2	Misc	Fryer	0.5531
10	1	1	Misc	Griddle	0.6285
10	1	2	Misc	Griddle	0.6913
10	2	1	Misc	Griddle	0.5028
10	2	2	Misc	Griddle	0.5531
10	1	1	Misc	Other_Cooking	0.6282
10	1	2	Misc	Other_Cooking	0.691
10	2	1	Misc	Other_Cooking	0.5025
10	2	2	Misc	Other_Cooking	0.5528
10	1	1	Misc	AC_Compressor	1.9306
10	1	2	Misc	AC_Compressor	2.1237
10	2	1	Misc	AC_Compressor	1.5445
10	2	2	Misc	AC_Compressor	1.6989
10	1	1	Misc	Other	0
10	2	1	Misc	Other	0
11	1	1	Government	Space_Heat	3.815
11	1	2	Government	Space_Heat	4.1965
11	1	3	Government	Space_Heat	4.578
11	1	4	Government	Space_Heat	4.9595
11	2	1	Government	Space_Heat	3.052
11	2	2	Government	Space_Heat	3.3572
11	2	3	Government	Space_Heat	3.6624
11	2	4	Government	Space_Heat	3.9676
11	1	1	Government	Water_Heat	0.5935
11	1	2	Government	Water_Heat	0.6528
11	1	3	Government	Water_Heat	0.7122
11	1	4	Government	Water_Heat	0.7715
11	2	1	Government	Water_Heat	0.4748
11	2	2	Government	Water_Heat	0.5222
11	2	3	Government	Water_Heat	0.5697
11	2	4	Government	Water_Heat	0.6172
11	1	1	Government	Cook_top	0.4333
11	1	2	Government	Cook_top	0.4766
11	2	1	Government	Cook_top	0.3466
11	2	2	Government	Cook_top	0.3813
11	1	1	Government	Fryer	0.4332
11	1	2	Government	Fryer	0.4765
11	2	1	Government	Fryer	0.3465
11	2	2	Government	Fryer	0.3812
11	1	1	Government	Griddle	0.4332
11	1	2	Government	Griddle	0.4765
11	2	1	Government	Griddle	0.3465
11	2	2	Government	Griddle	0.3812
11	1	1	Government	Other_Cooking	0.4333
11	1	2	Government	Other_Cooking	0.4766
11	2	1	Government	Other_Cooking	0.3466
11	2	2	Government	Other_Cooking	0.3813
11	1	1	Government	AC_Compressor	1.3062
11	1	2	Government	AC_Compressor	1.4368
11	2	1	Government	AC_Compressor	1.0449
11	2	2	Government	AC_Compressor	1.1494
11	1	1	Government	Other	0
11	2	1	Government	Other	0
12	1	1	TCU	Space_Heat	1.8457
12	1	2	TCU	Space_Heat	2.0303
12	1	3	TCU	Space_Heat	2.2149
12	1	4	TCU	Space_Heat	2.3995
12	2	1	TCU	Space_Heat	1.4766
12	2	2	TCU	Space_Heat	1.6242
12	2	3	TCU	Space_Heat	1.7719
12	2	4	TCU	Space_Heat	1.9196
12	1	1	TCU	Water_Heat	2.5303
12	1	2	TCU	Water_Heat	2.7833
12	1	3	TCU	Water_Heat	3.0364
12	1	4	TCU	Water_Heat	3.2894
12	2	1	TCU	Water_Heat	2.0243
12	2	2	TCU	Water_Heat	2.2267
12	2	3	TCU	Water_Heat	2.4291
12	2	4	TCU	Water_Heat	2.6315

12	9	1	1	TCU	Engine	30.6768
12	9	1	2	TCU	Engine	33.7445
12	9	2	1	TCU	Engine	24.5415
12	9	2	2	TCU	Engine	26.9956
12	11	1	1	TCU	Other	0
12	11	2	1	TCU	Other	0
13	1	1	1	Construction	Space_Heat	2.2951
13	1	1	2	Construction	Space_Heat	2.5246
13	1	1	3	Construction	Space_Heat	2.7542
13	1	1	4	Construction	Space_Heat	2.9837
13	1	2	1	Construction	Space_Heat	1.8361
13	1	2	2	Construction	Space_Heat	2.0197
13	1	2	3	Construction	Space_Heat	2.2033
13	1	2	4	Construction	Space_Heat	2.3869
13	2	1	1	Construction	Water_Heat	3.1464
13	2	1	2	Construction	Water_Heat	3.461
13	2	1	3	Construction	Water_Heat	3.7757
13	2	1	4	Construction	Water_Heat	4.0903
13	2	2	1	Construction	Water_Heat	2.5171
13	2	2	2	Construction	Water_Heat	2.7688
13	2	2	3	Construction	Water_Heat	3.0205
13	2	2	4	Construction	Water_Heat	3.2722
13	11	1	1	Construction	Other	0
13	11	2	1	Construction	Other	0
14	1	1	1	Agriculture	Space_Heat	1.6583
14	1	1	2	Agriculture	Space_Heat	1.8242
14	1	1	3	Agriculture	Space_Heat	1.99
14	1	1	4	Agriculture	Space_Heat	2.1558
14	1	2	1	Agriculture	Space_Heat	1.3267
14	1	2	2	Agriculture	Space_Heat	1.4593
14	1	2	3	Agriculture	Space_Heat	1.592
14	1	2	4	Agriculture	Space_Heat	1.7247
14	2	1	1	Agriculture	Water_Heat	2.2734
14	2	1	2	Agriculture	Water_Heat	2.5008
14	2	1	3	Agriculture	Water_Heat	2.7281
14	2	1	4	Agriculture	Water_Heat	2.9554
14	2	2	1	Agriculture	Water_Heat	1.8187
14	2	2	2	Agriculture	Water_Heat	2.0006
14	2	2	3	Agriculture	Water_Heat	2.1825
14	2	2	4	Agriculture	Water_Heat	2.3644
14	8	1	1	Agriculture	Drying	2.2734
14	8	1	2	Agriculture	Drying	2.5008
14	8	2	1	Agriculture	Drying	1.8187
14	8	2	2	Agriculture	Drying	2.0006
14	9	1	1	Agriculture	Engine	9.7757
14	9	1	2	Agriculture	Engine	10.7533
14	9	2	1	Agriculture	Engine	7.8206
14	9	2	2	Agriculture	Engine	8.6026
14	11	1	1	Agriculture	Other	0
14	11	2	1	Agriculture	Other	0

Southern California Gas Company
2016 California Gas Report
Employment (in millions)

YEAR	Office	Restaurant	Retail	Laundry	Warehouse	School	College	Health	Lodging	Misc	Government	TCU	Constructior	Agriculture	Total
2015	1.628575	0.730021	0.996872	0.095894	0.485708	0.641048	0.213683	1.155073	0.129428	0.2422183	0.6253858	0.532067	0.3652375	0.2338	8.075004
2016	1.66243	0.741557	1.012613	0.096423	0.495683	0.648131	0.216045	1.191794	0.134173	0.2435567	0.6316525	0.538078	0.3880433	0.243042	8.243212
2017	1.6949	0.740826	1.011608	0.095528	0.503604	0.652773	0.217591	1.217059	0.135682	0.241295	0.6338067	0.54402	0.4073683	0.244908	8.340963
2018	1.714186	0.734173	1.002533	0.094954	0.510741	0.662622	0.220874	1.236535	0.137629	0.2398467	0.6396108	0.552717	0.4244417	0.246387	8.41725
2019	1.729428	0.732839	1.000713	0.094442	0.517923	0.672145	0.224048	1.258138	0.138966	0.238555	0.64537	0.559856	0.4392	0.247606	8.499233
2020	1.756141	0.733028	1.000968	0.093892	0.524192	0.678311	0.226103	1.276141	0.139899	0.23716	0.6558058	0.563296	0.45422	0.24829	8.587445
2021	1.781956	0.731941	0.999483	0.093437	0.528082	0.684084	0.228028	1.293884	0.140751	0.2360175	0.6538258	0.568548	0.4680358	0.249218	8.657289
2022	1.817183	0.729919	0.99672	0.092937	0.532698	0.689948	0.229983	1.312278	0.141226	0.2347458	0.6579067	0.573151	0.4815183	0.250393	8.740603
2023	1.857095	0.728866	0.995287	0.092579	0.537155	0.695706	0.231902	1.330939	0.141526	0.2338458	0.6617533	0.576634	0.4941617	0.251755	8.829203
2024	1.892784	0.728703	0.995063	0.092224	0.541743	0.701809	0.233937	1.349826	0.141668	0.23295	0.666065	0.580055	0.5063475	0.252827	8.916007
2025	1.924226	0.728526	0.994828	0.092066	0.545555	0.708817	0.236272	1.367579	0.141431	0.2325542	0.67127	0.583677	0.5157767	0.253401	8.995983
2026	1.956786	0.730365	0.997334	0.092188	0.54829	0.715858	0.238619	1.384275	0.141317	0.2328625	0.6764767	0.587403	0.5230092	0.253947	9.078736
2027	1.987404	0.732086	0.999687	0.092369	0.549675	0.722934	0.240978	1.399681	0.141599	0.2333175	0.6817033	0.589436	0.5314533	0.254478	9.156803
2028	2.009981	0.733637	1.001801	0.092684	0.547423	0.730522	0.243506	1.417049	0.142158	0.2341192	0.6873192	0.59086	0.5380492	0.254793	9.2239
2029	2.031262	0.735453	1.004286	0.092833	0.545805	0.738004	0.246002	1.435838	0.142866	0.23449	0.6928442	0.592824	0.5448683	0.255209	9.292583
2030	2.056428	0.737375	1.006911	0.092854	0.542755	0.744743	0.248247	1.454143	0.143442	0.2345425	0.704105	0.593368	0.5546617	0.255623	9.369194
2031	2.084384	0.740045	1.010553	0.0928	0.540359	0.750741	0.250248	1.473855	0.144204	0.2344058	0.70293	0.594258	0.5634708	0.256193	9.438448
2032	2.114465	0.742748	1.014243	0.092766	0.536998	0.756681	0.252228	1.494343	0.144943	0.2343217	0.7072283	0.59565	0.5680492	0.256801	9.511466
2033	2.141471	0.746203	1.018965	0.092873	0.534775	0.762531	0.254177	1.515306	0.145762	0.2345917	0.7113742	0.597003	0.5727708	0.257415	9.585215
2034	2.169048	0.74922	1.023083	0.092888	0.531761	0.768836	0.256279	1.535847	0.146416	0.2346292	0.715865	0.597873	0.581105	0.257784	9.660635
2035	2.198495	0.752463	1.027511	0.092898	0.529199	0.774989	0.258328	1.552023	0.147143	0.234655	0.72021	0.598041	0.591875	0.257976	9.735805

Southern California Gas Company
2016 California Gas Report
Gas Engine Historical Data and Forecast (Mdth/year)

Mdth

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2014	118.54	172.54	146.47	118.80	270.67	340.82	340.42	321.69	271.00	223.90	167.22	92.80	2,585
2015	65.61	132.68	160.80	201.20	255.76	265.21	316.94	296.55	270.49	225.11	161.51	76.60	2,428
2016	84.85	139.91	148.37	155.07	254.94	303.15	327.79	311.48	277.78	219.75	170.03	98.83	2,492
2017	85.70	141.31	149.85	156.62	257.48	306.18	331.07	314.59	280.55	221.95	171.73	99.82	**2,517**
2018	86.55	142.72	151.35	158.18	260.06	309.24	334.38	317.74	283.36	224.17	173.44	100.82	2,542
2019	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2020	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2021	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2022	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2023	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2024	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2025	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2026	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2027	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2028	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2029	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2030	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2031	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2032	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2033	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2034	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2035	87.42	144.15	152.86	159.76	262.66	312.33	337.72	320.92	286.19	226.41	175.18	101.83	2,567
2036	87.42	144.15	152.87	159.77	262.66	312.34	337.73	320.92	286.20	226.41	175.18	101.83	2,567
2037	87.42	144.15	152.87	159.77	262.66	312.34	337.73	320.92	286.20	226.41	175.18	101.83	2,567
2038	87.42	144.15	152.87	159.77	262.66	312.34	337.73	320.92	286.20	226.41	175.18	101.83	2,567
2039	87.42	144.15	152.87	159.77	262.66	312.34	337.73	320.92	286.20	226.41	175.18	101.83	2,567
2040	87.42	144.15	152.87	159.77	262.66	312.34	337.73	320.92	286.20	226.41	175.18	101.83	2,567

Southern California Gas Company
2016 California Gas Report
Gas AC Historical Data and Forecast (Mdth/year)

Mdth

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2014	3.28	4.25	3.77	5.65	5.88	9.06	9.39	11.42	11.71	12.10	9.30	5.39	91.20
2015	3.42	7.77	4.83	1.64	11.05	0.00	8.56	9.62	10.00	10.80	9.40	4.54	81.63
2016	2.90	4.38	3.87	3.79	7.40	5.18	8.52	9.27	9.45	8.63	7.01	3.95	74.35
2017	2.90	4.38	3.87	3.79	7.40	5.18	8.52	9.27	9.45	8.63	7.01	3.95	74.35
2018	2.90	4.38	3.87	3.79	7.40	5.18	8.52	9.27	9.45	8.63	7.01	3.95	74.35
2019	2.90	4.38	3.87	3.79	7.40	5.18	8.52	9.27	9.45	8.63	7.01	3.95	74.35
2020	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2021	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2022	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2023	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2024	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2025	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2026	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2027	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2028	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2029	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2030	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2031	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2032	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2033	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2034	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2035	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2036	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2037	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2038	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2039	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17
2040	1.45	2.19	1.94	1.90	3.70	2.59	4.26	4.63	4.72	4.31	3.51	1.97	37.17

Southern California Gas Company
2016 California Gas Report
Average Temperature Year Demand Forecast
(Mdth/Year)

SOURCE	TEMP	RATE	MARKE	EXCHC	DELCOI	YEAR	MDTH1	MDTH2	MDTH3	MDTH4	MDTH5	MDTH6	MDTH7	MDTH8	MDTH9	MDTH10	MDTH11	MDTH12	TOTAL
G10Commercial A		G10	C	NA	N+T	**2015**	9,548	7,098	7,775	6,637	6,018	6,439	5,595	5,010	5,157	5,438	7,537	8,914	81,168
G10Commercial A		G10	C	NA	N+T	2016	9,352	6,953	7,615	6,501	5,895	6,307	5,481	4,907	5,051	5,326	7,383	8,731	79,502
G10Commercial A		G10	C	NA	N+T	2017	9,356	6,956	7,619	6,504	5,897	6,309	5,483	4,909	5,053	5,328	7,386	8,735	79,534
G10Commercial A		G10	C	NA	N+T	2018	9,199	6,839	7,491	6,395	5,799	6,204	5,391	4,827	4,969	5,239	7,262	8,589	78,204
G10Commercial A		G10	C	NA	N+T	2019	9,058	6,734	7,376	6,297	5,710	6,109	5,308	4,753	4,892	5,159	7,151	8,457	77,003
G10Commercial A		G10	C	NA	N+T	2020	8,929	6,638	7,271	6,207	5,628	6,021	5,233	4,685	4,822	5,085	7,049	8,336	75,904
G10Commercial A		G10	C	NA	N+T	2021	8,745	6,501	7,121	6,079	5,512	5,897	5,125	4,589	4,723	4,980	6,903	8,164	74,339
G10Commercial A		G10	C	NA	N+T	2022	8,547	6,354	6,959	5,941	5,387	5,764	5,009	4,485	4,616	4,867	6,747	7,979	72,653
G10Commercial A		G10	C	NA	N+T	2023	8,379	6,229	6,823	5,825	5,282	5,651	4,910	4,397	4,525	4,772	6,614	7,823	71,230
G10Commercial A		G10	C	NA	N+T	2024	8,234	6,122	6,705	5,724	5,190	5,553	4,826	4,321	4,447	4,689	6,500	7,688	70,000
G10Commercial A		G10	C	NA	N+T	2025	8,086	6,012	6,585	5,621	5,097	5,453	4,739	4,243	4,367	4,605	6,383	7,549	68,741
G10Commercial A		G10	C	NA	N+T	2026	7,947	5,908	6,471	5,524	5,009	5,359	4,657	4,170	4,292	4,526	6,273	7,419	67,553
G10Commercial A		G10	C	NA	N+T	2027	7,834	5,824	6,379	5,446	4,938	5,283	4,591	4,111	4,231	4,461	6,184	7,314	66,597
G10Commercial A		G10	C	NA	N+T	2028	7,718	5,738	6,285	5,365	4,865	5,205	4,523	4,050	4,168	4,395	6,093	7,206	65,612
G10Commercial A		G10	C	NA	N+T	2029	7,591	5,644	6,181	5,277	4,785	5,119	4,449	3,983	4,100	4,323	5,993	7,087	64,532
G10Commercial A		G10	C	NA	N+T	2030	7,470	5,554	6,083	5,193	4,709	5,038	4,378	3,920	4,035	4,254	5,897	6,974	63,505
G10Commercial A		G10	C	NA	N+T	2031	7,487	5,566	6,096	5,204	4,719	5,049	4,387	3,928	4,043	4,264	5,910	6,990	63,644
G10Commercial A		G10	C	NA	N+T	2032	7,497	5,573	6,104	5,211	4,725	5,056	4,393	3,934	4,049	4,269	5,918	6,999	63,728
G10Commercial A		G10	C	NA	N+T	2033	7,515	5,587	6,120	5,224	4,737	5,068	4,404	3,943	4,059	4,280	5,933	7,016	63,888
G10Commercial A		G10	C	NA	N+T	2034	7,533	5,600	6,134	5,236	4,748	5,080	4,414	3,953	4,068	4,290	5,946	7,033	64,036
G10Commercial A		G10	C	NA	N+T	2035	7,570	5,628	6,164	5,262	4,771	5,105	4,436	3,972	4,088	4,311	5,975	7,067	64,347

Com10Col

Southern California Gas Company
2016 California Gas Report
Cold Temperature Year Demand Forecast
Mdth/Year

SOURCE	TEMP	RATE	MARKE	EXCHC	DELCO	YEAR	MDTH1	MDTH2	MDTH3	MDTH4	MDTH5	MDTH6	MDTH7	MDTH8	MDTH9	MDTH10	MDTH11	MDTH12	TOTAL
G10Commercial	C	G10	C	NA	N+T	**2015**	10629.26	7594.51	8432.39	7022.85	6256.88	6767.37	5726.79	5008.13	5189.08	5536.84	8139.92	9843.39	86147.41
G10Commercial	C	G10	C	NA	N+T	2016	10414.92	7441.45	8262.42	6881.34	6130.83	6631.02	5611.45	4907.30	5084.59	5425.33	7975.84	9644.92	84411.42
G10Commercial	C	G10	C	NA	N+T	2017	10419.63	7444.70	8266.06	6884.31	6133.43	6633.86	5613.79	4909.29	5086.67	5427.58	7979.35	9649.25	84447.91
G10Commercial	C	G10	C	NA	N+T	2018	10245.37	7320.18	8127.81	6769.15	6030.82	6522.89	5519.87	4827.15	5001.56	5336.78	7845.88	9487.86	83035.32
G10Commercial	C	G10	C	NA	N+T	2019	10088.17	7207.84	8003.08	6665.26	5938.26	6422.78	5435.14	4753.05	4924.78	5254.87	7725.48	9342.27	81760.96
G10Commercial	C	G10	C	NA	N+T	2020	9944.25	7105.00	7888.89	6570.15	5853.52	6331.12	5357.57	4685.20	4854.49	5179.88	7615.25	9208.98	80594.31
G10Commercial	C	G10	C	NA	N+T	2021	9739.23	6958.51	7726.23	6434.67	5732.81	6200.57	5247.08	4588.57	4754.36	5073.06	7458.23	9019.11	78932.43
G10Commercial	C	G10	C	NA	N+T	2022	9518.50	6800.78	7551.11	6288.81	5602.85	6060.01	5128.12	4484.52	4646.56	4958.04	7289.17	8814.69	77143.15
G10Commercial	C	G10	C	NA	N+T	2023	9332.12	6667.60	7403.23	6165.63	5493.11	5941.31	5027.66	4396.66	4555.53	4860.92	7146.42	8642.07	75632.27
G10Commercial	C	G10	C	NA	N+T	2024	9171.08	6552.52	7275.46	6059.21	5398.29	5838.76	4940.87	4320.75	4476.87	4777.01	7023.07	8492.93	74326.81
G10Commercial	C	G10	C	NA	N+T	2025	9006.17	6434.68	7144.62	5950.24	5301.19	5733.74	4851.99	4243.02	4396.33	4691.08	6896.77	8340.20	72990.04
G10Commercial	C	G10	C	NA	N+T	2026	8850.61	6323.53	7021.20	5847.44	5209.60	5634.68	4768.15	4169.69	4320.36	4610.03	6777.63	8196.14	71729.06
G10Commercial	C	G10	C	NA	N+T	2027	8725.42	6234.07	6921.87	5764.71	5135.89	5554.96	4700.68	4110.68	4259.21	4544.80	6681.74	8080.20	70714.24
G10Commercial	C	G10	C	NA	N+T	2028	8596.40	6141.88	6819.51	5679.44	5059.92	5472.79	4631.14	4049.86	4196.20	4477.57	6582.92	7960.70	69668.34
G10Commercial	C	G10	C	NA	N+T	2029	8455.02	6040.86	6707.34	5586.02	4976.68	5382.76	4554.95	3983.22	4127.15	4403.91	6474.64	7829.77	68522.31
G10Commercial	C	G10	C	NA	N+T	2030	8320.48	5944.72	6600.59	5497.11	4897.46	5297.08	4482.43	3919.80	4061.44	4333.80	6371.59	7705.17	67431.68
G10Commercial	C	G10	C	NA	N+T	2031	8338.76	5957.78	6615.10	5509.19	4908.23	5308.72	4492.29	3928.41	4070.37	4343.33	6385.60	7722.10	67579.87
G10Commercial	C	G10	C	NA	N+T	2032	8349.76	5965.64	6623.82	5516.45	4914.70	5315.73	4498.21	3933.60	4075.74	4349.06	6394.02	7732.28	67669.00
G10Commercial	C	G10	C	NA	N+T	2033	8370.63	5980.55	6640.38	5530.24	4926.99	5329.02	4509.46	3943.43	4085.93	4359.93	6410.00	7751.61	67838.19
G10Commercial	C	G10	C	NA	N+T	2034	8390.05	5994.43	6655.79	5543.08	4938.43	5341.38	4519.93	3952.59	4095.41	4370.05	6424.88	7769.59	67995.61
G10Commercial	C	G10	C	NA	N+T	2035	8430.82	6023.56	6688.13	5570.02	4962.43	5367.35	4541.90	3971.80	4115.32	4391.30	6456.10	7807.35	68326.07

Southern California Gas Company
2016 California Gas Report
Hot Temperature Year Demand Forecast
Mdth/Year

SOURCE	TEMP	RATE	MARKE	EXCHC	DELCOI	YEAR	MDTH1	MDTH2	MDTH3	MDTH4	MDTH5	MDTH6	MDTH7	MDTH8	MDTH9	MDTH10	MDTH11	MDTH12	TOTAL
G10Commercial	H	G10	C	NA	N+T	**2015**	8461.22	6596.87	7111.43	6246.39	5775.24	6093.30	5433.07	5008.13	5117.15	5332.84	6930.61	7977.78	76084.03
G10Commercial	H	G10	C	NA	N+T	2016	8291.21	6464.21	6968.47	6120.76	5659.04	5970.73	5323.73	4907.30	5014.14	5225.51	6791.26	7817.45	74553.82
G10Commercial	H	G10	C	NA	N+T	2017	8294.09	6466.62	6971.00	6123.07	5661.23	5973.00	5325.82	4909.29	5016.15	5227.59	6793.74	7820.20	74581.79
G10Commercial	H	G10	C	NA	N+T	2018	8155.25	6358.39	6854.32	6020.59	5566.49	5873.04	5236.70	4827.15	4932.22	5140.12	6680.03	7689.29	73333.61
G10Commercial	H	G10	C	NA	N+T	2019	8030.00	6260.76	6749.06	5928.15	5481.03	5782.86	5156.30	4753.05	4856.50	5061.21	6577.45	7571.20	72207.59
G10Commercial	H	G10	C	NA	N+T	2020	7915.34	6171.39	6652.70	5843.52	5402.79	5700.31	5082.70	4685.20	4787.18	4988.98	6483.54	7463.09	71176.73
G10Commercial	H	G10	C	NA	N+T	2021	7752.00	6044.07	6515.44	5722.97	5291.34	5582.71	4977.85	4588.57	4688.43	4886.07	6349.77	7309.08	69708.29
G10Commercial	H	G10	C	NA	N+T	2022	7576.14	5906.99	6367.65	5593.17	5171.34	5456.09	4864.97	4484.52	4582.12	4775.28	6205.74	7143.27	68127.27
G10Commercial	H	G10	C	NA	N+T	2023	7427.64	5791.23	6242.85	5483.57	5070.02	5349.18	4769.65	4396.66	4492.35	4681.73	6084.12	7003.25	66792.24
G10Commercial	H	G10	C	NA	N+T	2024	7299.33	5691.22	6135.03	5388.87	4982.47	5256.80	4687.29	4320.75	4414.78	4600.90	5979.03	6882.27	65638.74
G10Commercial	H	G10	C	NA	N+T	2025	7167.95	5588.81	6024.61	5291.90	4892.82	5162.21	4602.95	4243.02	4335.35	4518.12	5871.43	6758.40	64457.56
G10Commercial	H	G10	C	NA	N+T	2026	7044.01	5492.21	5920.46	5200.42	4808.26	5072.98	4523.40	4169.69	4260.43	4440.04	5769.92	6641.54	63343.35
G10Commercial	H	G10	C	NA	N+T	2027	6944.27	5414.46	5836.64	5126.81	4740.20	5001.17	4459.37	4110.68	4200.13	4377.21	5688.23	6547.50	62446.66
G10Commercial	H	G10	C	NA	N+T	2028	6841.47	5334.34	5750.25	5050.94	4670.06	4927.16	4393.39	4049.86	4137.98	4312.45	5604.04	6450.57	61522.50
G10Commercial	H	G10	C	NA	N+T	2029	6728.84	5246.54	5655.59	4967.80	4593.20	4846.06	4321.08	3983.22	4069.89	4241.49	5511.79	6344.37	60509.87
G10Commercial	H	G10	C	NA	N+T	2030	6621.64	5162.98	5565.51	4888.69	4520.06	4768.89	4252.28	3919.80	4005.08	4173.96	5424.00	6243.30	59546.19
G10Commercial	H	G10	C	NA	N+T	2031	6636.21	5174.34	5577.75	4899.43	4530.00	4779.37	4261.63	3928.41	4013.89	4183.13	5435.93	6257.03	59677.13
G10Commercial	H	G10	C	NA	N+T	2032	6644.97	5181.17	5585.11	4905.90	4535.97	4785.68	4267.25	3933.60	4019.18	4188.65	5443.10	6265.29	59755.88
G10Commercial	H	G10	C	NA	N+T	2033	6661.60	5194.13	5599.09	4918.17	4547.32	4797.65	4277.92	3943.43	4029.23	4199.13	5456.72	6280.97	59905.38
G10Commercial	H	G10	C	NA	N+T	2034	6677.07	5206.19	5612.09	4929.59	4557.88	4808.79	4287.85	3952.59	4038.59	4208.88	5469.39	6295.56	60044.48
G10Commercial	H	G10	C	NA	N+T	2035	6709.55	5231.51	5639.39	4953.57	4580.04	4832.18	4308.70	3971.80	4058.22	4229.34	5495.99	6326.18	60336.48

Southern California Gas Company
2016 California Gas Report
Base Temperature Year Demand Forecast
Mdth/Year

SOURCE	YEAR	MDTH1	MDTH2	MDTH3	MDTH4	MDTH5	MDTH6	MDTH7	MDTH8	MDTH9	MDTH10	MDTH11	MDTH12	TOTAL
G10Commercial	2015	4990.298	4999.926	4997.267	5001.739	5004.172	5002.519	5005.834	5008.135	5007.558	5006.455	4998.201	4992.79	60014.894
G10Commercial	**2016**	4891.26	4899.93	4897.53	4901.55	4903.74	4902.25	4905.24	4907.30	4906.78	4905.80	4898.37	4893.50	58813.27
G10Commercial	2017	4891.20	4900.98	4898.27	4902.81	4905.28	4903.60	4906.96	4909.29	4908.71	4907.60	4899.22	4893.72	58827.63
G10Commercial	2018	4809.08	4818.85	4816.14	4820.67	4823.14	4821.46	4824.82	4827.15	4826.56	4825.46	4817.08	4811.59	57842.00
G10Commercial	2019	4734.98	4744.76	4742.04	4746.57	4749.04	4747.36	4750.72	4753.05	4752.46	4751.37	4742.98	4737.49	56952.83
G10Commercial	2020	4667.16	4676.93	4674.21	4678.74	4681.21	4679.53	4682.88	4685.20	4684.62	4683.53	4675.15	4669.66	56138.81
G10Commercial	2021	4570.53	4580.30	4577.58	4582.11	4584.58	4582.89	4586.25	4588.57	4587.98	4586.90	4578.52	4573.03	54979.23
G10Commercial	2022	4466.50	4476.27	4473.54	4478.07	4480.54	4478.85	4482.20	4484.52	4483.93	4482.87	4474.48	4468.99	53730.76
G10Commercial	2023	4378.66	4388.43	4385.69	4390.22	4392.69	4391.00	4394.35	4396.66	4396.07	4395.02	4386.62	4381.14	52676.55
G10Commercial	2024	4302.76	4312.53	4309.79	4314.31	4316.78	4315.09	4318.44	4320.75	4320.16	4319.11	4310.72	4305.23	51765.67
G10Commercial	2025	4225.04	4234.81	4232.06	4236.58	4239.06	4237.37	4240.71	4243.02	4242.43	4241.39	4232.99	4227.50	50832.96
G10Commercial	2026	4151.73	4161.49	4158.75	4163.26	4165.73	4164.05	4167.39	4169.69	4169.10	4168.07	4159.67	4154.18	49953.11
G10Commercial	2027	4092.73	4102.49	4099.74	4104.26	4106.73	4105.04	4108.38	4110.68	4110.09	4109.06	4100.66	4095.18	49245.04
G10Commercial	2028	4031.92	4041.69	4038.93	4043.44	4045.92	4044.23	4047.56	4049.86	4049.27	4048.25	4039.85	4034.36	48515.28
G10Commercial	2029	3965.30	3975.06	3972.30	3976.81	3979.28	3977.59	3980.92	3983.22	3982.63	3981.62	3973.21	3967.73	47715.65
G10Commercial	2030	3901.89	3911.65	3908.89	3913.39	3915.87	3914.17	3917.50	3919.80	3919.20	3918.20	3909.80	3904.31	46954.68
G10Commercial	2031	3910.51	3920.26	3917.50	3922.01	3924.48	3922.79	3926.12	3928.41	3927.82	3926.82	3918.42	3912.93	47058.08
G10Commercial	2032	3915.69	3925.45	3922.68	3927.19	3929.66	3927.97	3931.30	3933.60	3933.00	3932.00	3923.60	3918.11	47120.27
G10Commercial	2033	3925.53	3935.29	3932.52	3937.03	3939.50	3937.81	3941.14	3943.43	3942.84	3941.84	3933.44	3927.95	47238.33
G10Commercial	2034	3934.68	3944.44	3941.68	3946.18	3948.66	3946.96	3950.30	3952.59	3952.00	3951.00	3942.59	3937.11	47348.17
G10Commercial	2035	3953.90	3963.65	3960.89	3965.40	3967.87	3966.18	3969.51	3971.80	3971.21	3970.21	3961.81	3956.32	47578.76

G10 Industrial DATA TABLES

Southern California Gas Company
2016 CGR - Industrial G10
The Year the Equipment Was Installed by Business Types

Business Type	Fire_ Tube_ Boiler	Water_ Tube_ Boiler	Space_ Heat	Water_ Heat	Dryer	Furnace_ Oven_ Kiln	AC	Engine	Other
Mining	2002	1980	1979	1980	1968	1978	.	1970	1976
Food	2004	1999	2002	1992	1992	2002	1965	1994	1983
Textile	1999	1998	1994	1982	1992	1982	.	.	1980
Wood_Paper	1997	1994	1995	1981	1981	2006	.	.	1975
Chemical	2005	1995	2002	1986	1985	1981	.	1999	1976
Petroleum	2006	1990	2002	1975	1981	1971	.	.	1977
Stone	2007	1983	1996	1982	1982	1982	1985	2014	1975
Primary_Metal	1993	1991	1987	1982	1978	1982	.	1996	1976
Fabricated_Metal	2002	1989	1986	1980	1984	1980	.	1984	1975
Transport	1993	1994	1996	1981	1987	1983	1973	2003	1976
Misc	1996	1995	1994	1981	1987	1978	1984	1999	1978

Southern California Gas Company
2016 CGR - Industrial G10
Electric Price Forecasat (Cent/KWH)

(a) Average Price Forecast

Year	Chemical	Fab_Metal	Food	Mining	Petroleum	_Prim_Metal	Stone	Textile	Transport	Wood_Paper	Misc
2015	12.81	12.51	12.54	12.13	12.68	11.54	13.35	12.62	13.34	13.17	14.13
2016	12.59	12.30	12.33	11.94	12.46	11.38	13.11	12.41	13.09	12.92	13.83
2017	13.21	12.87	12.91	12.44	13.06	11.78	13.82	12.99	13.80	13.60	14.68
2018	13.60	13.26	13.29	12.82	13.45	12.14	14.23	13.39	14.21	14.00	15.11
2019	14.26	13.91	13.95	13.47	14.11	12.80	14.89	14.04	14.87	14.66	15.77
2020	14.88	14.53	14.57	14.07	14.73	13.38	15.53	14.66	15.51	15.29	16.43
2021	15.47	15.13	15.17	14.68	15.33	14.00	16.11	15.26	16.09	15.87	16.98
2022	15.73	15.40	15.44	14.98	15.59	14.34	16.33	15.53	16.31	16.10	17.16
2023	16.16	15.84	15.87	15.40	16.03	14.75	16.78	15.97	16.75	16.54	17.60
2024	16.73	16.40	16.44	15.97	16.60	15.31	17.35	16.54	17.33	17.10	18.17
2025	17.08	16.75	16.79	16.32	16.95	15.67	17.69	16.89	17.67	17.45	18.51
2026	17.69	17.37	17.41	16.93	17.56	16.28	18.31	17.51	18.29	18.06	19.12
2027	18.05	17.73	17.76	17.28	17.92	16.62	18.68	17.87	18.66	18.42	19.50
2028	18.42	18.09	18.13	17.64	18.29	16.97	19.06	18.24	19.04	18.80	19.89
2029	18.79	18.46	18.50	18.01	18.66	17.34	19.43	18.61	19.41	19.17	20.26
2030	19.16	18.84	18.88	18.38	19.04	17.71	19.81	18.98	19.79	19.54	20.64
2031	19.56	19.23	19.27	18.76	19.43	18.08	20.21	19.38	20.19	19.94	21.05
2032	19.95	19.62	19.66	19.15	19.83	18.47	20.62	19.77	20.59	20.33	21.45
2033	20.36	20.02	20.07	19.55	20.23	18.86	21.03	20.18	21.01	20.74	21.88
2034	20.79	20.45	20.49	19.96	20.66	19.27	21.47	20.61	21.44	21.17	22.32
2035	21.22	20.87	20.92	20.38	21.09	19.66	21.92	21.04	21.89	21.61	22.79

(b) Marginal Price Forecast

Year	Chemical	Fab_Metal	Food	Mining	Petroleum	_Prim_Metal	Stone	Textile	Transport	Wood_Paper	Misc
2015	10.07	10.01	10.00	9.79	10.03	9.56	10.36	9.90	10.28	10.32	10.75
2016	9.90	9.84	9.83	9.63	9.86	9.41	10.18	9.74	10.09	10.14	10.54
2017	10.38	10.31	10.30	10.06	10.33	9.79	10.71	10.19	10.61	10.67	11.15
2018	10.69	10.62	10.60	10.36	10.64	10.09	11.03	10.49	10.93	10.98	11.48
2019	11.21	11.14	11.12	10.88	11.16	10.61	11.55	11.01	11.45	11.50	11.99
2020	11.70	11.62	11.61	11.36	11.65	11.08	12.05	11.49	11.95	12.00	12.51
2021	12.16	12.09	12.08	11.83	12.12	11.56	12.51	11.97	12.41	12.46	12.96
2022	12.37	12.30	12.29	12.05	12.32	11.80	12.70	12.18	12.60	12.65	13.12
2023	12.71	12.64	12.63	12.39	12.66	12.13	13.04	12.52	12.94	13.00	13.47
2024	13.16	13.09	13.08	12.84	13.11	12.57	13.49	12.97	13.39	13.45	13.93
2025	13.43	13.36	13.35	13.11	13.39	12.85	13.77	13.24	13.67	13.72	14.20
2026	13.92	13.85	13.84	13.60	13.87	13.33	14.25	13.73	14.15	14.20	14.68
2027	14.20	14.13	14.12	13.88	14.15	13.61	14.54	14.01	14.44	14.49	14.98
2028	14.49	14.42	14.41	14.16	14.44	13.89	14.84	14.30	14.74	14.79	15.28
2029	14.78	14.71	14.70	14.45	14.74	14.18	15.13	14.59	15.03	15.08	15.58
2030	15.08	15.01	15.00	14.75	15.03	14.47	15.43	14.88	15.32	15.38	15.88
2031	15.39	15.32	15.30	15.05	15.34	14.77	15.74	15.19	15.64	15.69	16.20
2032	15.70	15.63	15.62	15.36	15.65	15.08	16.06	15.50	15.95	16.01	16.52
2033	16.02	15.95	15.94	15.68	15.97	15.39	16.39	15.82	16.28	16.34	16.85
2034	16.36	16.28	16.27	16.01	16.31	15.72	16.73	16.15	16.62	16.68	17.20
2035	16.70	16.62	16.61	16.34	16.65	16.04	17.08	16.48	16.96	17.02	17.56

Southern California Gas Company
2016 CGR - Industrial G10
Gas Price Forecasat ($/Therm)

(a) Average Price Forecast

Year	Price Deflator	Chemical	Fabricated Metal	Food	Mining	Petroleum	Primary Metal	Stone	Textile	Transport	Wood Paper	Misc
2015	100.00	0.5965	0.5824	0.5838	0.5647	0.5902	0.5373	0.6218	0.5874	0.6210	0.6131	0.6581
2016	101.05	0.6626	0.6477	0.6493	0.6285	0.6561	0.5993	0.6899	0.6532	0.6890	0.6801	0.7282
2017	103.39	0.5805	0.5657	0.5673	0.5468	0.5740	0.5180	0.6074	0.5711	0.6065	0.5978	0.6452
2018	106.10	0.5985	0.5834	0.5850	0.5640	0.5920	0.5344	0.6261	0.5891	0.6252	0.6161	0.6647
2019	108.86	0.6263	0.6112	0.6128	0.5918	0.6198	0.5622	0.6539	0.6169	0.6530	0.6439	0.6925
2020	111.74	0.6521	0.6366	0.6383	0.6166	0.6455	0.5862	0.6806	0.6425	0.6796	0.6701	0.7200
2021	114.71	0.7133	0.6974	0.6992	0.6768	0.7066	0.6455	0.7427	0.7036	0.7417	0.7317	0.7830
2022	117.68	0.7879	0.7717	0.7735	0.7503	0.7811	0.7182	0.8182	0.7781	0.8172	0.8067	0.8595
2023	120.60	0.8453	0.8283	0.8302	0.8056	0.8383	0.7717	0.8774	0.8352	0.8763	0.8649	0.9205
2024	123.57	0.8920	0.8747	0.8767	0.8513	0.8850	0.8166	0.9251	0.8819	0.9240	0.9120	0.9691
2025	126.47	0.9413	0.9236	0.9257	0.8996	0.9342	0.8640	0.9753	0.9311	0.9742	0.9617	1.0202
2026	129.36	0.9942	0.9761	0.9782	0.9514	0.9870	0.9150	1.0291	0.9838	1.0279	1.0150	1.0748
2027	132.35	1.0259	1.0074	1.0096	0.9820	1.0186	0.9447	1.0617	1.0154	1.0604	1.0471	1.1083
2028	135.41	1.0594	1.0405	1.0427	1.0144	1.0520	0.9762	1.0961	1.0487	1.0949	1.0810	1.1437
2029	138.50	1.1043	1.0850	1.0874	1.0583	1.0968	1.0191	1.1421	1.0936	1.1407	1.1263	1.1906
2030	141.62	1.1482	1.1285	1.1309	1.1011	1.1406	1.0610	1.1869	1.1373	1.1856	1.1707	1.2364
2031	144.91	1.1837	1.1636	1.1660	1.1354	1.1760	1.0943	1.2234	1.1727	1.2220	1.2066	1.2739
2032	148.23	1.2292	1.2087	1.2112	1.1797	1.2214	1.1376	1.2700	1.2180	1.2685	1.2525	1.3215
2033	151.65	1.2681	1.2472	1.2498	1.2174	1.2603	1.1744	1.3100	1.2569	1.3085	1.2920	1.3626
2034	155.23	1.3122	1.2908	1.2934	1.2602	1.3042	1.2161	1.3552	1.3008	1.3536	1.3365	1.4088
2035	158.87	1.3397	1.3178	1.3205	1.2864	1.3316	1.2412	1.3838	1.3281	1.3822	1.3645	1.4386

(b) Marginal Price Forecasat

Year	Price Deflator	Chemical	Fabricated Metal	Food	Mining	Petroleum	Primary Metal	Stone	Textile	Transport	Wood Paper	Misc
2015	100.00	0.5424	0.5391	0.5386	0.5272	0.5402	0.5148	0.5583	0.5334	0.5536	0.5561	0.5788
2016	101.05	0.6049	0.6014	0.6008	0.5885	0.6025	0.5750	0.6221	0.5951	0.6171	0.6197	0.6444
2017	103.39	0.5235	0.5200	0.5195	0.5073	0.5212	0.4941	0.5405	0.5139	0.5355	0.5381	0.5623
2018	106.10	0.5402	0.5366	0.5360	0.5235	0.5378	0.5099	0.5576	0.5302	0.5525	0.5552	0.5801
2019	108.86	0.5680	0.5644	0.5638	0.5513	0.5656	0.5377	0.5854	0.5581	0.5803	0.5830	0.6079
2020	111.74	0.5922	0.5885	0.5879	0.5750	0.5897	0.5609	0.6102	0.5819	0.6049	0.6077	0.6335
2021	114.71	0.6518	0.6479	0.6473	0.6340	0.6492	0.6194	0.6704	0.6412	0.6649	0.6678	0.6944
2022	117.68	0.7247	0.7208	0.7201	0.7064	0.7221	0.6913	0.7439	0.7138	0.7383	0.7413	0.7688
2023	120.60	0.7788	0.7746	0.7739	0.7592	0.7759	0.7432	0.7992	0.7671	0.7932	0.7963	0.8256
2024	123.57	0.8238	0.8195	0.8188	0.8037	0.8209	0.7873	0.8449	0.8118	0.8387	0.8419	0.8721
2025	126.47	0.8715	0.8671	0.8664	0.8508	0.8685	0.8339	0.8931	0.8592	0.8868	0.8901	0.9211
2026	129.36	0.9227	0.9182	0.9174	0.9015	0.9197	0.8841	0.9450	0.9101	0.9384	0.9419	0.9737
2027	132.35	0.9527	0.9480	0.9473	0.9309	0.9496	0.9130	0.9756	0.9397	0.9688	0.9724	1.0051
2028	135.41	0.9845	0.9797	0.9789	0.9621	0.9813	0.9437	1.0080	0.9711	1.0011	1.0047	1.0383
2029	138.50	1.0277	1.0228	1.0220	1.0047	1.0244	0.9858	1.0518	1.0140	1.0447	1.0485	1.0830
2030	141.62	1.0698	1.0648	1.0639	1.0462	1.0664	1.0268	1.0946	1.0557	1.0873	1.0912	1.1266
2031	144.91	1.1035	1.0982	1.0974	1.0792	1.0999	1.0592	1.1289	1.0890	1.1214	1.1254	1.1618
2032	148.23	1.1471	1.1417	1.1409	1.1221	1.1435	1.1017	1.1732	1.1322	1.1655	1.1696	1.2070
2033	151.65	1.1841	1.1786	1.1777	1.1585	1.1804	1.1375	1.2109	1.1688	1.2030	1.2072	1.2456
2034	155.23	1.2261	1.2205	1.2196	1.1998	1.2223	1.1782	1.2537	1.2104	1.2456	1.2499	1.2893
2035	158.87	1.2516	1.2457	1.2448	1.2245	1.2476	1.2023	1.2799	1.2354	1.2715	1.2759	1.3165

Southern California Gas Company
2016 CGR - Industrial G10
Historical Throughput and Customer Counts

Business Type	therms_ 2015	meters_ 2015	meters_ 2015_ ExCust	meters_ 2015_ NewCust	avgUse_ 2015_ ExCust	avgUse_ 2015_ NewCust	Price Elasticity	Employment Elasticity
Mining	**3311741**	247	245	2	**13506**	**1386**	0.000000	0.321451
Food	**71426370**	2818	2,772	46	**25439**	**19773**	-0.190795	1.242506
Textile	**11547905**	508	505	3	**22847**	**3325**	0.000000	0.033325
Wood_Paper	**10838386**	460	459	1	**22877**	**337945**	0.000000	0.508272
Chemical	**21539861**	993	987	6	**21725**	**16132**	-0.080517	0.650067
Petroleum	**12263371**	133	130	3	**94310**	**1027**	-0.180563	0.084537
Stone	**5102076**	432	431	1	**11833**	**1986**	0.000000	0.416909
Prim_Metal	**11217999**	341	340	1	**32953**	**13997**	0.000000	0.956685
Fab_Metal	**24798290**	2157	2,149	8	**11532**	**1985**	-0.137441	1.023881
Transport	**14237589**	1712	1,709	3	**8328**	**1572**	0.000000	0.402505
Misc	**37521435**	6970	6,951	19	**5360**	**13924**	-0.108307	0.879307
Total	223,805,023	16,771						

Southern California Gas Company
2016 CGR - Industrial G10
Average Use Per Meter

therm

Business Type	Water_ Boiler	Fire_ Boiler	Space_ Heat	Water_ Heat	Dryer	Furnace_ Oven_ Kiln	AC	Engine	Other	Total
Mining	0.00	6225.80	43.44	1922.69	76.05	0.56	0.00	2.75	4786.37	13057.66
Food	3180.78	10141.03	82.75	2847.86	5310.90	7.92	71.91	83.96	2503.74	24230.85
Textile	5027.39	6783.50	56.56	1340.65	7765.90	71.23	0.00	0.00	1098.82	22144.05
Wood_Paper	4463.96	11983.97	458.96	1285.89	1606.17	119.80	0.00	3.78	2324.39	22246.91
Chemical	1972.76	7552.98	2767.33	1673.42	2070.49	665.27	2.19	85.13	4219.74	21009.32
Petroleum	2197.09	20863.92	133.26	129.32	41681.87	8.61	0.00	9165.75	15693.36	89873.19
Stone	428.23	1589.00	45.91	474.03	3876.33	3293.73	0.59	0.02	1787.29	11495.13
Prim_Metal	1513.70	2386.00	313.35	1878.50	6092.33	16202.71	10.64	0.00	3538.66	31935.90
Fab_Metal	336.91	656.28	208.11	1452.36	3112.68	2689.72	0.05	7.80	2730.58	11194.48
Transport	488.08	1995.77	1128.58	1115.44	1053.17	659.96	0.00	196.93	1456.32	8094.24
Misc	230.00	1031.13	332.14	501.28	1535.53	375.48	0.01	17.60	1179.66	5202.83

Southern California Gas Company
2016 CGR - Industrial G10
Use Per Meter for New Customers therm

Business Type	Fire_ Tube_ Boiler	Water_ Tube_ Boiler	Space_ Heat	Water_ Heat	Dryer	Furnace_ Oven_ Kiln	AC	Engine	Other	Total
Mining	0.00	2.24	0.23	23947.31	0.00	0.00	0.00	0.00	9314.20	33263.98
Food	3155.88	12674.65	38.57	1919.40	1967.47	0.00	0.00	0.00	1249.16	21005.14
Textile	1329.08	131.16	1.11	7181.12	1647.02	0.00	0.00	0.00	17.62	10307.11
Wood_Paper	0.00	30721.53	214.64	20.21	9238.90	0.00	0.00	0.00	0.00	40195.28
Chemical	5624.56	11816.67	3290.36	2592.56	3709.92	0.00	0.00	35.54	587.66	27657.26
Petroleum	3649.78	91492.09	145.82	0.00	26440.15	0.00	0.00	0.00	868.47	122596.30
Stone	0.00	0.00	198.09	0.00	1636.20	0.00	0.00	0.00	0.00	1834.29
Prim_Metal	0.00	18017.06	0.00	0.00	1290.93	39287.08	0.00	0.00	0.00	58595.07
Fab_Metal	0.00	317.56	14.86	42.94	6237.87	33.44	0.00	0.00	2118.72	8765.39
Transport	0.00	3204.72	1876.33	589.64	2009.99	3173.04	0.00	5922.60	0.00	16776.31
Misc	1325.47	1281.96	223.24	588.39	2609.70	138.67	0.00	10.79	2858.83	9037.05

Southern California Gas Company
2016 CGR - Industrial G10
Electric UEC (Kwh/SqFt)

Business Type	Fire_ Tube_ Boiler	Water_ Tube_ Boiler	Space_ Heat	Water_ Heat	Dryer	Furnace_ Oven_ Kiln	AC	Engine	Other
Mining	12053557	117480	22540	4117	3349437	1388699	3261	2871579	0
Food	992080	234899	77958	15939	1062552	781260	24817	1163891	0
Textile	1428304	371125	20797	30369	3811277	1069238	74615	0	0
Wood_Paper	11051345	3626956	48301	2915	523062	985476	3282	0	0
Chemical	1169880	658201	34723	19440	26417	593554	1620	738	0
Petroleum	1527674	385215	15711	15192	13761553	60935	0	101154	0
Stone	4960873	985989	31975	22824	6850607	6237158	37820	0	0
Primary_Metal	174313	550730	55233	9317	25494	13916258	66288	0	0
Fabricated_Metal	605450	591011	55315	8658	57653	2084618	5763	0	0
Transportation	76358	44486	30560	6490	228869	392291	1456	7240	0
Miscellaneous	148060	104128	22745	4673	181266	1005453	8471	17618	0

Southern California Gas Company
2016 CGR - Industrial G10
GAS UEC (Therm per SqFt.)

Business Type	Fire_ Tube_ Boiler	Water_ Tube_ Boiler	Space_ Heat	Water_ Heat	Dryer	Furnace_ Oven_ Kiln	AC	Engine	Other
Mining	0.0	2241270.1	252.0	5267.6	91252.7	671.9	0.0	113.8	6627.3
Food	111173.3	105370.7	954.4	4330.2	187396.8	2236.7	39768.2	13205.2	3384.0
Textile	97755.9	84794.4	490.2	4405.9	97073.5	28811.2	0.0	0.0	2469.0
Wood_Paper	8370448.2	5798601.6	3701.3	3131.2	78732.7	32091.3	0.0	567.0	3557.8
Chemical	205830.3	167162.0	13968.3	3956.0	84010.5	226745.1	1213.0	3552.9	6903.5
Petroleum	211873.9	619041.3	1095.3	797.2	1339770.6	2324.5	0.0	235688.8	27337.0
Stone	1361621.6	1403586.3	285.7	1376.6	501089.7	171147.3	48.5	1.8	3023.2
Primary_Metal	659478.1	366907.6	2067.2	4478.5	123876.9	329457.3	2862.7	0.0	5996.1
Fabricated_Metal	352859.2	114530.0	1645.4	3351.1	65001.9	216650.8	55.1	949.7	3834.3
Transportation	219677.7	209547.3	7747.4	3076.9	44487.1	83149.8	0.0	31017.5	1883.4
Miscellaneous	107096.3	63856.5	2149.8	1292.7	53625.4	55446.0	4.5	2639.9	1626.2

Southern California Gas Company
2016 CGR - Industrial G10
Gas Market Shares

Business Type	Fire_ Tube_ Boiler	Water_ Tube_ Boiler	Space_ Heat	Water_ Heat	Dryer	Furnace_ Oven_ Kiln	AC	Engine	Other
Chemical	0.00000	0.27778	0.23611	0.50000	0.02778	0.01389	0.00000	0.02778	0.72222
Fabricated_Metal	0.06358	0.21387	0.14451	0.77374	0.23617	0.01073	0.00248	0.00908	0.73988
Food	0.19780	0.30769	0.16484	0.42857	0.57143	0.02747	0.00000	0.00000	0.44505
Mining	0.05333	0.20667	0.20000	0.53333	0.22667	0.05333	0.00000	0.01333	0.65333
Miscllaneous	0.06846	0.32274	0.27139	0.57946	0.20538	0.02934	0.00245	0.03423	0.61125
Petroleum	0.07407	0.24074	0.16667	0.22222	0.25926	0.03704	0.00000	0.05556	0.57407
Primary_Metal	0.03145	0.11321	0.22013	0.47170	0.25786	0.32075	0.01887	0.01258	0.59119
Stone	0.03279	0.09290	0.20765	0.55191	0.32787	0.49180	0.00546	0.01093	0.59016
Textile	0.01364	0.08186	0.17326	0.57026	0.31924	0.12415	0.00136	0.00955	0.71214
Transportation	0.01587	0.06803	0.19955	0.49660	0.19728	0.07937	0.00000	0.00907	0.77324
Wood_Paper	0.01534	0.11534	0.21164	0.53122	0.23862	0.06772	0.00159	0.00952	0.72540

Southern California Gas Company
2016 CGR - Industrial G10
Saturation Rate

Business Type	Fire_ Tube_ Boiler	Water_ Tube_ Boiler	Space_ Heat	Water_ Heat	Dryer	Furnace_ Oven_ Kiln	AC	Engine	Other
Mining	0.01	0.01	0.73	0.73	0.03	0.06	0.64	0.87	1.00
Food	0.45	0.45	0.60	0.85	0.12	0.33	0.73	0.70	1.00
Textile	0.26	0.26	0.70	0.71	0.14	0.09	0.72	0.46	1.00
Wood_Paper	0.01	0.01	0.62	0.77	0.09	0.07	0.71	0.50	1.00
Chemical	0.14	0.14	0.73	0.73	0.12	0.10	0.74	0.70	1.00
Petroleum	0.14	0.14	0.73	0.73	0.12	0.10	0.74	0.70	1.00
Stone	0.01	0.01	0.73	0.73	0.03	0.06	0.64	0.87	1.00
Prim_Metal	0.07	0.07	0.73	0.76	0.15	0.10	0.68	0.86	1.00
Fab_Metal	0.07	0.07	0.73	0.76	0.15	0.10	0.68	0.86	1.00
Transport	0.14	0.14	0.73	0.73	0.12	0.10	0.74	0.70	1.00
Misc	0.14	0.14	0.73	0.73	0.12	0.10	0.74	0.70	1.00

Southern California Gas Company
2016 CGR - Industrial G10
UEC, Equipment Cost and Efficiency Shares

Where Fuel = 1 (gas) and = 2 (electric), and
Efficiency =1 (stock), =2 (standard), =3 (high) and =4 (premium)

Business Type	End Use	Fuel	Efficiency	EQcost
Mining	Fire_Tube_Boiler	1	1	3,907,010
Mining	Fire_Tube_Boiler	1	2	4,297,711
Mining	Fire_Tube_Boiler	1	3	4,688,412
Mining	Fire_Tube_Boiler	2	1	3,125,608
Mining	Fire_Tube_Boiler	2	2	3,438,169
Mining	Fire_Tube_Boiler	2	3	3,750,729
Mining	Water_Tube_Boiler	1	1	38,080
Mining	Water_Tube_Boiler	1	2	41,888
Mining	Water_Tube_Boiler	1	3	45,696
Mining	Water_Tube_Boiler	2	1	30,464
Mining	Water_Tube_Boiler	2	2	33,510
Mining	Water_Tube_Boiler	2	3	36,557
Mining	Space_Heat	1	1	7,306
Mining	Space_Heat	1	2	8,037
Mining	Space_Heat	1	3	8,767
Mining	Space_Heat	2	1	5,845
Mining	Space_Heat	2	2	6,429
Mining	Space_Heat	2	3	7,014
Mining	Water_Heat	1	1	1,868
Mining	Water_Heat	1	2	2,055
Mining	Water_Heat	1	3	2,242
Mining	Water_Heat	2	1	1,494
Mining	Water_Heat	2	2	1,644
Mining	Water_Heat	2	3	1,793
Mining	Dryer	1	1	1,085,678
Mining	Dryer	1	2	1,194,246
Mining	Dryer	1	3	1,302,814
Mining	Dryer	2	1	868,543
Mining	Dryer	2	2	955,397
Mining	Dryer	2	3	1,042,251
Mining	Furnace_Oven_Kiln	1	1	450,129
Mining	Furnace_Oven_Kiln	1	2	495,142
Mining	Furnace_Oven_Kiln	1	3	540,155
Mining	Furnace_Oven_Kiln	2	1	360,104
Mining	Furnace_Oven_Kiln	2	2	396,114
Mining	Furnace_Oven_Kiln	2	3	432,124
Mining	AC	1	1	1,057
Mining	AC	1	2	1,163
Mining	AC	1	3	1,268
Mining	AC	2	1	846
Mining	AC	2	2	930
Mining	AC	2	3	1,015
Mining	Engine	1	1	930,786
Mining	Engine	1	2	1,023,865
Mining	Engine	1	3	1,116,944
Mining	Engine	2	1	744,629
Mining	Engine	2	2	819,092
Mining	Engine	2	3	893,555
Mining	Other	1	1	-
Mining	Other	1	2	-
Mining	Other	1	3	-
Mining	Other	2	1	-
Mining	Other	2	2	-
Mining	Other	2	3	-
Food	Fire_Tube_Boiler	1	1	303,093
Food	Fire_Tube_Boiler	1	2	333,402
Food	Fire_Tube_Boiler	1	3	363,711
Food	Fire_Tube_Boiler	2	1	242,474
Food	Fire_Tube_Boiler	2	2	266,722

Food	Fire_Tube_Boiler	2	3	290,969
Food	Water_Tube_Boiler	1	1	71,765
Food	Water_Tube_Boiler	1	2	78,941
Food	Water_Tube_Boiler	1	3	86,117
Food	Water_Tube_Boiler	2	1	57,412
Food	Water_Tube_Boiler	2	2	63,153
Food	Water_Tube_Boiler	2	3	68,894
Food	Space_Heat	1	1	23,817
Food	Space_Heat	1	2	26,199
Food	Space_Heat	1	3	28,580
Food	Space_Heat	2	1	19,054
Food	Space_Heat	2	2	20,959
Food	Space_Heat	2	3	22,864
Food	Water_Heat	1	1	6,817
Food	Water_Heat	1	2	7,499
Food	Water_Heat	1	3	8,181
Food	Water_Heat	2	1	5,454
Food	Water_Heat	2	2	5,999
Food	Water_Heat	2	3	6,545
Food	Dryer	1	1	324,623
Food	Dryer	1	2	357,085
Food	Dryer	1	3	389,547
Food	Dryer	2	1	259,698
Food	Dryer	2	2	285,668
Food	Dryer	2	3	311,638
Food	Furnace_Oven_Kiln	1	1	238,684
Food	Furnace_Oven_Kiln	1	2	262,553
Food	Furnace_Oven_Kiln	1	3	286,421
Food	Furnace_Oven_Kiln	2	1	190,948
Food	Furnace_Oven_Kiln	2	2	210,042
Food	Furnace_Oven_Kiln	2	3	229,137
Food	AC	1	1	7,582
Food	AC	1	2	8,340
Food	AC	1	3	9,098
Food	AC	2	1	6,065
Food	AC	2	2	6,672
Food	AC	2	3	7,279
Food	Engine	1	1	355,583
Food	Engine	1	2	391,141
Food	Engine	1	3	426,700
Food	Engine	2	1	284,466
Food	Engine	2	2	312,913
Food	Engine	2	3	341,360
Food	Other	1	1	-
Food	Other	1	2	-
Food	Other	1	3	-
Food	Other	2	1	-
Food	Other	2	2	-
Food	Other	2	3	-
Textile	Fire_Tube_Boiler	1	1	440,682
Textile	Fire_Tube_Boiler	1	2	484,750
Textile	Fire_Tube_Boiler	1	3	528,818
Textile	Fire_Tube_Boiler	2	1	352,546
Textile	Fire_Tube_Boiler	2	2	387,800
Textile	Fire_Tube_Boiler	2	3	423,055
Textile	Water_Tube_Boiler	1	1	114,505
Textile	Water_Tube_Boiler	1	2	125,956
Textile	Water_Tube_Boiler	1	3	137,406
Textile	Water_Tube_Boiler	2	1	91,604
Textile	Water_Tube_Boiler	2	2	100,765
Textile	Water_Tube_Boiler	2	3	109,925
Textile	Space_Heat	1	1	6,417
Textile	Space_Heat	1	2	7,058
Textile	Space_Heat	1	3	7,700
Textile	Space_Heat	2	1	5,133
Textile	Space_Heat	2	2	5,647
Textile	Space_Heat	2	3	6,160
Textile	Water_Heat	1	1	13,118
Textile	Water_Heat	1	2	14,430
Textile	Water_Heat	1	3	15,742
Textile	Water_Heat	2	1	10,494

Textile	Water_Heat	2	2	11,544
Textile	Water_Heat	2	3	12,593
Textile	Dryer	1	1	1,175,913
Textile	Dryer	1	2	1,293,505
Textile	Dryer	1	3	1,411,096
Textile	Dryer	2	1	940,731
Textile	Dryer	2	2	1,034,804
Textile	Dryer	2	3	1,128,877
Textile	Furnace_Oven_Kiln	1	1	329,898
Textile	Furnace_Oven_Kiln	1	2	362,887
Textile	Furnace_Oven_Kiln	1	3	395,877
Textile	Furnace_Oven_Kiln	2	1	263,918
Textile	Furnace_Oven_Kiln	2	2	290,310
Textile	Furnace_Oven_Kiln	2	3	316,702
Textile	AC	1	1	23,021
Textile	AC	1	2	25,323
Textile	AC	1	3	27,626
Textile	AC	2	1	18,417
Textile	AC	2	2	20,259
Textile	AC	2	3	22,100
Textile	Engine	1	1	-
Textile	Engine	1	2	-
Textile	Engine	1	3	-
Textile	Engine	2	1	-
Textile	Engine	2	2	-
Textile	Engine	2	3	-
Textile	Other	1	1	-
Textile	Other	1	2	-
Textile	Other	1	3	-
Textile	Other	2	1	-
Textile	Other	2	2	-
Textile	Other	2	3	-
Wood_Paper	Fire_Tube_Boiler	1	1	3,531,505
Wood_Paper	Fire_Tube_Boiler	1	2	3,884,655
Wood_Paper	Fire_Tube_Boiler	1	3	4,237,806
Wood_Paper	Fire_Tube_Boiler	2	1	2,825,204
Wood_Paper	Fire_Tube_Boiler	2	2	3,107,724
Wood_Paper	Fire_Tube_Boiler	2	3	3,390,245
Wood_Paper	Water_Tube_Boiler	1	1	1,159,009
Wood_Paper	Water_Tube_Boiler	1	2	1,274,910
Wood_Paper	Water_Tube_Boiler	1	3	1,390,811
Wood_Paper	Water_Tube_Boiler	2	1	927,207
Wood_Paper	Water_Tube_Boiler	2	2	1,019,928
Wood_Paper	Water_Tube_Boiler	2	3	1,112,649
Wood_Paper	Space_Heat	1	1	15,435
Wood_Paper	Space_Heat	1	2	16,978
Wood_Paper	Space_Heat	1	3	18,522
Wood_Paper	Space_Heat	2	1	12,348
Wood_Paper	Space_Heat	2	2	13,583
Wood_Paper	Space_Heat	2	3	14,817
Wood_Paper	Water_Heat	1	1	1,304
Wood_Paper	Water_Heat	1	2	1,435
Wood_Paper	Water_Heat	1	3	1,565
Wood_Paper	Water_Heat	2	1	1,043
Wood_Paper	Water_Heat	2	2	1,148
Wood_Paper	Water_Heat	2	3	1,252
Wood_Paper	Dryer	1	1	167,147
Wood_Paper	Dryer	1	2	183,861
Wood_Paper	Dryer	1	3	200,576
Wood_Paper	Dryer	2	1	133,717
Wood_Paper	Dryer	2	2	147,089
Wood_Paper	Dryer	2	3	160,461
Wood_Paper	Furnace_Oven_Kiln	1	1	314,913
Wood_Paper	Furnace_Oven_Kiln	1	2	346,404
Wood_Paper	Furnace_Oven_Kiln	1	3	377,896
Wood_Paper	Furnace_Oven_Kiln	2	1	251,931
Wood_Paper	Furnace_Oven_Kiln	2	2	277,124
Wood_Paper	Furnace_Oven_Kiln	2	3	302,317
Wood_Paper	AC	1	1	1,049
Wood_Paper	AC	1	2	1,154
Wood_Paper	AC	1	3	1,258

Wood_Paper	AC	2	1	839
Wood_Paper	AC	2	2	923
Wood_Paper	AC	2	3	1,007
Wood_Paper	Engine	1	1	-
Wood_Paper	Engine	1	2	-
Wood_Paper	Engine	1	3	-
Wood_Paper	Engine	2	1	-
Wood_Paper	Engine	2	2	-
Wood_Paper	Engine	2	3	-
Wood_Paper	Other	1	1	-
Wood_Paper	Other	1	2	-
Wood_Paper	Other	1	3	-
Wood_Paper	Other	2	1	-
Wood_Paper	Other	2	2	-
Wood_Paper	Other	2	3	-
Chemical	Fire_Tube_Boiler	1	1	374,525
Chemical	Fire_Tube_Boiler	1	2	411,977
Chemical	Fire_Tube_Boiler	1	3	449,430
Chemical	Fire_Tube_Boiler	2	1	299,620
Chemical	Fire_Tube_Boiler	2	2	329,582
Chemical	Fire_Tube_Boiler	2	3	359,544
Chemical	Water_Tube_Boiler	1	1	210,716
Chemical	Water_Tube_Boiler	1	2	231,788
Chemical	Water_Tube_Boiler	1	3	252,859
Chemical	Water_Tube_Boiler	2	1	168,573
Chemical	Water_Tube_Boiler	2	2	185,430
Chemical	Water_Tube_Boiler	2	3	202,287
Chemical	Space_Heat	1	1	11,116
Chemical	Space_Heat	1	2	12,228
Chemical	Space_Heat	1	3	13,339
Chemical	Space_Heat	2	1	8,893
Chemical	Space_Heat	2	2	9,782
Chemical	Space_Heat	2	3	10,672
Chemical	Water_Heat	1	1	8,713
Chemical	Water_Heat	1	2	9,584
Chemical	Water_Heat	1	3	10,456
Chemical	Water_Heat	2	1	6,970
Chemical	Water_Heat	2	2	7,668
Chemical	Water_Heat	2	3	8,365
Chemical	Dryer	1	1	8,457
Chemical	Dryer	1	2	9,303
Chemical	Dryer	1	3	10,148
Chemical	Dryer	2	1	6,766
Chemical	Dryer	2	2	7,442
Chemical	Dryer	2	3	8,119
Chemical	Furnace_Oven_Kiln	1	1	190,020
Chemical	Furnace_Oven_Kiln	1	2	209,022
Chemical	Furnace_Oven_Kiln	1	3	228,024
Chemical	Furnace_Oven_Kiln	2	1	152,016
Chemical	Furnace_Oven_Kiln	2	2	167,218
Chemical	Furnace_Oven_Kiln	2	3	182,419
Chemical	AC	1	1	519
Chemical	AC	1	2	571
Chemical	AC	1	3	622
Chemical	AC	2	1	415
Chemical	AC	2	2	456
Chemical	AC	2	3	498
Chemical	Engine	1	1	236
Chemical	Engine	1	2	260
Chemical	Engine	1	3	284
Chemical	Engine	2	1	189
Chemical	Engine	2	2	208
Chemical	Engine	2	3	227
Chemical	Other	1	1	-
Chemical	Other	1	2	-
Chemical	Other	1	3	-
Chemical	Other	2	1	-
Chemical	Other	2	2	-
Chemical	Other	2	3	-
Petroleum	Fire_Tube_Boiler	1	1	461,658
Petroleum	Fire_Tube_Boiler	1	2	507,824

Petroleum	Fire_Tube_Boiler	1	3	553,990
Petroleum	Fire_Tube_Boiler	2	1	369,326
Petroleum	Fire_Tube_Boiler	2	2	406,259
Petroleum	Fire_Tube_Boiler	2	3	443,192
Petroleum	Water_Tube_Boiler	1	1	116,411
Petroleum	Water_Tube_Boiler	1	2	128,052
Petroleum	Water_Tube_Boiler	1	3	139,693
Petroleum	Water_Tube_Boiler	2	1	93,129
Petroleum	Water_Tube_Boiler	2	2	102,442
Petroleum	Water_Tube_Boiler	2	3	111,754
Petroleum	Space_Heat	1	1	4,748
Petroleum	Space_Heat	1	2	5,222
Petroleum	Space_Heat	1	3	5,697
Petroleum	Space_Heat	2	1	3,798
Petroleum	Space_Heat	2	2	4,178
Petroleum	Space_Heat	2	3	4,558
Petroleum	Water_Heat	1	1	6,427
Petroleum	Water_Heat	1	2	7,070
Petroleum	Water_Heat	1	3	7,713
Petroleum	Water_Heat	2	1	5,142
Petroleum	Water_Heat	2	2	5,656
Petroleum	Water_Heat	2	3	6,170
Petroleum	Dryer	1	1	4,158,697
Petroleum	Dryer	1	2	4,574,567
Petroleum	Dryer	1	3	4,990,436
Petroleum	Dryer	2	1	3,326,957
Petroleum	Dryer	2	2	3,659,653
Petroleum	Dryer	2	3	3,992,349
Petroleum	Furnace_Oven_Kiln	1	1	18,414
Petroleum	Furnace_Oven_Kiln	1	2	20,256
Petroleum	Furnace_Oven_Kiln	1	3	22,097
Petroleum	Furnace_Oven_Kiln	2	1	14,731
Petroleum	Furnace_Oven_Kiln	2	2	16,205
Petroleum	Furnace_Oven_Kiln	2	3	17,678
Petroleum	AC	1	1	-
Petroleum	AC	1	2	-
Petroleum	AC	1	3	-
Petroleum	AC	2	1	-
Petroleum	AC	2	2	-
Petroleum	AC	2	3	-
Petroleum	Engine	1	1	30,569
Petroleum	Engine	1	2	33,625
Petroleum	Engine	1	3	36,682
Petroleum	Engine	2	1	24,455
Petroleum	Engine	2	2	26,900
Petroleum	Engine	2	3	29,346
Petroleum	Other	1	1	-
Petroleum	Other	1	2	-
Petroleum	Other	1	3	-
Petroleum	Other	2	1	-
Petroleum	Other	2	2	-
Petroleum	Other	2	3	-
Stone	Fire_Tube_Boiler	1	1	1,591,073
Stone	Fire_Tube_Boiler	1	2	1,750,181
Stone	Fire_Tube_Boiler	1	3	1,909,288
Stone	Fire_Tube_Boiler	2	1	1,272,859
Stone	Fire_Tube_Boiler	2	2	1,400,145
Stone	Fire_Tube_Boiler	2	3	1,527,431
Stone	Water_Tube_Boiler	1	1	316,231
Stone	Water_Tube_Boiler	1	2	347,854
Stone	Water_Tube_Boiler	1	3	379,477
Stone	Water_Tube_Boiler	2	1	252,985
Stone	Water_Tube_Boiler	2	2	278,283
Stone	Water_Tube_Boiler	2	3	303,582
Stone	Space_Heat	1	1	10,255
Stone	Space_Heat	1	2	11,281
Stone	Space_Heat	1	3	12,306
Stone	Space_Heat	2	1	8,204
Stone	Space_Heat	2	2	9,024
Stone	Space_Heat	2	3	9,845
Stone	Water_Heat	1	1	10,249

Stone	Water_Heat	1	2	11,273
Stone	Water_Heat	1	3	12,298
Stone	Water_Heat	2	1	8,199
Stone	Water_Heat	2	2	9,019
Stone	Water_Heat	2	3	9,839
Stone	Dryer	1	1	2,197,157
Stone	Dryer	1	2	2,416,873
Stone	Dryer	1	3	2,636,589
Stone	Dryer	2	1	1,757,726
Stone	Dryer	2	2	1,933,498
Stone	Dryer	2	3	2,109,271
Stone	Furnace_Oven_Kiln	1	1	2,000,409
Stone	Furnace_Oven_Kiln	1	2	2,200,450
Stone	Furnace_Oven_Kiln	1	3	2,400,491
Stone	Furnace_Oven_Kiln	2	1	1,600,327
Stone	Furnace_Oven_Kiln	2	2	1,760,360
Stone	Furnace_Oven_Kiln	2	3	1,920,393
Stone	AC	1	1	12,130
Stone	AC	1	2	13,343
Stone	AC	1	3	14,556
Stone	AC	2	1	9,704
Stone	AC	2	2	10,674
Stone	AC	2	3	11,645
Stone	Engine	1	1	-
Stone	Engine	1	2	-
Stone	Engine	1	3	-
Stone	Engine	2	1	-
Stone	Engine	2	2	-
Stone	Engine	2	3	-
Stone	Other	1	1	-
Stone	Other	1	2	-
Stone	Other	1	3	-
Stone	Other	2	1	-
Stone	Other	2	2	-
Stone	Other	2	3	-
Prim_Metal	Fire_Tube_Boiler	1	1	54,853
Prim_Metal	Fire_Tube_Boiler	1	2	60,338
Prim_Metal	Fire_Tube_Boiler	1	3	65,823
Prim_Metal	Fire_Tube_Boiler	2	1	43,882
Prim_Metal	Fire_Tube_Boiler	2	2	48,270
Prim_Metal	Fire_Tube_Boiler	2	3	52,658
Prim_Metal	Water_Tube_Boiler	1	1	173,303
Prim_Metal	Water_Tube_Boiler	1	2	190,633
Prim_Metal	Water_Tube_Boiler	1	3	207,963
Prim_Metal	Water_Tube_Boiler	2	1	138,642
Prim_Metal	Water_Tube_Boiler	2	2	152,506
Prim_Metal	Water_Tube_Boiler	2	3	166,371
Prim_Metal	Space_Heat	1	1	17,381
Prim_Metal	Space_Heat	1	2	19,119
Prim_Metal	Space_Heat	1	3	20,857
Prim_Metal	Space_Heat	2	1	13,905
Prim_Metal	Space_Heat	2	2	15,295
Prim_Metal	Space_Heat	2	3	16,685
Prim_Metal	Water_Heat	1	1	4,105
Prim_Metal	Water_Heat	1	2	4,515
Prim_Metal	Water_Heat	1	3	4,926
Prim_Metal	Water_Heat	2	1	3,284
Prim_Metal	Water_Heat	2	2	3,612
Prim_Metal	Water_Heat	2	3	3,941
Prim_Metal	Dryer	1	1	8,022
Prim_Metal	Dryer	1	2	8,825
Prim_Metal	Dryer	1	3	9,627
Prim_Metal	Dryer	2	1	6,418
Prim_Metal	Dryer	2	2	7,060
Prim_Metal	Dryer	2	3	7,701
Prim_Metal	Furnace_Oven_Kiln	1	1	4,379,149
Prim_Metal	Furnace_Oven_Kiln	1	2	4,817,064
Prim_Metal	Furnace_Oven_Kiln	1	3	5,254,978
Prim_Metal	Furnace_Oven_Kiln	2	1	3,503,319
Prim_Metal	Furnace_Oven_Kiln	2	2	3,853,651
Prim_Metal	Furnace_Oven_Kiln	2	3	4,203,983

Prim_Metal	AC	1	1	20,859
Prim_Metal	AC	1	2	22,945
Prim_Metal	AC	1	3	25,031
Prim_Metal	AC	2	1	16,687
Prim_Metal	AC	2	2	18,356
Prim_Metal	AC	2	3	20,025
Prim_Metal	Engine	1	1	-
Prim_Metal	Engine	1	2	-
Prim_Metal	Engine	1	3	-
Prim_Metal	Engine	2	1	-
Prim_Metal	Engine	2	2	-
Prim_Metal	Engine	2	3	-
Prim_Metal	Other	1	1	-
Prim_Metal	Other	1	2	-
Prim_Metal	Other	1	3	-
Prim_Metal	Other	2	1	-
Prim_Metal	Other	2	2	-
Prim_Metal	Other	2	3	-
Fab_Metal	Fire_Tube_Boiler	1	1	199,496
Fab_Metal	Fire_Tube_Boiler	1	2	219,446
Fab_Metal	Fire_Tube_Boiler	1	3	239,395
Fab_Metal	Fire_Tube_Boiler	2	1	159,597
Fab_Metal	Fire_Tube_Boiler	2	2	175,557
Fab_Metal	Fire_Tube_Boiler	2	3	191,516
Fab_Metal	Water_Tube_Boiler	1	1	194,739
Fab_Metal	Water_Tube_Boiler	1	2	214,212
Fab_Metal	Water_Tube_Boiler	1	3	233,686
Fab_Metal	Water_Tube_Boiler	2	1	155,791
Fab_Metal	Water_Tube_Boiler	2	2	171,370
Fab_Metal	Water_Tube_Boiler	2	3	186,949
Fab_Metal	Space_Heat	1	1	18,226
Fab_Metal	Space_Heat	1	2	20,049
Fab_Metal	Space_Heat	1	3	21,872
Fab_Metal	Space_Heat	2	1	14,581
Fab_Metal	Space_Heat	2	2	16,039
Fab_Metal	Space_Heat	2	3	17,497
Fab_Metal	Water_Heat	1	1	3,994
Fab_Metal	Water_Heat	1	2	4,393
Fab_Metal	Water_Heat	1	3	4,793
Fab_Metal	Water_Heat	2	1	3,195
Fab_Metal	Water_Heat	2	2	3,515
Fab_Metal	Water_Heat	2	3	3,834
Fab_Metal	Dryer	1	1	18,997
Fab_Metal	Dryer	1	2	20,896
Fab_Metal	Dryer	1	3	22,796
Fab_Metal	Dryer	2	1	15,197
Fab_Metal	Dryer	2	2	16,717
Fab_Metal	Dryer	2	3	18,237
Fab_Metal	Furnace_Oven_Kiln	1	1	686,883
Fab_Metal	Furnace_Oven_Kiln	1	2	755,571
Fab_Metal	Furnace_Oven_Kiln	1	3	824,260
Fab_Metal	Furnace_Oven_Kiln	2	1	549,507
Fab_Metal	Furnace_Oven_Kiln	2	2	604,457
Fab_Metal	Furnace_Oven_Kiln	2	3	659,408
Fab_Metal	AC	1	1	1,899
Fab_Metal	AC	1	2	2,089
Fab_Metal	AC	1	3	2,279
Fab_Metal	AC	2	1	1,519
Fab_Metal	AC	2	2	1,671
Fab_Metal	AC	2	3	1,823
Fab_Metal	Engine	1	1	-
Fab_Metal	Engine	1	2	-
Fab_Metal	Engine	1	3	-
Fab_Metal	Engine	2	1	-
Fab_Metal	Engine	2	2	-
Fab_Metal	Engine	2	3	-
Fab_Metal	Other	1	1	-
Fab_Metal	Other	1	2	-
Fab_Metal	Other	1	3	-
Fab_Metal	Other	2	1	-
Fab_Metal	Other	2	2	-

Fab_Metal	Other	2	3	-
Transport	Fire_Tube_Boiler	1	1	27,156
Transport	Fire_Tube_Boiler	1	2	29,871
Transport	Fire_Tube_Boiler	1	3	32,587
Transport	Fire_Tube_Boiler	2	1	21,724
Transport	Fire_Tube_Boiler	2	2	23,897
Transport	Fire_Tube_Boiler	2	3	26,069
Transport	Water_Tube_Boiler	1	1	15,821
Transport	Water_Tube_Boiler	1	2	17,403
Transport	Water_Tube_Boiler	1	3	18,985
Transport	Water_Tube_Boiler	2	1	12,657
Transport	Water_Tube_Boiler	2	2	13,922
Transport	Water_Tube_Boiler	2	3	15,188
Transport	Space_Heat	1	1	10,868
Transport	Space_Heat	1	2	11,955
Transport	Space_Heat	1	3	13,042
Transport	Space_Heat	2	1	8,694
Transport	Space_Heat	2	2	9,564
Transport	Space_Heat	2	3	10,433
Transport	Water_Heat	1	1	3,231
Transport	Water_Heat	1	2	3,554
Transport	Water_Heat	1	3	3,877
Transport	Water_Heat	2	1	2,585
Transport	Water_Heat	2	2	2,843
Transport	Water_Heat	2	3	3,102
Transport	Dryer	1	1	81,394
Transport	Dryer	1	2	89,533
Transport	Dryer	1	3	97,673
Transport	Dryer	2	1	65,115
Transport	Dryer	2	2	71,627
Transport	Dryer	2	3	78,138
Transport	Furnace_Oven_Kiln	1	1	139,512
Transport	Furnace_Oven_Kiln	1	2	153,464
Transport	Furnace_Oven_Kiln	1	3	167,415
Transport	Furnace_Oven_Kiln	2	1	111,610
Transport	Furnace_Oven_Kiln	2	2	122,771
Transport	Furnace_Oven_Kiln	2	3	133,932
Transport	AC	1	1	518
Transport	AC	1	2	570
Transport	AC	1	3	621
Transport	AC	2	1	414
Transport	AC	2	2	456
Transport	AC	2	3	497
Transport	Engine	1	1	2,575
Transport	Engine	1	2	2,832
Transport	Engine	1	3	3,090
Transport	Engine	2	1	2,060
Transport	Engine	2	2	2,266
Transport	Engine	2	3	2,472
Transport	Other	1	1	-
Transport	Other	1	2	-
Transport	Other	1	3	-
Transport	Other	2	1	-
Transport	Other	2	2	-
Transport	Other	2	3	-
Misc	Fire_Tube_Boiler	1	1	50,324
Misc	Fire_Tube_Boiler	1	2	55,356
Misc	Fire_Tube_Boiler	1	3	60,388
Misc	Fire_Tube_Boiler	2	1	40,259
Misc	Fire_Tube_Boiler	2	2	44,285
Misc	Fire_Tube_Boiler	2	3	48,311
Misc	Water_Tube_Boiler	1	1	35,392
Misc	Water_Tube_Boiler	1	2	38,931
Misc	Water_Tube_Boiler	1	3	42,470
Misc	Water_Tube_Boiler	2	1	28,313
Misc	Water_Tube_Boiler	2	2	31,145
Misc	Water_Tube_Boiler	2	3	33,976
Misc	Space_Heat	1	1	7,731
Misc	Space_Heat	1	2	8,504
Misc	Space_Heat	1	3	9,277
Misc	Space_Heat	2	1	6,185

Misc	Space_Heat	2	2	6,803
Misc	Space_Heat	2	3	7,422
Misc	Water_Heat	1	1	2,224
Misc	Water_Heat	1	2	2,446
Misc	Water_Heat	1	3	2,669
Misc	Water_Heat	2	1	1,779
Misc	Water_Heat	2	2	1,957
Misc	Water_Heat	2	3	2,135
Misc	Dryer	1	1	61,610
Misc	Dryer	1	2	67,771
Misc	Dryer	1	3	73,932
Misc	Dryer	2	1	49,288
Misc	Dryer	2	2	54,217
Misc	Dryer	2	3	59,145
Misc	Furnace_Oven_Kiln	1	1	341,739
Misc	Furnace_Oven_Kiln	1	2	375,913
Misc	Furnace_Oven_Kiln	1	3	410,087
Misc	Furnace_Oven_Kiln	2	1	273,391
Misc	Furnace_Oven_Kiln	2	2	300,731
Misc	Furnace_Oven_Kiln	2	3	328,070
Misc	AC	1	1	2,879
Misc	AC	1	2	3,167
Misc	AC	1	3	3,455
Misc	AC	2	1	2,303
Misc	AC	2	2	2,534
Misc	AC	2	3	2,764
Misc	Engine	1	1	5,988
Misc	Engine	1	2	6,587
Misc	Engine	1	3	7,186
Misc	Engine	2	1	4,790
Misc	Engine	2	2	5,270
Misc	Engine	2	3	5,749
Misc	Other	1	1	-
Misc	Other	1	2	-
Misc	Other	1	3	-
Misc	Other	2	1	-
Misc	Other	2	2	-
Misc	Other	2	3	-

Southern California Gas Company
2016 CGR - Industrial G10
Employment Forecast (in thousands)

YEAR	Mining	Food	Textile	Wood_Paper	Chemical	Petroleum	Stone	Primary_Metal	Fabricated_Metal	Transportation	Miscellaneous	Total
2015	20.2800	118.8717	10.8700	29.2425	47.2867	8.2742	18.6575	11.9492	89.7542	75.4125	313.6233	744.2208
2016	18.3108	120.1250	10.6400	29.1833	47.1983	8.0858	18.7583	11.7292	88.6933	74.2383	312.9100	739.8717
2017	18.2817	121.6033	10.3383	29.9667	47.6450	8.0583	18.8775	11.3925	89.7025	73.1375	316.5025	745.5075
2018	18.9867	122.8392	10.0225	31.0050	48.0408	7.9483	19.3583	11.3642	90.6017	72.1475	319.7425	752.0600
2019	19.6217	123.9625	9.7942	31.6700	48.1717	7.9142	19.7117	11.5167	92.5800	70.8617	321.6800	757.4833
2020	20.0142	125.1425	9.5208	32.4658	47.9425	7.8475	19.9308	11.5692	94.6658	69.6542	322.9175	761.6675
2021	20.3817	126.2075	9.2033	33.2892	47.4817	7.7250	20.2000	11.6142	96.9317	68.8775	324.2483	766.1600
2022	20.8658	126.8667	8.8558	33.8142	46.8258	7.5575	20.4033	11.5933	98.7700	67.6875	324.7133	767.9525
2023	21.0325	127.4650	8.5092	34.4058	46.0967	7.3883	20.5500	11.5125	100.2133	65.7783	324.7817	767.7383
2024	21.0925	128.1175	8.1817	34.9458	45.3567	7.2275	20.6617	11.4008	101.3542	64.1250	324.8475	767.3100
2025	21.0392	128.3958	8.0108	35.1708	44.7817	7.0817	20.6192	11.2567	101.6850	63.2750	323.6275	764.9442
2026	20.7708	128.6217	7.9775	35.2575	44.4608	6.9433	20.4950	11.1058	101.7142	63.1725	321.3942	761.9067
2027	20.4900	128.8817	7.9450	35.3333	44.1525	6.7950	20.4600	10.9217	101.5042	63.0100	319.2658	758.7592
2028	20.3458	129.0242	7.8942	35.3442	43.7792	6.6367	20.4608	10.6742	100.7308	62.5325	316.5900	754.0142
2029	20.2217	129.0792	7.8475	35.4842	43.3392	6.4875	20.4592	10.4342	99.9458	61.9008	314.1442	749.3450
2030	19.9950	129.0183	7.7733	35.8650	42.8658	6.3433	20.4875	10.2033	99.2875	61.1858	311.8100	744.8317
2031	19.8217	129.0183	7.6567	36.2058	42.3742	6.2008	20.4983	9.9358	98.8267	60.4708	309.9025	740.9125
2032	19.6592	128.9033	7.5408	36.2242	41.8450	6.0633	20.4633	9.6650	98.4483	59.9075	308.1617	736.8808
2033	19.4258	128.7242	7.4367	36.1508	41.3167	5.9458	20.4708	9.4008	98.0150	59.7200	306.4117	733.0167
2034	19.2375	128.3325	7.3217	36.3175	40.7992	5.8208	20.5083	9.1258	97.4375	59.6450	304.6458	729.1900
2035	19.0925	127.8950	7.2142	36.4292	40.3133	5.6933	20.5008	8.8517	96.8925	59.5942	302.9992	725.4725

Southern California Gas Company
2016 CGR - Industrial G10
Core Industrial Demand Forecast (Mdth)
Average Temperature

Avg Year	Model Output G10-Ind	EE/DSM	AB980	City of Vernon	AMI	C2NC Migration	Final
2015	22,380.5	0.0	0.0	0.0	0.0	0.0	22,380.5
2016	22,018.8	228.6	0.0	74.4	4.9	510.9	21,199.9
2017	22,517.9	456.0	0.0	148.8	14.4	510.9	21,387.9
2018	22,617.4	676.6	0.1	223.2	18.8	510.9	21,187.9
2019	22,695.0	906.2	0.1	297.6	18.9	510.9	20,961.5
2020	22,788.0	1,135.8	0.1	372.0	19.0	510.9	20,750.4
2021	22,721.8	1,350.4	0.1	446.4	18.9	510.9	20,395.2
2022	22,511.0	1,564.3	0.1	446.4	18.8	510.9	19,970.8
2023	22,339.7	1,775.9	0.2	446.4	18.6	510.9	19,588.1
2024	22,201.0	1,986.7	0.2	446.4	18.5	510.9	19,238.7
2025	21,991.1	2,197.6	0.2	446.4	18.3	510.9	18,818.1
2026	21,755.6	2,408.4	0.2	446.4	18.1	510.9	18,372.0
2027	21,596.2	2,619.3	0.3	446.4	18.0	510.9	18,001.8
2028	21,402.3	2,830.1	0.3	446.4	17.8	510.9	17,597.3
2029	21,169.3	3,041.0	0.3	446.4	17.6	510.9	17,153.6
2030	20,943.5	3,251.9	0.3	446.4	17.5	510.9	16,717.2
2031	20,759.1	3,234.1	0.3	446.4	17.3	510.9	16,550.8
2032	20,537.1	3,217.6	0.3	446.4	17.1	510.9	16,345.4
2033	20,336.0	3,207.8	0.3	446.4	16.9	510.9	16,154.2
2034	20,116.0	3,189.1	0.3	446.4	16.8	510.9	15,953.2
2035	19,947.0	3,170.3	0.3	446.4	16.6	510.9	15,803.1

Southern California Gas Company
2016 CGR - Industrial G10
Core Industrial Demand Forecast (Mdth)
Cold Temperature

Cold YEAR	Model Output G10-Ind	EE/DSM	AB980	City of Vernon	AMI	C2NC Migration	Final
2015	22,973.28	0.0	0.0	0.0	0.0	0.0	22,973.3
2016	22,601.96	234.7	0.0	74.4	5.0	510.9	21,777.0
2017	23,114.35	468.1	0.0	148.8	14.8	510.9	21,971.9
2018	23,216.42	694.5	0.1	223.2	19.3	510.9	21,768.5
2019	23,296.11	930.2	0.1	297.6	19.4	510.9	21,538.1
2020	23,391.63	1,165.9	0.1	372.0	19.5	510.9	21,323.4
2021	23,323.59	1,386.2	0.1	446.4	19.4	510.9	20,960.8
2022	23,107.21	1,605.7	0.1	446.4	19.3	510.9	20,525.1
2023	22,931.41	1,822.9	0.2	446.4	19.1	510.9	20,132.2
2024	22,789.07	2,039.4	0.2	446.4	19.0	510.9	19,773.6
2025	22,573.60	2,255.8	0.2	446.4	18.8	510.9	19,341.9
2026	22,331.83	2,472.2	0.2	446.4	18.6	510.9	18,883.9
2027	22,168.17	2,688.7	0.3	446.4	18.5	510.9	18,504.0
2028	21,969.16	2,905.1	0.3	446.4	18.3	510.9	18,088.7
2029	21,729.96	3,121.5	0.3	446.4	18.1	510.9	17,633.3
2030	21,498.25	3,338.0	0.3	446.4	17.9	510.9	17,185.4
2031	21,308.97	3,319.8	0.3	446.4	17.8	510.9	17,014.5
2032	21,081.06	3,302.8	0.3	446.4	17.6	510.9	16,803.7
2033	20,874.63	3,292.8	0.3	446.4	17.4	510.9	16,607.5
2034	20,648.83	3,273.5	0.3	446.4	17.2	510.9	16,401.1
2035	20,475.32	3,254.3	0.3	446.4	17.1	510.9	16,247.0

Southern California Gas Company
2016 CGR - Industrial G10
Core Industrial Demand Forecast (Mdth)
Hot Temperature

Hot

YEAR	Model Output G10-Ind	EE/DSM	AB980	City of Vernon	AMI	C2NC Migration	Final
2015	21,787.7	0.0	0.0	0.0	0.0	0.0	21,787.7
2016	21,435.6	222.6	0.0	74.4	4.8	510.9	20,622.9
2017	21,921.5	443.9	0.0	148.8	14.0	510.9	20,803.9
2018	22,018.3	658.7	0.1	223.2	18.3	510.9	20,607.2
2019	22,093.9	882.2	0.1	297.6	18.4	510.9	20,384.8
2020	22,184.5	1,105.7	0.1	372.0	18.5	510.9	20,177.4
2021	22,119.9	1,314.6	0.1	446.4	18.4	510.9	19,829.7
2022	21,914.7	1,522.8	0.1	446.4	18.3	510.9	19,416.5
2023	21,748.0	1,728.8	0.2	446.4	18.1	510.9	19,043.9
2024	21,613.0	1,934.1	0.2	446.4	18.0	510.9	18,703.8
2025	21,408.7	2,139.4	0.2	446.4	17.8	510.9	18,294.3
2026	21,179.4	2,344.6	0.2	446.4	17.6	510.9	17,860.0
2027	21,024.2	2,549.9	0.3	446.4	17.5	510.9	17,499.7
2028	20,835.4	2,755.2	0.3	446.4	17.4	510.9	17,105.8
2029	20,608.6	2,960.5	0.3	446.4	17.2	510.9	16,673.9
2030	20,388.8	3,165.7	0.3	446.4	17.0	510.9	16,249.1
2031	20,209.3	3,148.4	0.3	446.4	16.8	510.9	16,087.1
2032	19,993.1	3,132.4	0.3	446.4	16.7	510.9	15,887.1
2033	19,797.4	3,122.9	0.3	446.4	16.5	510.9	15,701.0
2034	19,583.2	3,104.6	0.3	446.4	16.3	510.9	15,505.3
2035	19,418.7	3,086.3	0.3	446.4	16.2	510.9	15,359.2

Southern California Gas Company
2016 CGR - Industrial G10
Core Industrial Demand Forecast (Mdth)
Base Temperature

Base

YEAR	Model Output G10-Ind	EE/DSM	AB980	City of Vernon	AMI	C2NC Migration	Final
2015	19,890.4	0.0	0.0	0.0	0.0	0.0	19,890.4
2016	19,568.9	203.2	0.0	74.4	4.4	510.9	18,776.1
2017	20,012.6	405.2	0.0	148.8	12.9	510.9	18,934.8
2018	20,101.0	601.3	0.1	223.2	16.8	510.9	18,748.8
2019	20,170.0	805.4	0.1	297.6	16.8	510.9	18,539.3
2020	20,252.6	1,009.4	0.1	372.0	16.9	510.9	18,343.5
2021	20,193.7	1,200.2	0.1	446.4	16.8	510.9	18,019.6
2022	20,006.4	1,390.2	0.1	446.4	16.7	510.9	17,642.3
2023	19,854.2	1,578.3	0.2	446.4	16.5	510.9	17,302.2
2024	19,731.0	1,765.7	0.2	446.4	16.4	510.9	16,991.7
2025	19,544.4	1,953.1	0.2	446.4	16.3	510.9	16,617.9
2026	19,335.1	2,140.5	0.2	446.4	16.1	510.9	16,221.4
2027	19,193.4	2,327.9	0.3	446.4	16.0	510.9	15,892.5
2028	19,021.1	2,515.3	0.3	446.4	15.9	510.9	15,532.9
2029	18,814.0	2,702.7	0.3	446.4	15.7	510.9	15,138.6
2030	18,613.3	2,890.1	0.3	446.4	15.5	510.9	14,750.8
2031	18,449.5	2,874.3	0.3	446.4	15.4	510.9	14,602.9
2032	18,252.1	2,859.6	0.3	446.4	15.2	510.9	14,420.4
2033	18,073.4	2,850.9	0.3	446.4	15.1	510.9	14,250.5
2034	17,877.9	2,834.3	0.3	446.4	14.9	510.9	14,071.8
2035	17,727.7	2,817.6	0.3	446.4	14.8	510.9	13,938.4

2016 CALIFORNIA GAS REPORT

NONCORE COMMERCIAL AND INDUSTRIAL

Noncore Commercial and Industrial End Use Model

Introduction

The purpose of these workpapers is to document the methodology used to forecast demand for SoCalGas' noncore commercial and industrial markets. The EUforecaster model's market segmentation and end-use modeling framework was used by SoCalGas to assess the impacts of equipment replacement and market scenarios on gas demand and market share. The model segments the noncore commercial and industrial markets into 14 sectors and 11 sectors by type of business activity, respectively. Business activity is determined by the NAICS (North American Industrial Classification System) code on the billing record. The final demand forecast for the noncore commercial and industrial market is taken from output from the EUForecaster and reduced by CPUC-authorized energy efficiency goal.

Data Sources

A. Historical Billing Data

Monthly historical gas consumption for the commercial and industrial markets was obtained from SoCalGas' billing records for 2015. The recorded usage was then further disaggregated into the 14 commercial or 11 industrial business sectors; however, the customer counts were often quite low for specific business types, especially for the noncore commercial segment. Historical data and model forecast results are provided only on an aggregated basis—for noncore commercial and noncore industrial (non-refinery) segments.

B. Natural Gas Price

The natural gas prices used to forecast demand were based on the price of gas at the burner-tip in each market segment, which is composed of the gas commodity cost, transportation rate (G-30 tariff rate), Public Purpose Program surcharge and GHG fee. The cost of gas delivered to the SoCalGas "city gate" was used for the gas commodity cost. Since the G-30 tariff rate is priced according to tier, calculations were made to arrive at the overall average and marginal transportation rates from historical usage in 2015. The average rate is calculated from the weighted average rate at each tier for each customer; whereas the marginal rate is calculated as the rate that applies to the last unit of gas consumed for each customer.

C. Electricity Price Data

Both average prices (cents/kWh) and marginal prices (cents/kWh) were developed as electricity price inputs. Forecasts of retail electricity prices were developed from the California Energy Commission's staff report entitled *California Energy Demand*

Updated Forecast, 2015-2025, December 2014, number CEC-200-2014-009-SD. Retail electricity price forecasts for the SCE industrial customer classes were based on the MID case assumptions for the SCE planning area (see EXCEL files posted at web-
link: http://www.energy.ca.gov/2015_energypolicy/documents/#reportsnomeeting of the CEC's web-site.). The electricity price forecast from this source ended in year 2026; it was extrapolated through 2035 applying the annual growth rate for 2025 relative to 2024 to the year 2027 prices and beyond. The resulting prices were used for the average electricity prices for the noncore commercial & industrial market, overall.

The marginal prices were calculated by multiplying each year's respective average price by a ratio. This ratio, 0.705, was estimated from an analysis of the SCE TOU-8 rate schedule, for non-self-generation customers, posted on their web-site in March 2006.

The same set of average and marginal prices were used for each of the noncore Commercial and Industrial markets.

D. Employment

Employment, as a measure of economic activity, is used to drive the noncore commercial and industrial demand forecast models. The employment forecast through 2035 is based on Global Insight's February 2016 Regional forecast. Global Insight prepares regular regional employment forecast for California and the aggregated six largest counties' Metropolitan Statistical Area (MSA) in SoCalGas' service area. (The six counties – Kern, Los Angeles, Orange, Riverside, San Bernardino, and Ventura – account for about 85% of the service area's total population and employment). The historical employment data used was derived from the California Employment Development Department (EDD) for the 12 counties served by SoCalGas. The monthly employment used in the model was generally by summing the weighted employment data over the commercial and industrial NAICS codes.

E. Post-Model Adjustment

Once the EuForecaster end-use model forecast was generated, post-model adjustments were made to account for effects the model is not designed to simulate. Energy savings goals that were authorized by the CPUC in decision D.04-09-060 and expected load leaving SoCalGas' retail service for service by the City of Vernon were subtracted from the model forecast. The gas load for these customers essentially transfers from retail to wholesale service. Migration of customers between noncore and core service has been observed to the extent that the net-migration is from core to noncore. An outlook for this net load migration, split between commercial and industrial sectors was developed and results in a *subtraction* from the respective core sector and a corresponding *addition* to the respective noncore sector.

Noncore Commercial Demand Forecast
Forecast by Sectors from End-Use Model (MDth)

Year	Agriculture	College	Construc-tion	Govern-ment	Health	Laundry	Lodging	Misc	Office	Restaurant	Retail	School	TCU	Warehouse	Grand Total
2015	2,114.3	1,657.7	28.9	2,183.5	6,925.1	1,013.8	1,004.0	0.0	63.4	103.1	104.4	0.0	1,697.4	126.4	17,022.1
2016	2,167.1	1,675.5	29.8	2,205.3	7,067.2	1,023.4	1,026.8	0.0	64.4	104.5	105.7	0.0	1,716.6	128.4	17,314.8
2017	2,165.7	1,672.5	30.3	2,196.9	7,102.7	1,015.0	1,027.2	0.0	64.6	104.1	105.1	0.0	1,717.2	128.8	17,330.2
2018	2,170.1	1,681.1	30.9	2,201.7	7,146.3	1,011.6	1,032.6	0.0	64.8	103.6	104.5	0.0	1,727.6	129.6	17,404.3
2019	2,171.0	1,687.7	31.3	2,204.2	7,188.3	1,007.5	1,034.8	0.0	64.8	103.3	104.1	0.0	1,734.0	130.2	17,461.5
2020	2,171.1	1,691.4	31.8	2,215.3	7,224.9	1,003.8	1,036.2	0.0	65.1	103.2	103.9	0.0	1,736.0	130.8	17,513.6
2021	2,166.0	1,689.9	32.1	2,201.0	7,240.2	997.8	1,034.5	0.0	65.2	102.8	103.3	0.0	1,735.8	130.7	17,499.2
2022	2,160.0	1,687.0	32.4	2,194.1	7,250.8	990.7	1,030.5	0.0	65.4	102.1	102.6	0.0	1,733.0	130.6	17,479.2
2023	2,158.7	1,687.0	32.7	2,191.0	7,275.1	986.0	1,027.7	0.0	65.8	101.8	102.1	0.0	1,731.9	130.7	17,490.6
2024	2,157.8	1,688.7	33.1	2,190.1	7,305.0	982.1	1,025.2	0.0	66.2	101.5	101.7	0.0	1,731.8	130.9	17,514.2
2025	2,154.5	1,691.2	33.3	2,190.5	7,331.0	979.1	1,021.3	0.0	66.5	101.3	101.3	0.0	1,731.9	131.0	17,532.8
2026	2,150.8	1,693.5	33.4	2,190.5	7,352.8	977.3	1,017.6	0.0	66.8	101.1	101.1	0.0	1,731.8	131.0	17,547.6
2027	2,150.7	1,698.7	33.6	2,194.2	7,383.5	977.4	1,017.1	0.0	67.2	101.2	101.0	0.0	1,732.3	131.0	17,587.8
2028	2,149.5	1,704.4	33.8	2,198.5	7,419.2	978.1	1,017.5	0.0	67.4	101.2	100.9	0.0	1,731.8	130.6	17,632.9
2029	2,147.2	1,708.8	34.0	2,201.1	7,453.2	977.2	1,017.6	0.0	67.6	101.1	100.7	0.0	1,730.8	130.1	17,669.4
2030	2,145.2	1,712.6	34.2	2,212.7	7,486.9	975.9	1,017.4	0.0	67.9	101.1	100.6	0.0	1,728.1	129.5	17,712.2
2031	2,145.4	1,716.8	34.5	2,207.1	7,529.7	974.9	1,018.7	0.0	68.2	101.2	100.6	0.0	1,727.2	129.1	17,753.4
2032	2,144.5	1,719.9	34.6	2,208.6	7,570.2	973.5	1,019.2	0.0	68.6	101.2	100.5	0.0	1,725.9	128.5	17,795.1
2033	2,144.8	1,723.8	34.7	2,211.0	7,615.8	973.1	1,020.6	0.0	68.9	101.3	100.6	0.0	1,725.5	128.1	17,848.2
2034	2,143.5	1,727.9	34.9	2,213.5	7,658.8	972.2	1,021.2	0.0	69.2	101.4	100.5	0.0	1,724.1	127.6	17,895.0
2035	2,142.1	1,732.3	35.2	2,216.3	7,691.9	971.5	1,022.3	0.0	69.6	101.5	100.6	0.0	1,722.1	127.2	17,932.5

Noncore Industrial Demand Forecast
Forecast by Sectors from End-Use Model (MDth)

Year	Chemical	Fab_Metal	Food	Mining	Misc	Petroleum	Prim_Metal	Stone	Textile	Transport	Wood_Paper	Grand Total
2015	3,257.1	4,732.1	18,259.0	1,941.5	1,904.8	3,899.9	6,382.3	3,939.5	2,394.4	1,551.5	3,430.9	51,692.9
2016	3,288.0	4,754.6	18,534.9	1,875.0	1,924.2	3,900.0	6,393.9	3,991.1	2,396.1	1,556.8	3,464.0	52,078.7
2017	3,281.2	4,749.1	18,522.3	1,861.4	1,922.6	3,869.1	6,270.6	3,976.3	2,350.1	1,536.2	3,483.5	51,822.4
2018	3,289.5	4,764.8	18,586.1	1,889.8	1,928.3	3,839.7	6,255.7	4,017.8	2,315.0	1,524.8	3,534.8	51,946.3
2019	3,283.6	4,798.3	18,609.3	1,911.8	1,925.5	3,820.4	6,273.7	4,039.5	2,284.7	1,507.9	3,559.6	52,014.4
2020	3,269.8	4,839.1	18,655.5	1,924.9	1,923.2	3,797.7	6,274.2	4,052.5	2,252.3	1,493.4	3,595.2	52,077.8
2021	3,234.2	4,862.7	18,610.8	1,928.1	1,912.3	3,746.3	6,244.1	4,051.5	2,205.5	1,476.2	3,615.4	51,887.1
2022	3,188.3	4,868.7	18,511.6	1,933.5	1,896.9	3,680.8	6,189.5	4,038.2	2,153.1	1,453.2	3,614.1	51,527.9
2023	3,149.9	4,879.4	18,462.9	1,931.0	1,886.3	3,626.1	6,139.9	4,031.8	2,107.6	1,428.1	3,627.3	51,270.4
2024	3,114.6	4,887.6	18,436.5	1,925.7	1,878.1	3,577.3	6,088.6	4,026.4	2,066.8	1,407.1	3,641.2	51,050.0
2025	3,084.0	4,875.8	18,381.0	1,915.4	1,865.9	3,531.3	6,029.2	4,005.6	2,041.0	1,393.3	3,638.0	50,760.5
2026	3,060.6	4,855.5	18,317.2	1,895.4	1,850.2	3,486.2	5,966.8	3,976.0	2,028.4	1,386.0	3,626.2	50,448.4
2027	3,045.9	4,842.7	18,304.7	1,880.2	1,840.4	3,449.0	5,913.0	3,966.0	2,021.5	1,382.0	3,624.2	50,269.6
2028	3,029.0	4,816.3	18,282.8	1,870.7	1,829.8	3,409.3	5,843.5	3,958.9	2,012.7	1,375.1	3,618.3	50,046.5
2029	3,006.6	4,784.0	18,233.7	1,859.7	1,818.0	3,367.9	5,769.0	3,946.9	2,001.8	1,365.1	3,614.9	49,767.7
2030	2,983.9	4,756.1	18,181.1	1,845.0	1,806.9	3,328.0	5,698.8	3,938.7	1,988.9	1,354.7	3,624.8	49,506.9
2031	2,964.2	4,738.2	18,153.4	1,834.7	1,799.2	3,292.7	5,626.6	3,933.5	1,974.3	1,346.0	3,636.9	49,299.7
2032	2,940.6	4,717.6	18,100.9	1,823.1	1,790.5	3,255.9	5,548.0	3,920.3	1,957.6	1,337.3	3,628.7	49,020.6
2033	2,919.6	4,699.9	18,059.1	1,810.1	1,783.3	3,225.1	5,476.5	3,914.3	1,943.9	1,333.3	3,618.9	48,784.0
2034	2,898.0	4,677.4	17,997.6	1,798.5	1,775.6	3,192.2	5,400.6	3,909.9	1,928.8	1,329.8	3,620.4	48,528.7
2035	2,878.4	4,657.2	17,939.2	1,789.4	1,769.0	3,160.7	5,326.4	3,902.7	1,914.9	1,327.0	3,620.2	48,285.0

Noncore Commercial Demand Forecast

Sum of totalUsage year	Total from EUForeaster (Therms)
2015	170,220,706
2016	173,147,610
2017	173,302,340
2018	174,043,413
2019	174,614,590
2020	175,135,801
2021	174,992,479
2022	174,792,269
2023	174,905,965
2024	175,142,200
2025	175,328,376
2026	175,476,332
2027	175,878,275
2028	176,328,649
2029	176,694,428
2030	177,122,447
2031	177,533,781
2032	177,950,682
2033	178,481,633
2034	178,949,918
2035	179,325,247

Noncore Commercial Demand Forecast
Forecast by Sectors from End-Use Model (MDth)

Year	Total
2015	17,022
2016	17,315
2017	17,330
2018	17,404
2019	17,461
2020	17,514
2021	17,499
2022	17,479
2023	17,491
2024	17,514
2025	17,533
2026	17,548
2027	17,588
2028	17,633
2029	17,669
2030	17,712
2031	17,753
2032	17,795
2033	17,848
2034	17,895
2035	17,933

Noncore Industrial Demand Forecast

Sum of totalUsage year	Total from EUForeaster (Therms)
2015	516,929,471
2016	520,786,796
2017	518,223,910
2018	519,462,841
2019	520,144,218
2020	520,778,430
2021	518,871,328
2022	515,278,944
2023	512,704,379
2024	510,499,524
2025	507,605,219
2026	504,484,243
2027	502,696,326
2028	500,465,001
2029	497,676,677
2030	495,069,393
2031	492,996,595
2032	490,205,591
2033	487,839,650
2034	485,287,125
2035	482,850,228

Noncore Industrial Demand Forecast
Forecast by Sectors from End-Use Model (MDth)

Year	Total
2015	51,693
2016	52,079
2017	51,822
2018	51,946
2019	52,014
2020	52,078
2021	51,887
2022	51,528
2023	51,270
2024	51,050
2025	50,761
2026	50,448
2027	50,270
2028	50,047
2029	49,768
2030	49,507
2031	49,300
2032	49,021
2033	48,784
2034	48,529
2035	48,285

Noncore Commercial Monthly Demand Forecast (MDth)

Load per HDD: 14,773 Therm/HDD

	Commercial Average Year						Commercial Cold Year				
Date	End-Use Fcst @AvgYr HDD	DSM	Vernon	Migr: g10-- > g30	AvgYr Adj (MDth)	Cold Yr less Avg Yr HDD Load Incr.	End-Use Fcst @ColdYr HDD	DSM	Vernon	Migr: g10-- > g30	ColdYr Adj (MDth)
Jan-15	1,723	0	0	0	1,723	63	1,817	0	0	0	1,817
Feb-15	1,516	0	0	0	1,516	56	1,598	0	0	0	1,598
Mar-15	1,535	0	0	0	1,535	42	1,597	0	0	0	1,597
Apr-15	1,381	0	0	0	1,381	30	1,426	0	0	0	1,426
May-15	1,291	0	0	0	1,291	11	1,307	0	0	0	1,307
Jun-15	1,167	0	0	0	1,167	3	1,171	0	0	0	1,171
Jul-15	1,198	0	0	0	1,198	1	1,199	0	0	0	1,199
Aug-15	1,278	0	0	0	1,278	0	1,279	0	0	0	1,279
Sep-15	1,450	0	0	0	1,450	1	1,451	0	0	0	1,451
Oct-15	1,381	0	0	0	1,381	9	1,394	0	0	0	1,394
Nov-15	1,405	0	0	0	1,405	34	1,455	0	0	0	1,455
Dec-15	1,696	0	0	0	1,696	70	1,800	0	0	0	1,800
Jan-16	1,753	22	0	29	1,760	63	1,846	22	0	29	1,854
Feb-16	1,542	19	0	26	1,548	56	1,624	19	0	26	1,630
Mar-16	1,562	19	0	26	1,568	42	1,623	19	0	26	1,630
Apr-16	1,405	17	0	23	1,411	30	1,449	17	0	23	1,455
May-16	1,313	16	0	22	1,318	11	1,329	16	0	22	1,334
Jun-16	1,187	15	0	20	1,192	3	1,191	15	0	20	1,196
Jul-16	1,219	15	0	20	1,224	1	1,220	15	0	20	1,225
Aug-16	1,300	16	0	22	1,306	0	1,301	16	0	22	1,306
Sep-16	1,475	18	0	24	1,481	1	1,476	18	0	24	1,482
Oct-16	1,405	17	0	23	1,410	9	1,418	17	0	23	1,423
Nov-16	1,430	18	0	24	1,435	34	1,480	18	0	24	1,486
Dec-16	1,725	21	0	29	1,732	70	1,829	21	0	29	1,836
Jan-17	1,755	43	0	29	1,740	63	1,848	43	0	29	1,833
Feb-17	1,543	38	0	26	1,530	56	1,625	38	0	26	1,613
Mar-17	1,563	39	0	26	1,550	42	1,625	39	0	26	1,612
Apr-17	1,406	35	0	23	1,394	30	1,451	35	0	23	1,439
May-17	1,314	33	0	22	1,303	11	1,330	33	0	22	1,319
Jun-17	1,188	29	0	20	1,178	3	1,192	29	0	20	1,182
Jul-17	1,220	30	0	20	1,210	1	1,221	30	0	20	1,211
Aug-17	1,301	32	0	22	1,291	0	1,302	32	0	22	1,291
Sep-17	1,476	37	0	24	1,464	1	1,477	37	0	24	1,465
Oct-17	1,406	35	0	23	1,394	9	1,419	35	0	23	1,407
Nov-17	1,431	35	0	24	1,419	34	1,481	35	0	24	1,469
Dec-17	1,727	43	0	29	1,713	70	1,830	43	0	29	1,816
Jan-18	1,762	65	0	29	1,727	63	1,856	65	0	29	1,820
Feb-18	1,550	57	0	26	1,519	56	1,632	57	0	26	1,601
Mar-18	1,570	57	0	26	1,538	42	1,631	57	0	26	1,600
Apr-18	1,412	52	0	23	1,384	30	1,457	52	0	23	1,428
May-18	1,320	48	0	22	1,293	11	1,336	48	0	22	1,309
Jun-18	1,193	44	0	20	1,169	3	1,197	44	0	20	1,173
Jul-18	1,225	45	0	20	1,201	1	1,226	45	0	20	1,201
Aug-18	1,307	48	0	22	1,281	0	1,308	48	0	22	1,281
Sep-18	1,482	54	0	24	1,452	1	1,484	54	0	24	1,454
Oct-18	1,412	52	0	23	1,383	9	1,425	52	0	23	1,396
Nov-18	1,437	53	0	24	1,408	34	1,487	53	0	24	1,458
Dec-18	1,734	64	0	29	1,699	70	1,838	64	0	29	1,803
Jan-19	1,768	86	0	29	1,710	63	1,861	86	0	29	1,804
Feb-19	1,555	76	0	26	1,504	56	1,637	76	0	26	1,586
Mar-19	1,575	77	0	26	1,524	42	1,637	77	0	26	1,585
Apr-19	1,417	69	0	23	1,371	30	1,461	69	0	23	1,415
May-19	1,324	65	0	22	1,281	11	1,340	65	0	22	1,297
Jun-19	1,197	59	0	20	1,158	3	1,201	59	0	20	1,162
Jul-19	1,229	60	0	20	1,189	1	1,230	60	0	20	1,190
Aug-19	1,311	64	0	22	1,269	0	1,312	64	0	22	1,269
Sep-19	1,487	73	0	24	1,439	1	1,489	73	0	24	1,440
Oct-19	1,417	69	0	23	1,370	9	1,430	69	0	23	1,383
Nov-19	1,442	70	0	24	1,395	34	1,492	70	0	24	1,445
Dec-19	1,740	85	0	29	1,683	70	1,843	85	0	29	1,787

Noncore Commercial Monthly Demand Forecast (MDth)

Load per HDD: 14,773 Therm/HDD

	Commercial Average Year						Commercial Cold Year				
Date	End-Use Fcst @AvgYr HDD	DSM	Vernon	Migr: g10-- > g30	AvgYr Adj (MDth)	Cold Yr less Avg Yr HDD Load Incr.	End-Use Fcst @ColdYr HDD	DSM	Vernon	Migr: g10-- > g30	ColdYr Adj (MDth)
Jan-20	1,773	108	0	29	1,694	63	1,867	108	0	29	1,787
Feb-20	1,560	95	0	26	1,490	56	1,642	95	0	26	1,572
Mar-20	1,579	97	0	26	1,509	42	1,641	97	0	26	1,570
Apr-20	1,421	87	0	23	1,357	30	1,466	87	0	23	1,402
May-20	1,328	81	0	22	1,268	11	1,344	81	0	22	1,284
Jun-20	1,201	73	0	20	1,147	3	1,205	73	0	20	1,151
Jul-20	1,233	75	0	20	1,178	1	1,234	75	0	20	1,178
Aug-20	1,315	80	0	22	1,256	0	1,316	80	0	22	1,257
Sep-20	1,492	91	0	24	1,425	1	1,493	91	0	24	1,426
Oct-20	1,421	87	0	23	1,357	9	1,434	87	0	23	1,370
Nov-20	1,446	88	0	24	1,381	34	1,496	88	0	24	1,431
Dec-20	1,745	107	0	29	1,667	70	1,849	107	0	29	1,770
Jan-21	1,772	129	0	29	1,672	63	1,865	129	0	29	1,765
Feb-21	1,558	113	0	26	1,470	56	1,640	113	0	26	1,552
Mar-21	1,578	115	0	26	1,489	42	1,640	115	0	26	1,551
Apr-21	1,420	103	0	23	1,340	30	1,464	103	0	23	1,384
May-21	1,327	96	0	22	1,252	11	1,343	96	0	22	1,268
Jun-21	1,200	87	0	20	1,132	3	1,204	87	0	20	1,136
Jul-21	1,232	90	0	20	1,162	1	1,233	90	0	20	1,163
Aug-21	1,314	96	0	22	1,240	0	1,315	96	0	22	1,240
Sep-21	1,490	108	0	24	1,406	1	1,492	108	0	24	1,408
Oct-21	1,420	103	0	23	1,339	9	1,433	103	0	23	1,352
Nov-21	1,445	105	0	24	1,363	34	1,495	105	0	24	1,413
Dec-21	1,744	127	0	29	1,645	70	1,847	127	0	29	1,749
Jan-22	1,770	149	0	29	1,649	63	1,863	149	0	29	1,743
Feb-22	1,557	131	0	26	1,451	56	1,639	131	0	26	1,533
Mar-22	1,576	133	0	26	1,469	42	1,638	133	0	26	1,531
Apr-22	1,418	120	0	23	1,322	30	1,463	120	0	23	1,366
May-22	1,325	112	0	22	1,235	11	1,341	112	0	22	1,251
Jun-22	1,198	101	0	20	1,117	3	1,203	101	0	20	1,121
Jul-22	1,231	104	0	20	1,147	1	1,231	104	0	20	1,148
Aug-22	1,313	111	0	22	1,223	0	1,313	111	0	22	1,224
Sep-22	1,489	126	0	24	1,387	1	1,490	126	0	24	1,389
Oct-22	1,418	120	0	23	1,321	9	1,431	120	0	23	1,334
Nov-22	1,443	122	0	24	1,345	34	1,493	122	0	24	1,395
Dec-22	1,742	147	0	29	1,623	70	1,845	147	0	29	1,727
Jan-23	1,771	169	0	29	1,630	63	1,864	169	0	29	1,724
Feb-23	1,558	149	0	26	1,434	56	1,640	149	0	26	1,516
Mar-23	1,577	151	0	26	1,452	42	1,639	151	0	26	1,514
Apr-23	1,419	136	0	23	1,306	30	1,464	136	0	23	1,351
May-23	1,326	127	0	22	1,221	11	1,342	127	0	22	1,237
Jun-23	1,199	115	0	20	1,104	3	1,203	115	0	20	1,108
Jul-23	1,231	118	0	20	1,134	1	1,232	118	0	20	1,134
Aug-23	1,313	126	0	22	1,209	0	1,314	126	0	22	1,210
Sep-23	1,490	142	0	24	1,371	1	1,491	142	0	24	1,373
Oct-23	1,419	136	0	23	1,306	9	1,432	136	0	23	1,319
Nov-23	1,444	138	0	24	1,329	34	1,494	138	0	24	1,379
Dec-23	1,743	167	0	29	1,604	70	1,846	167	0	29	1,708
Jan-24	1,773	190	0	29	1,613	63	1,867	190	0	29	1,706
Feb-24	1,560	167	0	26	1,418	56	1,642	167	0	26	1,500
Mar-24	1,580	169	0	26	1,436	42	1,641	169	0	26	1,498
Apr-24	1,421	152	0	23	1,292	30	1,466	152	0	23	1,337
May-24	1,328	142	0	22	1,208	11	1,344	142	0	22	1,224
Jun-24	1,201	128	0	20	1,092	3	1,205	128	0	20	1,096
Jul-24	1,233	132	0	20	1,121	1	1,234	132	0	20	1,122
Aug-24	1,315	141	0	22	1,196	0	1,316	141	0	22	1,197
Sep-24	1,492	159	0	24	1,356	1	1,493	159	0	24	1,358
Oct-24	1,421	152	0	23	1,292	9	1,434	152	0	23	1,305
Nov-24	1,446	155	0	24	1,315	34	1,496	155	0	24	1,365
Dec-24	1,745	187	0	29	1,587	70	1,849	187	0	29	1,690

Noncore Commercial Monthly Demand Forecast (MDth)

Load per HDD: 14,773 Therm/HDD

	Commercial Average Year						Commercial Cold Year				
Date	End-Use Fcst @AvgYr HDD	DSM	Vernon	Migr: g10-- > g30	AvgYr Adj (MDth)	Cold Yr less Avg Yr HDD Load Incr.	End-Use Fcst @ColdYr HDD	DSM	Vernon	Migr: g10-- > g30	ColdYr Adj (MDth)
Jan-25	1,775	210	0	29	1,594	63	1,869	210	0	29	1,688
Feb-25	1,561	184	0	26	1,402	56	1,643	184	0	26	1,484
Mar-25	1,581	187	0	26	1,420	42	1,643	187	0	26	1,482
Apr-25	1,423	168	0	23	1,278	30	1,467	168	0	23	1,322
May-25	1,329	157	0	22	1,194	11	1,346	157	0	22	1,210
Jun-25	1,202	142	0	20	1,080	3	1,206	142	0	20	1,084
Jul-25	1,234	146	0	20	1,109	1	1,235	146	0	20	1,109
Aug-25	1,317	155	0	22	1,182	0	1,317	155	0	22	1,183
Sep-25	1,493	176	0	24	1,341	1	1,495	176	0	24	1,343
Oct-25	1,422	168	0	23	1,277	9	1,435	168	0	23	1,290
Nov-25	1,448	171	0	24	1,300	34	1,498	171	0	24	1,350
Dec-25	1,747	206	0	29	1,569	70	1,850	206	0	29	1,672
Jan-26	1,777	230	0	29	1,576	63	1,870	230	0	29	1,669
Feb-26	1,563	202	0	26	1,386	56	1,645	202	0	26	1,468
Mar-26	1,583	205	0	26	1,404	42	1,644	205	0	26	1,465
Apr-26	1,424	184	0	23	1,263	30	1,468	184	0	23	1,307
May-26	1,331	172	0	22	1,180	11	1,347	172	0	22	1,196
Jun-26	1,203	156	0	20	1,067	3	1,207	156	0	20	1,071
Jul-26	1,235	160	0	20	1,096	1	1,236	160	0	20	1,096
Aug-26	1,318	170	0	22	1,169	0	1,318	170	0	22	1,169
Sep-26	1,494	193	0	24	1,325	1	1,496	193	0	24	1,327
Oct-26	1,424	184	0	23	1,263	9	1,436	184	0	23	1,275
Nov-26	1,449	187	0	24	1,285	34	1,499	187	0	24	1,335
Dec-26	1,749	226	0	29	1,551	70	1,852	226	0	29	1,654
Jan-27	1,781	250	0	29	1,560	63	1,874	250	0	29	1,653
Feb-27	1,566	220	0	26	1,372	56	1,648	220	0	26	1,454
Mar-27	1,586	223	0	26	1,389	42	1,648	223	0	26	1,451
Apr-27	1,427	200	0	23	1,250	30	1,472	200	0	23	1,294
May-27	1,334	187	0	22	1,168	11	1,350	187	0	22	1,184
Jun-27	1,206	169	0	20	1,056	3	1,210	169	0	20	1,060
Jul-27	1,238	174	0	20	1,084	1	1,239	174	0	20	1,085
Aug-27	1,321	185	0	22	1,157	0	1,321	185	0	22	1,157
Sep-27	1,498	210	0	24	1,312	1	1,499	210	0	24	1,313
Oct-27	1,427	200	0	23	1,250	9	1,440	200	0	23	1,263
Nov-27	1,452	204	0	24	1,272	34	1,502	204	0	24	1,322
Dec-27	1,753	246	0	29	1,535	70	1,856	246	0	29	1,638
Jan-28	1,785	270	0	29	1,544	63	1,879	270	0	29	1,637
Feb-28	1,570	237	0	26	1,358	56	1,652	237	0	26	1,440
Mar-28	1,590	240	0	26	1,375	42	1,652	240	0	26	1,437
Apr-28	1,431	216	0	23	1,237	30	1,475	216	0	23	1,282
May-28	1,337	202	0	22	1,156	11	1,353	202	0	22	1,172
Jun-28	1,209	183	0	20	1,046	3	1,213	183	0	20	1,050
Jul-28	1,241	188	0	20	1,074	1	1,242	188	0	20	1,074
Aug-28	1,324	200	0	22	1,145	0	1,325	200	0	22	1,146
Sep-28	1,502	227	0	24	1,299	1	1,503	227	0	24	1,300
Oct-28	1,430	216	0	23	1,237	9	1,443	216	0	23	1,250
Nov-28	1,456	220	0	24	1,259	34	1,506	220	0	24	1,309
Dec-28	1,757	266	0	29	1,520	70	1,860	266	0	29	1,623
Jan-29	1,789	290	0	29	1,528	63	1,882	290	0	29	1,621
Feb-29	1,573	255	0	26	1,344	56	1,656	255	0	26	1,426
Mar-29	1,594	258	0	26	1,361	42	1,655	258	0	26	1,423
Apr-29	1,434	232	0	23	1,224	30	1,478	232	0	23	1,269
May-29	1,340	217	0	22	1,144	11	1,356	217	0	22	1,160
Jun-29	1,211	196	0	20	1,035	3	1,216	196	0	20	1,039
Jul-29	1,244	202	0	20	1,062	1	1,245	202	0	20	1,063
Aug-29	1,327	215	0	22	1,133	0	1,327	215	0	22	1,134
Sep-29	1,505	244	0	24	1,285	1	1,506	244	0	24	1,286
Oct-29	1,433	232	0	23	1,224	9	1,446	232	0	23	1,237
Nov-29	1,459	237	0	24	1,246	34	1,509	237	0	24	1,296
Dec-29	1,761	285	0	29	1,503	70	1,864	285	0	29	1,607

Noncore Commercial Monthly Demand Forecast (MDth)

Load per HDD: 14,773 Therm/HDD

	Commercial Average Year						Commercial Cold Year				
Date	End-Use Fcst @AvgYr HDD	DSM	Vernon	Migr: g10-- > g30	AvgYr Adj (MDth)	Cold Yr less Avg Yr HDD Load Incr.	End-Use Fcst @ColdYr HDD	DSM	Vernon	Migr: g10-- > g30	ColdYr Adj (MDth)
Jan-30	1,793	310	0	29	1,512	63	1,887	310	0	29	1,605
Feb-30	1,577	273	0	26	1,330	56	1,659	273	0	26	1,412
Mar-30	1,597	276	0	26	1,347	42	1,659	276	0	26	1,408
Apr-30	1,437	249	0	23	1,212	30	1,482	249	0	23	1,256
May-30	1,343	232	0	22	1,132	11	1,359	232	0	22	1,148
Jun-30	1,214	210	0	20	1,024	3	1,219	210	0	20	1,028
Jul-30	1,247	216	0	20	1,051	1	1,248	216	0	20	1,052
Aug-30	1,330	230	0	22	1,121	0	1,331	230	0	22	1,122
Sep-30	1,508	261	0	24	1,272	1	1,510	261	0	24	1,273
Oct-30	1,437	249	0	23	1,211	9	1,450	249	0	23	1,224
Nov-30	1,462	253	0	24	1,233	34	1,512	253	0	24	1,283
Dec-30	1,765	305	0	29	1,488	70	1,868	305	0	29	1,591
Jan-31	1,798	309	0	29	1,518	63	1,891	309	0	29	1,611
Feb-31	1,581	271	0	26	1,335	56	1,663	271	0	26	1,417
Mar-31	1,601	275	0	26	1,352	42	1,663	275	0	26	1,414
Apr-31	1,440	247	0	23	1,216	30	1,485	247	0	23	1,261
May-31	1,346	231	0	22	1,137	11	1,362	231	0	22	1,153
Jun-31	1,217	209	0	20	1,028	3	1,221	209	0	20	1,032
Jul-31	1,250	215	0	20	1,055	1	1,251	215	0	20	1,056
Aug-31	1,333	229	0	22	1,126	0	1,334	229	0	22	1,126
Sep-31	1,512	260	0	24	1,277	1	1,513	260	0	24	1,278
Oct-31	1,440	247	0	23	1,216	9	1,453	247	0	23	1,229
Nov-31	1,466	252	0	24	1,238	34	1,516	252	0	24	1,288
Dec-31	1,769	304	0	29	1,494	70	1,872	304	0	29	1,597
Jan-32	1,802	307	0	29	1,524	63	1,895	307	0	29	1,617
Feb-32	1,585	270	0	26	1,340	56	1,667	270	0	26	1,422
Mar-32	1,605	273	0	26	1,357	42	1,667	273	0	26	1,419
Apr-32	1,444	246	0	23	1,221	30	1,488	246	0	23	1,265
May-32	1,349	230	0	22	1,141	11	1,365	230	0	22	1,157
Jun-32	1,220	208	0	20	1,032	3	1,224	208	0	20	1,036
Jul-32	1,253	213	0	20	1,059	1	1,254	213	0	20	1,060
Aug-32	1,336	228	0	22	1,130	0	1,337	228	0	22	1,131
Sep-32	1,516	258	0	24	1,282	1	1,517	258	0	24	1,283
Oct-32	1,444	246	0	23	1,221	9	1,457	246	0	23	1,234
Nov-32	1,469	250	0	24	1,242	34	1,519	250	0	24	1,292
Dec-32	1,773	302	0	29	1,499	70	1,877	302	0	29	1,603
Jan-33	1,807	306	0	29	1,530	63	1,900	306	0	29	1,623
Feb-33	1,589	269	0	26	1,346	56	1,672	269	0	26	1,428
Mar-33	1,610	273	0	26	1,363	42	1,671	273	0	26	1,424
Apr-33	1,448	245	0	23	1,226	30	1,493	245	0	23	1,270
May-33	1,353	229	0	22	1,146	11	1,369	229	0	22	1,162
Jun-33	1,224	207	0	20	1,036	3	1,228	207	0	20	1,040
Jul-33	1,257	213	0	20	1,064	1	1,257	213	0	20	1,065
Aug-33	1,340	227	0	22	1,135	0	1,341	227	0	22	1,135
Sep-33	1,520	257	0	24	1,287	1	1,522	257	0	24	1,288
Oct-33	1,448	245	0	23	1,226	9	1,461	245	0	23	1,239
Nov-33	1,474	250	0	24	1,248	34	1,524	250	0	24	1,298
Dec-33	1,778	301	0	29	1,506	70	1,882	301	0	29	1,609
Jan-34	1,812	304	0	29	1,536	63	1,905	304	0	29	1,630
Feb-34	1,594	268	0	26	1,351	56	1,676	268	0	26	1,433
Mar-34	1,614	271	0	26	1,369	42	1,676	271	0	26	1,430
Apr-34	1,452	244	0	23	1,231	30	1,496	244	0	23	1,276
May-34	1,357	228	0	22	1,151	11	1,373	228	0	22	1,167
Jun-34	1,227	206	0	20	1,040	3	1,231	206	0	20	1,045
Jul-34	1,260	212	0	20	1,068	1	1,261	212	0	20	1,069
Aug-34	1,344	226	0	22	1,139	0	1,344	226	0	22	1,140
Sep-34	1,524	256	0	24	1,292	1	1,526	256	0	24	1,294
Oct-34	1,452	244	0	23	1,231	9	1,465	244	0	23	1,244
Nov-34	1,477	248	0	24	1,253	34	1,528	248	0	24	1,303
Dec-34	1,783	299	0	29	1,512	70	1,887	299	0	29	1,615

Noncore Commercial Monthly Demand Forecast (MDth)

Load per HDD: 14,773 Therm/HDD

	Commercial Average Year						Commercial Cold Year				
Date	End-Use Fcst @AvgYr HDD	DSM	Vernon	Migr: g10-- > g30	AvgYr Adj (MDth)	Cold Yr less Avg Yr HDD Load Incr.	End-Use Fcst @ColdYr HDD	DSM	Vernon	Migr: g10-- > g30	ColdYr Adj (MDth)
Jan-35	1,816	302	0	29	1,542	63	1,909	302	0	29	1,635
Feb-35	1,597	266	0	26	1,356	56	1,679	266	0	26	1,438
Mar-35	1,617	269	0	26	1,374	42	1,679	269	0	26	1,435
Apr-35	1,455	242	0	23	1,236	30	1,500	242	0	23	1,280
May-35	1,360	226	0	22	1,155	11	1,376	226	0	22	1,171
Jun-35	1,230	205	0	20	1,044	3	1,234	205	0	20	1,048
Jul-35	1,262	210	0	20	1,072	1	1,263	210	0	20	1,073
Aug-35	1,347	224	0	22	1,144	0	1,347	224	0	22	1,144
Sep-35	1,527	254	0	24	1,297	1	1,529	254	0	24	1,299
Oct-35	1,455	242	0	23	1,236	9	1,468	242	0	23	1,248
Nov-35	1,481	247	0	24	1,257	34	1,531	247	0	24	1,307
Dec-35	1,787	298	0	29	1,518	70	1,890	298	0	29	1,621

Noncore Industrial Monthly Demand Forecast (MDth)

	Industrial - All Temperature Years				
Date	IndModel	DSM	Vernon	Migr: g10--> g30	Ind-All
Jan-15	4,434	0	0	0	4,434
Feb-15	4,029	0	0	0	4,029
Mar-15	4,526	0	0	0	4,526
Apr-15	4,305	0	0	0	4,305
May-15	4,393	0	0	0	4,393
Jun-15	4,130	0	0	0	4,130
Jul-15	4,576	0	0	0	4,576
Aug-15	5,081	0	0	0	5,081
Sep-15	4,719	0	0	0	4,719
Oct-15	4,369	0	0	0	4,369
Nov-15	3,708	0	0	0	3,708
Dec-15	3,422	0	0	0	3,422
Jan-16	4,467	30	3	44	4,478
Feb-16	4,059	27	3	40	4,069
Mar-16	4,559	31	3	45	4,570
Apr-16	4,338	29	3	43	4,348
May-16	4,426	30	3	43	4,437
Jun-16	4,161	28	3	41	4,171
Jul-16	4,610	31	3	45	4,621
Aug-16	5,119	34	4	50	5,131
Sep-16	4,754	32	3	47	4,765
Oct-16	4,402	29	3	43	4,412
Nov-16	3,736	25	3	37	3,744
Dec-16	3,447	23	3	34	3,456
Jan-17	4,445	60	7	44	4,423
Feb-17	4,039	54	6	40	4,019
Mar-17	4,537	61	7	45	4,514
Apr-17	4,316	58	6	43	4,294
May-17	4,404	59	7	43	4,382
Jun-17	4,141	56	6	41	4,120
Jul-17	4,588	62	7	45	4,565
Aug-17	5,094	68	8	50	5,068
Sep-17	4,731	63	7	47	4,707
Oct-17	4,380	59	6	43	4,358
Nov-17	3,717	50	5	37	3,698
Dec-17	3,430	46	5	34	3,413
Jan-18	4,456	89	10	44	4,402
Feb-18	4,049	80	9	40	3,999
Mar-18	4,548	90	10	45	4,492
Apr-18	4,327	86	10	43	4,274
May-18	4,415	88	10	43	4,361
Jun-18	4,151	82	9	41	4,100
Jul-18	4,599	91	10	45	4,542
Aug-18	5,106	101	11	50	5,044
Sep-18	4,742	94	10	47	4,684
Oct-18	4,390	87	10	43	4,337
Nov-18	3,726	74	8	37	3,680
Dec-18	3,439	68	8	34	3,396
Jan-19	4,462	119	13	44	4,374
Feb-19	4,054	108	12	40	3,974
Mar-19	4,554	121	13	45	4,464
Apr-19	4,332	115	13	43	4,247
May-19	4,421	117	13	43	4,334
Jun-19	4,156	110	12	41	4,074
Jul-19	4,605	122	14	45	4,514
Aug-19	5,113	136	15	50	5,012
Sep-19	4,748	126	14	47	4,655
Oct-19	4,396	117	13	43	4,310
Nov-19	3,731	99	11	37	3,657
Dec-19	3,443	91	10	34	3,375

Noncore Industrial Monthly Demand Forecast (MDth)

	Industrial - All Temperature Years				
Date	IndModel	DSM	Vernon	Migr: g10--> g30	Ind-All
Jan-20	4,467	149	16	44	4,346
Feb-20	4,059	135	15	40	3,949
Mar-20	4,559	152	17	45	4,436
Apr-20	4,338	144	16	43	4,220
May-20	4,426	147	16	43	4,306
Jun-20	4,161	138	15	41	4,048
Jul-20	4,610	153	17	45	4,485
Aug-20	5,119	170	19	50	4,980
Sep-20	4,754	158	17	47	4,625
Oct-20	4,402	146	16	43	4,282
Nov-20	3,736	124	14	37	3,634
Dec-20	3,447	115	13	34	3,354
Jan-21	4,451	177	20	44	4,298
Feb-21	4,044	160	18	40	3,905
Mar-21	4,543	180	20	45	4,387
Apr-21	4,322	172	19	43	4,174
May-21	4,410	175	20	43	4,259
Jun-21	4,146	165	18	41	4,004
Jul-21	4,594	182	20	45	4,436
Aug-21	5,100	202	23	50	4,926
Sep-21	4,736	188	21	47	4,574
Oct-21	4,385	174	19	43	4,235
Nov-21	3,722	148	16	37	3,594
Dec-21	3,435	136	15	34	3,317
Jan-22	4,420	205	20	44	4,240
Feb-22	4,016	186	18	40	3,852
Mar-22	4,511	209	20	45	4,327
Apr-22	4,292	199	19	43	4,116
May-22	4,379	203	20	43	4,200
Jun-22	4,117	191	18	41	3,949
Jul-22	4,562	211	20	45	4,375
Aug-22	5,065	234	23	50	4,858
Sep-22	4,704	218	21	47	4,512
Oct-22	4,355	202	19	43	4,177
Nov-22	3,696	171	16	37	3,545
Dec-22	3,411	158	15	34	3,272
Jan-23	4,398	232	20	44	4,190
Feb-23	3,996	211	18	40	3,807
Mar-23	4,489	237	20	45	4,276
Apr-23	4,270	226	19	43	4,068
May-23	4,357	230	20	43	4,151
Jun-23	4,097	216	18	41	3,903
Jul-23	4,539	240	20	45	4,324
Aug-23	5,040	266	23	50	4,801
Sep-23	4,680	247	21	47	4,459
Oct-23	4,333	229	19	43	4,128
Nov-23	3,678	194	16	37	3,503
Dec-23	3,394	179	15	34	3,233
Jan-24	4,379	260	20	44	4,143
Feb-24	3,979	236	18	40	3,765
Mar-24	4,469	265	20	45	4,229
Apr-24	4,252	252	19	43	4,023
May-24	4,339	257	20	43	4,105
Jun-24	4,079	242	18	41	3,859
Jul-24	4,519	268	20	45	4,276
Aug-24	5,018	298	23	50	4,748
Sep-24	4,660	277	21	47	4,409
Oct-24	4,315	256	19	43	4,082
Nov-24	3,662	217	16	37	3,465
Dec-24	3,379	201	15	34	3,197

Noncore Industrial Monthly Demand Forecast (MDth)

	Industrial - All Temperature Years				
Date	IndModel	DSM	Vernon	Migr: g10--> g30	Ind-All
Jan-25	4,354	287	20	44	4,091
Feb-25	3,956	261	18	40	3,717
Mar-25	4,444	293	20	45	4,175
Apr-25	4,228	279	19	43	3,972
May-25	4,314	285	20	43	4,053
Jun-25	4,056	268	18	41	3,811
Jul-25	4,494	297	20	45	4,222
Aug-25	4,990	329	23	50	4,688
Sep-25	4,634	306	21	47	4,353
Oct-25	4,290	283	19	43	4,031
Nov-25	3,641	240	16	37	3,421
Dec-25	3,360	222	15	34	3,157
Jan-26	4,328	315	20	44	4,037
Feb-26	3,932	286	18	40	3,668
Mar-26	4,417	322	20	45	4,120
Apr-26	4,202	306	19	43	3,919
May-26	4,288	312	20	43	3,999
Jun-26	4,031	293	18	41	3,760
Jul-26	4,466	325	20	45	4,166
Aug-26	4,959	361	23	50	4,626
Sep-26	4,605	335	21	47	4,296
Oct-26	4,264	310	19	43	3,977
Nov-26	3,619	263	16	37	3,375
Dec-26	3,339	243	15	34	3,115
Jan-27	4,312	343	20	44	3,994
Feb-27	3,918	311	18	40	3,629
Mar-27	4,401	350	20	45	4,076
Apr-27	4,187	333	19	43	3,878
May-27	4,272	339	20	43	3,957
Jun-27	4,017	319	18	41	3,720
Jul-27	4,450	354	20	45	4,122
Aug-27	4,941	393	23	50	4,576
Sep-27	4,589	365	21	47	4,250
Oct-27	4,249	338	19	43	3,935
Nov-27	3,606	287	16	37	3,339
Dec-27	3,328	264	15	34	3,082
Jan-28	4,293	370	20	44	3,947
Feb-28	3,901	336	18	40	3,586
Mar-28	4,381	378	20	45	4,028
Apr-28	4,168	359	19	43	3,832
May-28	4,253	367	20	43	3,910
Jun-28	3,999	345	18	41	3,676
Jul-28	4,431	382	20	45	4,073
Aug-28	4,919	424	23	50	4,523
Sep-28	4,568	394	21	47	4,200
Oct-28	4,230	365	19	43	3,889
Nov-28	3,590	310	16	37	3,300
Dec-28	3,313	286	15	34	3,046
Jan-29	4,269	398	20	44	3,895
Feb-29	3,879	361	18	40	3,539
Mar-29	4,357	406	20	45	3,976
Apr-29	4,145	386	19	43	3,782
May-29	4,230	394	20	43	3,859
Jun-29	3,976	371	18	41	3,628
Jul-29	4,406	411	20	45	4,020
Aug-29	4,892	456	23	50	4,464
Sep-29	4,543	423	21	47	4,145
Oct-29	4,206	392	19	43	3,838
Nov-29	3,570	333	16	37	3,257
Dec-29	3,294	307	15	34	3,006

Noncore Industrial Monthly Demand Forecast (MDth)

	Industrial - All Temperature Years				
Date	IndModel	DSM	Vernon	Migr: g10--> g30	Ind-All
Jan-30	4,247	425	20	44	3,846
Feb-30	3,858	386	18	40	3,494
Mar-30	4,334	434	20	45	3,925
Apr-30	4,123	413	19	43	3,734
May-30	4,208	421	20	43	3,810
Jun-30	3,956	396	18	41	3,582
Jul-30	4,383	439	20	45	3,969
Aug-30	4,866	487	23	50	4,407
Sep-30	4,519	453	21	47	4,092
Oct-30	4,184	419	19	43	3,789
Nov-30	3,551	356	16	37	3,216
Dec-30	3,277	328	15	34	2,967
Jan-31	4,229	423	20	44	3,830
Feb-31	3,842	384	18	40	3,480
Mar-31	4,316	432	20	45	3,909
Apr-31	4,106	411	19	43	3,719
May-31	4,190	419	20	43	3,795
Jun-31	3,939	394	18	41	3,567
Jul-31	4,364	437	20	45	3,953
Aug-31	4,846	485	23	50	4,389
Sep-31	4,500	450	21	47	4,076
Oct-31	4,167	417	19	43	3,774
Nov-31	3,536	354	16	37	3,203
Dec-31	3,263	326	15	34	2,956
Jan-32	4,205	421	20	44	3,808
Feb-32	3,821	382	18	40	3,460
Mar-32	4,292	430	20	45	3,887
Apr-32	4,083	409	19	43	3,698
May-32	4,166	417	20	43	3,773
Jun-32	3,917	392	18	41	3,547
Jul-32	4,340	434	20	45	3,930
Aug-32	4,819	482	23	50	4,364
Sep-32	4,475	448	21	47	4,053
Oct-32	4,143	415	19	43	3,752
Nov-32	3,516	352	16	37	3,184
Dec-32	3,245	325	15	34	2,939
Jan-33	4,185	420	20	44	3,789
Feb-33	3,802	381	18	40	3,443
Mar-33	4,271	428	20	45	3,867
Apr-33	4,063	407	19	43	3,679
May-33	4,146	416	20	43	3,754
Jun-33	3,898	391	18	41	3,529
Jul-33	4,319	433	20	45	3,911
Aug-33	4,795	481	23	50	4,342
Sep-33	4,453	447	21	47	4,032
Oct-33	4,123	413	19	43	3,733
Nov-33	3,499	351	16	37	3,169
Dec-33	3,229	324	15	34	2,924
Jan-34	4,163	417	20	44	3,770
Feb-34	3,782	379	18	40	3,425
Mar-34	4,249	426	20	45	3,847
Apr-34	4,042	405	19	43	3,660
May-34	4,124	413	20	43	3,735
Jun-34	3,878	389	18	41	3,511
Jul-34	4,296	431	20	45	3,891
Aug-34	4,770	478	23	50	4,320
Sep-34	4,430	444	21	47	4,012
Oct-34	4,102	411	19	43	3,714
Nov-34	3,481	349	16	37	3,152
Dec-34	3,212	322	15	34	2,909

Noncore Industrial Monthly Demand Forecast (MDth)

	Industrial - All Temperature Years				
Date	IndModel	DSM	Vernon	Migr: g10--> g30	Ind-All
Jan-35	4,142	415	20	44	3,751
Feb-35	3,763	377	18	40	3,408
Mar-35	4,227	423	20	45	3,829
Apr-35	4,022	403	19	43	3,642
May-35	4,104	411	20	43	3,717
Jun-35	3,858	386	18	41	3,494
Jul-35	4,275	428	20	45	3,872
Aug-35	4,746	475	23	50	4,299
Sep-35	4,408	441	21	47	3,992
Oct-35	4,081	409	19	43	3,696
Nov-35	3,463	347	16	37	3,137
Dec-35	3,196	320	15	34	2,895

EUForecaster (Noncore Commercial), Adj. to "Avg Yr HDD"

Yr-2009 ["B4" DSM/COV/ Migr(g10-->g30)] for 2009 BCAP

Month	2009 Forecast	Pred G30-Com at 2010 Cgr Avg Hdd (MThm)	Weather Adj. Share of Ann. Total
1	Jan-09	**21,598**	10.125%
2	Feb-09	**18,996**	8.905%
3	Mar-09	**19,238**	9.019%
4	Apr-09	**17,308**	8.114%
5	May-09	**16,175**	7.582%
6	Jun-09	**14,626**	6.856%
7	Jul-09	**15,018**	7.040%
8	Aug-09	**16,018**	7.509%
9	Sep-09	**18,167**	8.516%
10	Oct-09	**17,306**	8.113%
11	Nov-09	**17,612**	8.256%
12	Dec-09	**21,256**	9.964%
		213,317	**100.000%**

EUForecaster (Noncore Industrial/Non-Refinery)

Month	"Fitted Monthly" Load (per BMW's Simple Regression Model) **(MDTh)**	Monthly Proportions of Annual Total Load **(%-of-Annual)**
1	3,710	8.58%
2	3,371	7.79%
3	3,786	8.75%
4	3,602	8.33%
5	3,676	8.50%
6	3,456	7.99%
7	3,829	8.85%
8	4,251	9.83%
9	3,948	9.13%
10	3,655	8.45%
11	3,102	7.17%
12	2,863	6.62%
	43,250	100.00%

Natural Gas Rates/Prices

Year	Com Price Deflator	Ind Price Deflator	C Non Core Average Price	C Non Core Marginal Price	I Non Core Average Price	I Non Core Marginal Price
2015	100.00	100.00	0.5098	0.4738	0.4798	0.4536
2016	101.05	101.05	0.4368	0.4037	0.4085	0.3838
2017	103.39	103.39	0.4886	0.4524	0.4574	0.4303
2018	106.10	106.10	0.5049	0.4675	0.4726	0.4446
2019	108.86	108.86	0.5322	0.4948	0.4999	0.4719
2020	111.74	111.74	0.5550	0.5166	0.5218	0.4931
2021	114.71	114.71	0.6125	0.5731	0.5784	0.5489
2022	117.68	117.68	0.6828	0.6425	0.6478	0.6176
2023	120.60	120.60	0.7341	0.6918	0.6973	0.6655
2024	123.57	123.57	0.7775	0.7343	0.7398	0.7072
2025	126.47	126.47	0.8233	0.7791	0.7847	0.7514
2026	129.36	129.36	0.8726	0.8274	0.8331	0.7990
2027	132.35	132.35	0.9012	0.8550	0.8608	0.8259
2028	135.41	135.41	0.9315	0.8843	0.8901	0.8544
2029	138.50	138.50	0.9730	0.9247	0.9306	0.8941
2030	141.62	141.62	1.0134	0.9641	0.9701	0.9328
2031	144.91	144.91	1.0455	0.9952	1.0012	0.9630
2032	148.23	148.23	1.0874	1.0359	1.0421	1.0030
2033	151.65	151.65	1.1228	1.0702	1.0764	1.0365
2034	155.23	155.23	1.1631	1.1093	1.1156	1.0747
2035	158.87	158.87	1.2011	1.1461	1.1525	1.1106

Prices in Nominal $/Therm

Electricity Rates/Prices

Year	C Non Core Average Price	C Non Core Marginal Price	I Non Core Average Price	I Non Core Marginal Price
2015	11.73	8.26	11.73	8.26
2016	11.57	8.15	11.57	8.15
2017	12.14	8.55	12.14	8.55
2018	12.62	8.90	12.62	8.90
2019	13.32	9.39	13.32	9.39
2020	14.00	9.87	14.00	9.87
2021	14.64	10.32	14.64	10.32
2022	14.78	10.42	14.78	10.42
2023	15.21	10.72	15.21	10.72
2024	15.76	11.11	15.76	11.11
2025	16.11	11.35	16.11	11.35
2026	16.72	11.78	16.72	11.78
2027	17.08	12.04	17.08	12.04
2028	17.45	12.30	17.45	12.30
2029	17.82	12.56	17.82	12.56
2030	18.19	12.82	18.19	12.82
2031	18.59	13.10	18.59	13.10
2032	18.98	13.38	18.98	13.38
2033	19.39	13.67	19.39	13.67
2034	19.82	13.97	19.82	13.97
2035	20.26	14.28	20.26	14.28

Prices in Nominal ¢/Kwh

Alternative Fuel (Propane) Prices

Year	C Non Core Average Price	C Non Core Marginal Price	I Non Core Average Price	I Non Core Marginal Price
2015	2.4618	2.4618	2.4618	2.4618
2016	2.6505	2.6505	2.6505	2.6505
2017	2.7775	2.7775	2.7775	2.7775
2018	2.9007	2.9007	2.9007	2.9007
2019	3.0564	3.0564	3.0564	3.0564
2020	3.2283	3.2283	3.2283	3.2283
2021	3.4788	3.4788	3.4788	3.4788
2022	3.7347	3.7347	3.7347	3.7347
2023	4.0062	4.0062	4.0062	4.0062
2024	4.2802	4.2802	4.2802	4.2802
2025	4.5612	4.5612	4.5612	4.5612
2026	4.8581	4.8581	4.8581	4.8581
2027	5.1581	5.1581	5.1581	5.1581
2028	5.4666	5.4666	5.4666	5.4666
2029	5.7899	5.7899	5.7899	5.7899
2030	6.1216	6.1216	6.1216	6.1216
2031	6.4769	6.4769	6.4769	6.4769
2032	6.8509	6.8509	6.8509	6.8509
2033	7.2315	7.2315	7.2315	7.2315
2034	7.6277	7.6277	7.6277	7.6277
2035	8.0360	8.0360	8.0360	8.0360

Prices in Nominal $/Therm

Annual G30 Noncore C&I Gas Rates						Nominal Dollars					Constant 2015 Dollars			
	Com Trsp Average	Com Trsp Marginal	Ind Trsp Average	Ind Trsp Marginal	CBSP BTS+GHG	Com B/T Average	Com B/T Marginal	Ind B/T Average	Ind B/T Marginal	CPI	Com B/T Average	Com B/T Marginal	Ind B/T Average	Ind B/T Marginal
Year	¢/Therm	¢/Therm	¢/Therm	¢/Therm	¢/Therm	$/Dth	$/Dth	$/Dth	$/Dth	(Yr-2015 = 1.0000)	2015-$ /Dth	2015-$ /Dth	2015-$ /Dth	2015-$ /Dth
2015	16.798	13.199	13.803	11.174	34.181	5.098	4.738	4.798	4.536	1.0000	5.098	4.738	4.798	4.536
2016	15.402	12.084	12.565	10.103	28.282	4.368	4.037	4.085	3.838	1.0105	4.323	3.995	4.042	3.799
2017	16.598	12.972	13.475	10.768	32.264	4.886	4.524	4.574	4.303	1.0339	4.726	4.375	4.424	4.162
2018	17.098	13.352	13.864	11.063	33.394	5.049	4.675	4.726	4.446	1.0610	4.759	4.406	4.454	4.190
2019	17.260	13.514	14.026	11.225	35.963	5.322	4.948	4.999	4.719	1.0886	4.889	4.545	4.592	4.335
2020	17.706	13.868	14.387	11.513	37.796	5.550	5.166	5.218	4.931	1.1174	4.967	4.624	4.670	4.413
2021	18.185	14.251	14.777	11.828	43.061	6.125	5.731	5.784	5.489	1.1471	5.339	4.996	5.042	4.785
2022	18.687	14.654	15.187	12.160	49.597	6.828	6.425	6.478	6.176	1.1768	5.803	5.460	5.505	5.248
2023	19.466	15.238	15.785	12.604	53.945	7.341	6.918	6.973	6.655	1.2060	6.087	5.737	5.782	5.518
2024	19.959	15.633	16.187	12.927	57.796	7.775	7.343	7.398	7.072	1.2357	6.293	5.942	5.987	5.723
2025	20.439	16.017	16.577	13.242	61.893	8.233	7.791	7.847	7.514	1.2647	6.510	6.160	6.205	5.941
2026	20.919	16.400	16.968	13.557	66.339	8.726	8.274	8.331	7.990	1.2936	6.745	6.396	6.440	6.176
2027	21.406	16.789	17.364	13.874	68.712	9.012	8.550	8.608	8.259	1.3235	6.809	6.460	6.504	6.240
2028	21.906	17.187	17.769	14.199	71.246	9.315	8.843	8.901	8.544	1.3541	6.879	6.531	6.574	6.310
2029	22.415	17.593	18.182	14.532	74.882	9.730	9.247	9.306	8.941	1.3850	7.025	6.677	6.720	6.456
2030	22.928	18.003	18.600	14.868	78.412	10.134	9.641	9.701	9.328	1.4162	7.156	6.808	6.850	6.587
2031	23.465	18.431	19.036	15.217	81.087	10.455	9.952	10.012	9.630	1.4491	7.215	6.868	6.909	6.646
2032	24.011	18.866	19.479	15.574	84.726	10.874	10.359	10.421	10.030	1.4823	7.336	6.989	7.030	6.767
2033	24.571	19.313	19.934	15.939	87.711	11.228	10.702	10.764	10.365	1.5165	7.404	7.057	7.098	6.835
2034	25.157	19.781	20.410	16.322	91.152	11.631	11.093	11.156	10.747	1.5523	7.493	7.146	7.187	6.923
2035	25.744	20.247	20.885	16.701	94.362	12.011	11.461	11.525	11.106	1.5887	7.560	7.214	7.254	6.991
							Avg-Ann Growth Rate (2015 through 2035):				2.0%	2.1%	2.1%	2.2%
Col-#01	Col-#02	Col-#03	Col-#04	Col-#05	Col-#06	Col-#07	Col-#08	Col-#09	Col-#10	Col-#11	Col-#12	Col-#13	Col-#14	Col-#15

2015 G30 C&I Weight of Usage by Tier

	Service	Tier	Both	Com	Ind
Average	D	1	D1	29.92%	15.71%
Average	D	2	D2	43.37%	29.04%
Average	D	3	D3	15.07%	17.04%
Average	D	4	D4	11.65%	38.21%
Average	T	1	T1	99.44%	47.49%
Average	T	2	T2	0.56%	52.51%
Marginal	D	1	D1	4.08%	1.23%
Marginal	D	2	D2	43.35%	18.43%
Marginal	D	3	D3	23.26%	19.79%
Marginal	D	4	D4	29.30%	60.55%
Marginal	T	1	T1	92.96%	18.30%
Marginal	T	2	T2	7.04%	81.70%

2015 Volume (Therms)			Percent	
Com&Ind	D&T	681,668,608	100.00%	
Com&Ind	D	649,126,970	95.23%	of ALL (Com & Ind ; D&T).
Com&Ind	T	32,541,638	4.77%	of ALL (Com & Ind ; D&T).
Com	D&T	164,739,598	24.17%	of ALL (Com & Ind ; D&T).
Ind	D&T	516,929,010	75.83%	of ALL (Com & Ind ; D&T).
Com	D	159,602,964	96.88%	of COM.
Com	T	5,136,634	3.12%	of COM.
Ind	D	489,524,006	94.70%	of IND.
Ind	T	27,405,004	5.30%	of IND.

				("Cust Cnt")	G-30 C&I (Non-Refinery)		Annual	Annual $/Cust under:	
Obs	seg	service	_TYPE_	_FREQ_	Therms	Prop/Pct.	Therms/"Cust"	Class Avg Rates	Rsvr Rates
1			0	579	681,668,608	100.0%	1,177,321		
2		D	1	554	649,126,970	95.2%	1,171,709		
3		T	1	25	32,541,638	4.8%	1,301,666		
4	COM		2	226	164,739,598	24.2%	728,936		
5	IND		2	353	516,929,010	75.8%	1,464,388		
6	COM	D	3	215	159,602,964	96.9%	742,339	$40,754	$39,364
7	COM	T	3	11	5,136,634	3.1%	466,967	$25,636	$24,762
8	IND	D	3	339	489,524,006	94.70%	1,444,024	$79,277	$76,573
9	IND	T	3	14	27,405,004	5.30%	1,957,500	$107,467	$103,801

Gas Transp. Forecast from Rate Design (Nominal Cents per Therm)							Trans Option: "Class Averge"			Trans Option: "Reservation"							
Year	PPP (¢/Thm)	Dcharge ($/mo /mtr)	D1 (¢/Thm)	D2 (¢/Thm)	D3 (¢/Thm)	D4 (¢/Thm)	Tcharge ($/mo /mtr)	T1 (¢/Thm)	T2 (¢/Thm)	Tcharge (¢/Thm/day per Mtr)	T1 (¢/Thm)	T2 (¢/Thm)	CPI	CBSP $/Dth	BTS $/Dth	GHG $/Dth	Price Deflator
2015	3.66	$350	18.81	12.11	8.42	5.78	$0	5.49	5.49	0.72	4.69	4.69	1.000	2.605	0.166	0.65	100.00
2016	2.81	$350	17.53	11.86	8.23	5.64	$0	4.49	4.49	0.55	3.75	3.75	1.010	2.163	0.162	0.50	101.05
2017	2.909	$350	19.24	12.94	8.91	6.03	$0	4.70	4.70	0.57	3.93	3.93	1.034	2.729	0.178	0.32	103.39
2018	3.01	$350	19.88	13.33	9.14	6.15	$0	4.77	4.77	0.58	4.00	4.00	1.061	2.821	0.142	0.38	106.10
2019	3.09	$350	19.96	13.41	9.23	6.24	$0	4.86	4.86	0.58	4.08	4.08	1.089	2.886	0.271	0.44	108.86
2020	3.17	$350	20.50	13.77	9.47	6.39	$0	4.96	4.96	0.58	4.18	4.18	1.117	2.983	0.261	0.53	111.74
2021	3.26	$350	21.09	14.16	9.73	6.56	$0	5.09	5.09	0.59	4.29	4.29	1.147	3.338	0.339	0.63	114.71
2022	3.34	$350	21.70	14.57	10.01	6.75	$0	5.23	5.23	0.60	4.43	4.43	1.177	3.853	0.334	0.77	117.68
2023	3.42	$350	22.79	15.26	10.44	7.00	$0	5.37	5.37	0.61	4.55	4.55	1.206	4.136	0.328	0.93	120.60
2024	3.51	$350	23.39	15.66	10.71	7.18	$0	5.51	5.51	0.62	4.67	4.67	1.236	4.355	0.322	1.10	123.57
2025	3.59	$350	23.98	16.05	10.98	7.35	$0	5.63	5.63	0.62	4.79	4.79	1.265	4.642	0.316	1.23	126.47
2026	3.67	$350	24.57	16.44	11.24	7.53	$0	5.76	5.76	0.63	4.91	4.91	1.294	4.960	0.310	1.36	129.36
2027	3.76	$350	25.17	16.84	11.51	7.70	$0	5.88	5.88	0.64	5.02	5.02	1.323	5.064	0.304	1.50	132.35
2028	3.84	$350	25.78	17.24	11.78	7.88	$0	6.01	6.01	0.65	5.14	5.14	1.354	5.180	0.298	1.65	135.41
2029	3.93	$350	26.41	17.66	12.06	8.07	$0	6.14	6.14	0.65	5.26	5.26	1.385	5.401	0.292	1.79	138.50
2030	4.02	$350	27.04	18.08	12.35	8.25	$0	6.28	6.28	0.66	5.39	5.39	1.416	5.606	0.286	1.95	141.62
2031	4.11	$350	27.70	18.51	12.64	8.44	$0	6.41	6.41	0.67	5.51	5.51	1.449	5.720	0.280	2.11	144.91
2032	4.21	$350	28.37	18.96	12.94	8.64	$0	6.55	6.55	0.68	5.64	5.64	1.482	5.920	0.277	2.28	148.23
2033	4.30	$350	29.05	19.41	13.25	8.84	$0	6.70	6.70	0.68	5.78	5.78	1.517	6.049	0.275	2.45	151.65
2034	4.41	$350	29.77	19.89	13.57	9.05	$0	6.85	6.85	0.69	5.92	5.92	1.552	6.217	0.272	2.63	155.23
2035	4.51	$350	30.50	20.37	13.89	9.26	$0	6.99	6.99	0.70	6.05	6.05	1.589	6.355	0.269	2.81	158.87

Example of Calculations: 2017 Noncore Industrial Average Gas Price:

Transportation Charge (¢/Thm):	**13.475**	**=**	**+ (94.70% Ind Dist of total Ind) * { [(100 ¢/$ *12 Mo/Yr)*($350.00 /mo/mtr)/(1,444,024 Thm/Mtr Ind Dist)]** **+ (15.71% * 19.24 ¢/Thm + 29.04% * 12.94 ¢/Thm + 17.04% * 8.91 ¢/Thm + 38.21% * 6.03 ¢/Thm) }** **+ (5.30% Ind Trans of total Ind) * { [(100 ¢/$ *12 Mo/Yr)*($0.00 /mo/mtr)/(1,957,500 Thm/Mtr Ind Trans)]** **+ (47.49% * 4.70 ¢/Thm + 52.51% * 4.70¢/Thm) }** **+ PPP Surcharge (¢/Thm):**
Gas Commodity Price (¢/Thm):	**29.066**	**=**	**(market price of gas at the SoCalGas City Gate = CBSP + BTS)**
Gas Transp + Cmdty (¢/Thm):	**42.541**	**=**	**(at "GasPrices" worksheet AVERAGE price)**
GHG "Adder" (¢/Thm):	**3.198**	=	
Customer's "Burner-Tip" Price:	**45.739**	**=**	**(13.475 + 29.066 + 3.198) ¢/Thm**

Example of Calculations: 2017 Noncore Industrial Marginal Gas Price:

Transportation Charge (¢/Thm):	**10.768**	**=**	**+ (94.70% Ind Dist of total Ind) * {(1.23% * 19.24 ¢/Thm + 18.43% * 12.94 ¢/Thm + 19.79% * 8.91 ¢/Thm + 60.55% * 6.03 ¢/Thm)** **+ (5.30% Ind Trans of total Ind) * { (18.30% * 4.70¢/Thm+81.70% * 4.70¢/Thm) }** **+ PPP Surcharge (¢/Thm):**
Gas Commodity Price (¢/Thm):	**29.066**	**=**	**(market price of gas at the SoCalGas City Gate = CBSP + BTS)**
Gas Transp + Cmdty (¢/Thm):	**39.834**	**=**	**(at "GasPrices" worksheet MARGINAL price)**
GHG "Adder" (¢/Thm):	**3.198**	=	
Customer's "Burner-Tip" Price:	**43.032**	**=**	**(10.768 + 29.066 + 3.198) ¢/Thm**

YEAR	Office	Restaurant	Retail	Laundry	Warehouse	School	College	Health	Lodging	Misc	Governmen	TCU	Constructic	Agriculture	EMPLTOT
2015	1.62858	0.73002	0.99687	0.09589	0.48571	0.64105	0.21368	1.15507	0.12943	0.24222	0.62539	0.53207	0.36524	0.23380	8.07500
2016	1.66243	0.74156	1.01261	0.09642	0.49568	0.64813	0.21604	1.19179	0.13417	0.24356	0.63165	0.53808	0.38804	0.24304	8.24321
2017	1.69490	0.74083	1.01161	0.09553	0.50360	0.65277	0.21759	1.21706	0.13568	0.24129	0.63381	0.54402	0.40737	0.24491	8.34096
2018	1.71419	0.73417	1.00253	0.09495	0.51074	0.66262	0.22087	1.23653	0.13763	0.23985	0.63961	0.55272	0.42444	0.24639	8.41725
2019	1.72943	0.73284	1.00071	0.09444	0.51792	0.67215	0.22405	1.25814	0.13897	0.23855	0.64537	0.55986	0.43920	0.24761	8.49923
2020	1.75614	0.73303	1.00097	0.09389	0.52419	0.67831	0.22610	1.27614	0.13990	0.23716	0.65581	0.56329	0.45422	0.24829	8.58744
2021	1.78195	0.73194	0.99948	0.09344	0.52808	0.68408	0.22803	1.29388	0.14075	0.23602	0.65383	0.56855	0.46804	0.24922	8.65729
2022	1.81718	0.72992	0.99672	0.09294	0.53270	0.68995	0.22998	1.31228	0.14123	0.23475	0.65791	0.57315	0.48152	0.25039	8.74060
2023	1.85709	0.72887	0.99529	0.09258	0.53715	0.69571	0.23190	1.33094	0.14152	0.23385	0.66175	0.57663	0.49416	0.25175	8.82920
2024	1.89278	0.72870	0.99506	0.09222	0.54174	0.70181	0.23394	1.34983	0.14167	0.23295	0.66606	0.58006	0.50635	0.25283	8.91601
2025	1.92423	0.72853	0.99483	0.09207	0.54555	0.70882	0.23627	1.36758	0.14143	0.23255	0.67127	0.58368	0.51578	0.25340	8.99598
2026	1.95679	0.73036	0.99734	0.09219	0.54829	0.71586	0.23862	1.38427	0.14132	0.23286	0.67648	0.58740	0.52301	0.25395	9.07874
2027	1.98741	0.73209	0.99969	0.09237	0.54967	0.72293	0.24098	1.39968	0.14160	0.23332	0.68170	0.58943	0.53145	0.25448	9.15680
2028	2.00998	0.73364	1.00180	0.09269	0.54742	0.73052	0.24351	1.41705	0.14216	0.23412	0.68732	0.59086	0.53805	0.25479	9.22390
2029	2.03126	0.73545	1.00429	0.09283	0.54581	0.73800	0.24600	1.43584	0.14287	0.23449	0.69284	0.59282	0.54487	0.25521	9.29258
2030	2.05643	0.73738	1.00691	0.09285	0.54275	0.74474	0.24825	1.45414	0.14344	0.23454	0.70411	0.59337	0.55466	0.25562	9.36919
2031	2.08438	0.74005	1.01055	0.09280	0.54036	0.75074	0.25025	1.47385	0.14420	0.23441	0.70293	0.59426	0.56347	0.25619	9.43845
2032	2.11446	0.74275	1.01424	0.09277	0.53700	0.75668	0.25223	1.49434	0.14494	0.23432	0.70723	0.59565	0.56805	0.25680	9.51146
2033	2.14147	0.74620	1.01896	0.09287	0.53477	0.76253	0.25418	1.51531	0.14576	0.23459	0.71137	0.59700	0.57277	0.25742	9.58522
2034	2.16905	0.74922	1.02308	0.09289	0.53176	0.76884	0.25628	1.53585	0.14642	0.23463	0.71586	0.59787	0.58111	0.25778	9.66063
2035	2.19849	0.75246	1.02751	0.09290	0.52920	0.77499	0.25833	1.55202	0.14715	0.23466	0.72021	0.59804	0.59187	0.25798	9.73580
AvgAnn Gwth (2015-2035)	1.5%	0.2%	0.2%	-0.2%	0.4%	1.0%	1.0%	1.5%	0.6%	-0.2%	0.7%	0.6%	2.4%	0.5%	0.9%

zname	bname	nname	SAT	SOURCE
Commercial	Agriculture	Drying	1.0000	Assumed
Commercial	Agriculture	Engine	0.5000	Assumed
Commercial	Agriculture	Other	1.0000	DEFAULT
Commercial	Agriculture	Space_Heat	0.7200	CI_1996_STUDY
Commercial	Agriculture	Water_Heat	0.6900	CI_1996_STUDY
Commercial	College	AC_Compressor	0.8850	CBECS
Commercial	College	Cook_top	0.1470	CBECS
Commercial	College	Fryer	0.1470	CBECS
Commercial	College	Griddle	0.1470	CBECS
Commercial	College	Other	1.0000	DEFAULT
Commercial	College	Other_Cooking	0.1470	CBECS
Commercial	College	Space_Heat	0.7630	SDGE_EUI_STUDY
Commercial	College	Water_Heat	0.9550	SDGE_EUI_STUDY
Commercial	Construction	Other	1.0000	DEFAULT
Commercial	Construction	Space_Heat	0.7200	CI_1996_STUDY
Commercial	Construction	Water_Heat	0.6900	CI_1996_STUDY
Commercial	Government	AC_Compressor	0.8880	CBECS
Commercial	Government	Cook_top	0.1960	CBECS
Commercial	Government	Fryer	0.1960	CBECS
Commercial	Government	Griddle	0.1960	CBECS
Commercial	Government	Other	1.0000	DEFAULT
Commercial	Government	Other_Cooking	0.1960	CBECS
Commercial	Government	Space_Heat	0.8720	SDGE_EUI_STUDY
Commercial	Government	Water_Heat	0.7000	CI_1996_STUDY
Commercial	Grocery	AC_Compressor	0.8560	CBECS
Commercial	Grocery	Cook_top	0.2450	CBECS
Commercial	Grocery	Fryer	0.2450	CBECS
Commercial	Grocery	Griddle	0.2450	CBECS
Commercial	Grocery	Other	1.0000	DEFAULT
Commercial	Grocery	Other_Cooking	0.2450	CBECS
Commercial	Grocery	Space_Heat	0.6470	SDGE_EUI_STUDY
Commercial	Grocery	Water_Heat	0.9300	CI_1996_STUDY
Commercial	Health	AC_Compressor	0.7920	CBECS
Commercial	Health	Cook_top	0.1020	CBECS
Commercial	Health	Drying	0.8200	CI_1996_STUDY
Commercial	Health	Fryer	0.1020	CBECS
Commercial	Health	Griddle	0.1020	CBECS
Commercial	Health	Other	1.0000	DEFAULT
Commercial	Health	Other_Cooking	0.1020	CBECS
Commercial	Health	Space_Heat	0.9360	SDGE_EUI_STUDY
Commercial	Health	Water_Heat	1.0000	CI_1996_STUDY
Commercial	Laundry	Drying	1.0000	CI_1996_STUDY
Commercial	Laundry	Other	1.0000	CI_1996_STUDY
Commercial	Laundry	Space_Heat	0.7200	CI_1996_STUDY
Commercial	Laundry	Water_Heat	1.0000	CI_1996_STUDY
Commercial	Lodging	AC_Compressor	0.7950	CBECS
Commercial	Lodging	Cook_top	0.0840	CBECS
Commercial	Lodging	Drying	0.8200	CI_1996_STUDY

zname	bname	nname	SAT	SOURCE
Commercial	Lodging	Fryer	0.0840	CBECS
Commercial	Lodging	Griddle	0.0840	CBECS
Commercial	Lodging	Other	1.0000	CI_1996_STUDY
Commercial	Lodging	Other_Cooking	0.0840	CBECS
Commercial	Lodging	Space_Heat	0.8950	SDGE_EUI_STUDY
Commercial	Lodging	Water_Heat	1.0000	CI_1996_STUDY
Commercial	Misc	AC_Compressor	0.7310	CBECS
Commercial	Misc	Cook_top	0.0210	CBECS
Commercial	Misc	Fryer	0.0210	CBECS
Commercial	Misc	Griddle	0.0210	CBECS
Commercial	Misc	Other	1.0000	CI_1996_STUDY
Commercial	Misc	Other_Cooking	0.0210	CBECS
Commercial	Misc	Space_Heat	0.6950	SDGE_EUI_STUDY
Commercial	Misc	Water_Heat	0.6900	CI_1996_STUDY
Commercial	Office	AC_Compressor	0.9310	CBECS
Commercial	Office	Cooking	0.0820	CBECS
Commercial	Office	Other	1.0000	CI_1996_STUDY
Commercial	Office	Space_Heat	0.8720	SDGE_EUI_STUDY
Commercial	Office	Water_Heat	0.7000	CI_1996_STUDY
Commercial	Restaurant	AC_Compressor	0.8710	CBECS
Commercial	Restaurant	Cook_top	0.7500	SCG_COOKING_STUDY
Commercial	Restaurant	Fryer	0.7290	SCG_COOKING_STUDY
Commercial	Restaurant	Griddle	0.5740	SCG_COOKING_STUDY
Commercial	Restaurant	Other	1.0000	CI_1996_STUDY
Commercial	Restaurant	Other_Cooking	0.9000	CI_1996_STUDY
Commercial	Restaurant	Space_Heat	0.8180	SDGE_EUI_STUDY
Commercial	Restaurant	Water_Heat	0.9600	CI_1996_STUDY
Commercial	Retail	Cooking	0.2450	CBECS
Commercial	Retail	Other	1.0000	CI_1996_STUDY
Commercial	Retail	Space_Heat	0.7710	SDGE_EUI_STUDY
Commercial	Retail	Water_Heat	0.6200	CI_1996_STUDY
Commercial	School	AC_Compressor	0.8850	CBECS
Commercial	School	Cook_top	0.1470	CBECS
Commercial	School	Fryer	0.1470	CBECS
Commercial	School	Griddle	0.1470	CBECS
Commercial	School	Other	1.0000	CI_1996_STUDY
Commercial	School	Other_Cooking	0.1470	CBECS
Commercial	School	Space_Heat	0.9670	SDGE_EUI_STUDY
Commercial	School	Water_Heat	0.9000	CI_1996_STUDY
Commercial	TCU	Engine	0.5000	Assumed
Commercial	TCU	Other	1.0000	CI_1996_STUDY
Commercial	TCU	Space_Heat	0.7200	CI_1996_STUDY
Commercial	TCU	Water_Heat	0.6900	CI_1996_STUDY
Commercial	Warehouse	Engine	0.2500	Assumed
Commercial	Warehouse	Other	1.0000	DEFAULT
Commercial	Warehouse	Space_Heat	0.2310	SDGE_EUI_STUDY
Commercial	Warehouse	Water_Heat	0.8800	SDGE_EUI_STUDY

WP_ScgNoncore_03_Com_NCore_Source_Data.xlsx - ComNCoreAvgEQAge

Sector	Space Heater	Water Heater	Cooktop	Griddle	Fryer	Other Cooking Equipment	Kitchen Equipment	AC	Dryer	Engine	Other
Office	.	.	.	.	.	.	.	.	.	.	1966
Restaurant	1972	.	.	.	.	.	.	.	.	.	1974
Retail	.	.	.	.	.	.	.	.	.	.	.
Laundry	1965	1980	.	.	.	.	.	2001	1983	.	1984
Warehouse	.	.	.	.	.	.	.	.	.	.	.
School	.	.	.	.	.	.	.	.	.	.	.
College	1974	1975	.	.	.	.	1988	1981	.	.	1968
Health	1975	1973	1973	1979	1983	1980	1975	1985	1972	.	1974
Lodging	1985	1978	1990	1986	1986	1990	1990	1953	1989	.	1991
Misc	.	1996	.	.	.	.	.	.	.	.	1991
Government	1979	1980	1976	1982	1979	1979	1982	1987	1980	1965	1976
TCU	1976	1969	.	.	.	.	.	.	.	1975	1977
Construction	.	.	.	.	.	.	.	.	.	.	.
Agriculture	1992	1991	.	.	.	.	1998	.	1970	1975	1992

Year Equipment Installed

Sector	Space Heater	Water Heater	Cooktop	Griddle	Fryer	Other Cooking Equipment	Kitchen Equipment	AC	Dryer	Engine	Other	Total Building
Office	240528	99863	12180	4049	3089	12599	2702	4123	11990	3426	239824	634373
Restaurant	36161	69993	116822	48059	92292	102114	24865	1440	644	0	22948	515339
Retail	119673	72688	26466	4408	29480	50818	31426	6973	13400	1071	165827	522229
Laundry	2223	35344	290	45	72	420	2	67	355047	0	330601	724110
Warehouse	77071	22390	3185	888	7677	8827	11285	8770	25630	7614	247995	421331
School	0	0	0	0	0	0	0	0	0	0	0	0
College	425788	210314	20545	6061	10537	25291	5846	26614	6455	9045	289584	1036079
Health	270862	169722	27202	5269	7390	20919	11832	4902	37260	2778	286384	844520
Lodging	86205	176079	24304	5932	7595	29595	14567	1425	45873	30	199012	590616
Misc	0	0	0	0	0	0	0	0	0	0	0	0
Government	285554	166009	14590	7190	4268	12009	6514	7623	3851	42175	111896	661680
TCU	105318	37862	3335	829	1573	2921	1994	5145	325	165241	174691	499232
Construction	94394	29501	2369	14	352	1316	807	2799	17649	61	139255	288515
Agriculture	144119	34917	5930	990	12334	27426	24934	338	36347	238308	481188	1006831

Segment	2015 Therm Sales	2015 Meter Count	2015 Meter Count, Existing/Old customers	2015 Meter Count New Customers	Avg Use Per Meter Existing Customers	Avg Use Per Meter New Customers	Price Elasticity	Employment Elasticities	MAS SQFT ADJ
Office + Restaurant + Retail + Laundry	12,847,052	19	19	0	676161	0	-0.046000	0.474000	6,881,366
Warehouse + School + College	17,841,262	19	19	0	939014	0	-0.046000	0.474000	10,064,926
Health	69,250,615	82	82	0	844520	0	-0.046000	0.474000	1,707,720
Lodging + Misc	10,040,470	17	17	0	590616	0	-0.046000	0.474000	14,736,871
Government	21,835,435	33	33	0	661680	0	-0.046000	0.474000	3,533,422
TCU	16,973,905	34	34	0	499232	0	-0.046000	0.474000	2,992,940
Construction + Agriculture	21,431,968	22	22	0	974180	0	-0.046000	0.474000	2,571,346
Total	170,220,706	226							

Adjustment for Normal Year Year

Normal Year HDD	**1,340**	HDD
Actual 2015 HDD	**969**	HDD
HDD Difference	371	HDD
Load per HDD	14,773	Therm/HDD
Temperature Adj.	5,480,888	Therms

	Actual 2015	Ratio
Office + Restaurant + Retail + Laundry	12,433,393	7.55%
Warehouse + School + College	17,266,796	10.48%
Health	67,020,834	40.68%
Lodging + Misc	9,717,180	5.90%
Government	21,132,362	12.83%
TCU	16,427,367	9.97%
Construction + Agriculture	20,741,886	12.59%
Total	164,739,818	100.00%

WP_ScgNoncore_04_Ind_NCore_Source_Data.xlsx - IndNonCoreEmpFcast

YEAR	Mining	Food	Textile	Wood_Paper	Chemical	Petroleum	Stone	Prim_Metal	Fab_Metal	Transport	Misc	EMPLTOT
2015	20.28088	118.87216	10.87162	29.24192	47.28538	8.27545	18.65821	11.94872	89.75430	75.41229	280.55436	711.16
2016	18.31180	120.12527	10.63912	29.18295	47.19782	8.08588	18.75922	11.72810	88.69332	74.23747	280.29821	707.26
2017	18.28203	121.60343	10.33909	29.96579	47.64461	8.06064	18.87543	11.39187	89.70308	73.13834	283.80114	712.81
2018	18.98688	122.84206	10.02292	31.00353	48.04038	7.94849	19.35774	11.36460	90.60186	72.14723	286.45849	718.77
2019	19.62337	123.96180	9.79463	31.66864	48.17093	7.91478	19.71105	11.51644	92.58106	70.86180	287.47349	723.28
2020	20.01356	125.14277	9.52009	32.46552	47.94184	7.84665	19.93106	11.57042	94.66543	69.65398	288.02266	726.77
2021	20.38143	126.20805	9.20337	33.28865	47.48186	7.72440	20.20007	11.61397	96.93100	68.87677	288.61573	730.53
2022	20.86558	126.86682	8.85609	33.81321	46.82581	7.55908	20.40243	11.59221	98.76851	67.68841	288.60785	731.85
2023	21.03384	127.46472	8.50864	34.40707	46.09720	7.38932	20.54882	11.51345	100.21471	65.77814	288.29564	731.25
2024	21.09209	128.11773	8.18224	34.94473	45.35721	7.22778	20.66188	11.40015	101.35239	64.12424	288.07677	730.54
2025	21.03983	128.39527	8.01076	35.17182	44.78063	7.08172	20.61930	11.25675	101.68633	63.27479	286.65220	727.97
2026	20.77116	128.62173	7.97734	35.25645	44.45967	6.94305	20.49413	11.10564	101.71273	63.17251	284.22489	724.74
2027	20.49065	128.88136	7.94481	35.33351	44.15101	6.79499	20.45982	10.92250	101.50438	63.01073	282.05369	721.55
2028	20.34675	129.02435	7.89448	35.34356	43.77930	6.63642	20.46067	10.67455	100.73194	62.53159	279.64813	717.07
2029	20.22197	129.07978	7.84776	35.48294	43.33937	6.48838	20.45896	10.43376	99.94535	61.90180	277.53974	712.74
2030	19.99559	129.01697	7.77380	35.86394	42.86503	6.34247	20.48672	10.20345	99.28759	61.18591	275.53991	708.56
2031	19.82247	129.01692	7.65789	36.20614	42.37330	6.19969	20.49713	9.93641	98.82875	60.47007	273.93655	704.95
2032	19.65868	128.90308	7.54061	36.22465	41.84511	6.06480	20.46337	9.66430	98.44683	59.90819	272.58353	701.30
2033	19.42586	128.72364	7.43636	36.14973	41.31708	5.94472	20.46980	9.40126	98.01428	59.72042	271.21106	697.81
2034	19.23703	128.33280	7.32284	36.31814	40.79987	5.81888	20.50781	9.12633	97.43794	59.64510	269.85056	694.40
2035	19.09301	127.89503	7.21439	36.42792	40.31287	5.69386	20.49998	8.84979	96.89171	59.59439	268.61857	691.09

WP_ScgNoncore_04_Ind_NCore_Source_Data.xlsx - IndNonCoreUsePerMeterAvg

Segment	Fire_Tube_Boil	Wat_Tube_Boil	Space_Heat	Water_Heat	Dryer	Furnace_Oven_Kiln	AC	Engine	Misc_Other	Total
Mining	64331	254665	3310	1972	170948	448009	0	18580	8931	970747
Food	879689	238082	9519	12401	327015	80205	905	2641	62989	1613447
Textile	562362	77391	4643	14770	257180	81483	0	8518	34698	1041046
Wood_Paper	268612	674539	114	470	100295	57638	0	0	41948	1143617
Chemical	589598	184524	4141	2879	0	28534	9482	0	344085	1163243
Petroleum	56739	0	25466	1964	214962	684098	0	0	70811	1054040
Stone	104002	0	16121	2918	65486	2711108	0	0	130760	3030396
Prim_Metal	53292	191266	6005	690	63127	2358751	216	0	227703	2901049
Fab_Metal	133536	14027	18162	1885	2952	797011	60	1110	157940	1126682
Transport	76353	114491	23253	2435	1358	639480	180	0	112135	969685
Misc	260210	86238	10557	11042	19342	179290	4	0	165942	732625

WP_ScgNoncore_04_Ind_NCore_Source_Data.xlsx - IndNonCoreSat

Segment	Fire_Tube_Boil	Wat_Tube_Boil	Space_Heat	Water_Heat	Dryer	Furnace_Oven_Kiln	AC	Engine	Misc_Other
Mining	0.01	0.01	0.73	0.73	0.03	0.06	0.64	0.87	1.00
Food	0.45	0.45	0.60	0.85	0.12	0.33	0.73	0.70	1.00
Textile	0.26	0.26	0.70	0.71	0.14	0.09	0.72	0.46	1.00
Wood_Paper	0.01	0.01	0.62	0.77	0.09	0.07	0.71	0.50	1.00
Chemical	0.14	0.14	0.73	0.73	0.12	0.10	0.74	0.70	1.00
Petroleum	0.14	0.14	0.73	0.73	0.12	0.10	0.74	0.70	1.00
Stone	0.01	0.01	0.73	0.73	0.03	0.06	0.64	0.87	1.00
Prim_Metal	0.07	0.07	0.73	0.76	0.15	0.10	0.68	0.86	1.00
Fab_Metal	0.07	0.07	0.73	0.76	0.15	0.10	0.68	0.86	1.00
Transport	0.14	0.14	0.73	0.73	0.12	0.10	0.74	0.70	1.00
Misc	0.14	0.14	0.73	0.73	0.12	0.10	0.74	0.70	1.00

WP_ScgNoncore_04_Ind_NCore_Source_Data.xlsx - IndNonCoreGasShare

Segment	Fire_Tube_Boil	Wat_Tube_Boil	Space_Heat	Water_Heat	Dryer	Furnace_Oven_Kiln	AC	Engine	Misc_Other
Mining	0.75	0.75	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Food	0.79	0.79	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Textile	0.79	0.79	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Wood_Paper	0.75	0.75	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Chemical	0.79	0.79	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Petroleum	0.79	0.79	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Stone	0.79	0.79	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Prim_Metal	0.79	0.79	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Fab_Metal	0.79	0.79	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Transport	0.75	0.75	0.61	0.59	0.32	0.62	0.11	0.01	1.00
Misc	0.79	0.79	0.61	0.59	0.32	0.62	0.11	0.01	1.00

WP_ScgNoncore_04_Ind_NCore_Source_Data.xlsx - IndNonCoreGasUec

Segment	Fire_Tube_Boil	Wat_Tube_Boil	Space_Heat	Water_Heat	Dryer	Furnace_Oven_Kiln	AC	Engine	Misc_Other
Mining	15197607	60162069	12984	7981	31551928	34672498	0	3748606	15676
Food	2019797	546644	19869	18855	6599447	493600	8815	289660	48356
Textile	3108844	427834	11556	37402	6188629	2557853	0	1977498	37055
Wood_Paper	38981557	97890377	324	1108	3790529	2348782	0	0	45230
Chemical	3457019	1081930	5644	4049	0	460401	72363	0	209860
Petroleum	1031793	0	107646	8566	10689246	34233510	0	0	133945
Stone	13851560	0	35651	6660	6814194	118290626	0	0	129396
Prim_Metal	338405	1214539	4432	505	438453	20608729	969	0	75202
Fab_Metal	1904588	200068	30108	3097	46052	15640956	609	95727	117161
Transport	813269	1219491	57573	6221	39541	18743866	2495	0	124241
Misc	2821763	935185	26612	28723	573541	5350309	51	0	187184

WP_ScgNoncore_04_Ind_NCore_Source_Data.xlsx - IndNonCoreElecUec

Segment	Fire_Tube_Boil	Wat_Tube_Boil	Space_Heat	Water_Heat	Dryer	Furnace_Oven_ Kiln	AC	Engine	Misc_Other
Mining	311700114	1233912930	266299	116921	647124219	711126534	0	76883217	0
Food	41425664	11211568	407510	276223	135353440	10123645	180794	5940873	0
Textile	63761817	8774796	237011	547934	126927638	52461093	0	40558119	0
Wood_Paper	799504539	2007713563	6645	16232	77743050	48173085	0	0	0
Chemical	70902822	22190185	115757	59317	0	9442740	1484152	0	0
Petroleum	21161884	0	2207800	125491	219234462	702122971	0	0	0
Stone	284092939	0	731195	97568	139757861	2426118904	0	0	0
Prim_Metal	6940624	24909971	90900	7398	8992590	422681228	19874	0	0
Fab_Metal	39062748	4103358	617510	45371	944518	320793120	12490	1963343	0
Transport	16679997	25011535	1180812	91137	810979	384433232	51172	0	0
Misc	57873838	19180472	545807	420788	11763220	109733850	1046	0	0

WP_ScgNoncore_04_Ind_NCore_Source_Data.xlsx - IndNonCoreAvgEQAge

Segment	Fire_Tube_Boil	Wat_Tube_Boil	Space_Heat	Water_Heat	Dryer	Furnace_Oven_ Kiln	AC	Engine	Misc_Other
Mining	1978.50	1976.00	1971.00	1989.00	1972.60	1971.75	.	1984.50	1971.50
Food	1981.14	1979.00	1978.44	1979.54	1983.50	1977.64	1998.50	1988.50	1976.33
Textile	1977.00	1975.25	.	1980.00	1988.00	1975.00	1990.00	.	1971.00
Wood_Paper	1979.60	1974.64	1975.00	1975.00	1981.40	1977.00	.	1968.00	1980.80
Chemical	1985.20	1976.00	1978.14	1985.00	1986.00	1979.00	1996.00	.	1983.21
Petroleum	1970.00	.	1980.25	1981.50	1967.87	1988.00	.	.	1967.86
Stone	1976.00	.	1984.33	1982.00	1978.25	1975.50	.	.	1966.50
Prim_Metal	1989.50	1974.83	1974.20	1982.88	1988.50	1982.13	1975.00	.	1978.73
Fab_Metal	1973.50	1972.00	1975.50	1981.33	1976.00	1980.05	1998.00	.	1978.05
Transport	1976.50	1989.00	1970.33	1976.00	.	1981.20	1976.00	.	1982.00
Misc	1979.92	1978.00	1978.31	1981.80	1984.33	1979.77	.	.	1983.71

WP_ScgNoncore_04_Ind_NCore_Source_Data.xlsx - Historical_Data

Segment	2015 Therm Sales	2015 Meter Count	2015 Meter Count, Existing/Old customers	2015 Meter Count New Customers	Avg Use Per Meter Existing Customers	Avg Use Per Meter New Customers	Price Elasticity	Emp Elasticity	MAS SQFT ADJ	Initial SQFT Calibration	Initial SQFT
Mining	19414930	20	20	0	970747	.	-0.071000	0.474000	13.2900	177.2025	8539
Food	182589593	96	96	0	1613447	.	-0.071000	0.474000	12.7700	116.3474	2356
Textile	23944047	23	23	0	1041046	.	-0.071000	0.474000	13.0200	271.4589	11002
Wood_Paper	34308508	30	30	0	1143617	.	-0.071000	0.474000	8.3700	11.8754	3237
Chemical	32570811	28	28	0	1163243	.	-0.071000	0.474000	17.2700	728.2737	17662
Petroleum	38999480	37	37	0	1054040	.	-0.071000	0.474000	3.7300	0.3081	47145
Stone	39395147	13	13	0	3030396	.	-0.071000	0.474000	6.2300	40.1230	42397
Prim_Metal	63823088	22	22	0	2901049	.	-0.071000	0.474000	20.0200	184.5367	15764
Fab_Metal	47320656	42	42	0	1126682	.	-0.071000	0.474000	9.0100	16.8171	21333
Transport	15514963	16	16	0	969685	.	-0.071000	0.474000	7.9900	966.3551	6969
Misc	19048248	26	26	0	732625	.	-0.071000	0.474000	9.4800	226.5333	17929
Total	516,929,471	353									

No temperature adjustment for noncore Industrial

2016 CALIFORNIA GAS REPORT

NATURAL GAS VEHICLES

SoCalGas compressed, uncompressed and Transportation only throughput forecast 2015 through 2035 in Ml

	CAGR = .063		0.063					
YEAR	MDTH1	MDTH2	MDTH3	MDTH4	MDTH5	MDTH6	MDTH7	MDTH8
2015	20	20	20	20	20	20	20	20
2016	21	21	21	21	21	21	21	21
2017	22	22	22	22	22	22	22	22
2018	23	23	23	23	23	23	23	23
2019	24	24	24	24	24	24	24	24
2020	25	25	25	25	25	25	25	25
2021	26	26	26	26	26	26	26	26
2022	27	27	27	27	27	27	27	27
2023	28	28	28	28	28	28	28	28
2024	29	29	29	29	29	29	29	29
2025	30	30	30	30	30	30	30	30
2026	31	31	31	31	31	31	31	31
2027	32	32	32	32	32	32	32	32
2028	33	33	33	33	33	33	33	33
2029	34	34	34	34	34	34	34	34
2030	35	35	35	35	35	35	35	35
2031	36	36	36	36	36	36	36	36
2032	37	37	37	37	37	37	37	37
2033	37	37	37	37	37	37	37	37
2034	38	38	38	38	38	38	38	38
2035	39	39	39	39	39	39	39	39
2015	761	761	761	761	761	761	761	761
2016	798	798	798	798	798	798	798	798
2017	835	835	835	835	835	835	835	835
2018	872	872	872	872	872	872	872	872
2019	909	909	909	909	909	909	909	909
2020	946	946	946	946	946	946	946	946
2021	983	983	983	983	983	983	983	983
2022	1020	1020	1020	1020	1020	1020	1020	1020
2023	1057	1057	1057	1057	1057	1057	1057	1057
2024	1094	1094	1094	1094	1094	1094	1094	1094
2025	1132	1132	1132	1132	1132	1132	1132	1132
2026	1169	1169	1169	1169	1169	1169	1169	1169
2027	1206	1206	1206	1206	1206	1206	1206	1206
2028	1243	1243	1243	1243	1243	1243	1243	1243
2029	1280	1280	1280	1280	1280	1280	1280	1280
2030	1317	1317	1317	1317	1317	1317	1317	1317
2031	1354	1354	1354	1354	1354	1354	1354	1354
2032	1391	1391	1391	1391	1391	1391	1391	1391
2033	1428	1428	1428	1428	1428	1428	1428	1428
2034	1465	1465	1465	1465	1465	1465	1465	1465
2035	1502	1502	1502	1502	1502	1502	1502	1502
2015	321	321	321	321	321	321	321	321
2016	336	336	336	336	336	336	336	336
2017	352	352	352	352	352	352	352	352
2018	368	368	368	368	368	368	368	368
2019	383	383	383	383	383	383	383	383
2020	399	399	399	399	399	399	399	399
2021	414	414	414	414	414	414	414	414

2022	430	430	430	430	430	430	430	430
2023	446	446	446	446	446	446	446	446
2024	461	461	461	461	461	461	461	461
2025	477	477	477	477	477	477	477	477
2026	493	493	493	493	493	493	493	493
2027	508	508	508	508	508	508	508	508
2028	524	524	524	524	524	524	524	524
2029	540	540	540	540	540	540	540	540
2030	555	555	555	555	555	555	555	555
2031	571	571	571	571	571	571	571	571
2032	586	586	586	586	586	586	586	586
2033	602	602	602	602	602	602	602	602
2034	618	618	618	618	618	618	618	618
2035	633	633	633	633	633	633	633	633

DTH

MDTH9	MDTH10	MDTH11	MDTH12	TOTAL	RATE	NGVTYPE
20	20	20	20	240	GNV	C
21	21	21	21	251	GNV	C
22	22	22	22	263	GNV	C
23	23	23	23	275	GNV	C
24	24	24	24	286	GNV	C
25	25	25	25	298	GNV	C
26	26	26	26	310	GNV	C
27	27	27	27	321	GNV	C
28	28	28	28	333	GNV	C
29	29	29	29	345	GNV	C
30	30	30	30	356	GNV	C
31	31	31	31	368	GNV	C
32	32	32	32	380	GNV	C
33	33	33	33	391	GNV	C
34	34	34	34	403	GNV	C
35	35	35	35	415	GNV	C
36	36	36	36	426	GNV	C
37	37	37	37	438	GNV	C
37	37	37	37	450	GNV	C
38	38	38	38	461	GNV	C
39	39	39	39	473	GNV	C
761	761	761	761	9127	GNV	U
798	798	798	798	9572	GNV	U
835	835	835	835	10017	GNV	U
872	872	872	872	10463	GNV	U
909	909	909	909	10908	GNV	U
946	946	946	946	11353	GNV	U
983	983	983	983	11798	GNV	U
1020	1020	1020	1020	12243	GNV	U
1057	1057	1057	1057	12688	GNV	U
1094	1094	1094	1094	13133	GNV	U
1132	1132	1132	1132	13578	GNV	U
1169	1169	1169	1169	14024	GNV	U
1206	1206	1206	1206	14469	GNV	U
1243	1243	1243	1243	14914	GNV	U
1280	1280	1280	1280	15359	GNV	U
1317	1317	1317	1317	15804	GNV	U
1354	1354	1354	1354	16249	GNV	U
1391	1391	1391	1391	16694	GNV	U
1428	1428	1428	1428	17140	GNV	U
1465	1465	1465	1465	17585	GNV	U
1502	1502	1502	1502	18030	GNV	U
321	321	321	321	3847	GNV	UT
336	336	336	336	4035	GNV	UT
352	352	352	352	4223	GNV	UT
368	368	368	368	4410	GNV	UT
383	383	383	383	4598	GNV	UT
399	399	399	399	4785	GNV	UT
414	414	414	414	4973	GNV	UT

430	430	430	430	5161	GNV	UT
446	446	446	446	5348	GNV	UT
461	461	461	461	5536	GNV	UT
477	477	477	477	5724	GNV	UT
493	493	493	493	5911	GNV	UT
508	508	508	508	6099	GNV	UT
524	524	524	524	6287	GNV	UT
540	540	540	540	6474	GNV	UT
555	555	555	555	6662	GNV	UT
571	571	571	571	6849	GNV	UT
586	586	586	586	7037	GNV	UT
602	602	602	602	7225	GNV	UT
618	618	618	618	7412	GNV	UT
633	633	633	633	7600	GNV	UT

SoCalGas station growth 2015 through 2035

Station Fo	No. of Stat	Stations ad	Average S	Station growth Rate
2015	311	15.4		15.4
2016	326.4	15.4		
2017	341.8	15.4		
2018	357.2	15.4		
2019	372.6	15.4		
2020	388	15.4		
2021	403.4	15.4		
2022	418.8	15.4		
2023	434.2	15.4		
2024	449.6	15.4		
2025	465	15.4		
2026	480.4	15.4		
2027	495.8	15.4		
2028	511.2	15.4		
2029	526.6	15.4		
2030	542	15.4		
2031	557.4	15.4		
2032	572.8	15.4	15.4	
2033	588.2	15.4		
2034	603.6	15.4		
2035	619	15.4		
2036	634.4			

Throughput forecast methodoloy.

Years	Total Volume	Yearly Volume Change	Yearly Percentage Change	CAGR (2011 -2015)
	MM CCF	MM CCF	%	
2015	129	6	5.2%	0.063
2014	122	8	7.4%	
2013	114	7	6.5%	
2012	107	6	6.2%	
2011	101	4	4.3%	
2010	97	1	0.8%	
2009	96	4	4.3%	
2008	92	9	11.1%	
2007	83	7	8.8%	
2006	76	n/a	#VALUE!	

Station count forecast methodology.				
SoCalGas NGV Station Count				
Year	Historical Station	Private stations	yearly change	% change
2015	311			
2014	297			
2013	287			7.9%
2012	266			3.9%
2011	256	182	22	9.4%
2010	234	166	14	6.4%
2009	220	155	24	12.2%
2008	196	137	n/a	#DIV/0!

15.4

2016 CGR Station Count Forecast			
2015	311		0
2016	326		15
2017	342		15
2018	357		15
2019	373		15
2020	388		15
2021	403		15
2022	419		15
2023	434		15
2024	450		15
2025	465		15
2026	480		15
2027	496		15
2028	511		15
2029	527		15
2030	542		15
2031	557		15
2032	573		15
2033	588		15
2034	604		15
2035	619		15
		Average	15

2016 CALIFORNIA GAS REPORT

ENERGY EFFICIENCY

Southern California Gas Company
2016 California Gas Report
Energy Efficiency Savings

	Reported 2010 Therms	Reported 2011 Therms	Reported 2012 Therms	Reported 2013	Reported 2014	Reported 2015	Forecast 2016	Forecast 2017	Forecast 2018	Forecast 2019	Forecast 2020
SoCalGas EE Program TOTAL	**27,413,193**	**37,233,416**	**32,077,678**	**25,817,960**	**28,856,008**	**21,620,562**					
PUC Goal	**28,000,000**	**30,000,000**	**32,000,000**	24,120,000	23,190,000	25,300,000	29,100,000	30,300,000	29,400,000	30,600,000	30,600,000
Difference	**(586,807)**	**7,233,416**	**77,678**	**1,697,960**	**5,666,008**	**(3,679,438)**					

SoCalGas	**2010 therms**	**2011 therms**	**2012 therms**	**2013 therms**	**2014 therms**	**2015 therms**	**2016 therms**
Core Residential	9,072,268	12,564,473	8,445,190	8,173,595	7,371,223	7,037,522	8,103,623
Core Commercial	7,457,290	10,030,218	9,608,803	2,380,370	4,093,890	6,286,602	10,981,846
Core Industrial	2,268,570	3,051,276	2,923,078	2,803,233	2,457,183	1,928,820	2,286,147
NonCore Commercial	1,064,214	1,431,391	1,371,252	293,874	2,168,951	1,878,668	2,153,946
NonCore Industrial retail	2,483,166	3,339,913	3,199,588	4,184,881	6,592,493	2,495,191	3,486,200
NonCore Industrial refinery	5,067,684	6,816,146	6,529,768	7,982,006	6,172,268	1,993,759	3,455,184
Total	**27,413,193**	**37,233,416**	**32,077,678**	**25,817,960**	**28,856,008**	**21,620,562**	**30,466,947**

Proportionally scale it down or up to match PUC Goals for 2010 - 2014

ANNUAL NET SAVINGS	**2010 Mdth**	**2011 Mdth**	**2012 Mdth**	**2013 Mdth**	**2014 Mdth**	**2015 Mdth**	**2016 Mdth**	**2017 Mdth**	**2018 Mdth**	**2019 Mdth**	**2020 Mdth**
Core Residential	927	1,012	842	764	592	704	810	806	782	814	814
Core Commercial	762	808	959	222	329	629	1,098	1,092	1,060	1,103	1,103
Core Industrial	232	246	292	262	197	193	229	227	221	230	230
NonCore Commercial	109	115	137	27	174	188	215	214	208	216	216
NonCore Industrial retail	254	269	319	391	530	250	349	347	336	350	350
NonCore Industrial refinery	518	549	651	746	496	199	346	344	333	347	347
Total	**2,800**	**3,000**	**3,200**	**2,412**	**2,319**	**2,162**	**3,047**	**3,030**	**2,940**	**3,060**	**3,060**

Cumulative Savings Mdth	**2012 Mdth**	**2013 Mdth**	**2014 Mdth**	**2015 Mdth**	**2016 Mdth**	**2017 Mdth**	**2018 Mdth**	**2019 Mdth**	**2020 Mdth**
Core Residential					810	1,616	2,398	3,212	4,026
Core Commercial					1,098	2,190	3,250	4,353	5,456
Core Industrial					229	456	677	906	1,136
NonCore Commercial					215	430	637	854	1,070
NonCore Industrial regular					349	695	1,032	1,382	1,732
NonCore Industrial refinery					346	689	1,023	1,370	1,717
Total Load Impacts					**3,047**	**6,077**	**9,017**	**12,077**	**15,137**

MMCF factor: **1.0353**

Cumulative Savings MMCF	**2012 mmcf**	**2013 mmcf**	**2014 mmcf**	**2015 mmcf**	**2016 mmcf**	**2017 mmcf**	**2018 mmcf**	**2019 mmcf**	**2020 mmcf**
Core Residential	-		-	-	783	1,561	2,316	3,103	3,889
Core Commercial	-		-	-	1,061	2,116	3,139	4,205	5,270
Core Industrial	-		-	-	221	440	654	875	1,097
NonCore Commercial	-		-	-	208	415	616	825	1,034

NonCore Industrial regular	-	-	-	337	672	997	1,335	1,673
NonCore Industrial refinery	-	-	-	334	666	988	1,323	1,658
Total Cumulative Load	-	**-**	**-**	**2,943**	**5,870**	**8,709**	**11,665**	**14,621**
Forecast Year ====>				1	2	3	4	5

Southern California Gas Company
2016 California Gas Report
Energy Efficiency Savings

	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029	Forecast 2030	Forecast 2031
SoCalGas EE Program TOTAL											
PUC Goal	28,600,000	28,500,000	28,200,000	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000
Difference											

SoCalGas
Core Residential
Core Commercial
Core Industrial
NonCore Commercial
NonCore Industrial retail
NonCore Industrial refinery
Total

Proportionally scale it down or up to match PUC Goals for 2010 - 2014

ANNUAL NET SAVINGS	2021 Mdth	2022 Mdth	2023 Mdth	2024 Mdth	2025 Mdth	2026 Mdth	2027 Mdth	2028 Mdth	2029 Mdth	2030 Mdth	2031 Mdth
Core Residential	761	758	750	747	747	747	747	747	747	747	747
Core Commercial	1,031	1,027	1,016	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013
Core Industrial	215	214	212	211	211	211	211	211	211	211	211
NonCore Commercial	202	201	199	199	199	199	199	199	199	199	199
NonCore Industrial retail	327	326	323	322	322	322	322	322	322	322	322
NonCore Industrial refinery	324	323	320	319	319	319	319	319	319	319	319
Total	**2,860**	**2,850**	**2,820**	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**

Cumulative Savings Mdth	2021 Mdth	2022 Mdth	2023 Mdth	2024 Mdth	2025 Mdth	2026 Mdth	2027 Mdth	2028 Mdth	2029 Mdth	2030 Mdth	2031 Mdth
Core Residential	4,787	5,545	6,295	7,042	7,790	8,537	9,285	10,032	10,779	11,527	11,464
Core Commercial	6,487	7,514	8,531	9,544	10,556	11,569	12,582	13,595	14,608	15,621	15,535
Core Industrial	1,350	1,564	1,776	1,987	2,198	2,408	2,619	2,830	3,041	3,252	3,234
NonCore Commercial	1,272	1,474	1,673	1,872	2,071	2,269	2,468	2,666	2,865	3,064	3,047
NonCore Industrial regular	2,059	2,385	2,708	3,030	3,351	3,673	3,994	4,316	4,637	4,959	4,932
NonCore Industrial refinery	2,041	2,364	2,684	3,003	3,321	3,640	3,959	4,277	4,596	4,915	4,888
Total Load Impacts	**17,997**	**20,847**	**23,667**	**26,477**	**29,287**	**32,097**	**34,907**	**37,717**	**40,527**	**43,337**	**43,100**

Cumulative Savings MMCF	2021 mmcf	2022 mmcf	2023 mmcf	2024 mmcf	2025 mmcf	2026 mmcf	2027 mmcf	2028 mmcf	2029 mmcf	2030 mmcf	2031 mmcf
Core Residential	4,624	5,356	6,080	6,802	7,524	8,246	8,968	9,690	10,412	11,134	11,073
Core Commercial	6,266	7,258	8,240	9,218	10,196	11,175	12,153	13,131	14,110	15,088	15,006
Core Industrial	1,304	1,511	1,715	1,919	2,123	2,326	2,530	2,734	2,937	3,141	3,124
NonCore Commercial	1,229	1,424	1,616	1,808	2,000	2,192	2,384	2,576	2,767	2,959	2,943

NonCore Industrial regular	1,989	2,304	2,616	2,926	3,237	3,547	3,858	4,169	4,479	4,790	4,764
NonCore Industrial refinery	1,971	2,284	2,592	2,900	3,208	3,516	3,824	4,132	4,439	4,747	4,721
Total Cumulative Load	**17,383**	**20,136**	**22,860**	**25,574**	**28,288**	**31,002**	**33,717**	**36,431**	**39,145**	**41,859**	**41,630**
	6	7	8	9	10	11	12	13	14	15	16

Southern California Gas Company
2016 California Gas Report
Energy Efficiency Savings

	Forecast 2032	Forecast 2033	Forecast 2034	Forecast 2035	Forecast 2036	Forecast 2037	Forecast 2038	Forecast 2039	Forecast 2040
SoCalGas EE Program TOTAL PUC Goal Difference	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000	28,100,000

SoCalGas
Core Residential
Core Commercial
Core Industrial
NonCore Commercial
NonCore Industrial retail
NonCore Industrial refinery
Total

Proportionally scale it down or up to match PUC Goals for 2010 - 2014

ANNUAL NET SAVINGS	2032 Mdth	2033 Mdth	2034 Mdth	2035 Mdth	2036 Mdth	2037 Mdth	2038 Mdth	2039 Mdth	2040 Mdth
Core Residential	747	747	747	747	747	747	747	747	747
Core Commercial	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,013
Core Industrial	211	211	211	211	211	211	211	211	211
NonCore Commercial	199	199	199	199	199	199	199	199	199
NonCore Industrial retail	322	322	322	322	322	322	322	322	322
NonCore Industrial refinery	319	319	319	319	319	319	319	319	319
Total	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**	**2,810**

Cumulative Savings Mdth	2032 Mdth	2033 Mdth	2034 Mdth	2035 Mdth	2036 Mdth	2037 Mdth	2038 Mdth	2039 Mdth	2040 Mdth
Core Residential	11,405	11,371	11,304	11,238	11,224	11,214	11,211	11,211	11,211
Core Commercial	15,456	15,409	15,319	15,229	15,211	15,197	15,193	15,193	15,193
Core Industrial	3,218	3,208	3,189	3,170	3,167	3,164	3,163	3,163	3,163
NonCore Commercial	3,032	3,022	3,005	2,987	2,983	2,981	2,980	2,980	2,980
NonCore Industrial regular	4,907	4,892	4,863	4,834	4,829	4,824	4,823	4,823	4,823
NonCore Industrial refinery	4,863	4,848	4,820	4,791	4,786	4,781	4,780	4,780	4,780
Total Load Impacts	**42,880**	**42,750**	**42,500**	**42,250**	**42,200**	**42,160**	**42,150**	**42,150**	**42,150**

Cumulative Savings MMCF	2032 mmcf	2033 mmcf	2034 mmcf	2035 mmcf	2036 mmcf	2037 mmcf	2038 mmcf	2039 mmcf	2040 mmcf
Core Residential	11,016	10,983	10,919	10,855	10,842	10,831	10,829	10,829	10,829
Core Commercial	14,929	14,884	14,797	**14,710**	14,692	14,678	14,675	14,675	14,675
Core Industrial	3,108	3,098	3,080	3,062	3,059	3,056	3,055	3,055	3,055
NonCore Commercial	2,928	2,919	2,902	2,885	2,882	2,879	2,878	2,878	2,878

NonCore Industrial regular	4,739	4,725	4,697	4,670	4,664	4,660	4,659	4,659	4,659
NonCore Industrial refinery	4,697	4,683	4,655	4,628	4,623	4,618	4,617	4,617	4,617
Total Cumulative Load	**41,418**	**41,292**	**41,051**	**40,809**	**40,761**	**40,722**	**40,713**	**40,713**	**40,713**
	17	18	19	20	21	22	23	24	25

2016 CALIFORNIA GAS REPORT

EXCHANGE

2016 California Gas Report
Gas Exchange Demand Forecast

Overview

An interutility gas exchange agreement allows each utility to fulfill gas demand from gas provided by the other utility company. In the case of Pacific Gas and Electric Company (PG&E) and Southern California Gas Company (SCG) such an exchange agreement is contained in the Master Exchange Agreement (MEA).

Interutility Exchange Demand Forecasts

The exchange of gas between SCG and PG&E has been in practice since 1949. With the termination of the General Service Mutual Assistance Agreement between the two companies in May 5, 1988, the CPUC ordered the two companies to renegotiate a uniform procedure for exchanging gas. This instrument is now called the Master Exchange Agreement, which the CPUC approved on February 7, 1990.

The primary purpose of the MEA exchange forecast is to establish the net revenues/costs resulting from the services mutually provided by PG&E and SoCalGas. Monthly gas load under the MEA from 2012 to 2014 formed the forecasts for the exchange gas load. Exchange load is expected to remain stable as has been in the past years. Table 1 summarizes the forecast for SCG gas deliveries under the Master Exchange Agreement. Note the table shows unilateral flows and not the net transactions.

Southern California Gas Company
2016 California Gas Report
Exchange (Mdth)

SOURCE	RATE	YEAR	MDTH1	MDTH2	MDTH3	MDTH4	MDTH5	MDTH6	MDTH7	MDTH8	MDTH9	MDTH10	MDTH11	MDTH12	TOTAL
EXCH	G40	**2015**	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	**2015**	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2016	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2016	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2017	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2017	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2018	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2018	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2019	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2019	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2020	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2020	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2021	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2021	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2022	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2022	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2023	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2023	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2024	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2024	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2025	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2025	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2026	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2026	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2027	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2027	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2028	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2028	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2029	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2029	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2030	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2030	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2031	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2031	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2032	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2032	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2033	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2033	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00

EXCH	G40	2034	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2034	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00
EXCH	G40	2035	**0.37**	**0.00**	**2.02**	**0.27**	**0.00**	**0.00**	**0.00**	**0.50**	**0.20**	**0.14**	**0.01**	**1.49**	5.00
EXCH	G30	2035	**63.40**	**46.07**	**37.68**	**22.73**	**18.13**	**15.45**	**13.86**	**12.09**	**13.21**	**17.53**	**31.16**	**54.69**	346.00

2016 CALIFORNIA GAS REPORT

ENHANCED OIL RECOVERY-STEAM

Enhanced Oil Recovery - Steam

2016 CALIFORNIA GAS REPORT WORKPAPERS

Actuals were recorded for 1995 through 2015. Forecasted demand for 2016 to 2036 assumes that EOR is going to maintain at 2015 levels. Forecasted break out by service levels (Medium Pressure Distribution - MPD, High Pressure Distribution - HPD, and Transmission Level Service - TLS) was determined by using service level distributions from 2015 actuals.

Crude oil futures price appear to be flat for the next 8 years which is expected to result in California EOR operations staying steady going forward.

SoCalGas 2016 CGR Demand Forecast for EOR Market
2016 CGR Forecast Years = 2016 thru 2036

			Steaming		
		MPD	HPD	TLS	Total
Units	Year	0.5%	66.1%	33.5%	100.0%
Mdth/year	1995 actual	74	10,835	5,486	**16,395**
Mdth/year	1995 actual	62	9,015	4,564	**13,640**
Mdth/year	1996 actual	71	10,448	5,290	**15,810**
Mdth/year	1997 actual	52	7,576	3,835	**11,463**
Mdth/year	1999 actual	44	6,438	3,260	**9,742**
Mdth/year	2000 actual	60	8,805	4,458	**13,323**
Mdth/year	2001 actual	51	7,464	3,779	**11,294**
Mdth/year	2002 actual	68	9,974	5,049	**15,091**
Mdth/year	2003 actual	72	10,583	5,358	**16,013**
Mdth/year	2004 actual	60	8,794	4,452	**13,306**
Mdth/year	2005 actual	59	8,652	4,380	**13,091**
Mdth/year	2006 actual	67	9,799	4,961	**14,827**
Mdth/year	2007 actual	68	9,876	5,000	**14,943**
Mdth/year	2008 actual	68	9,959	5,042	**15,069**
Mdth/year	2009 actual	61	8,975	4,544	**13,580**
Mdth/year	2010 actual	48	7,032	3,560	**10,641**
Mdth/year	2011 actual	47	6,862	3,474	**10,382**
Mdth/year	2012 actual	52	7,674	3,885	**11,612**
Mdth/year	2013 actual	61	8,934	4,523	**13,518**
Mdth/year	2014 actual	76	11,176	5,658	**16,911**
Mdth/year	2015 actual	79	11,607	5,876	**17,562**
Mdth/year	2016 forecast	79	11,607	5,876	**17,562**
Mdth/year	2017 forecast	79	11,607	5,876	**17,562**
Mdth/year	2018 forecast	79	11,607	5,876	**17,562**
Mdth/year	2019 forecast	79	11,607	5,876	**17,562**
Mdth/year	2020 forecast	79	11,607	5,876	**17,562**
Mdth/year	2021 forecast	79	11,607	5,876	**17,562**
Mdth/year	2022 forecast	79	11,607	5,876	**17,562**
Mdth/year	2023 forecast	79	11,607	5,876	**17,562**
Mdth/year	2024 forecast	79	11,607	5,876	**17,562**
Mdth/year	2025 forecast	79	11,607	5,876	**17,562**
Mdth/year	2026 forecast	79	11,607	5,876	**17,562**
Mdth/year	2027 forecast	79	11,607	5,876	**17,562**
Mdth/year	2028 forecast	79	11,607	5,876	**17,562**
Mdth/year	2029 forecast	79	11,607	5,876	**17,562**
Mdth/year	2030 forecast	79	11,607	5,876	**17,562**
Mdth/year	2031 forecast	79	11,607	5,876	**17,562**
Mdth/year	2032 forecast	79	11,607	5,876	**17,562**
Mdth/year	2033 forecast	79	11,607	5,876	**17,562**
Mdth/year	2034 forecast	79	11,607	5,876	**17,562**
Mdth/year	2035 forecast	79	11,607	5,876	**17,562**
Mdth/year	2036 forecast	79	11,607	5,876	**17,562**

Enhanced Oil Recovery - Cogeneration

2016 CALIFORNIA GAS REPORT WORKPAPERS

Actuals were recorded for 1995 through 2015. Forecasted demand for 2016 to 2036 assumes that EOR is going to maintain at 2015 levels. Forecasted break out by service levels (Medium Pressure Distribution - MPD, High Pressure Distribution - HPD, and Transmission Level Service - TLS) was determined by using service level distributions from 2015 actuals.

In 2015, recorded gas deliveries to the EOR-related cogeneration market decreased by 37% from 2014 mainly due to changes in operations for some of the existing EOR-related cogeneration customers. EOR-related cogeneration demand is forecasted to remain steady going forward.

SoCalGas 2016 CGR Demand Forecast for EOR Market
2016 CGR Forecast Years = 2016 thru 2036

Units	Year	MPD 0.5%	Cogen HPD 66.1%	TLS 33.5%	Total 100.0%
Mdth/year	1995 actual	168	24,614	12,462	**37,244**
Mdth/year	1995 actual	210	30,782	15,584	**46,577**
Mdth/year	1996 actual	204	29,864	15,120	**45,188**
Mdth/year	1997 actual	190	27,763	14,056	**42,009**
Mdth/year	1999 actual	151	22,104	11,191	**33,446**
Mdth/year	2000 actual	126	18,476	9,354	**27,957**
Mdth/year	2001 actual	70	10,302	5,216	**15,588**
Mdth/year	2002 actual	111	16,213	8,208	**24,532**
Mdth/year	2003 actual	85	12,454	6,305	**18,844**
Mdth/year	2004 actual	71	10,456	5,294	**15,821**
Mdth/year	2005 actual	71	10,411	5,271	**15,753**
Mdth/year	2006 actual	82	11,933	6,041	**18,056**
Mdth/year	2007 actual	110	16,020	8,111	**24,240**
Mdth/year	2008 actual	100	14,573	7,378	**22,050**
Mdth/year	2009 actual	36	5,193	2,629	**7,857**
Mdth/year	2010 actual	21	3,023	1,531	**4,574**
Mdth/year	2011 actual	19	2,762	1,398	**4,179**
Mdth/year	2012 actual	37	5,398	2,733	**8,168**
Mdth/year	2013 actual	40	5,867	2,970	**8,877**
Mdth/year	2014 actual	28	4,128	2,090	**6,246**
Mdth/year	2015 actual	18	2,582	1,307	**3,907**
Mdth/year	2016 forecast	18	2,582	1,307	**3,907**
Mdth/year	2017 forecast	18	2,582	1,307	**3,907**
Mdth/year	2018 forecast	18	2,582	1,307	**3,907**
Mdth/year	2019 forecast	18	2,582	1,307	**3,907**
Mdth/year	2020 forecast	18	2,582	1,307	**3,907**
Mdth/year	2021 forecast	18	2,582	1,307	**3,907**
Mdth/year	2022 forecast	18	2,582	1,307	**3,907**
Mdth/year	2023 forecast	18	2,582	1,307	**3,907**
Mdth/year	2024 forecast	18	2,582	1,307	**3,907**
Mdth/year	2025 forecast	18	2,582	1,307	**3,907**
Mdth/year	2026 forecast	18	2,582	1,307	**3,907**
Mdth/year	2027 forecast	18	2,582	1,307	**3,907**
Mdth/year	2028 forecast	18	2,582	1,307	**3,907**
Mdth/year	2029 forecast	18	2,582	1,307	**3,907**
Mdth/year	2030 forecast	18	2,582	1,307	**3,907**
Mdth/year	2031 forecast	18	2,582	1,307	**3,907**
Mdth/year	2032 forecast	18	2,582	1,307	**3,907**
Mdth/year	2033 forecast	18	2,582	1,307	**3,907**
Mdth/year	2034 forecast	18	2,582	1,307	**3,907**
Mdth/year	2035 forecast	18	2,582	1,307	**3,907**
Mdth/year	2036 forecast	18	2,582	1,307	**3,907**

2016 CALIFORNIA GAS REPORT

REFINERIES

Refinery Non-Cogeneration and Cogeneration Gas Demand

INTRODUCTION

Gas demand for refineries is developed from a base econometric forecast for both non-cogeneration (rate class G-30) load and cogeneration (rate class G-50) load. The separation into G-30 and G-50 categories is based on the historical 2014 and 2015 average monthly proportions of each rate class.

For the non-cogeneration load component, there is an "out-of-model" adjustment to reflect expected additional gas load from installation of new equipment for this customer segment.

BASE FORECAST EQUATION

The base econometric forecast is generated from an equation that uses the natural logarithm of average daily monthly refinery gas consumption as the dependent variable. The key explanatory variable is the natural logarithm of the monthly ratio of 2-month average burner-tip natural gas rates (e.g., transportation rate + commodity price + GHG price adder) relative to the 2-month average of propane prices. The second component of the forecast equation is a constant term.

The base forecast equation is shown below:

LN(Ref_MDth/d) = 5.64341 + (-0.09689) LN(G/P)

where

G = Average of current month's and prior month's burner-tip gas price, and
P = Average of current month's and prior month's propane price.

The parameters of this equation were estimated from monthly data for Feb-1997 through Dec-2015.

EXAMPLE OF FORECAST CALCULATIONS

The refinery gas demand in a particular month is calculated as:

Ref_MDth/mo = (#days in month) x EXP[LN(Ref_MDth/d)].

For example, the calculation of total refinery gas demand for August 2016 is as follows:

LN[Ref_MDth/d] = 5.64341 + (-0.09689) x LN[((3.329+3.413)/2)/((6.435+6.347)/2)]
LN[Ref_MDth/d] = 5.70539

Ref_MDth = (31 days) x (EXP[5.70539])
= (31 days) x (300.483 MDth/d)
= (9,315.0 MDth)

This total refinery gas demand was "split" between G-30 and G-50 load using the 2014 and 2015 average monthly proportions that the G-30 load represented relative to the total refinery load. The table below provides these proportions.

Month	2014 &2015 Avg G-30 % of total Refinery
Jan	78.20%
Feb	79.37%
Mar	79.17%
Apr	79.70%
May	78.77%
Jun	78.09%
Jul	78.36%
Aug	78.38%
Sep	79.77%
Oct	79.38%
Nov	80.63%
Dec	81.11%

Based on the August 2015 example above, the total refinery gas demand is split into G-30 and G-50 values:

Ref_G-30 = (7,301.1 MDth) = (9,315.0 MDth) x (78.38%), and
Ref_G-50 = (2,013.9 MDth) = (9,315.0 MDth) x (21.62%).

The table below shows the entire base refinery gas demand forecast and the split into G-30 and G-50 rate class component loads.

Base Forecast of Refinery Gas Demand (2014-2035)

Month	Ref G30 %	#Days per month	Month #	Total Ref Mdth	Total Ref Mdth/Day	Ln(Mdth_D)	ln(G/P): Moving 2-Mo Avg	Burner_tip_Gas (G) $/dth	Propane (P) $/dth
Jan-14	78.20%	31	1	10,371.0	334.5	5.8128	-1.0625	5.7488	18.6985
Feb-14	79.37%	28	2	7,731.6	276.1	5.6209	-1.0236	7.7391	18.8409
Mar-14	79.17%	31	3	8,287.5	267.3	5.5885	-0.8583	6.1166	13.8482
Apr-14	79.70%	30	4	9,572.4	319.1	5.7654	-0.8157	5.7615	13.0051
May-14	78.77%	31	5	9,654.6	311.4	5.7412	-0.8035	5.5716	12.3044
Jun-14	78.09%	30	6	9,241.0	308.0	5.7302	-0.7669	5.8429	12.2715
Jul-14	78.36%	31	7	9,030.1	291.3	5.6743	-0.7886	5.4155	12.5014
Aug-14	78.38%	31	8	8,842.5	285.2	5.6533	-0.8442	5.2394	12.2825
Sep-14	79.77%	30	9	9,119.7	304.0	5.7170	-0.8789	5.1518	12.7423
Oct-14	79.38%	31	10	8,992.8	290.1	5.6702	-0.9088	4.8847	12.1620
Nov-14	80.63%	30	11	8,480.4	282.7	5.6443	-0.8395	5.2523	11.3080
Dec-14	81.11%	31	12	10,049.8	324.2	5.7813	-0.7630	4.5427	9.6985
Jan-15	78.20%	31	1	10,197.1	328.9	5.7959	-0.7459	4.1289	8.5834
Feb-15	79.37%	28	2	8,952.9	319.7	5.7675	-0.7967	3.7829	8.9666
Mar-15	79.17%	31	3	9,846.1	317.6	5.7608	-0.8340	3.7252	8.3207
Apr-15	79.70%	30	4	9,708.2	323.6	5.7795	-0.7372	3.5924	6.9739
May-15	78.77%	31	5	8,732.1	281.7	5.6408	-0.5501	3.8792	5.9776
Jun-15	78.09%	30	6	8,204.0	273.5	5.6112	-0.3618	3.9053	5.2002
Jul-15	78.36%	31	7	9,159.5	295.5	5.6886	-0.2665	4.0702	5.2112
Aug-15	78.38%	31	8	8,929.9	288.1	5.6632	-0.2487	4.0316	5.1783
Sep-15	79.77%	30	9	9,178.1	305.9	5.7234	-0.3395	3.8664	5.9119
Oct-15	79.38%	31	10	8,986.0	289.9	5.6694	-0.5131	3.5723	6.5141
Nov-15	80.63%	30	11	8,595.9	286.5	5.6578	-0.6133	3.3708	6.3061
Dec-15	81.11%	31	12	9,805.5	316.3	5.7567	-0.6153	3.4102	6.2404
Jan-16	78.20%	31	1	9,502.6	306.5	5.7253	-0.8455	3.4620	9.7652
Feb-16	79.37%	29	2	9,130.7	314.9	5.7521	-1.1218	2.9588	9.9481
Mar-16	79.17%	31	3	9,813.5	316.6	5.7575	-1.1777	2.5645	7.9856
Apr-16	79.70%	30	4	9,356.7	311.9	5.7426	-1.0241	2.8972	7.2234
May-16	78.77%	31	5	9,522.6	307.2	5.7274	-0.8671	2.9245	6.6328
Jun-16	78.09%	30	6	9,131.9	304.4	5.7183	-0.7732	3.0681	6.3508
Jul-16	78.36%	31	7	9,362.8	302.0	5.7105	-0.6925	3.3286	6.4346
Aug-16	78.38%	31	8	9,315.1	300.5	5.7054	-0.6397	3.4128	6.3470
Sep-16	79.77%	30	9	9,026.4	300.9	5.7067	-0.6532	3.4088	6.7623
Oct-16	79.38%	31	10	9,356.6	301.8	5.7099	-0.6856	3.4083	6.7700
Nov-16	80.63%	30	11	9,009.0	300.3	5.7048	-0.6333	3.5827	6.4003
Dec-16	81.11%	31	12	9,149.8	295.2	5.6875	-0.4550	4.1690	5.8173
Jan-17	78.20%	31	1	9,385.4	302.8	5.7129	-0.7174	3.6680	10.2410
Feb-17	79.37%	28	2	8,716.4	311.3	5.7408	-1.0046	3.9026	10.4332
Mar-17	79.17%	31	3	9,569.1	308.7	5.7323	-0.9175	3.6106	8.3716
Apr-17	79.70%	30	4	9,174.7	305.8	5.7230	-0.8214	3.4013	7.5710
May-17	78.77%	31	5	9,416.7	303.8	5.7163	-0.7517	3.4464	6.9506
Jun-17	78.09%	30	6	9,033.6	301.1	5.7075	-0.6614	3.5751	6.6544
Jul-17	78.36%	31	7	9,284.1	299.5	5.7021	-0.6053	3.7383	6.7424
Aug-17	78.38%	31	8	9,264.6	298.9	5.7000	-0.5837	3.7327	6.6504
Sep-17	79.77%	30	9	8,995.3	299.8	5.7033	-0.6176	3.6748	7.0867
Oct-17	79.38%	31	10	9,337.3	301.2	5.7078	-0.6644	3.6229	7.0947
Nov-17	80.63%	30	11	9,003.7	300.1	5.7042	-0.6272	3.7480	6.7064
Dec-17	81.11%	31	12	9,189.7	296.4	5.6918	-0.4998	4.0171	6.0939
Jan-18	78.20%	31	1	9,411.2	303.6	5.7157	-0.7456	3.9134	10.6220
Feb-18	79.37%	28	2	8,695.4	310.6	5.7383	-0.9797	4.1366	10.8214
Mar-18	79.17%	31	3	9,549.9	308.1	5.7303	-0.8966	3.8196	8.6822
Apr-18	79.70%	30	4	9,167.8	305.6	5.7223	-0.8137	3.5082	7.8514
May-18	78.77%	31	5	9,423.7	304.0	5.7170	-0.7594	3.5387	7.2075
Jun-18	78.09%	30	6	9,043.7	301.5	5.7086	-0.6730	3.6588	6.9002
Jul-18	78.36%	31	7	9,297.1	299.9	5.7035	-0.6198	3.8160	6.9915
Aug-18	78.38%	31	8	9,278.7	299.3	5.7015	-0.5993	3.8109	6.8960
Sep-18	79.77%	30	9	9,008.9	300.3	5.7048	-0.6333	3.7511	7.3488
Oct-18	79.38%	31	10	9,351.3	301.7	5.7093	-0.6798	3.7004	7.3571
Nov-18	80.63%	30	11	9,016.8	300.6	5.7056	-0.6423	3.8287	6.9542
Dec-18	81.11%	31	12	9,203.6	296.9	5.6934	-0.5155	4.0981	6.3186

Base Forecast of Refinery Gas Demand (2014-2035)

Month	Ref G30 %	#Days per month	Month #	Total Ref Mdth	Total Ref Mdth/Day	Ln(Mdth_D)	ln(G/P): Moving 2-Mo Avg	Burner_tip_Gas (G) $/dth	Propane (P) $/dth
Jan-19	78.20%	31	1	9,407.7	303.5	5.7153	-0.7419	4.1655	11.0336
Feb-19	79.37%	28	2	8,676.0	309.9	5.7361	-0.9567	4.3913	11.2406
Mar-19	79.17%	31	3	9,527.6	307.3	5.7280	-0.8726	4.0749	9.0194
Apr-19	79.70%	30	4	9,141.4	304.7	5.7194	-0.7840	3.7677	8.1568
May-19	78.77%	31	5	9,393.8	303.0	5.7138	-0.7266	3.7974	7.4883
Jun-19	78.09%	30	6	9,016.3	300.5	5.7056	-0.6417	3.9183	7.1691
Jul-19	78.36%	31	7	9,271.2	299.1	5.7007	-0.5910	4.0745	7.2640
Aug-19	78.38%	31	8	9,253.3	298.5	5.6987	-0.5711	4.0766	7.1648
Sep-19	79.77%	30	9	8,982.8	299.4	5.7019	-0.6032	4.0196	7.6349
Oct-19	79.38%	31	10	9,322.3	300.7	5.7062	-0.6478	3.9743	7.6435
Nov-19	80.63%	30	11	8,988.8	299.6	5.7025	-0.6102	4.1032	7.2252
Dec-19	81.11%	31	12	9,177.2	296.0	5.6905	-0.4858	4.3806	6.5653
Jan-20	78.20%	31	1	9,391.8	303.0	5.7136	-0.7244	4.3507	11.4518
Feb-20	79.37%	29	2	8,981.3	309.7	5.7356	-0.9514	4.5768	11.6655
Mar-20	79.17%	31	3	9,523.1	307.2	5.7275	-0.8677	4.2579	9.3729
Apr-20	79.70%	30	4	9,134.5	304.5	5.7186	-0.7761	3.9592	8.4825
May-20	78.77%	31	5	9,384.9	302.7	5.7129	-0.7168	3.9883	7.7925
Jun-20	78.09%	30	6	9,009.2	300.3	5.7048	-0.6335	4.1082	7.4631
Jul-20	78.36%	31	7	9,265.5	298.9	5.7001	-0.5847	4.2644	7.5610
Aug-20	78.38%	31	8	9,247.9	298.3	5.6982	-0.5650	4.2720	7.4586
Sep-20	79.77%	30	9	8,976.4	299.2	5.7012	-0.5959	4.2158	7.9439
Oct-20	79.38%	31	10	9,314.6	300.5	5.7053	-0.6392	4.1732	7.9528
Nov-20	80.63%	30	11	8,981.5	299.4	5.7017	-0.6018	4.3040	7.5210
Dec-20	81.11%	31	12	9,170.7	295.8	5.6898	-0.4785	4.5957	6.8398
Jan-21	78.20%	31	1	9,372.8	302.3	5.7116	-0.7035	4.7172	11.9797
Feb-21	79.37%	28	2	8,638.2	308.5	5.7318	-0.9117	4.9998	12.2006
Mar-21	79.17%	31	3	9,486.4	306.0	5.7236	-0.8279	4.6271	9.8300
Apr-21	79.70%	30	4	9,097.8	303.3	5.7146	-0.7346	4.3620	8.9093
May-21	78.77%	31	5	9,339.3	301.3	5.7080	-0.6665	4.4216	8.1958
Jun-21	78.09%	30	6	8,962.6	298.8	5.6996	-0.5801	4.5645	7.8552
Jul-21	78.36%	31	7	9,216.2	297.3	5.6947	-0.5296	4.7461	7.9564
Aug-21	78.38%	31	8	9,194.9	296.6	5.6924	-0.5057	4.7865	7.8505
Sep-21	79.77%	30	9	8,917.9	297.3	5.6946	-0.5284	4.7657	8.3523
Oct-21	79.38%	31	10	9,246.5	298.3	5.6980	-0.5635	4.7485	8.3615
Nov-21	80.63%	30	11	8,885.5	296.2	5.6910	-0.4909	5.2143	7.9150
Dec-21	81.11%	31	12	9,046.1	291.8	5.6761	-0.3373	5.5810	7.2107
Jan-22	78.20%	31	1	9,255.2	298.6	5.6990	-0.5732	5.5850	12.5964
Feb-22	79.37%	28	2	8,542.1	305.1	5.7206	-0.7961	5.8821	12.8246
Mar-22	79.17%	31	3	9,410.5	303.6	5.7156	-0.7449	5.1330	10.3758
Apr-22	79.70%	30	4	9,045.6	301.5	5.7088	-0.6752	4.9465	9.4249
May-22	78.77%	31	5	9,277.4	299.3	5.7013	-0.5979	5.0152	8.6878
Jun-22	78.09%	30	6	8,906.5	296.9	5.6933	-0.5153	5.1538	8.3360
Jul-22	78.36%	31	7	9,163.4	295.6	5.6890	-0.4703	5.3283	8.4406
Aug-22	78.38%	31	8	9,144.6	295.0	5.6869	-0.4491	5.3758	8.3312
Sep-22	79.77%	30	9	8,868.3	295.6	5.6890	-0.4709	5.3528	8.8495
Oct-22	79.38%	31	10	9,194.9	296.6	5.6924	-0.5057	5.3265	8.8590
Nov-22	80.63%	30	11	8,823.9	294.1	5.6840	-0.4190	6.0232	8.3978
Dec-22	81.11%	31	12	8,974.3	289.5	5.6681	-0.2551	6.4267	7.6703
Jan-23	78.20%	31	1	9,183.3	296.2	5.6912	-0.4927	6.3773	13.2868
Feb-23	79.37%	28	2	8,481.1	302.9	5.7134	-0.7222	6.6438	13.5233
Mar-23	79.17%	31	3	9,367.3	302.2	5.7110	-0.6974	5.5590	10.9866
Apr-23	79.70%	30	4	9,023.5	300.8	5.7064	-0.6500	5.3982	10.0015
May-23	78.77%	31	5	9,254.9	298.5	5.6989	-0.5729	5.4513	9.2381
Jun-23	78.09%	30	6	8,891.2	296.4	5.6916	-0.4975	5.5613	8.8736
Jul-23	78.36%	31	7	9,153.5	295.3	5.6879	-0.4592	5.7200	8.9820
Aug-23	78.38%	31	8	9,139.4	294.8	5.6864	-0.4432	5.7395	8.8687
Sep-23	79.77%	30	9	8,867.8	295.6	5.6890	-0.4703	5.6789	9.4056
Oct-23	79.38%	31	10	9,198.4	296.7	5.6928	-0.5097	5.6266	9.4154
Nov-23	80.63%	30	11	8,831.8	294.4	5.6849	-0.4283	6.3325	8.9376
Dec-23	81.11%	31	12	8,978.5	289.6	5.6686	-0.2599	6.8701	8.1840

Base Forecast of Refinery Gas Demand (2014-2035)

Month	Ref G30 %	#Days per month	Month #	Total Ref Mdth	Total Ref Mdth/Day	Ln(Mdth_D)	ln(G/P): Moving 2-Mo Avg	Burner_tip_Gas (G) $/dth	Propane (P) $/dth
Jan-24	78.20%	31	1	9,182.2	296.2	5.6910	-0.4915	6.6930	13.9880
Feb-24	79.37%	29	2	8,787.3	303.0	5.7138	-0.7260	6.9605	14.2323
Mar-24	79.17%	31	3	9,367.9	302.2	5.7111	-0.6981	5.8971	11.6106
Apr-24	79.70%	30	4	9,017.3	300.6	5.7057	-0.6429	5.7767	10.5925
May-24	78.77%	31	5	9,246.8	298.3	5.6980	-0.5638	5.8297	9.8035
Jun-24	78.09%	30	6	8,885.5	296.2	5.6910	-0.4909	5.9408	9.4268
Jul-24	78.36%	31	7	9,146.9	295.1	5.6872	-0.4517	6.1312	9.5387
Aug-24	78.38%	31	8	9,130.8	294.5	5.6854	-0.4335	6.1594	9.4217
Sep-24	79.77%	30	9	8,859.6	295.3	5.6881	-0.4608	6.0767	9.9765
Oct-24	79.38%	31	10	9,190.1	296.5	5.6919	-0.5003	6.0278	9.9867
Nov-24	80.63%	30	11	8,821.5	294.1	5.6838	-0.4163	6.8185	9.4929
Dec-24	81.11%	31	12	8,965.9	289.2	5.6672	-0.2454	7.4259	8.7141
Jan-25	78.20%	31	1	9,166.9	295.7	5.6894	-0.4743	7.0906	14.6122
Feb-25	79.37%	28	2	8,473.5	302.6	5.7125	-0.7129	7.3597	14.8645
Mar-25	79.17%	31	3	9,355.1	301.8	5.7097	-0.6840	6.2757	12.1574
Apr-25	79.70%	30	4	9,004.3	300.1	5.7043	-0.6279	6.1398	11.1061
May-25	78.77%	31	5	9,235.3	297.9	5.6968	-0.5509	6.1938	10.2914
Jun-25	78.09%	30	6	8,875.8	295.9	5.6899	-0.4796	6.3062	9.9024
Jul-25	78.36%	31	7	9,137.3	294.8	5.6861	-0.4409	6.5122	10.0180
Aug-25	78.38%	31	8	9,121.4	294.2	5.6844	-0.4229	6.5350	9.8971
Sep-25	79.77%	30	9	8,851.0	295.0	5.6871	-0.4507	6.4422	10.4701
Oct-25	79.38%	31	10	9,180.9	296.2	5.6909	-0.4900	6.3924	10.4806
Nov-25	80.63%	30	11	8,808.7	293.6	5.6823	-0.4013	7.2989	9.9707
Dec-25	81.11%	31	12	8,932.6	288.1	5.6635	-0.2070	8.2602	9.1665
Jan-26	78.20%	31	1	9,126.8	294.4	5.6850	-0.4289	7.6625	15.2850
Feb-26	79.37%	28	2	8,447.7	301.7	5.7094	-0.6815	7.9342	15.5461
Mar-26	79.17%	31	3	9,329.9	301.0	5.7070	-0.6561	6.7452	12.7449
Apr-26	79.70%	30	4	8,983.4	299.4	5.7019	-0.6040	6.5933	11.6570
May-26	78.77%	31	5	9,215.5	297.3	5.6947	-0.5288	6.6490	10.8139
Jun-26	78.09%	30	6	8,858.1	295.3	5.6879	-0.4590	6.7633	10.4114
Jul-26	78.36%	31	7	9,121.4	294.2	5.6844	-0.4229	6.9574	10.5310
Aug-26	78.38%	31	8	9,106.9	293.8	5.6828	-0.4065	6.9863	10.4059
Sep-26	79.77%	30	9	8,835.3	294.5	5.6853	-0.4324	6.9038	10.9988
Oct-26	79.38%	31	10	9,162.8	295.6	5.6889	-0.4696	6.8565	11.0097
Nov-26	80.63%	30	11	8,795.2	293.2	5.6808	-0.3855	7.7610	10.4821
Dec-26	81.11%	31	12	8,939.1	288.4	5.6642	-0.2146	8.4835	9.6499
Jan-27	78.20%	31	1	9,140.8	294.9	5.6865	-0.4449	7.9233	15.9492
Feb-27	79.37%	28	2	8,455.5	302.0	5.7104	-0.6910	8.1958	16.2187
Mar-27	79.17%	31	3	9,338.6	301.2	5.7079	-0.6658	6.9870	13.3273
Apr-27	79.70%	30	4	8,992.0	299.7	5.7029	-0.6138	6.8326	12.2045
May-27	78.77%	31	5	9,225.2	297.6	5.6957	-0.5397	6.8887	11.3343
Jun-27	78.09%	30	6	8,868.5	295.6	5.6891	-0.4712	7.0035	10.9188
Jul-27	78.36%	31	7	9,132.9	294.6	5.6856	-0.4358	7.1993	11.0423
Aug-27	78.38%	31	8	9,118.7	294.2	5.6841	-0.4198	7.2291	10.9132
Sep-27	79.77%	30	9	8,846.3	294.9	5.6866	-0.4453	7.1460	11.5251
Oct-27	79.38%	31	10	9,173.6	295.9	5.6901	-0.4817	7.0993	11.5364
Nov-27	80.63%	30	11	8,806.5	293.5	5.6820	-0.3987	8.0220	10.9918
Dec-27	81.11%	31	12	8,952.4	288.8	5.6657	-0.2299	8.7640	10.1328
Jan-28	78.20%	31	1	9,150.4	295.2	5.6876	-0.4556	8.2030	16.6265
Feb-28	79.37%	29	2	8,763.7	302.2	5.7111	-0.6983	8.4764	16.9045
Mar-28	79.17%	31	3	9,345.5	301.5	5.7087	-0.6733	7.2452	13.9220
Apr-28	79.70%	30	4	8,998.7	300.0	5.7036	-0.6215	7.0883	12.7637
May-28	78.77%	31	5	9,233.0	297.8	5.6966	-0.5484	7.1447	11.8660
Jun-28	78.09%	30	6	8,877.0	295.9	5.6900	-0.4810	7.2600	11.4375
Jul-28	78.36%	31	7	9,142.3	294.9	5.6867	-0.4465	7.4577	11.5649
Aug-28	78.38%	31	8	9,128.5	294.5	5.6852	-0.4309	7.4886	11.4317
Sep-28	79.77%	30	9	8,855.4	295.2	5.6876	-0.4558	7.4049	12.0630
Oct-28	79.38%	31	10	9,182.3	296.2	5.6910	-0.4916	7.3587	12.0745
Nov-28	80.63%	30	11	8,815.8	293.9	5.6831	-0.4096	8.3018	11.5128
Dec-28	81.11%	31	12	8,964.2	289.2	5.6670	-0.2435	9.0526	10.6267

Base Forecast of Refinery Gas Demand (2014-2035)

Month	Ref G30 %	#Days per month	Month #	Total Ref Mdth	Total Ref Mdth/Day	Ln(Mdth_D)	ln(G/P): Moving 2-Mo Avg	Burner_tip_Gas (G) $/dth	Propane (P) $/dth
Jan-29	78.20%	31	1	9,154.2	295.3	5.6880	-0.4600	8.6073	17.3469
Feb-29	79.37%	28	2	8,457.3	302.0	5.7106	-0.6932	8.8822	17.6341
Mar-29	79.17%	31	3	9,341.3	301.3	5.7082	-0.6688	7.6084	14.5529
Apr-29	79.70%	30	4	8,995.0	299.8	5.7032	-0.6173	7.4464	13.3564
May-29	78.77%	31	5	9,230.0	297.7	5.6962	-0.5451	7.5037	12.4290
Jun-29	78.09%	30	6	8,875.2	295.8	5.6898	-0.4789	7.6202	11.9863
Jul-29	78.36%	31	7	9,141.3	294.9	5.6866	-0.4453	7.8213	12.1179
Aug-29	78.38%	31	8	9,127.7	294.4	5.6851	-0.4300	7.8543	11.9803
Sep-29	79.77%	30	9	8,854.2	295.1	5.6875	-0.4545	7.7692	12.6324
Oct-29	79.38%	31	10	9,180.4	296.1	5.6908	-0.4895	7.7242	12.6444
Nov-29	80.63%	30	11	8,814.4	293.8	5.6829	-0.4080	8.7064	12.0641
Dec-29	81.11%	31	12	8,965.6	289.2	5.6672	-0.2451	9.4610	11.1487
Jan-30	78.20%	31	1	9,154.1	295.3	5.6880	-0.4598	8.9973	18.0861
Feb-30	79.37%	28	2	8,455.6	302.0	5.7104	-0.6911	9.2737	18.3827
Mar-30	79.17%	31	3	9,339.8	301.3	5.7081	-0.6671	7.9605	15.2010
Apr-30	79.70%	30	4	8,993.8	299.8	5.7031	-0.6159	7.7940	13.9655
May-30	78.77%	31	5	9,229.6	297.7	5.6962	-0.5446	7.8520	13.0079
Jun-30	78.09%	30	6	8,875.8	295.9	5.6899	-0.4796	7.9696	12.5507
Jul-30	78.36%	31	7	9,142.6	294.9	5.6867	-0.4468	8.1738	12.6866
Aug-30	78.38%	31	8	9,129.3	294.5	5.6853	-0.4319	8.2087	12.5445
Sep-30	79.77%	30	9	8,855.4	295.2	5.6876	-0.4558	8.1224	13.2179
Oct-30	79.38%	31	10	9,181.0	296.2	5.6909	-0.4901	8.0784	13.2303
Nov-30	80.63%	30	11	8,815.5	293.9	5.6831	-0.4093	9.0966	12.6310
Dec-30	81.11%	31	12	8,968.4	289.3	5.6675	-0.2483	9.8736	11.6858
Jan-31	78.20%	31	1	9,160.9	295.5	5.6887	-0.4675	9.2915	18.9019
Feb-31	79.37%	28	2	8,465.7	302.3	5.7116	-0.7034	9.5687	19.2091
Mar-31	79.17%	31	3	9,351.0	301.6	5.7093	-0.6795	8.2338	15.9128
Apr-31	79.70%	30	4	9,004.5	300.1	5.7043	-0.6281	8.0647	14.6326
May-31	78.77%	31	5	9,241.3	298.1	5.6974	-0.5577	8.1230	13.6405
Jun-31	78.09%	30	6	8,887.8	296.3	5.6912	-0.4936	8.2412	13.1669
Jul-31	78.36%	31	7	9,155.6	295.3	5.6881	-0.4615	8.4472	13.3077
Aug-31	78.38%	31	8	9,142.6	294.9	5.6867	-0.4468	8.4832	13.1605
Sep-31	79.77%	30	9	8,867.9	295.6	5.6890	-0.4704	8.3963	13.8582
Oct-31	79.38%	31	10	9,193.5	296.6	5.6923	-0.5041	8.3529	13.8710
Nov-31	80.63%	30	11	8,828.3	294.3	5.6845	-0.4243	9.3909	13.2501
Dec-31	81.11%	31	12	8,983.3	289.8	5.6691	-0.2654	10.1804	12.2708
Jan-32	78.20%	31	1	9,170.0	295.8	5.6897	-0.4778	9.6926	19.7745
Feb-32	79.37%	29	2	8,770.9	302.4	5.7119	-0.7068	9.9713	20.0933
Mar-32	79.17%	31	3	9,354.3	301.8	5.7096	-0.6831	8.5980	16.6722
Apr-32	79.70%	30	4	9,007.6	300.3	5.7046	-0.6317	8.4243	15.3436
May-32	78.77%	31	5	9,245.1	298.2	5.6979	-0.5619	8.4835	14.3140
Jun-32	78.09%	30	6	8,892.3	296.4	5.6917	-0.4988	8.6026	13.8224
Jul-32	78.36%	31	7	9,160.8	295.5	5.6887	-0.4674	8.8117	13.9686
Aug-32	78.38%	31	8	9,148.1	295.1	5.6873	-0.4531	8.8496	13.8158
Sep-32	79.77%	30	9	8,873.0	295.8	5.6896	-0.4763	8.7615	14.5399
Oct-32	79.38%	31	10	9,198.2	296.7	5.6928	-0.5094	8.7191	14.5531
Nov-32	80.63%	30	11	8,833.4	294.4	5.6851	-0.4302	9.7923	13.9088
Dec-32	81.11%	31	12	8,990.0	290.0	5.6699	-0.2731	10.6036	12.8924
Jan-33	78.20%	31	1	9,177.5	296.0	5.6905	-0.4862	10.0198	20.6437
Feb-33	79.37%	28	2	8,476.8	302.7	5.7129	-0.7170	10.2994	20.9739
Mar-33	79.17%	31	3	9,363.5	302.0	5.7106	-0.6932	8.9015	17.4312
Apr-33	79.70%	30	4	9,016.3	300.5	5.7056	-0.6417	8.7250	16.0554
May-33	78.77%	31	5	9,254.8	298.5	5.6989	-0.5727	8.7845	14.9892
Jun-33	78.09%	30	6	8,902.3	296.7	5.6929	-0.5104	8.9043	14.4801
Jul-33	78.36%	31	7	9,171.7	295.9	5.6899	-0.4797	9.1154	14.6315
Aug-33	78.38%	31	8	9,159.3	295.5	5.6885	-0.4656	9.1545	14.4733
Sep-33	79.77%	30	9	8,883.5	296.1	5.6907	-0.4885	9.0657	15.2231
Oct-33	79.38%	31	10	9,208.6	297.1	5.6939	-0.5211	9.0239	15.2368
Nov-33	80.63%	30	11	8,844.2	294.8	5.6863	-0.4428	10.1197	14.5696
Dec-33	81.11%	31	12	9,002.5	290.4	5.6713	-0.2875	10.9491	13.5171

Base Forecast of Refinery Gas Demand (2014-2035)

Month	Ref G30 %	#Days per month	Month #	Total Ref Mdth	Total Ref Mdth/Day	Ln(Mdth_D)	ln(G/P): Moving 2-Mo Avg	Burner_tip_Gas (G) $/dth	Propane (P) $/dth
Jan-34	78.20%	31	1	9,186.4	296.3	5.6915	-0.4962	10.4029	21.5532
Feb-34	79.37%	28	2	8,481.7	302.9	5.7135	-0.7229	10.6837	21.8953
Mar-34	79.17%	31	3	9,369.0	302.2	5.7112	-0.6993	9.2529	18.2248
Apr-34	79.70%	30	4	9,021.6	300.7	5.7062	-0.6478	9.0724	16.7994
May-34	78.77%	31	5	9,260.7	298.7	5.6996	-0.5794	9.1325	15.6946
Jun-34	78.09%	30	6	8,908.8	297.0	5.6936	-0.5179	9.2532	15.1672
Jul-34	78.36%	31	7	9,179.0	296.1	5.6907	-0.4878	9.4671	15.3240
Aug-34	78.38%	31	8	9,166.8	295.7	5.6894	-0.4741	9.5077	15.1601
Sep-34	79.77%	30	9	8,890.4	296.3	5.6915	-0.4966	9.4180	15.9370
Oct-34	79.38%	31	10	9,215.3	297.3	5.6946	-0.5286	9.3771	15.9512
Nov-34	80.63%	30	11	8,851.3	295.0	5.6871	-0.4511	10.5029	15.2599
Dec-34	81.11%	31	12	9,013.3	290.8	5.6725	-0.2998	11.3022	14.1694
Jan-35	78.20%	31	1	9,197.1	296.7	5.6927	-0.5081	10.7540	22.4922
Feb-35	79.37%	28	2	8,489.8	303.2	5.7144	-0.7327	11.0358	22.8466
Mar-35	79.17%	31	3	9,377.9	302.5	5.7121	-0.7091	9.5785	19.0442
Apr-35	79.70%	30	4	9,030.0	301.0	5.7071	-0.6573	9.3949	17.5676
May-35	78.77%	31	5	9,269.9	299.0	5.7005	-0.5896	9.4554	16.4232
Jun-35	78.09%	30	6	8,918.3	297.3	5.6947	-0.5289	9.5768	15.8768
Jul-35	78.36%	31	7	9,189.3	296.4	5.6918	-0.4994	9.7928	16.0393
Aug-35	78.38%	31	8	9,177.3	296.0	5.6905	-0.4859	9.8348	15.8695
Sep-35	79.77%	30	9	8,900.4	296.7	5.6927	-0.5081	9.7443	16.6742
Oct-35	79.38%	31	10	9,225.2	297.6	5.6957	-0.5397	9.7041	16.6890
Nov-35	80.63%	30	11	8,861.5	295.4	5.6883	-0.4629	10.8542	15.9728
Dec-35	81.11%	31	12	9,025.2	291.1	5.6738	-0.3135	11.6687	14.8432

ADJUSTMENTS TO THE BASE FORECAST

A. Energy Efficiency/DSM Program Savings

Adjustments for energy efficiency/DSM (EE/DSM) programs for refinery customers are applied to the G-30 load portion of the refinery gas demand. The cogeneration (G-50) load is exempt from participating in these programs. The values applied to the refinery G-30 load have been noted in the earlier discussion of the overall G-30 load forecast.

B. Refinery Industrial G-30 Gas Demand

The noncore industrial refinery gas demand receives G-30 rate treatment. It is basically the non-cogeneration gas load at refinery facilities served by SoCalGas. The details of how the gas demand forecast for total gas demand at refineries is provided above as the Base forecast of refinery gas demand. In this part of the noncore C&I only the refinery load billed at G-30 rates is discussed.

Continuing with the August 2016 month as an example and using the data from the following two tables, the G-30 industrial refinery demand was projected to be:

G-30 Refinery Gas Demand, Aug-2016 = (7,301) – (29) = (7,272 MDth).

The reduction of 29 MDth is the accumulated EE/DSM program impact for refineries.

C. Refinery Cogeneration Gas Demand

Gas used for cogeneration at refineries receives G-50 rate treatment. The base gas demand forecasted for cogeneration is adjusted as described in “C.” above. Using August 2015 as an example:

G-50 Refinery Gas Demand, Aug-2016 = (2,014 MDth).

REFINERY GAS DEMAND FORECASTS

A. Annual Forecast Table

The first table below provides annual gas demand for the refinery segment. Recorded data are for years 2014-2015, while forecasts cover years 2016-2035.

B. Monthly Forecast Tables

The additional five tables below provide monthly gas demand for the refinery segment. Recorded data are for years 2014-2015, while forecasts cover years 2016-2035.

Annual Refinery Gas Demand: Recorded (2014-2015) and

Forecast (2016-2035) (MDth)

		Refinery Industrial (G-30) Gas Demand			Refinery Cogeneration (G-50) Gas Demand			
Year	Total Refinery (G30 + G50) (MDth)	Ref **G30**, Base Econ. Fcst	Accum. EE/DSM Scg Pgm Savings for **Refinery G-30**	Base Ref **G30,** *less* EE/DSM (MDth)	Cal. Days per Month	Ref **G50**, Base Econ. Fcst	Out-of-model Adj. for **Refinery G-50**	Base Ref **G50** *plus* Out-of-model Adj (MDth)
2014	**109,373**	87,086	0	87,086	365	22,287	0	22,287
2015	**110,295**	86,999	0	86,999	365	23,296	0	23,296
2016	**111,332**	88,490	346	88,145	366	23,188	0	23,188
2017	**109,681**	87,458	689	86,768	365	22,913	0	22,913
2018	**109,425**	87,519	1,023	86,496	365	22,929	0	22,929
2019	**108,789**	87,289	1,370	85,919	365	22,869	0	22,869
2020	**108,665**	87,466	1,717	85,750	366	22,915	0	22,915
2021	**107,363**	86,689	2,041	84,648	365	22,715	0	22,715
2022	**106,242**	86,057	2,364	83,693	365	22,549	0	22,549
2023	**105,687**	85,872	2,684	83,188	365	22,499	0	22,499
2024	**105,599**	86,055	3,003	83,052	366	22,547	0	22,547
2025	**104,822**	85,690	3,321	82,369	365	22,453	0	22,453
2026	**104,282**	85,516	3,640	81,876	365	22,406	0	22,406
2027	**104,092**	85,618	3,959	81,660	365	22,433	0	22,433
2028	**104,179**	85,940	4,277	81,663	366	22,517	0	22,517
2029	**103,541**	85,686	4,596	81,090	365	22,451	0	22,451
2030	**103,226**	85,690	4,915	80,775	365	22,451	0	22,451
2031	**103,395**	85,802	4,888	80,914	365	22,481	0	22,481
2032	**103,781**	86,088	4,863	81,226	366	22,555	0	22,555
2033	**103,613**	85,943	4,848	81,095	365	22,518	0	22,518
2034	**103,725**	86,010	4,820	81,190	365	22,535	0	22,535
2035	**103,870**	86,103	4,791	81,311	365	22,559	0	22,559

Monthly Refinery Gas Demand: Recorded (2014-2015) and

Forecast (2016-2035) (MDth)

		Refinery Industrial (G-30) Gas Demand			Refinery Cogeneration (G-50) Gas Demand			
Month	Total Refinery (G30 + G50) (MDth)	Ref **G30**, Base Econ. Fcst	Accum. EE/DSM Scg Pgm Savings for **Refinery G-30**	Base Ref **G30,** *less* EE/DSM (MDth)	Cal. Days per Month	Ref **G50**, Base Econ. Fcst	Out-of-model Adj. for **Refinery G-50**	Base Ref **G50** *plus* Out-of-model Adj (MDth)
Jan-14	**10,371**	8,067	0	8,067	31	2,304	0	2,304
Feb-14	**7,732**	6,109	0	6,109	28	1,623	0	1,623
Mar-14	**8,287**	6,505	0	6,505	31	1,783	0	1,783
Apr-14	**9,572**	7,680	0	7,680	30	1,893	0	1,893
May-14	**9,655**	7,772	0	7,772	31	1,882	0	1,882
Jun-14	**9,241**	7,377	0	7,377	30	1,864	0	1,864
Jul-14	**9,030**	7,124	0	7,124	31	1,906	0	1,906
Aug-14	**8,843**	6,951	0	6,951	31	1,892	0	1,892
Sep-14	**9,120**	7,287	0	7,287	30	1,832	0	1,832
Oct-14	**8,993**	7,147	0	7,147	31	1,846	0	1,846
Nov-14	**8,480**	6,917	0	6,917	30	1,563	0	1,563
Dec-14	**10,050**	8,149	0	8,149	31	1,900	0	1,900
Jan-15	**10,197**	8,017	0	8,017	31	2,180	0	2,180
Feb-15	**8,953**	7,134	0	7,134	28	1,819	0	1,819
Mar-15	**9,846**	7,851	0	7,851	31	1,995	0	1,995
Apr-15	**9,708**	7,688	0	7,688	30	2,020	0	2,020
May-15	**8,732**	6,711	0	6,711	31	2,021	0	2,021
Jun-15	**8,204**	6,246	0	6,246	30	1,958	0	1,958
Jul-15	**9,160**	7,130	0	7,130	31	2,029	0	2,029
Aug-15	**8,930**	6,979	0	6,979	31	1,950	0	1,950
Sep-15	**9,178**	7,309	0	7,309	30	1,869	0	1,869
Oct-15	**8,986**	7,125	0	7,125	31	1,861	0	1,861
Nov-15	**8,596**	6,852	0	6,852	30	1,743	0	1,743
Dec-15	**9,805**	7,956	0	7,956	31	1,850	0	1,850
Jan-16	**9,473**	7,431	29	7,402	31	2,071	0	2,071
Feb-16	**9,103**	7,247	27	7,220	29	1,884	0	1,884
Mar-16	**9,784**	7,769	29	7,740	31	2,044	0	2,044
Apr-16	**9,328**	7,458	28	7,429	30	1,899	0	1,899
May-16	**9,493**	7,501	29	7,472	31	2,021	0	2,021
Jun-16	**9,104**	7,131	28	7,103	30	2,000	0	2,000
Jul-16	**9,334**	7,337	29	7,308	31	2,026	0	2,026
Aug-16	**9,286**	7,301	29	7,272	31	2,014	0	2,014
Sep-16	**8,998**	7,201	28	7,172	30	1,826	0	1,826
Oct-16	**9,327**	7,427	29	7,398	31	1,929	0	1,929
Nov-16	**8,981**	7,264	28	7,236	30	1,745	0	1,745
Dec-16	**9,121**	7,422	29	7,392	31	1,728	0	1,728
Jan-17	**9,327**	7,340	59	7,281	31	2,046	0	2,046
Feb-17	**8,664**	6,918	53	6,865	28	1,798	0	1,798
Mar-17	**9,511**	7,576	59	7,517	31	1,993	0	1,993
Apr-17	**9,118**	7,313	57	7,256	30	1,862	0	1,862
May-17	**9,358**	7,418	59	7,359	31	1,999	0	1,999
Jun-17	**8,977**	7,055	57	6,998	30	1,979	0	1,979
Jul-17	**9,226**	7,275	59	7,217	31	2,009	0	2,009
Aug-17	**9,206**	7,262	59	7,203	31	2,003	0	2,003
Sep-17	**8,939**	7,176	57	7,119	30	1,819	0	1,819
Oct-17	**9,279**	7,412	59	7,354	31	1,925	0	1,925
Nov-17	**8,947**	7,260	57	7,203	30	1,744	0	1,744
Dec-17	**9,131**	7,454	59	7,395	31	1,736	0	1,736

Monthly Refinery Gas Demand: Recorded (2014-2015) and

Forecast (2016-2035) (MDth)

		Refinery Industrial (G-30) Gas Demand			Refinery Cogeneration (G-50) Gas Demand			
Month	Total Refinery (G30 + G50) (MDth)	Ref **G30**, Base Econ. Fcst	Accum. EE/DSM Scg Pgm Savings for **Refinery G-30**	Base Ref **G30,** *less* EE/DSM (MDth)	Cal. Days per Month	Ref **G50**, Base Econ. Fcst	Out-of-model Adj. for **Refinery G-50**	Base Ref **G50** *plus* Out-of-model Adj (MDth)
Jan-18	**9,324**	7,360	87	7,273	31	2,052	0	2,052
Feb-18	**8,617**	6,902	78	6,823	28	1,794	0	1,794
Mar-18	**9,463**	7,561	87	7,474	31	1,989	0	1,989
Apr-18	**9,084**	7,307	84	7,223	30	1,861	0	1,861
May-18	**9,337**	7,423	87	7,336	31	2,000	0	2,000
Jun-18	**8,960**	7,063	84	6,979	30	1,981	0	1,981
Jul-18	**9,210**	7,285	87	7,199	31	2,012	0	2,012
Aug-18	**9,192**	7,273	87	7,186	31	2,006	0	2,006
Sep-18	**8,925**	7,187	84	7,103	30	1,822	0	1,822
Oct-18	**9,264**	7,423	87	7,336	31	1,928	0	1,928
Nov-18	**8,933**	7,271	84	7,187	30	1,746	0	1,746
Dec-18	**9,117**	7,465	87	7,378	31	1,738	0	1,738
Jan-19	**9,291**	7,357	116	7,241	31	2,051	0	2,051
Feb-19	**8,571**	6,886	105	6,781	28	1,790	0	1,790
Mar-19	**9,411**	7,543	116	7,427	31	1,985	0	1,985
Apr-19	**9,029**	7,286	113	7,174	30	1,855	0	1,855
May-19	**9,277**	7,400	116	7,283	31	1,994	0	1,994
Jun-19	**8,904**	7,041	113	6,929	30	1,975	0	1,975
Jul-19	**9,155**	7,265	116	7,149	31	2,006	0	2,006
Aug-19	**9,137**	7,253	116	7,137	31	2,000	0	2,000
Sep-19	**8,870**	7,166	113	7,053	30	1,817	0	1,817
Oct-19	**9,206**	7,400	116	7,284	31	1,922	0	1,922
Nov-19	**8,876**	7,248	113	7,136	30	1,741	0	1,741
Dec-19	**9,061**	7,444	116	7,327	31	1,733	0	1,733
Jan-20	**9,246**	7,345	145	7,199	31	2,047	0	2,047
Feb-20	**8,845**	7,128	136	6,992	29	1,853	0	1,853
Mar-20	**9,378**	7,539	145	7,394	31	1,984	0	1,984
Apr-20	**8,994**	7,281	141	7,140	30	1,854	0	1,854
May-20	**9,239**	7,393	145	7,247	31	1,992	0	1,992
Jun-20	**8,868**	7,036	141	6,895	30	1,974	0	1,974
Jul-20	**9,120**	7,261	145	7,115	31	2,005	0	2,005
Aug-20	**9,102**	7,249	145	7,103	31	1,999	0	1,999
Sep-20	**8,836**	7,161	141	7,020	30	1,816	0	1,816
Oct-20	**9,169**	7,394	145	7,249	31	1,921	0	1,921
Nov-20	**8,841**	7,242	141	7,101	30	1,739	0	1,739
Dec-20	**9,025**	7,438	145	7,293	31	1,732	0	1,732
Jan-21	**9,199**	7,330	173	7,156	31	2,043	0	2,043
Feb-21	**8,482**	6,856	157	6,700	28	1,782	0	1,782
Mar-21	**9,313**	7,510	173	7,337	31	1,976	0	1,976
Apr-21	**8,930**	7,251	168	7,084	30	1,846	0	1,846
May-21	**9,166**	7,357	173	7,183	31	1,983	0	1,983
Jun-21	**8,795**	6,999	168	6,832	30	1,963	0	1,963
Jul-21	**9,043**	7,222	173	7,049	31	1,994	0	1,994
Aug-21	**9,022**	7,207	173	7,034	31	1,988	0	1,988
Sep-21	**8,750**	7,114	168	6,946	30	1,804	0	1,804
Oct-21	**9,073**	7,340	173	7,167	31	1,906	0	1,906
Nov-21	**8,718**	7,165	168	6,997	30	1,721	0	1,721
Dec-21	**8,873**	7,337	173	7,164	31	1,709	0	1,709
Jan-22	**9,054**	7,238	201	7,037	31	2,018	0	2,018
Feb-22	**8,361**	6,780	181	6,598	28	1,762	0	1,762
Mar-22	**9,210**	7,450	201	7,249	31	1,960	0	1,960
Apr-22	**8,851**	7,210	194	7,015	30	1,836	0	1,836
May-22	**9,077**	7,308	201	7,107	31	1,969	0	1,969
Jun-22	**8,712**	6,955	194	6,761	30	1,951	0	1,951
Jul-22	**8,963**	7,181	201	6,980	31	1,983	0	1,983
Aug-22	**8,944**	7,168	201	6,967	31	1,977	0	1,977
Sep-22	**8,674**	7,074	194	6,880	30	1,794	0	1,794
Oct-22	**8,994**	7,299	201	7,098	31	1,896	0	1,896
Nov-22	**8,630**	7,115	194	6,921	30	1,709	0	1,709
Dec-22	**8,774**	7,279	201	7,078	31	1,695	0	1,695

Monthly Refinery Gas Demand: Recorded (2014-2015) and

Forecast (2016-2035) (MDth)

		Refinery Industrial (G-30) Gas Demand			Refinery Cogeneration (G-50) Gas Demand			
Month	Total Refinery (G30 + G50) (MDth)	Ref **G30**, Base Econ. Fcst	Accum. EE/DSM Scg Pgm Savings for **Refinery G-30**	Base Ref **G30,** *less* EE/DSM (MDth)	Cal. Days per Month	Ref **G50**, Base Econ. Fcst	Out-of-model Adj. for **Refinery G-50**	Base Ref **G50** *plus* Out-of-model Adj (MDth)
Jan-23	**8,955**	7,181	228	6,954	31	2,002	0	2,002
Feb-23	**8,275**	6,731	206	6,526	28	1,750	0	1,750
Mar-23	**9,139**	7,416	228	7,188	31	1,951	0	1,951
Apr-23	**8,803**	7,192	221	6,972	30	1,831	0	1,831
May-23	**9,027**	7,290	228	7,062	31	1,965	0	1,965
Jun-23	**8,671**	6,944	221	6,723	30	1,948	0	1,948
Jul-23	**8,926**	7,173	228	6,945	31	1,981	0	1,981
Aug-23	**8,911**	7,164	228	6,936	31	1,976	0	1,976
Sep-23	**8,647**	7,074	221	6,853	30	1,794	0	1,794
Oct-23	**8,970**	7,302	228	7,074	31	1,897	0	1,897
Nov-23	**8,611**	7,121	221	6,901	30	1,710	0	1,710
Dec-23	**8,751**	7,283	228	7,055	31	1,696	0	1,696
Jan-24	**8,928**	7,181	254	6,926	31	2,002	0	2,002
Feb-24	**8,549**	6,974	238	6,737	29	1,813	0	1,813
Mar-24	**9,114**	7,416	254	7,162	31	1,951	0	1,951
Apr-24	**8,771**	7,187	246	6,941	30	1,830	0	1,830
May-24	**8,992**	7,284	254	7,030	31	1,963	0	1,963
Jun-24	**8,639**	6,939	246	6,693	30	1,946	0	1,946
Jul-24	**8,893**	7,168	254	6,914	31	1,979	0	1,979
Aug-24	**8,876**	7,157	254	6,903	31	1,974	0	1,974
Sep-24	**8,614**	7,068	246	6,821	30	1,792	0	1,792
Oct-24	**8,936**	7,295	254	7,041	31	1,895	0	1,895
Nov-24	**8,575**	7,113	246	6,867	30	1,708	0	1,708
Dec-24	**8,712**	7,272	254	7,018	31	1,694	0	1,694
Jan-25	**8,885**	7,169	282	6,887	31	1,998	0	1,998
Feb-25	**8,219**	6,725	255	6,471	28	1,748	0	1,748
Mar-25	**9,073**	7,406	282	7,124	31	1,949	0	1,949
Apr-25	**8,731**	7,177	273	6,904	30	1,827	0	1,827
May-25	**8,953**	7,275	282	6,993	31	1,960	0	1,960
Jun-25	**8,603**	6,932	273	6,659	30	1,944	0	1,944
Jul-25	**8,855**	7,160	282	6,878	31	1,977	0	1,977
Aug-25	**8,839**	7,150	282	6,867	31	1,972	0	1,972
Sep-25	**8,578**	7,061	273	6,788	30	1,790	0	1,790
Oct-25	**8,899**	7,288	282	7,006	31	1,893	0	1,893
Nov-25	**8,536**	7,103	273	6,830	30	1,706	0	1,706
Dec-25	**8,650**	7,245	282	6,963	31	1,687	0	1,687
Jan-26	**8,818**	7,137	309	6,828	31	1,990	0	1,990
Feb-26	**8,168**	6,705	279	6,426	28	1,743	0	1,743
Mar-26	**9,021**	7,386	309	7,077	31	1,944	0	1,944
Apr-26	**8,684**	7,160	299	6,861	30	1,823	0	1,823
May-26	**8,906**	7,259	309	6,950	31	1,956	0	1,956
Jun-26	**8,559**	6,918	299	6,618	30	1,940	0	1,940
Jul-26	**8,812**	7,148	309	6,839	31	1,974	0	1,974
Aug-26	**8,798**	7,138	309	6,829	31	1,969	0	1,969
Sep-26	**8,536**	7,048	299	6,749	30	1,787	0	1,787
Oct-26	**8,854**	7,274	309	6,964	31	1,889	0	1,889
Nov-26	**8,496**	7,092	299	6,793	30	1,703	0	1,703
Dec-26	**8,630**	7,251	309	6,942	31	1,688	0	1,688
Jan-27	**8,805**	7,148	336	6,812	31	1,993	0	1,993
Feb-27	**8,152**	6,711	304	6,407	28	1,744	0	1,744
Mar-27	**9,002**	7,393	336	7,057	31	1,945	0	1,945
Apr-27	**8,667**	7,167	325	6,842	30	1,825	0	1,825
May-27	**8,889**	7,267	336	6,931	31	1,958	0	1,958
Jun-27	**8,543**	6,926	325	6,600	30	1,943	0	1,943
Jul-27	**8,797**	7,157	336	6,821	31	1,976	0	1,976
Aug-27	**8,782**	7,147	336	6,811	31	1,971	0	1,971
Sep-27	**8,521**	7,057	325	6,732	30	1,789	0	1,789
Oct-27	**8,837**	7,282	336	6,946	31	1,891	0	1,891
Nov-27	**8,481**	7,101	325	6,776	30	1,705	0	1,705
Dec-27	**8,616**	7,261	336	6,925	31	1,691	0	1,691

Monthly Refinery Gas Demand: Recorded (2014-2015) and

Forecast (2016-2035) (MDth)

		Refinery Industrial (G-30) Gas Demand			Refinery Cogeneration (G-50) Gas Demand			
Month	Total Refinery (G30 + G50) (MDth)	Ref **G30**, Base Econ. Fcst	Accum. EE/DSM Scg Pgm Savings for **Refinery G-30**	Base Ref **G30,** *less* EE/DSM (MDth)	Cal. Days per Month	Ref **G50**, Base Econ. Fcst	Out-of-model Adj. for **Refinery G-50**	Base Ref **G50** *plus* Out-of-model Adj (MDth)
Jan-28	**8,788**	7,156	362	6,793	31	1,995	0	1,995
Feb-28	**8,425**	6,956	339	6,617	29	1,808	0	1,808
Mar-28	**8,983**	7,399	362	7,036	31	1,947	0	1,947
Apr-28	**8,648**	7,172	351	6,822	30	1,826	0	1,826
May-28	**8,871**	7,273	362	6,911	31	1,960	0	1,960
Jun-28	**8,526**	6,932	351	6,582	30	1,945	0	1,945
Jul-28	**8,780**	7,164	362	6,802	31	1,978	0	1,978
Aug-28	**8,766**	7,155	362	6,793	31	1,973	0	1,973
Sep-28	**8,505**	7,064	351	6,714	30	1,791	0	1,791
Oct-28	**8,820**	7,289	362	6,927	31	1,893	0	1,893
Nov-28	**8,465**	7,109	351	6,758	30	1,707	0	1,707
Dec-28	**8,602**	7,271	362	6,909	31	1,693	0	1,693
Jan-29	**8,764**	7,159	390	6,768	31	1,996	0	1,996
Feb-29	**8,105**	6,713	353	6,360	28	1,745	0	1,745
Mar-29	**8,951**	7,395	390	7,005	31	1,946	0	1,946
Apr-29	**8,617**	7,169	378	6,792	30	1,826	0	1,826
May-29	**8,840**	7,271	390	6,880	31	1,959	0	1,959
Jun-29	**8,497**	6,931	378	6,553	30	1,944	0	1,944
Jul-29	**8,751**	7,163	390	6,773	31	1,978	0	1,978
Aug-29	**8,737**	7,154	390	6,764	31	1,973	0	1,973
Sep-29	**8,476**	7,063	378	6,686	30	1,791	0	1,791
Oct-29	**8,790**	7,288	390	6,897	31	1,893	0	1,893
Nov-29	**8,437**	7,107	378	6,730	30	1,707	0	1,707
Dec-29	**8,575**	7,272	390	6,882	31	1,693	0	1,693
Jan-30	**8,737**	7,159	417	6,741	31	1,995	0	1,995
Feb-30	**8,079**	6,711	377	6,334	28	1,744	0	1,744
Mar-30	**8,922**	7,394	417	6,977	31	1,946	0	1,946
Apr-30	**8,590**	7,168	404	6,765	30	1,825	0	1,825
May-30	**8,812**	7,270	417	6,853	31	1,959	0	1,959
Jun-30	**8,472**	6,931	404	6,528	30	1,944	0	1,944
Jul-30	**8,725**	7,164	417	6,747	31	1,978	0	1,978
Aug-30	**8,712**	7,156	417	6,738	31	1,974	0	1,974
Sep-30	**8,451**	7,064	404	6,660	30	1,791	0	1,791
Oct-30	**8,764**	7,288	417	6,871	31	1,893	0	1,893
Nov-30	**8,412**	7,108	404	6,704	30	1,707	0	1,707
Dec-30	**8,551**	7,274	417	6,857	31	1,694	0	1,694
Jan-31	**8,746**	7,164	415	6,749	31	1,997	0	1,997
Feb-31	**8,091**	6,719	375	6,344	28	1,746	0	1,746
Mar-31	**8,936**	7,403	415	6,988	31	1,948	0	1,948
Apr-31	**8,603**	7,177	402	6,775	30	1,827	0	1,827
May-31	**8,826**	7,280	415	6,864	31	1,962	0	1,962
Jun-31	**8,486**	6,941	402	6,539	30	1,947	0	1,947
Jul-31	**8,740**	7,175	415	6,759	31	1,981	0	1,981
Aug-31	**8,727**	7,166	415	6,751	31	1,976	0	1,976
Sep-31	**8,466**	7,074	402	6,672	30	1,794	0	1,794
Oct-31	**8,778**	7,298	415	6,883	31	1,896	0	1,896
Nov-31	**8,427**	7,119	402	6,717	30	1,710	0	1,710
Dec-31	**8,568**	7,287	415	6,871	31	1,697	0	1,697
Jan-32	**8,758**	7,171	412	6,759	31	1,999	0	1,999
Feb-32	**8,386**	6,961	385	6,576	29	1,809	0	1,809
Mar-32	**8,942**	7,406	412	6,994	31	1,949	0	1,949
Apr-32	**8,609**	7,179	399	6,781	30	1,828	0	1,828
May-32	**8,833**	7,283	412	6,871	31	1,963	0	1,963
Jun-32	**8,494**	6,944	399	6,546	30	1,948	0	1,948
Jul-32	**8,749**	7,179	412	6,767	31	1,982	0	1,982
Aug-32	**8,736**	7,171	412	6,759	31	1,978	0	1,978
Sep-32	**8,474**	7,078	399	6,680	30	1,795	0	1,795
Oct-32	**8,786**	7,302	412	6,890	31	1,897	0	1,897
Nov-32	**8,435**	7,123	399	6,724	30	1,711	0	1,711
Dec-32	**8,578**	7,292	412	6,880	31	1,698	0	1,698

Monthly Refinery Gas Demand: Recorded (2014-2015) and

Forecast (2016-2035) (MDth)

		Refinery Industrial (G-30) Gas Demand			Refinery Cogeneration (G-50) Gas Demand			
Month	Total Refinery (G30 + G50) (MDth)	Ref **G30**, Base Econ. Fcst	Accum. EE/DSM Scg Pgm Savings for **Refinery G-30**	Base Ref **G30,** *less* EE/DSM (MDth)	Cal. Days per Month	Ref **G50**, Base Econ. Fcst	Out-of-model Adj. for **Refinery G-50**	Base Ref **G50** *plus* Out-of-model Adj (MDth)
Jan-33	**8,766**	7,177	412	6,765	31	2,001	0	2,001
Feb-33	**8,105**	6,728	372	6,356	28	1,749	0	1,749
Mar-33	**8,952**	7,413	412	7,001	31	1,951	0	1,951
Apr-33	**8,618**	7,186	398	6,788	30	1,830	0	1,830
May-33	**8,843**	7,290	412	6,878	31	1,965	0	1,965
Jun-33	**8,504**	6,952	398	6,554	30	1,950	0	1,950
Jul-33	**8,760**	7,187	412	6,776	31	1,984	0	1,984
Aug-33	**8,748**	7,179	412	6,767	31	1,980	0	1,980
Sep-33	**8,485**	7,087	398	6,688	30	1,797	0	1,797
Oct-33	**8,797**	7,310	412	6,898	31	1,899	0	1,899
Nov-33	**8,446**	7,131	398	6,733	30	1,713	0	1,713
Dec-33	**8,591**	7,302	412	6,890	31	1,700	0	1,700
Jan-34	**8,777**	7,184	409	6,775	31	2,003	0	2,003
Feb-34	**8,112**	6,732	370	6,362	28	1,750	0	1,750
Mar-34	**8,960**	7,417	409	7,008	31	1,952	0	1,952
Apr-34	**8,625**	7,191	396	6,794	30	1,831	0	1,831
May-34	**8,851**	7,295	409	6,885	31	1,966	0	1,966
Jun-34	**8,513**	6,957	396	6,561	30	1,952	0	1,952
Jul-34	**8,770**	7,193	409	6,784	31	1,986	0	1,986
Aug-34	**8,757**	7,185	409	6,776	31	1,982	0	1,982
Sep-34	**8,494**	7,092	396	6,696	30	1,798	0	1,798
Oct-34	**8,806**	7,315	409	6,906	31	1,900	0	1,900
Nov-34	**8,455**	7,137	396	6,741	30	1,714	0	1,714
Dec-34	**8,604**	7,311	409	6,901	31	1,702	0	1,702
Jan-35	**8,790**	7,192	407	6,785	31	2,005	0	2,005
Feb-35	**8,122**	6,738	368	6,371	28	1,751	0	1,751
Mar-35	**8,971**	7,424	407	7,017	31	1,954	0	1,954
Apr-35	**8,636**	7,197	394	6,803	30	1,833	0	1,833
May-35	**8,863**	7,302	407	6,895	31	1,968	0	1,968
Jun-35	**8,525**	6,965	394	6,571	30	1,954	0	1,954
Jul-35	**8,782**	7,201	407	6,794	31	1,988	0	1,988
Aug-35	**8,770**	7,193	407	6,786	31	1,984	0	1,984
Sep-35	**8,507**	7,100	394	6,706	30	1,800	0	1,800
Oct-35	**8,818**	7,323	407	6,916	31	1,902	0	1,902
Nov-35	**8,468**	7,145	394	6,752	30	1,716	0	1,716
Dec-35	**8,618**	7,321	407	6,914	31	1,705	0	1,705

2016 CALIFORNIA GAS REPORT

ELECTRIC GENERATION

2016 CALIFORNIA GAS REPORT

NON-COGENERATION EG

2016 CGR EG Workpapers

SDG&E/SoCalGas

Jeff Huang

The electric generation forecast is based on an analysis of the plant's operation in the western electric market using the Market Analytics model from Ventyx. Market Analytics has been used by SoCalGas in previous applications before the Commission. This workpapers include both the input assumptions and results.

Workpapers List

California Energy Demand Forecast
California Energy Commission's (CEC) California Energy Demand 2016 – 2026, Revised/Final Electricity Forecast, dated January 2016. SoCalGas selected the Mid Energy Demand scenario with Mid Additional Achievable Energy Efficiency (AAEE) scenario.

See Schedule 1 - 3 for the summary of peak and energy data.

Renewable Power Supply Assumptions
The base case assumes that California achieves its Renewable Portfolio Standard (RPS) goal of 33% by 2020, and 50% by 2030. For summary of RPS, see Schedule 4.

Energy Storage Assumption
See Schedule 5.

Green House Gas (GHG) Compliance Costs
See Schedule 6.

Once Through Cooling (OTC) Compliance Schedule
See Schedule 7.

Annual Gas Demand Throughput Forecasts
See Schedule 8 and Schedule 9.

Peak Day Forecasts
See Schedule 10 and Schedule 11.

Schedule 1: Form 1.5a - Statewide
California Energy Demand Revised/Final Forecast, 2016 - 2026, Mid Demand Baseline Case, Mid AAEE Savings
Net Energy for Load by Agency and Balancing Authority (GWh)

Balancing Authority	Agency	2014	2015	2016	2017	2018	2019	2020	2021	2022	2013	2024	2025	2026	Average Annual Growth 2014 - 2026
	CCSF	1,118	1,118	1,116	1,122	1,128	1,132	1,137	1,144	1,153	1,161	1,166	1,170	1,175	0.42%
	NCPA - Greater Bay Area	1,491	1,491	1,487	1,496	1,504	1,509	1,517	1,526	1,537	1,548	1,554	1,561	1,566	0.41%
	Other NP15 LSEs - Bay Area	35	35	35	35	35	35	35	36	36	36	36	37	37	0.46%
	PG&E Service Area - Greater Bay Area	36,753	36,421	36,154	36,107	35,959	35,867	35,826	35,822	35,853	35,907	35,880	35,801	35,741	-0.23%
	Silicon Valley Power	3,313	3,313	3,305	3,324	3,341	3,354	3,370	3,390	3,415	3,438	3,454	3,467	3,480	0.41%
Greater Bay Area Subtotal		42,710	42,378	42,097	42,084	41,967	41,897	41,885	41,918	41,994	42,090	42,090	42,036	41,999	-0.14%
	CDWR-N	296	571	571	571	571	571	571	571	571	571	571	571	571	5.63%
	NCPA - Non Bay Area	1,060	1,060	1,057	1,063	1,068	1,073	1,078	1,084	1,092	1,100	1,105	1,109	1,113	0.41%
	Other NP15 LSEs - Non Bay Area	226	226	226	227	228	229	230	232	233	235	236	237	238	0.43%
	PG&E Service Area - Non Bay Area	48,172	47,737	47,104	46,907	46,596	46,395	46,274	46,144	46,180	46,110	45,943	45,777	45,575	-0.46%
	WAPA (CAISO)	1,635	1,635	1,631	1,640	1,649	1,655	1,663	1,673	1,685	1,697	1,704	1,711	1,717	0.41%
Total North of Path 15		94,099	93,608	92,686	92,492	92,079	91,821	91,701	91,622	91,755	91,803	91,649	91,442	91,213	-0.26%
	CDWR-ZP26	572	1,104	1,104	1,104	1,104	1,104	1,104	1,104	1,104	1,104	1,104	1,104	1,104	5.63%
	PG&E Service Area - ZP26	10,027	9,937	9,856	9,828	9,750	9,692	9,652	9,610	9,572	9,538	9,484	9,417	9,351	-0.58%
Total Zone Path 26		10,599	11,041	10,960	10,932	10,854	10,796	10,756	10,714	10,676	10,642	10,588	10,521	10,455	-0.11%
Total Valley		61,988	62,270	61,549	61,340	60,966	60,720	60,572	60,418	60,437	60,355	60,147	59,926	59,669	-0.32%
Total North of Path 26		104,698	104,648	103,646	103,423	102,933	102,617	102,457	102,336	102,431	102,444	102,237	101,963	101,668	-0.24%
	Merced	522	531	536	542	547	552	557	562	568	575	581	586	592	1.05%
	Turlock Irrigation District	2,095	2,134	2,154	2,178	2,196	2,215	2,236	2,258	2,282	2,308	2,332	2,354	2,378	1.06%
Total Turlock Irrigation District Control Area		2,617	2,665	2,690	2,720	2,743	2,767	2,793	2,820	2,850	2,883	2,913	2,940	2,970	1.06%
	City of Shasta Lake	193	196	198	200	202	204	206	208	210	213	215	217	219	1.06%
	Modesto Irrigation District	2,725	2,761	2,788	2,819	2,843	2,871	2,901	2,932	2,966	2,999	3,031	3,061	3,090	1.05%
	Redding	817	828	836	846	853	861	870	880	890	900	909	918	927	1.06%
	Roseville	1,301	1,318	1,331	1,346	1,357	1,371	1,385	1,400	1,416	1,432	1,447	1,461	1,475	1.05%
	SMUD	11,249	11,307	11,329	11,369	11,309	11,300	11,313	11,314	11,312	11,359	11,407	11,481	11,546	0.22%
	WAPA (BANC)	458	464	468	474	478	482	487	493	498	504	509	514	519	1.05%
Total BANC Control Area		16,743	16,874	16,950	17,054	17,042	17,089	17,162	17,227	17,292	17,407	17,518	17,652	17,776	0.50%
	Anaheim	2,478	2,531	2,546	2,546	2,550	2,552	2,558	2,563	2,578	2,586	2,591	2,600	2,602	0.41%
	MWD	231	236	237	237	237	237	238	238	240	241	241	242	242	0.39%
	Other SP15 LSEs - LA Basin	1,488	1,520	1,529	1,529	1,531	1,533	1,537	1,539	1,548	1,553	1,557	1,562	1,563	0.41%
	Pasadena	1,229	1,255	1,262	1,262	1,264	1,265	1,268	1,271	1,278	1,282	1,285	1,289	1,290	0.40%
	Riverside	2,382	2,434	2,448	2,448	2,451	2,454	2,459	2,464	2,478	2,486	2,491	2,500	2,502	0.41%
	SCE Service Area - LA Basin	73,083	72,290	72,074	71,291	70,492	69,873	69,412	68,867	68,633	68,202	67,719	67,313	66,728	-0.76%
	Vernon	1,234	1,261	1,268	1,268	1,270	1,271	1,274	1,276	1,284	1,288	1,291	1,295	1,296	0.41%
LA Basin Subtotal		82,125	81,527	81,364	80,581	79,795	79,185	78,746	78,218	78,039	77,638	77,175	76,801	76,223	-0.62%
	CDWR-S	2,190	5,191	5,191	5,191	5,191	5,191	5,191	5,191	5,191	5,191	5,191	5,191	5,191	7.46%
	SCE Service Area - Big Creek Ventura	15,992	15,818	15,798	15,699	15,596	15,524	15,487	15,424	15,485	15,441	15,381	15,360	15,273	-0.38%
Big Creek/Ventura Subtotal		18,182	21,009	20,989	20,890	20,787	20,715	20,678	20,615	20,676	20,632	20,572	20,551	20,464	0.99%
	MWD	2,331	2,381	2,395	2,395	2,399	2,401	2,406	2,411	2,425	2,433	2,438	2,446	2,448	0.41%
	Other SP15 LSEs - Out of LA Basin	82	84	84	84	85	85	85	85	86	86	86	86	86	0.40%
	SCE Service Area - Out of LA Basin	4,052	4,008	3,982	3,927	3,874	3,839	3,818	3,790	3,776	3,750	3,721	3,696	3,661	-0.84%
Total SCE TAC Area		106,772	109,009	108,814	107,878	106,940	106,225	105,733	105,120	105,001	104,539	103,992	103,579	102,881	-0.31%
SDG&E Service Area		21,542	21,422	21,068	20,988	20,773	20,658	20,553	20,483	20,503	20,416	20,340	20,257	20,163	-0.55%
Valley Electric Association		11	11	11	11	12	12	12	12	12	12	12	13	13	1.40%
Total South of Path 26		128,325	130,442	129,893	128,877	127,725	126,895	126,299	125,614	125,517	124,966	124,344	123,849	123,058	-0.35%
	Burbank	1,204	1,187	1,187	1,193	1,198	1,202	1,208	1,214	1,225	1,229	1,233	1,238	1,241	0.25%
	Glendale	1,183	1,166	1,167	1,172	1,177	1,181	1,186	1,192	1,203	1,208	1,212	1,217	1,219	0.25%
	LADWP	26,621	25,911	25,714	25,488	25,057	24,808	24,655	24,768	24,907	25,027	25,190	25,355	25,538	-0.35%

Northern California Non-CAISO Total		18,195	18,365	18,460	18,587	18,599	18,667	18,761	18,849	18,942	19,079	19,215	19,368	19,514	0.6%
LADWP	Los Angeles Department of Water and Power	23,455	22,829	22,658	22,463	22,086	21,868	21,737	21,840	21,966	22,075	22,222	22,370	22,536	-0.3%
BUGL	City of Burbank	1,132	1,115	1,116	1,121	1,126	1,130	1,135	1,141	1,151	1,156	1,160	1,165	1,167	0.3%
	City of Glendale	1,112	1,096	1,097	1,102	1,107	1,111	1,115	1,121	1,131	1,136	1,139	1,144	1,146	0.3%
BUGL Total		2,244	2,211	2,213	2,223	2,233	2,241	2,250	2,262	2,282	2,292	2,299	2,309	2,313	0.3%
IID	Imperial Irrigation District	3,392	3,369	3,433	3,478	3,521	3,570	3,625	3,682	3,751	3,815	3,877	3,941	3,997	1.4%
VEA	Valley Electric Association, Inc.	11	10	11	11	11	11	11	11	11	12	12	12	12	0.7%
OTHER	Kirkwood Meadows Public Utility District	6	6	6	6	6	6	7	7	7	7	7	7	7	1.3%
	Liberty Utilities	533	537	537	542	547	551	556	561	566	571	575	578	581	0.7%
	City of Needles	52	53	53	53	54	54	55	55	56	56	57	57	57	0.8%
	PacifiCorp	754	760	760	766	773	779	786	794	801	807	813	818	822	0.7%
	Surprise Valley Electrification Corporation	109	110	110	111	112	113	114	115	116	117	118	119	119	0.7%
	Truckee-Donner Public Utility District	142	143	143	144	146	147	148	150	151	152	153	154	155	0.7%
OTHER Total		1,596	1,609	1,609	1,622	1,638	1,650	1,666	1,682	1,697	1,710	1,723	1,733	1,741	0.7%
Statewide Total		264,619	266,175	264,748	263,610	261,805	260,674	260,028	259,566	259,900	259,748	259,357	259,048	258,434	-0.2%
Total Pumping Load		6,058	9,783	9,797	9,802	9,810	9,817	9,827	9,837	9,858	9,872	9,882	9,894	9,900	4.2%
Total Statewide Retail Deliveries excluding pumping		258,561	256,392	254,951	253,808	251,995	250,857	250,201	249,729	250,042	249,876	249,475	249,154	248,534	-0.3%

This table includes retail sales and other deliveries only measured at the customer level. Losses and consumption served by self-generation are excluded. Table developed based on actual 2014 data.

Table includes sales from entities outside of California control areas. Thus, total sales in row 76 are higher than state totals given in Form 1.1b.

AAEE savings applied to PG&E, SCE, SDG&E, LADWP, and SMUD service territories.

PG&E Direct Access includes BART.

Schedule 2: Form 1.5b - Statewide
California Energy Demand Revised/Final Forecast, 2016 - 2026, Mid Demand Baseline Case, Mid AAEE Savings
1 in 2 Net Electricity Peak Demand by Agency and Balancing Authority (MW)

Balancing Authority	Agency	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average Annual Growth 2015 - 2026
	CCSF	223	223	225	226	227	228	229	231	233	234	235	236	0.52%
	NCPA - Greater Bay Area	297	297	300	301	302	304	306	308	311	313	313	314	0.51%
	Other NP15 LSEs - Bay Area	7	7	7	7	7	7	7	7	7	7	7	7	0.00%
	PG&E Service Area - Greater Bay Area	7,382	7,306	7,290	7,234	7,180	7,133	7,094	7,065	7,040	6,993	6,909	6,848	-0.68%
	Silicon Valley Power	659	659	666	670	672	675	680	685	691	695	695	698	0.52%
Greater Bay Area Subtotal		8,568	8,492	8,488	8,438	8,388	8,347	8,316	8,296	8,282	8,242	8,159	8,103	-0.51%
	CDWR-N	98	98	98	98	98	98	98	98	98	98	98	98	0.00%
	NCPA - Non Bay Area	211	211	213	214	215	216	217	219	221	222	222	223	0.50%
	Other NP15 LSEs - Non Bay Area	45	45	45	46	46	46	46	47	47	47	48	48	0.59%
	PG&E Service Area - Non Bay Area	9,578	9,500	9,531	9,504	9,468	9,465	9,459	9,485	9,498	9,482	9,430	9,400	-0.17%
	WAPA (CAISO)	325	325	328	331	332	333	335	338	341	343	343	345	0.54%
Total North of Path 15		18,825	18,671	18,703	18,631	18,547	18,505	18,471	18,483	18,487	18,434	18,300	18,217	-0.30%
	CDWR-ZP26	117	117	117	117	117	117	117	117	117	117	117	117	0.00%
	PG&E Service Area - ZP26	1,897	1,883	1,884	1,872	1,857	1,849	1,841	1,836	1,833	1,824	1,807	1,796	-0.49%
Total Zone Path 26		2,014	2,000	2,001	1,989	1,974	1,966	1,958	1,953	1,950	1,941	1,924	1,913	-0.46%
Total Valley		12,271	12,179	12,216	12,182	12,133	12,124	12,114	12,140	12,155	12,134	12,065	12,027	-0.18%
Total North of Path 26		20,839	20,671	20,704	20,620	20,521	20,472	20,429	20,437	20,437	20,376	20,224	20,130	-0.31%
	Merced	124	128	130	132	133	135	136	138	140	141	143	144	1.37%
	Turlock Irrigation District	499	514	521	529	535	541	548	554	561	567	573	579	1.36%
Total Turlock Irrigation District Control Area		623	642	651	661	668	676	684	692	701	708	716	723	1.36%
	City of Shasta Lake	53	54	54	55	56	56	57	58	58	59	60	60	1.13%
	Modesto Irrigation District	743	756	765	776	786	795	804	813	822	831	839	848	1.21%
	Redding	223	227	230	233	236	239	241	244	247	249	252	254	1.19%
	Roseville	355	361	365	371	375	380	384	388	393	397	401	405	1.21%
	SMUD	2,943	2,983	2,984	2,984	2,985	2,991	2,991	2,993	3,003	3,012	3,022	3,033	0.27%
	WAPA (BANC)	125	127	129	130	132	134	135	137	138	140	141	142	1.17%
Total BANC Control Area		4,442	4,508	4,527	4,549	4,570	4,595	4,612	4,633	4,661	4,688	4,715	4,742	0.60%
	Anaheim	528	529	533	534	533	534	534	537	538	538	538	538	0.17%
	MWD	23	23	23	23	23	23	23	23	23	23	23	23	0.00%
	Other SP15 LSEs - LA Basin	317	318	320	321	320	321	321	322	323	323	323	323	0.17%
	Pasadena	262	263	264	265	264	265	265	266	267	267	267	267	0.17%
	Riverside	507	509	512	513	513	513	513	516	517	517	518	517	0.18%
	SCE Service Area - LA Basin	16,165	16,068	16,003	15,817	15,621	15,463	15,282	15,169	15,012	14,830	14,656	14,444	-1.02%
	Vernon	263	264	265	266	266	266	266	267	268	268	268	268	0.17%
LA Basin Subtotal		18,065	17,974	17,920	17,739	17,540	17,385	17,204	17,100	16,948	16,766	16,593	16,380	-0.89%
	CDWR-S	160	160	160	160	160	160	160	160	160	160	160	160	0.00%
	SCE Service Area - Big Creek Ventura	3,377	3,354	3,351	3,331	3,310	3,301	3,288	3,303	3,299	3,288	3,286	3,270	-0.29%
Big Creek/Ventura Subtotal		3,537	3,514	3,511	3,491	3,470	3,461	3,448	3,463	3,459	3,448	3,446	3,430	-0.28%
	MWD	223	224	226	226	226	226	226	227	228	228	228	228	0.20%
	Other SP15 LSEs - Out of LA Basin	18	18	18	18	18	18	18	18	18	18	18	18	0.00%
	SCE Service Area - Out of LA Basin	896	893	896	891	887	886	884	886	886	884	883	880	-0.16%
Total SCE TAC Area		22,739	22,623	22,570	22,366	22,142	21,977	21,780	21,694	21,539	21,344	21,168	20,936	-0.75%
SDG&E Service Area		4,602	4,563	4,567	4,516	4,474	4,430	4,396	4,387	4,350	4,310	4,267	4,222	-0.78%

Valley Electric Association	121	124	126	128	129	131	132	134	135	137	138	140	1.33%
Total South of Path 26	27,462	27,310	27,263	27,010	26,745	26,538	26,309	26,216	26,024	25,791	25,574	25,298	-0.74%
Burbank	313	316	319	320	320	321	322	325	326	326	327	327	0.40%
Glendale	308	310	313	314	315	315	317	319	320	320	321	322	0.40%
LADWP	5,999	5,971	5,948	5,849	5,772	5,723	5,729	5,739	5,742	5,750	5,755	5,764	-0.36%
Total LADWP Control Area	6,620	6,597	6,580	6,483	6,407	6,359	6,368	6,383	6,388	6,396	6,403	6,413	-0.29%
Imperial Irrigation District Control Area	983	994	1,008	1,023	1,035	1,049	1,063	1,081	1,097	1,111	1,126	1,137	1.33%
Total CAISO Noncoincident Peak	48,301	47,982	47,967	47,630	47,266	47,010	46,738	46,652	46,461	46,167	45,798	45,429	-0.56%
Total CAISO Coincident Peak	46,610	46,302	46,288	45,963	45,612	45,364	45,102	45,019	44,835	44,551	44,195	43,839	-0.56%
Total Statewide Noncoincident Peak	60,969	60,723	60,733	60,346	59,947	59,688	59,465	59,442	59,308	59,070	58,759	58,444	-0.38%
Total Statewide Coincident Peak	58,835	58,597	58,607	58,234	57,848	57,599	57,383	57,361	57,232	57,003	56,702	56,398	-0.38%

Table developed based on weather-adjusted 2015 peak estimates.

AAEE savings applied to PG&E, SCE, SDG&E, LADWP, and SMUD service territories.

For PG&E service territory, Bay Area baseline growth is based on projections for forecasting climate zone 1, non-Bay Area on climate zones 2-5, and ZP 26 on climate zone 6.

For SCE service territory, LA Basin baseline growth is based on projections for forecasting climate zone 7, Big Creek-Ventura on climate zones 8 and 9, and Out of LA Basin on climate zones 10 and 11.

In 2013, Valley Electric Association became a CAISO participating transmission owner.

Schedule 3: Form 1.1c - Statewide
California Energy Demand Revised/Final Forecast, 2016 - 2026, Mid Demand Baseline Case, Mid AAEE Savings
Electricity Deliveries to End Users by Agency (GWh)

Planning Area	Agency	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Average Annual Growth 2014 - 2026
PGE	Calaveras Public Power Agency	32	32	32	32	32	33	33	33	33	33	34	34	34	0.5%
	City of Alameda	351	351	350	352	354	356	357	359	362	365	366	368	369	0.4%
	City of Biggs	16	16	16	16	16	16	16	16	16	16	16	16	17	0.5%
	City of Gridley	36	36	36	36	36	36	36	36	37	37	37	37	37	0.2%
	City of Healdsburg	74	75	74	75	75	75	76	76	77	77	78	78	78	0.4%
	City of Hercules	12	12	12	12	12	12	12	12	12	12	12	12	12	0.0%
	City of Lodi	449	449	448	451	453	455	457	460	463	466	468	470	472	0.4%
	City of Lompoc	134	135	134	135	136	136	137	138	139	140	140	141	141	0.4%
	City of Palo Alto	962	962	960	965	970	974	979	985	992	999	1,004	1,008	1,012	0.4%
	City of San Francisco	1,021	1,021	1,019	1,025	1,030	1,034	1,039	1,045	1,053	1,061	1,065	1,070	1,074	0.4%
	City of Ukiah	109	109	109	109	110	110	111	112	112	113	114	114	115	0.4%
	Department of Water Resources (North)	837	1,614	1,614	1,614	1,614	1,614	1,614	1,614	1,614	1,614	1,614	1,614	1,614	5.6%
	Island Energy/Pittsburg	20	20	20	20	20	21	21	21	21	21	21	21	21	0.4%
	Lassen Municipal Utility District	132	132	131	132	133	133	134	135	136	137	137	138	138	0.4%
	Pacific Gas and Electric Company (Bundled)	75,421	72,855	71,879	71,660	71,209	70,917	70,753	70,619	70,669	70,648	70,447	70,188	69,911	-0.6%
	Pacific Gas and Electric Company (Direct Access)	9,520	9,520	9,520	9,520	9,520	9,520	9,520	9,520	9,520	9,520	9,520	9,520	9,520	0.0%
	Pacific Gas and Electric Company (Marin Clean Energy CCA)	1,255	1,701	1,802	1,793	1,781	1,774	1,768	1,761	1,756	1,750	1,744	1,739	1,733	2.7%
	Pacific Gas and Electric Company (Sonoma Clean Power CCA)	436	1,769	1,757	1,743	1,725	1,713	1,704	1,692	1,681	1,671	1,660	1,650	1,640	11.7%
	Plumas-Sierra Rural Electric Cooperation	149	149	149	150	150	151	152	153	154	155	156	156	157	0.4%
	Port of Oakland	48	48	48	49	49	49	49	49	50	50	50	51	51	0.5%
	Port of Stockton	20	20	19	20	20	20	20	20	20	20	20	20	21	0.4%
	Silicon Valley Power	3,024	3,026	3,018	3,036	3,052	3,064	3,079	3,097	3,120	3,142	3,156	3,169	3,181	0.4%
	Tuolumne County Public Power Agency	23	23	23	23	24	24	24	24	24	24	24	24	25	0.7%
	WAPA (CAISO)	1,493	1,493	1,490	1,498	1,506	1,512	1,519	1,528	1,540	1,551	1,558	1,564	1,570	0.4%
PGE Total		95,574	95,568	94,660	94,465	94,027	93,749	93,610	93,505	93,601	93,622	93,441	93,203	92,943	-0.2%
SCE	Anza Electric Cooperative, Inc.	49	50	50	50	50	50	51	51	51	51	51	51	51	0.3%
	Azusa Light & Water	256	261	263	263	263	264	264	265	266	267	268	269	269	0.4%
	Bear Valley Electric Service	129	132	132	132	133	133	133	133	134	134	135	135	135	0.4%
	City of Anaheim	2,322	2,373	2,387	2,387	2,391	2,393	2,399	2,403	2,418	2,426	2,431	2,439	2,441	0.4%
	City of Banning	147	150	151	151	151	151	151	152	153	153	153	154	154	0.4%
	City of Cerritos	81	83	83	83	83	83	84	84	84	85	85	85	85	0.4%
	City of Colton	356	364	366	366	367	367	368	369	371	372	373	374	374	0.4%
	City of Corona	149	152	153	153	153	153	154	154	155	155	156	156	156	0.4%
	City of Pasadena	1,151	1,177	1,183	1,184	1,185	1,187	1,190	1,192	1,199	1,203	1,205	1,209	1,210	0.4%
	City of Rancho Cucamonga	76	77	78	78	78	78	78	78	79	79	79	80	80	0.4%
	City of Riverside	2,232	2,282	2,295	2,295	2,299	2,301	2,307	2,311	2,325	2,332	2,337	2,345	2,347	0.4%
	City of Vernon	1,156	1,182	1,189	1,189	1,191	1,192	1,195	1,197	1,204	1,208	1,211	1,215	1,216	0.4%
	Department of Water Resources (South)	2,110	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	7.5%
	Metropolitan Water District	2,400	2,454	2,468	2,468	2,472	2,474	2,480	2,485	2,500	2,507	2,513	2,521	2,524	0.4%
	Moreno Valley Utilities	153	156	157	157	158	158	158	158	159	160	160	161	161	0.4%
	Southern California Edison Company (Bundled)	75,723	74,399	73,715	72,846	71,960	71,287	70,808	70,221	70,051	69,591	69,063	68,647	67,991	-0.9%
	Southern California Edison Company (Direct Access)	11,469	11,710	11,710	11,710	11,710	11,710	11,710	11,710	11,710	11,710	11,710	11,710	11,710	0.2%
	Southern California Edison Company (Lancaster Choice Energy CCA)	-	128	570	567	562	560	557	555	552	550	548	547	543	0.0%
	Victorville Municipal	77	79	79	79	79	79	80	80	80	80	81	81	81	0.4%
SCE Total		100,036	102,210	102,030	101,159	100,286	99,621	99,168	98,599	98,492	98,064	97,559	97,179	96,530	-0.3%
SDGE	San Diego Gas and Electric Company (Bundled)	16,653	16,556	16,252	16,156	15,952	15,835	15,731	15,651	15,641	15,546	15,461	15,372	15,286	-0.7%
	San Diego Gas and Electric Company (Direct Access)	3,463	3,448	3,423	3,445	3,451	3,461	3,469	3,486	3,517	3,532	3,547	3,560	3,562	0.2%
SDGE Total		20,116	20,004	19,675	19,601	19,403	19,296	19,200	19,137	19,158	19,078	19,008	18,932	18,848	-0.5%
Northern California Non-CAISO	City of Redding	768	779	786	795	802	810	818	827	837	846	855	864	872	1.1%
	City of Roseville	1,222	1,239	1,251	1,265	1,276	1,289	1,302	1,316	1,331	1,346	1,361	1,374	1,387	1.1%
	City of Shasta Lake	182	184	186	188	189	191	193	195	198	200	202	204	206	1.0%
	Merced Irrigation District	490	499	504	510	514	519	523	529	534	540	546	551	557	1.1%
	Modesto Irrigation District	2,561	2,595	2,621	2,650	2,673	2,699	2,728	2,757	2,789	2,820	2,851	2,879	2,906	1.1%
	Sacramento Municipal Utility District	10,573	10,627	10,648	10,687	10,631	10,623	10,637	10,639	10,638	10,683	10,728	10,798	10,861	0.2%
	Turlock Irrigation District	1,969	2,006	2,024	2,047	2,065	2,082	2,102	2,123	2,146	2,170	2,193	2,214	2,237	1.1%
	WAPA (BANC)	430	436	440	445	449	454	458	463	469	474	479	484	488	1.1%

Total LADWP Control Area	29,008	28,264	28,068	27,853	27,432	27,191	27,049	27,174	27,335	27,464	27,635	27,810	27,998	-0.29%
Imperial Irrigation District Control Area	3,827	3,801	3,872	3,922	3,970	4,025	4,087	4,151	4,228	4,300	4,370	4,441	4,504	1.37%
Total CAISO	233,023	235,090	233,540	232,300	230,658	229,512	228,756	227,950	227,948	227,411	226,580	225,812	224,726	-0.30%
Total Statewide	285,218	286,694	285,119	283,849	281,846	280,584	279,846	279,322	279,653	279,465	279,016	278,654	277,974	-0.21%

Table developed based on actual 2014 data.

AAEE savings applied to PG&E, SCE, SDG&E, LADWP, and SMUD service territories.

For PG&E service territory, Bay Area baseline growth is based on projections for forecasting climate zone 1, non-Bay Area on climate zones 2-5, and ZP 26 on climate zone 6.

For SCE service territory, LA Basin baseline growth is based on projections for forecasting climate zone 7, Big Creek-Ventura on climate zones 8 and 9, and Out of LA Basin on climate zones 10 and 11.

In 2013, Valley Electric Association became a CAISO participating transmission owner.

Schedule 4
Statewide Total Renewable Generation by Year (GWh)

Year	Biogas & Biomass	Geothermal	Hydro (Small)	Solar PV/Thermal	Wind	Out-of-State	Total	RPS
2016	6,572	12,186	3,926	15,839	13,611	14,916	67,049	26%
2017	6,572	12,186	4,272	16,672	15,191	14,916	69,809	28%
2018	6,572	12,186	4,799	17,505	17,101	14,916	73,078	29%
2019	6,572	12,186	4,799	20,154	19,140	14,916	77,766	31%
2020	6,572	12,186	4,799	24,173	19,921	14,916	82,566	33%
2021	6,572	12,186	4,799	27,156	21,152	14,916	86,781	35%
2022	6,572	12,186	4,799	30,440	22,353	14,916	91,265	37%
2023	6,572	12,186	4,799	33,817	23,288	14,916	95,577	38%
2024	6,572	12,186	4,799	36,404	24,913	14,916	99,790	40%
2025	6,572	12,186	4,799	38,043	27,299	14,916	103,814	42%
2026	6,572	12,186	4,799	39,575	29,650	14,916	107,698	43%
2027	6,572	12,186	4,799	42,233	30,767	14,916	111,472	45%
2028	6,572	12,186	4,799	44,812	31,935	14,916	115,220	47%
2029	6,572	12,186	4,799	47,869	32,601	14,916	118,943	48%
2030	6,572	12,186	4,799	50,214	33,953	14,916	122,639	50%

Note: The annual renewable generation assumption is roughly based on the RPS Calculator 6.2 and CEC RPS goals.
CEC RPS goals: 25% by 2016, 33% by 2020, 40% by 2024, 45% by 2027, and 50% by 2030.
http://www.energy.ca.gov/portfolio/documents/rps_certification.html

Schedule 5
Energy Storage (MW)

Year	SDG&E	SCE	PG&E	Total
2016	40	0	0	40
2017	90	50	50	190
2018	90	100	100	290
2019	90	150	150	390
2020	90	250	250	590
2021	140	300	300	740
2022	140	350	350	840
2023	140	400	400	940
2024	140	500	500	1140
2025	140	500	500	1140
2026	140	500	500	1140
2027	140	500	500	1140
2028	140	500	500	1140
2029	140	500	500	1140
2030	140	500	500	1140

Schedule 6

GHG Compliance Cost

Year	Nominal $/Ton
2016	$ 12.93
2017	$ 13.31
2018	$ 13.73
2019	$ 14.33
2020	$ 15.82
2021	$ 18.61
2022	$ 22.83
2023	$ 27.53
2024	$ 32.62
2025	$ 36.42
2026	$ 40.36
2027	$ 44.47
2028	$ 48.71
2029	$ 53.10
2030	$ 57.65
2031	$ 62.39
2032	$ 67.31
2033	$ 72.41
2034	$ 77.71
2035	$ 83.18

Schedule 7
OTC Schedule

Plants	Existing Capacity (MW)	SWRCB Approved Compliance Dates	Updated Compliance Dates	2016 CGR Compliance Dates
South Bay	708	12/31/2011	12/31/2010	Offline
Humboldt Bay (1,2)	163	12/31/2010	9/30/2010	Offline
Potrero (3)	206	10/1/2011	2/28/2011	Offline
Huntington Beach (3,4)	452	12/31/2020	11/1/2012	Offline
Contra Costa (6,7)	674	12/31/2017	4/30/2013	Offline
San Onofre (2,3)	2,246	12/31/2016	1/31/2011	Offline
El Segundo (3)	335	12/31/2015	7/27/2013	Offline
Haynes (5,6)	535	12/31/2019	6/1/2013	Offline
Morro Bay (3,4)	650	12/31/2015	2/5/2014	Offline
El Segundo (4)	335	12/31/2015		Offline
Scattergood (3)	450	12/31/2015		Offline
Encina (1,2,3)	318	12/31/2017		12/31/2017
Encina (4,5)	628	12/31/2017		12/31/2017
Pittsburg (5,6)	629	12/31/2017		12/31/2017
Moss Landing (1,2)	1,020	12/31/2017	12/31/2020	12/31/2020
Moss Landing (6,7)	1,510	12/31/2017	12/31/2020	12/31/2020
Huntington Beach (1,2)	452	12/31/2020		12/31/2020
Redondo (5,6)	354	12/31/2020		12/31/2020
Redondo (7,8)	989	12/31/2020		12/31/2020
Alamitos (1,2)	350	12/31/2020		12/31/2020
Alamitos (3,4)	668	12/31/2020		12/31/2020
Alamitos (5,6)	993	12/31/2020		12/31/2020
Mandalay (1,2)	430	12/31/2020		12/31/2020
Ormand Beach (1,2)	1,516	12/31/2020		12/31/2020
Scattergood (1,2)	367	12/31/2024		12/31/2024
Diablo Canyon (1,2)	2,240	12/31/2024		12/31/2035
Haynes (1,2)	444	12/31/2019	12/31/2029	12/31/2027
Harbor (1,2,5)	229	12/31/2015	12/31/2029	12/31/2029
Haynes (8,9,10)	575	12/31/2019	12/31/2029	12/31/2029

Schedule 8
Annual Base Case EG Throughput (BCF)

Year	SDG&E EWG/UEG	SoCal EWG/UEG	SoCal Large Cogen	Total
2016	51	188	49	287
2017	48	177	49	274
2018	43	169	49	261
2019	41	164	49	254
2020	40	162	48	250
2021	40	153	48	241
2022	40	152	47	239
2023	39	151	47	237
2024	39	150	46	235
2025	38	149	45	233
2026	38	147	45	230
2027	37	145	45	227
2028	37	143	44	224
2029	36	141	44	221
2030	36	138	44	218
2031	36	138	44	218
2032	36	138	44	218
2033	36	138	44	218
2034	36	138	44	218
2035	36	138	44	218

Schedule 9
Annual Dry Hydro EG Throughput (BCF)

Year	SDG&E EWG/UEG	SoCal EWG/UEG	SoCal Large Cogen	Total
2016	52	211	49	312
2017	51	201	49	301
2018	46	194	49	290
2019	45	187	49	281
2020	43	184	49	276
2021	44	181	49	273
2022	44	180	48	272
2023	43	179	47	270
2024	43	178	47	268
2025	43	177	46	266
2026	42	174	46	261
2027	41	170	45	257
2028	41	167	45	253
2029	40	163	44	248
2030	40	160	44	244
2031	40	160	44	244
2032	40	160	44	244
2033	40	160	44	244
2034	40	160	44	244
2035	40	160	44	244

Schedule 10
Base Case EG Winter Coincidental Peak Day Demand (MMCFD)

Year	SDG&E EWG/UEG	SoCal EWG/UEG & Large Cogen	Total
2016	145	712	857
2017	142	712	854
2018	139	711	850
2019	135	711	846
2020	132	711	842
2021	128	710	838
2022	123	710	833
2023	119	710	828
2024	116	709	825
2025	113	709	822
2026	111	709	819
2027	108	708	817
2028	106	708	814
2029	103	707	810
2030	98	707	805
2031	98	707	805
2032	98	707	805
2033	98	707	805
2034	98	707	805
2035	98	707	805

Schedule 11
Dry Hydro EG Summer Coincidental Peak Day Demand (MMCFD)

Year	SDG&E EWG/UEG	SoCal EWG/UEG & Large Cogen	Total
2016	281	1,588	1,868
2017	255	1,535	1,790
2018	230	1,478	1,708
2019	204	1,422	1,627
2020	201	1,355	1,556
2021	202	1,286	1,488
2022	201	1,251	1,452
2023	200	1,221	1,422
2024	200	1,188	1,389
2025	202	1,153	1,355
2026	203	1,118	1,321
2027	205	1,084	1,288
2028	206	1,053	1,259
2029	207	1,026	1,233
2030	207	1,006	1,213
2031	207	1,006	1,213
2032	207	1,006	1,213
2033	207	1,006	1,213
2034	207	1,006	1,213
2035	207	1,006	1,213

2016 CALIFORNIA GAS REPORT

INDUSTRIAL/COMMERCIAL COGENERATION < 20MW

Small Cogeneration (Capacity < 20 Mw)
Gas Demand

INTRODUCTION

The gas demand forecast for small cogeneration (capacity < 20 Mw) is based on an econometric relationship from analysis of annual historical data together with a monthly profile of how the annual consumption is split over the months of a year.

Although these customers are associated with G-50 transportation rates their gas demand in total is split into two tiers based on a customers' annual consumption (tier 1 for ≤ 3,000,000 Thm/yr; and tier 2 for > 3,000,000 Thm/yr). As electric generation customers their consumption is billed at the EG rate structure.

BASE EQUATION TO FORECAST ANNUAL DEMAND

The base forecast equation for annual demand is shown below:

LN(SmCoGen_MDth/yr) = 7.71609+ LN(#Cust) x (0.45007)
+ LN(G/E) x (-0.23693), where

#Cust = Number of active meters/customers,
G =SCG's "EG tier1" Burner-Tip Price cnv. to ¢/Kwh
at 87.60 Thm/Yr per Kw, and
E = SCE-Retail Ind Elec. Price. ¢/Kwh

The small cogeneration gas demand in a particular year is calculated as:

SmCoGen_MDth/yr = EXP[LN(SmCoGen_MDth/yr)].

For example, the calculation of small cogeneration gas demand for 2017 is as follows:

LN[SmCoGen_MDth/yr] = 7.71609 + LN(223.6) x (0.45007)
+ LN[(11.322 ¢/Kwh)/(12.135 ¢/Kwh)] x (-0.23693)

LN[SmCoGen_MDth/yr] = 10.16734

(26,039 MDth/yr) = (EXP[10.16734])

The table below shows the base annual small cogeneration gas demand forecast.

Base Annual Forecast of Small Cogeneration Gas Demand

Year	Annual Load (Mdth)	Cust cnt	LN(Ann. Mdth/Yr)	LN(Cust cnt)	LN (G/E)	Gas/Elec. (G/E) Price Ratio	SCE-Retail Ind Elec. Price	SCG's "EG tier1" Burner-Tip Price cnv. to ¢/Kwh at 87.60 Thm/Yr per Kw
2016	26,345	221	10.179	5.398	-0.140	0.87	11.57	10.05
2017	26,039	224	10.167	5.410	-0.069	0.93	12.14	11.32
2018	26,176	226	10.173	5.419	-0.074	0.93	12.62	11.72
2019	26,296	228	10.177	5.428	-0.076	0.93	13.32	12.35
2020	26,455	230	10.183	5.438	-0.082	0.92	14.00	12.90
2021	26,186	232	10.173	5.446	-0.024	0.98	14.64	14.29
2022	25,661	234	10.153	5.455	0.078	1.08	14.78	15.98
2023	25,482	236	10.146	5.464	0.125	1.13	15.21	17.24
2024	25,445	238	10.144	5.473	0.148	1.16	15.76	18.29
2025	25,315	240	10.139	5.481	0.185	1.20	16.11	19.39
2026	25,275	242	10.138	5.489	0.208	1.23	16.72	20.57
2027	25,292	244	10.138	5.497	0.219	1.24	17.08	21.26
2028	25,290	246	10.138	5.503	0.232	1.26	17.45	21.99
2029	25,223	247	10.136	5.510	0.255	1.29	17.82	22.99
2030	25,182	249	10.134	5.517	0.276	1.32	18.19	23.96
2031	25,194	251	10.134	5.524	0.286	1.33	18.59	24.74
2032	25,159	252	10.133	5.530	0.305	1.36	18.98	25.74
2033	25,170	254	10.133	5.537	0.316	1.37	19.39	26.60
2034	25,165	256	10.133	5.544	0.330	1.39	19.82	27.57
2035	25,178	258	10.134	5.551	0.341	1.41	20.26	28.48

NONCORE SELF-GENERATION INCENTIVE PROGRAM (G-50, SGIP LOAD)

SoCalGas administers a program funded by the State of California to encourage customers to install small capacity electric generation equipment to generate electricity for the customer's own use (not for re-sale in to the electric transmission & distribution grid). The table below shows the expected annual gas demand for the noncore (G-50) part of the SGIP:

Noncore SGIP Annual Forecast of Gas Demand

Year	G50 SGIP (Mdth)
2015	0.0
2016	2.8
2017	7.3
2018	13.0
2019	18.6
2020	24.3
2021	29.9
2022	35.6
2023	41.2
2024	46.9
2025	52.5
2026	58.2
2027	63.8
2028	69.5
2029	75.1
2030	75.1
2031	75.1
2032	75.1
2033	75.1
2034	75.1
2035	75.1

MONTHLY PATTERN FOR TOTAL SMALL EG/COGEN LOAD

This total annual small cogeneration gas demand was "split" into monthly load using the monthly proportions in the table below.

Month #	Month	Smoothed Monthly Load as % of Annual (2013-2015)
1	Jan	8.145%
2	Feb	7.273%
3	Mar	7.906%
4	Apr	8.072%
5	May	8.150%
6	Jun	8.341%
7	Jul	9.064%
8	Aug	9.416%
9	Sep	8.972%
10	Oct	8.524%
11	Nov	8.097%
12	Dec	8.040%
	Total	100.000%

FORECAST RESULTS

Based on the year 2017 example above together with the monthly percentages of annual total load in the table above, the August 2017 small cogeneration (G-50) gas demand is calculated as:

SmCoGen_G-50 = (2,452 MDth) = (26,039 MDth/yr, base forecast
+ 7 MDth/yr, from G-50 SGIP)
x (0.09416, monthly % of annual)

The tables below provide the small cogeneration annual and monthly gas demand forecasts. Recorded data are for year 2015, while forecasts cover years from 2016 through 2035.

**Annual Small CoGen (C&I) Gas Demand:
Recorded (2015) and
Forecast (2016-2035) (MDth)**

Date	Small Cogen (C&I) (G-50) Gas Demand (MDth)
2015	24,486
2016	26,348
2017	26,047
2018	26,189
2019	26,314
2020	26,480
2021	26,216
2022	25,697
2023	25,523
2024	25,492
2025	25,368
2026	25,333
2027	25,356
2028	25,359
2029	25,299
2030	25,257
2031	25,269
2032	25,234
2033	25,245
2034	25,240
2035	25,253

**Monthly Small CoGen (C&I) Gas Demand:
Recorded (2015) and
Forecast (2016-2035) (MDth)**

Year	Month	Small Cogen (C&I) (G-50) Gas Demand (MDth)
2015	Jan-15	1,994
2015	Feb-15	1,781
2015	Mar-15	1,936
2015	Apr-15	1,976
2015	May-15	1,996
2015	Jun-15	2,042
2015	Jul-15	2,220
2015	Aug-15	2,306
2015	Sep-15	2,197
2015	Oct-15	2,087
2015	Nov-15	1,983
2015	Dec-15	1,969
2016	Jan-16	2,146
2016	Feb-16	1,916
2016	Mar-16	2,083
2016	Apr-16	2,127
2016	May-16	2,147
2016	Jun-16	2,198
2016	Jul-16	2,388
2016	Aug-16	2,481
2016	Sep-16	2,364
2016	Oct-16	2,246
2016	Nov-16	2,133
2016	Dec-16	2,118
2017	Jan-17	2,121
2017	Feb-17	1,894
2017	Mar-17	2,059
2017	Apr-17	2,102
2017	May-17	2,123
2017	Jun-17	2,173
2017	Jul-17	2,361
2017	Aug-17	2,452
2017	Sep-17	2,337
2017	Oct-17	2,220
2017	Nov-17	2,109
2017	Dec-17	2,094
2018	Jan-18	2,133
2018	Feb-18	1,905
2018	Mar-18	2,071
2018	Apr-18	2,114
2018	May-18	2,134
2018	Jun-18	2,184
2018	Jul-18	2,374
2018	Aug-18	2,466
2018	Sep-18	2,350
2018	Oct-18	2,232
2018	Nov-18	2,120
2018	Dec-18	2,106

**Monthly Small CoGen (C&I) Gas Demand:
Recorded (2015) and
Forecast (2016-2035) (MDth)**

Year	Month	Small Cogen (C&I) (G-50) Gas Demand (MDth)
2019	Jan-19	2,143
2019	Feb-19	1,914
2019	Mar-19	2,080
2019	Apr-19	2,124
2019	May-19	2,145
2019	Jun-19	2,195
2019	Jul-19	2,385
2019	Aug-19	2,478
2019	Sep-19	2,361
2019	Oct-19	2,243
2019	Nov-19	2,131
2019	Dec-19	2,116
2020	Jan-20	2,157
2020	Feb-20	1,926
2020	Mar-20	2,094
2020	Apr-20	2,137
2020	May-20	2,158
2020	Jun-20	2,209
2020	Jul-20	2,400
2020	Aug-20	2,493
2020	Sep-20	2,376
2020	Oct-20	2,257
2020	Nov-20	2,144
2020	Dec-20	2,129
2021	Jan-21	2,135
2021	Feb-21	1,907
2021	Mar-21	2,073
2021	Apr-21	2,116
2021	May-21	2,137
2021	Jun-21	2,187
2021	Jul-21	2,376
2021	Aug-21	2,468
2021	Sep-21	2,352
2021	Oct-21	2,235
2021	Nov-21	2,123
2021	Dec-21	2,108
2022	Jan-22	2,093
2022	Feb-22	1,869
2022	Mar-22	2,032
2022	Apr-22	2,074
2022	May-22	2,094
2022	Jun-22	2,143
2022	Jul-22	2,329
2022	Aug-22	2,420
2022	Sep-22	2,306
2022	Oct-22	2,190
2022	Nov-22	2,081
2022	Dec-22	2,066
2023	Jan-23	2,079
2023	Feb-23	1,856
2023	Mar-23	2,018
2023	Apr-23	2,060
2023	May-23	2,080
2023	Jun-23	2,129
2023	Jul-23	2,314
2023	Aug-23	2,403
2023	Sep-23	2,290
2023	Oct-23	2,176
2023	Nov-23	2,067
2023	Dec-23	2,052

**Monthly Small CoGen (C&I) Gas Demand:
Recorded (2015) and
Forecast (2016-2035) (MDth)**

Year	Month	Small Cogen (C&I) (G-50) Gas Demand (MDth)
2024	Jan-24	2,076
2024	Feb-24	1,854
2024	Mar-24	2,015
2024	Apr-24	2,058
2024	May-24	2,078
2024	Jun-24	2,126
2024	Jul-24	2,311
2024	Aug-24	2,400
2024	Sep-24	2,287
2024	Oct-24	2,173
2024	Nov-24	2,064
2024	Dec-24	2,050
2025	Jan-25	2,066
2025	Feb-25	1,845
2025	Mar-25	2,006
2025	Apr-25	2,048
2025	May-25	2,067
2025	Jun-25	2,116
2025	Jul-25	2,299
2025	Aug-25	2,389
2025	Sep-25	2,276
2025	Oct-25	2,162
2025	Nov-25	2,054
2025	Dec-25	2,040
2026	Jan-26	2,063
2026	Feb-26	1,843
2026	Mar-26	2,003
2026	Apr-26	2,045
2026	May-26	2,065
2026	Jun-26	2,113
2026	Jul-26	2,296
2026	Aug-26	2,385
2026	Sep-26	2,273
2026	Oct-26	2,159
2026	Nov-26	2,051
2026	Dec-26	2,037
2027	Jan-27	2,065
2027	Feb-27	1,844
2027	Mar-27	2,005
2027	Apr-27	2,047
2027	May-27	2,066
2027	Jun-27	2,115
2027	Jul-27	2,298
2027	Aug-27	2,387
2027	Sep-27	2,275
2027	Oct-27	2,161
2027	Nov-27	2,053
2027	Dec-27	2,039
2028	Jan-28	2,065
2028	Feb-28	1,844
2028	Mar-28	2,005
2028	Apr-28	2,047
2028	May-28	2,067
2028	Jun-28	2,115
2028	Jul-28	2,299
2028	Aug-28	2,388
2028	Sep-28	2,275
2028	Oct-28	2,162
2028	Nov-28	2,053
2028	Dec-28	2,039

**Monthly Small CoGen (C&I) Gas Demand:
Recorded (2015) and
Forecast (2016-2035) (MDth)**

Year	Month	Small Cogen (C&I) (G-50) Gas Demand (MDth)
2029	Jan-29	2,061
2029	Feb-29	1,840
2029	Mar-29	2,000
2029	Apr-29	2,042
2029	May-29	2,062
2029	Jun-29	2,110
2029	Jul-29	2,293
2029	Aug-29	2,382
2029	Sep-29	2,270
2029	Oct-29	2,156
2029	Nov-29	2,048
2029	Dec-29	2,034
2030	Jan-30	2,057
2030	Feb-30	1,837
2030	Mar-30	1,997
2030	Apr-30	2,039
2030	May-30	2,058
2030	Jun-30	2,107
2030	Jul-30	2,289
2030	Aug-30	2,378
2030	Sep-30	2,266
2030	Oct-30	2,153
2030	Nov-30	2,045
2030	Dec-30	2,031
2031	Jan-31	2,058
2031	Feb-31	1,838
2031	Mar-31	1,998
2031	Apr-31	2,040
2031	May-31	2,059
2031	Jun-31	2,108
2031	Jul-31	2,290
2031	Aug-31	2,379
2031	Sep-31	2,267
2031	Oct-31	2,154
2031	Nov-31	2,046
2031	Dec-31	2,032
2032	Jan-32	2,055
2032	Feb-32	1,835
2032	Mar-32	1,995
2032	Apr-32	2,037
2032	May-32	2,057
2032	Jun-32	2,105
2032	Jul-32	2,287
2032	Aug-32	2,376
2032	Sep-32	2,264
2032	Oct-32	2,151
2032	Nov-32	2,043
2032	Dec-32	2,029
2033	Jan-33	2,056
2033	Feb-33	1,836
2033	Mar-33	1,996
2033	Apr-33	2,038
2033	May-33	2,057
2033	Jun-33	2,106
2033	Jul-33	2,288
2033	Aug-33	2,377
2033	Sep-33	2,265
2033	Oct-33	2,152
2033	Nov-33	2,044
2033	Dec-33	2,030

**Monthly Small CoGen (C&I) Gas Demand:
Recorded (2015) and
Forecast (2016-2035) (MDth)**

Year	Month	Small Cogen (C&I) (G-50) Gas Demand (MDth)
2034	Jan-34	2,056
2034	Feb-34	1,836
2034	Mar-34	1,996
2034	Apr-34	2,037
2034	May-34	2,057
2034	Jun-34	2,105
2034	Jul-34	2,288
2034	Aug-34	2,377
2034	Sep-34	2,265
2034	Oct-34	2,151
2034	Nov-34	2,044
2034	Dec-34	2,029
2035	Jan-35	2,057
2035	Feb-35	1,837
2035	Mar-35	1,997
2035	Apr-35	2,038
2035	May-35	2,058
2035	Jun-35	2,106
2035	Jul-35	2,289
2035	Aug-35	2,378
2035	Sep-35	2,266
2035	Oct-35	2,153
2035	Nov-35	2,045
2035	Dec-35	2,030

2016 CALIFORNIA GAS REPORT

INDUSTRIAL/COMMERCIAL COGENERATION > 20MW

Please refer to the Non-Cogeneration EG section of the workpapers for the description of the details concerning Industrial/Commercial Cogen.

2016 CALIFORNIA GAS REPORT

ENHANED OIL RECOVERY-RELATED COGENERATION

Enhanced Oil Recovery - Cogeneration

2016 CALIFORNIA GAS REPORT WORKPAPERS

Actuals were recorded for 1995 through 2015. Forecasted demand for 2016 to 2036 assumes that EOR is going to maintain at 2015 levels. Forecasted break out by service levels (Medium Pressure Distribution - MPD, High Pressure Distribution - HPD, and Transmission Level Service - TLS) was determined by using service level distributions from 2015 actuals.

In 2015, recorded gas deliveries to the EOR-related cogeneration market decreased by 37% from 2014 mainly due to changes in operations for some of the existing EOR-related cogeneration customers. EOR-related cogeneration demand is forecasted to remain steady going forward.

SoCalGas 2016 CGR Demand Forecast for EOR Market
2016 CGR Forecast Years = 2016 thru 2036

Units	Year	MPD 0.5%	Cogen HPD 66.1%	TLS 33.5%	Total 100.0%
Mdth/year	1995 actual	168	24,614	12,462	**37,244**
Mdth/year	1995 actual	210	30,782	15,584	**46,577**
Mdth/year	1996 actual	204	29,864	15,120	**45,188**
Mdth/year	1997 actual	190	27,763	14,056	**42,009**
Mdth/year	1999 actual	151	22,104	11,191	**33,446**
Mdth/year	2000 actual	126	18,476	9,354	**27,957**
Mdth/year	2001 actual	70	10,302	5,216	**15,588**
Mdth/year	2002 actual	111	16,213	8,208	**24,532**
Mdth/year	2003 actual	85	12,454	6,305	**18,844**
Mdth/year	2004 actual	71	10,456	5,294	**15,821**
Mdth/year	2005 actual	71	10,411	5,271	**15,753**
Mdth/year	2006 actual	82	11,933	6,041	**18,056**
Mdth/year	2007 actual	110	16,020	8,111	**24,240**
Mdth/year	2008 actual	100	14,573	7,378	**22,050**
Mdth/year	2009 actual	36	5,193	2,629	**7,857**
Mdth/year	2010 actual	21	3,023	1,531	**4,574**
Mdth/year	2011 actual	19	2,762	1,398	**4,179**
Mdth/year	2012 actual	37	5,398	2,733	**8,168**
Mdth/year	2013 actual	40	5,867	2,970	**8,877**
Mdth/year	2014 actual	28	4,128	2,090	**6,246**
Mdth/year	2015 actual	18	2,582	1,307	**3,907**
Mdth/year	2016 forecast	18	2,582	1,307	**3,907**
Mdth/year	2017 forecast	18	2,582	1,307	**3,907**
Mdth/year	2018 forecast	18	2,582	1,307	**3,907**
Mdth/year	2019 forecast	18	2,582	1,307	**3,907**
Mdth/year	2020 forecast	18	2,582	1,307	**3,907**
Mdth/year	2021 forecast	18	2,582	1,307	**3,907**
Mdth/year	2022 forecast	18	2,582	1,307	**3,907**
Mdth/year	2023 forecast	18	2,582	1,307	**3,907**
Mdth/year	2024 forecast	18	2,582	1,307	**3,907**
Mdth/year	2025 forecast	18	2,582	1,307	**3,907**
Mdth/year	2026 forecast	18	2,582	1,307	**3,907**
Mdth/year	2027 forecast	18	2,582	1,307	**3,907**
Mdth/year	2028 forecast	18	2,582	1,307	**3,907**
Mdth/year	2029 forecast	18	2,582	1,307	**3,907**
Mdth/year	2030 forecast	18	2,582	1,307	**3,907**
Mdth/year	2031 forecast	18	2,582	1,307	**3,907**
Mdth/year	2032 forecast	18	2,582	1,307	**3,907**
Mdth/year	2033 forecast	18	2,582	1,307	**3,907**
Mdth/year	2034 forecast	18	2,582	1,307	**3,907**
Mdth/year	2035 forecast	18	2,582	1,307	**3,907**
Mdth/year	2036 forecast	18	2,582	1,307	**3,907**

2016 CALIFORNIA GAS REPORT

REFINERY RELATED COGENERATION

Refinery Related Cogeneration
Gas Demand

Please see the discussion under “Refineries” section above for refinery-related cogeneration gas demand.

2016 CALIFORNIA GAS REPORT

WHOLESALE AND INTERNATIONAL REQUIREMENTS

2016 CALIFORNIA GAS REPORT

SAN DIEGO GAS & ELECTRIC

San Diego Gas and Electric Company

The detail of SDG&E's forecast is published in the 2016 California Gas Report Workpapers for San Diego Gas and Electric. Please refer to the SDG&E redacted workpapers.

2016 CALIFORNIA GAS REPORT

LONG BEACH GAS AND OIL DEPARTMENT

The workpapers for Long Beach Oil and Gas have been redacted in this version.

2016 CALIFORNIA GAS REPORT

SOUTHWEST GAS CORPORATION

The workpapers for Southwest Gas Corporation have been redacted in this version.

2016 CALIFORNIA GAS REPORT

CITY OF VERNON

The workpapers for the City of Vernon have been redacted in this version.

2016 CALIFORNIA GAS REPORT

MEXICALI

The workpapers for ECOGAS Mexico have been redacted in this version.

2016 CALIFORNIA GAS REPORT

CORE PEAK DAY FORECAST

SoCalGas Heating Degree Day (HDD) Weather Designs
(Calendar Based)

	Cold		Average	Hot	
	1-in-35 exceedance	1-in-10 exceedance		1-in-10 exceedance	1-in-35 exceedance
January	328.5	306.7	265.3	224.0	202.2
February	289.2	270.0	233.6	197.1	178.0
March	217.4	203.0	175.6	148.2	133.8
April	156.7	146.3	126.6	106.8	96.5
May	56.7	52.9	45.8	38.6	34.9
June	14.4	13.5	11.7	9.8	8.9
July	2.7	2.5	2.2	1.8	1.6
August	2.3	2.1	1.9	1.6	1.4
September	5.3	4.9	4.3	3.6	3.2
October	45.5	42.5	36.8	31.0	28.0
November	176.4	164.7	142.4	120.2	108.5
December	364.0	339.9	294.0	248.1	224.0
	1659.0	1549.0	**1340.0**	1131.0	1021.0

Notes:

1/ 20-Yr-Avg (Jan1996-Dec2015)

2/ Daily system wide temperature based on six-zone average using customer counts by zone for December 2015.

2016-CGR Sales + Transport + Exchange for Month of DECEMBER
(units=Mdth/Day)
"1-in-2" Likelihood Cold Day Temperature

No.	"CGR_B"	CLASS	2015	2016	2017	2018	2019	2020	2020	2022	2025	2030	2035
1	RESIDEN		2012.2	2007.9	2003.0	1997.1	1990.4	1979.2	1979.2	1952.3	1913.9	1866.7	1851.3
2	Com G10		422.0	413.4	413.7	406.8	400.5	394.8	394.8	377.9	357.6	330.4	334.8
2	GAC 2/		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2	GEN 2/		2.5	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
3	Ind G10		73.6	69.9	70.6	70.0	69.3	68.7	68.7	66.1	62.4	55.4	52.4
4	NGV 2/		35.5	37.3	39.0	40.7	42.5	44.2	44.2	47.6	52.8	61.5	70.2
Total:		MDth/day	2545.9	2531.9	2529.6	2518.0	2506.1	2490.2	2490.2	2447.3	2390.0	2317.4	2312.0
		MMcf/day 4/	2459.1	2445.5	2443.3	2432.1	2420.6	2405.3	2405.3	2363.9	2308.5	2238.4	2233.2
		Days per Mo	31	31	31	31	31	31	31	31	31	31	31
		Pk-Day Temp. (deg-F) =	**45.4**	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4
		Hdd: December--ColdYr =	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0
		"Wkday/Wkend" Factor-Res:	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		"Wkday/Wkend" Factor-NonRes:	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Use this Methodology for the 2016-CGR Res and C&I Calculations

Notes:

1/ =("Base-Dec" / 31 days)+[("Cold-Dec" - "Base-Dec")
/ 'Cold-Dec_Hdd']*(65 degF - 45.4 degF)

2/ "Non-temperature" sensitive market segment.

3/ "Weekday/Weekend" Factor applies to the "raw" estimate.

4/ Dth/Mcf= 1.0353

2016-CGR Sales + Transport + Exchange for Month of DECEMBER
(units=Mdth/Day)
"1-in-10" Likelihood Cold Day Temperature

No. "CGR_B"	CLASS	2015	2016	2017	2018	2019	2020	2020	2022	2025	2030	2035
1	RESIDEN	2309.6	2304.9	2299.5	2293.0	2285.5	2272.9	2272.9	2242.3	2198.8	2145.5	2127.6
2	Com G10	469.2	459.7	460.0	452.3	445.4	439.0	439.0	420.3	397.7	367.4	372.3
2	GAC 2/	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2	GEN 2/	2.5	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
3	Ind G10	77.2	73.5	74.2	73.6	72.8	72.2	72.2	69.5	65.6	58.3	55.2
4	NGV 2/	35.5	37.3	39.0	40.7	42.5	44.2	44.2	47.6	52.8	61.5	70.2
Total:	MDth/day	2894.2	2878.7	2876.0	2863.0	2849.6	2831.6	2831.6	2783.1	2718.2	2636.1	2628.6
	MMcf/day 4/	2795.5	2780.6	2778.0	2765.4	2752.4	2735.1	2735.1	2688.3	2625.5	2546.2	2539.0
	Days per Mo	31	31	31	31	31	31	31	31	31	31	31
Pk-Day Temp. (deg-F) =		**41.9**	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9
Hdd: December--ColdYr =		364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0
"Wkday/Wkend" Factor-Res:		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
"Wkday/Wkend" Factor-NonRes:		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Use this Methodology for the 2016-CGR Res and C&I Calculations

Notes:

1/ =("Base-Dec" / 31 days)+[("Cold-Dec" - "Base-Dec")
/ 'Cold-Dec_Hdd']*(65 degF - 41.9 degF)

2/ "Non-temperature" sensitive market segment.

3/ "Weekday/Weekend" Factor applies to the "raw" estimate.

4/ Dth/Mcf= 1.0353

2016-CGR Sales + Transport + Exchange for Month of DECEMBER
(units=Mdth/Day)
"1-in-35" Likelihood Cold Day Temperature

No.	"CGR_B"	CLASS	2015	2016	2017	2018	2019	2020	2020	2022	2025	2030	2035
1	RESIDEN		2457.1	2452.2	2446.6	2439.7	2431.9	2418.5	2418.5	2386.2	2340.1	2283.8	2264.7
2	Com G10		492.7	482.7	483.0	474.9	467.6	461.0	461.0	441.3	417.5	385.8	390.9
2	GAC 2/		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2	GEN 2/		2.5	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
3	Ind G10		79.0	75.2	76.0	75.3	74.6	73.9	73.9	71.2	67.2	59.7	56.5
4	NGV 2/		35.5	37.3	39.0	40.7	42.5	44.2	44.2	47.6	52.8	61.5	70.2
Total:		MDth/day	3067.0	3050.7	3047.9	3034.1	3020.0	3000.9	3000.9	2949.7	2881.0	2794.2	2785.7
		MMcf/day 4/	2962.4	2946.7	2944.0	2930.6	2917.0	2898.6	2898.6	2849.1	2782.8	2699.0	2690.7
		Days per Mo	31	31	31	31	31	31	31	31	31	31	31
		Pk-Day Temp. (deg-F) =	**40.1**	40.1	40.1	40.1	40.1	40.1	40.1	40.1	40.1	40.1	40.1
		Hdd: December--ColdYr =	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0	364.0
		"Wkday/Wkend" Factor-Res:	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
		"Wkday/Wkend" Factor-NonRes:	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Use this Methodology for the 2016-CGR Res and C&I Calculations

Notes:

1/ =("Base-Dec" / 31 days)+[("Cold-Dec" - "Base-Dec")
/ Cold-Dec_Hdd]*(65 degF - 40.1 degF

2/ "Non-temperature" sensitive market segment.

3/ "Weekday/Weekend" Factor applies to the "raw" estimate.

4/ Dth/Mcf= 1.0353

2016-CGR Sales + Transport + Exchange for Month of DECEMBER
(units=mdth)
Temp=December, Cold Year

No.	"CGR_CLASS	2015	2016	2017	2018	2019	2020	2020	2022	2025	2030	2035
1	Residen	41999.6	41892.8	41774.0	41636.2	41480.6	41232.7	41232.7	40645.2	39806.1	38759.0	38453.6
2	Com G10	9843.4	9644.9	9649.2	9487.9	9342.3	9209.0	9209.0	8814.7	8340.2	7705.2	7807.3
2	GAC	4.5	4.1	4.1	4.1	4.1	2.0	2.0	2.0	2.0	2.0	2.0
2	GEN	76.6	98.8	99.8	100.8	101.8	101.8	101.8	101.8	101.8	101.8	101.8
3	Ind G10	2031.0	1925.7	1943.3	1926.1	1906.1	1887.5	1887.5	1817.3	1712.7	1522.0	1439.1
4	NGV	1101.2	1154.9	1208.6	1262.3	1316.0	1369.7	1369.7	1477.1	1638.2	1906.7	2175.2
		55056	54721	54679	54417	54151	53803	53803	52858	51601	49997	49979
	2016 CGR: Mdth/Hdd	98	98	98	97	97	96	96	95	93	90	89

2016-CGR Sales + Transport + Exchange for Month of DECEMBER
(units=mdth)
Temp=December, "Base/Zero-Hdd" Year

No. "CGR_ CLASS	2015	2016	2017	2018	2019	2020	2020	2022	2025	2030	2035
1 Residen	11471.2	11404.9	11336.4	11265.4	11189.0	11089.0	11089.0	10871.3	10559.4	10135.4	10086.6
2 Com G10	4992.8	4893.5	4893.7	4811.6	4737.5	4669.7	4669.7	4469.0	4227.5	3904.3	3956.3
2 GAC	4.5	4.1	4.1	4.1	4.1	2.0	2.0	2.0	2.0	2.0	2.0
2 GEN	76.6	98.8	99.8	100.8	101.8	101.8	101.8	101.8	101.8	101.8	101.8
3 Ind G10	1657.5	1562.2	1575.4	1560.3	1542.8	1526.5	1526.5	1468.0	1382.7	1227.1	1159.4
4 NGV	1101.2	1154.9	1208.6	1262.3	1316.0	1369.7	1369.7	1477.1	1638.2	1906.7	2175.2
	19304	19118	19118	19004	18891	18759	18759	18389	17912	17277	17481
2016 CGR: Mdth	19304	19118	19118	19004	18891	18759	18759	18389	17912	17277	17481

2016 CALIFORNIA GAS REPORT

SUPPORTING DATA

2016 CALIFORNIA GAS REPORT

WEATHER

HEATING DEGREE DAYS – AVERAGE AND "COLD" YEAR DESIGNS AND WINTER PEAK DAY DESIGN TEMPERATURES

Weather for SoCalGas: Heating Degree Days – Average and Cold Year Designs; and Winter Peak Day Design Temperatures

July 2016

I. Overview

Southern California Gas Company's service area extends from Fresno County to the Mexican border. To quantify the overall temperature experienced within this region, SoCalGas aggregates daily temperature recordings from fifteen U.S. Weather Bureau weather stations first into six temperature zones and then into one system average heating degree-day ("HDD") figure. The table below lists weather station locations by temperature zones.

Table 1

Weather Stations by Temperature Zones and Weights

Temperature Zone	Weight	Station (After 10/31/2002)	Station (Before 11/1/2002)
1. High mountain	0.0058	Big Bear Lake	Lake Arrowhead
2. Low desert	0.0383	Palm Springs	Palm Springs
		El Centro	Brawley
3. Coastal	0.1862	Los Angeles Airport	Los Angeles Airport
		Newport Beach	Newport Beach Harbor
		Santa Barbara Airport	Santa Barbara Airport
4. High desert	0.0711	Bakersfield	Bakersfield Airport
		Lancaster Airport	Palmdale
		Fresno	Visalia
5. Interior valleys	0.3857	Burbank	Burbank
		Pasadena	Pasadena
		Ontario	Pomona Cal Poly
		Rialto	Redlands
6. Basin	0.3128	Los Angeles Civic Center	Los Angeles Civic Center/ Downtown-USC
		Santa Ana	Santa Ana

SoCalGas uses 65° Fahrenheit to calculate the number of HDDs. One heating degree day is accumulated for each degree that the daily average is below 65° Fahrenheit. To arrive at the HDD figure for each temperature zone, SoCalGas uses the simple average of the weather station HDDs in that temperature zone. To arrive at the system average HDDs figure for its entire service area, SoCalGas weights the HDD figure for each zone using the proportion of gas customers within each temperature zone based on calendar year 2015 customer counts. These weights are used in calculating the data shown from January 1977 to December 2015.

Daily weather temperatures are from the National Climatic Data Center or from preliminary data that SoCalGas captures each day and posts on its internal Company web-site at the URL: http://utilinet.sempra.com/departments/massmarkets/weather/default.htm for various individual weather stations as well as for its system average values of HDD. Annual HDDs for the entire service area from 1977 to 2015 are listed in Table 2, below.

Table 2

Calendar Month Heating Degree-Days (Jan. 1996 through Dec. 2015)

	Month												Total "Cal-
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year"
1977	313	155	306	101	134	12	4	0	4	29	99	197	1354
1978	284	236	150	175	47	8	6	1	4	17	245	421	1594
1979	416	319	249	110	61	10	3	1	0	30	169	230	1598
1980	241	157	231	126	121	26	2	2	7	37	134	205	1289
1981	229	178	215	101	34	1	1	1	3	62	136	229	1190
1982	376	187	268	151	63	37	3	1	5	22	204	335	1652
1983	266	200	201	173	58	17	1	0	3	9	179	282	1389
1984	240	206	116	117	18	6	0	0	0	45	218	368	1334
1985	356	256	279	89	63	13	1	2	6	30	238	255	1588
1986	154	201	156	108	49	8	2	3	31	31	81	269	1093
1987	351	227	213	60	42	12	6	2	3	18	161	407	1502
1988	302	159	142	119	64	31	2	3	11	16	176	343	1368
1989	367	315	153	61	53	18	1	3	8	40	105	236	1360
1990	298	299	206	72	56	10	1	1	1	10	121	370	1445
1991	284	117	315	119	100	26	4	3	4	45	114	277	1408
1992	284	183	202	40	15	15	1	1	1	11	128	373	1254
1993	338	259	116	51	16	11	0	0	3	11	129	277	1211
1994	231	260	130	112	79	6	3	0	2	41	293	310	1467
1995	318	136	179	129	110	40	2	1	2	14	68	246	1245
1996	264	201	170	57	14	3	1	0	0	68	145	262	1185
1997	283	206	114	97	5	4	1	0	0	27	120	297	1154
1998	269	283	187	185	87	21	0	0	5	43	167	322	1569
1999	265	246	284	235	78	39	1	2	5	8	128	246	1537
2000	247	243	210	81	26	5	2	1	3	65	248	242	1373
2001	379	338	196	209	26	6	4	3	3	21	146	359	1690
2002	334	202	226	149	79	11	2	4	8	78	92	315	1500
2003	141	233	166	180	74	17	1	1	3	16	201	306	1339
2004	292	301	86	85	18	8	3	2	4	73	227	292	1391
2005	287	208	177	116	35	11	4	1	9	44	100	235	1227
2006	272	201	338	163	29	3	0	1	5	36	104	279	1431
2007	348	215	125	118	51	16	1	1	12	37	126	354	1404

2008	347	263	149	124	76	8	1	0	2	23	75	334	1402
2009	196	259	194	134	19	16	3	4	1	44	117	320	1307
2010	254	221	174	164	72	14	8	10	14	43	203	268	1445
2011	251	308	212	105	81	27	3	3	6	40	207	350	1593
2012	224	236	223	119	38	11	6	1	1	16	111	300	1286
2013	330	264	126	66	17	4	1	2	2	44	103	257	1216
2014	142	148	90	76	20	4	0	1	1	5	66	224	777
2015	180	94	64	68	70	5	1	0	1	4	162	316	965
20-Yr-Avg (Jan1996-Dec2015)													
Avg.	**265.3**	**233.5**	**175.6**	**126.6**	**45.8**	**11.7**	**2.2**	**1.9**	**4.3**	**36.8**	**142.4**	**293.9**	**1339.6**
St.Dev.	**65.7**	**55.2**	**66.4**	**50.3**	**28.1**	**9.2**	**2.1**	**2.3**	**3.9**	**22.2**	**51.8**	**40.9**	**215.536**
Min.	**141.0**	**94.0**	**64.0**	**57.0**	**5.0**	**3.0**	**0.0**	**0.0**	**0.0**	**4.0**	**66.0**	**224.0**	**777.0**
Max.	**379.0**	**338.0**	**338.0**	**235.0**	**87.0**	**39.0**	**8.0**	**10.0**	**14.0**	**78.0**	**248.0**	**359.0**	**1690.0**

II. Calculations to Define Our Average-Temperature Year

The simple average of the 20-year period (January 1996 through December 2015) was used to represent the Average Year total and the individual monthly values for HDD. The average of the standard deviations of the 20 most recent 20 year periods (1977-1996, 1978-1997,…,1996-2015) of annual HDDs was used to design the two Cold Years based on a "1-in-10" and "1-in-35" chance, ***c***, that the respective annual "Cold Year" $\boldsymbol{hdd_c}$ value would be exceeded.

A probability model for the annual HDD is based on a t-Distribution with N-1 degrees of freedom, where, N is the number of years of HDD data we use, μ is the average of the last 20 years of HDD, and S_{20} is the average of the standard deviations of the 20 most recent 20 year periods:

$U = (HDD_y - \mu)/S_{20}$, has a t-Distribution with N-1 degrees of freedom.

III. Calculating the Cold-Temperature Year Weather Designs

Cold Year HDD Weather Designs

For SoCalGas, cold-temperature-year HDD weather designs are developed with a 1-in-35 annual chance of occurrence. In terms of probabilities this can be expressed as the following for a "1-in-35" cold-year HDD value in equation 1 and a "1-in-10" cold-year HDD value in equation 2, with Annual HDD as the random variable:

(1) Prob { Annual HDD > "1-in-35" Cold-Yr HDD } = 1/35 = 0.0286

(2) Prob { Annual HDD > "1-in-10" Cold-Yr HDD } = 1/10 = 0.1000

An area of 0.0286 under one tail of the T-Distribution translates to 2.025 standard deviations *above* an average-year based on a t-statistic with 19 degrees of freedom. Using the average of the standard deviations of the 20 most recent 20 year periods, 157.5 HDD, these equations yield values of about 1,659 HDD for a "1-in-35" cold year and 1,549 as the number of HDDs for a "1-in-10" cold year (an area of 0.1000 under one tail of the T-Distribution translates to 1.328 standard deviations *above* an average-year based on a t-statistic with 19 degrees of freedom). For example, the "1-in-35" cold-year HDD is calculated as follows:

(3) Cold-year HDD = 1,659 which equals approximately
1,340 average-year HDDs + 2.025 * 157.5

Table 3 shows monthly HDD figures for "1-in-35" cold year, "1-in-10" cold year and, average year temperature designs. The monthly average-temperature-year HDDs are calculated from weighted monthly HDDs from 1996 to 2015, as shown as the bottom of Table 2, above. For example, the average-year December value of 293.9 HDD equals the simple average of the 20 December HDD figures from 1996 to 2015. SoCalGas calculates the cold--temperature-year monthly HDD values using the same distribution of average-year HDDs. For example, since 21.9 percent of average-temperature-year HDDs occurred in December, the estimated number of HDDs during December for a cold-year is equal to 1,659 HDDs multiplied by 21.9 percent, or 364.0 HDDs.

Table 3

Calendar Month Heating Degree-Day Designs

	Cold		Average	Hot	
	1-in-35 Design	1-in-10 Design		1-in-10 Design	1-in-35 Design
January	328.5	306.7	265.3	224.0	202.2
February	289.2	270.0	233.6	197.1	178.0
March	217.4	203.0	175.6	148.2	133.8
April	156.7	146.3	126.6	106.8	96.5
May	56.7	52.9	45.8	38.6	34.9
June	14.4	13.5	11.7	9.8	8.9
July	2.7	2.5	2.2	1.8	1.6
August	2.3	2.1	1.9	1.6	1.4
September	5.3	4.9	4.3	3.6	3.2
October	45.5	42.5	36.8	31.0	28.0
November	176.4	164.7	142.4	120.2	108.5
December	364.0	339.9	294.0	248.1	224.0
	1659	1549	1340	1131	1021

IV. Calculating the Peak-Day Design Temperature

SoCalGas' Peak-Day design temperature of 40.1 degrees Fahrenheit, denoted "Deg-F," is determined from a statistical analysis of observed annual minimum daily system average temperatures constructed from daily temperature recordings from the three U.S. Weather Bureau weather stations discussed above. Since we have a time series of daily data by year, the following notation will be used for the remainder of this discussion:

(1) $AVG_{y,d}$ = system average value of Temperature
for calendar year "y" and day "d".

The calendar year, y, can range from 1950 through 2015, while the day, d, can range from 1 to 365, for non leap years, or from 1 to 366 for leap years. The "upper" value for the day, d, thus depends on the calendar year, y, and will be denoted by n(y)=365, or 366, respectively, when y is a non-leap year or a leap year.

For each calendar year, we calculate the following statistic from our series of daily system average temperatures defined in equation (1) above:

(2) $$MinAVG_y = \min_{d=1}^{n(y)}\{ AVG_{y,d} \}, \text{ for } y=1950, 1951, \ldots, 2015.$$

(The notation used in equation 2 means "For a particular year, y, list all the daily values of system average temperature for that year, then pick the smallest one.")

The resulting minimum annual temperatures are shown in Tables 4.1 and 4.2, below. Note that most of the minimum temperatures occur in the months of December or January; however, for some calendar years the minimums occurred in other months (the minimum for 2006 was observed in March).

The statistical methods we use to analyze this data employ software developed to fit three generic probability models: the Generalized Extreme Value (GEV) model, the Double-Exponential or GUMBEL (EV1) model and a 2-Parameter Students' T-Distribution (T-Dist) model. [The GEV and EV1 models have the same mathematical specification as those implemented in a DOS-based executable-only computer code that was developed by Richard L. Lehman and described in a paper published in the Proceedings of the Eighth Conference on Applied Climatology, January 17-22, 1993, Anaheim, California, pp. 270-273, by the American Meteorological Society, Boston, MA., with the title "Two Software Products for Extreme Value Analysis: System Overviews of ANYEX and DDEX." At the time he wrote the paper, Dr. Lehman was with the Climate Analysis Center, National Weather Service/NOAA in Washington, D.C., zip code 20233.] The Statistical Analysis Software (SAS) procedure for nonlinear statistical model estimation (PROC MODEL, from SAS V6.12) was used to do the calculations. Further, the calculation procedures were implemented to fit the probability models to observed *maximums* of data, like heating degrees. By recognizing that:

$$- \text{MinAVG}_y = - \min_{d=1}^{n(y)}\{\text{AVG}_{y,d}\} = \max_{d=1}^{n(y)}\{ -\text{AVG}_{y,d}\}, \text{ for y=1950, …, 2015;}$$

this same software, when applied to the *negative* of the minimum temperature data, yields appropriate probability model estimation results.

The calculations done to fit any one of the three probability models chooses the parameter values that provide the "best fit" of the parametric probability model's calculated cumulative distribution function (CDF) to the empirical cumulative distribution function (ECDF). Note that the ECDF is constructed based on the variable "-MinAVG$_y$" (which is a *maximum* over a set of *negative* temperatures) with values of the variable MinAVG$_y$ that are the same as shown in Tables 4.1 and 4.2, below.

In Tables 5.1 and 5.2, the data for -MinAVG$_y$ are shown after they have been sorted from "lowest" to "highest" value. The ascending *ordinal* value is shown in the column labeled "RANK" and the empirical cumulative distribution function is calculated and shown in the next column. The formula used to calculate this function is:

ECDF = (RANK – α)/[MaxRANK + (1 – 2 α)],

where the parameter "α" (shown as *alpha* in Table 5.1 and Table 5.2) is a "small" positive value (usually less than ½) that is used to bound the ECDF away from 0 and 1.

Of the three probability models considered (GEV, EV1, and T_Dist) the results obtained for the T_Dist model were selected since the fit to the ECDF was better than that of either the GEV model or the EV1 model. (Although convergence to stable parameter estimates is occasionally a problem with fitting a GEV model to the ECDF, the T_Dist model had no problems with convergence of the iterative procedure to estimate parameters.)

The T_Dist model used here is a three-parameter probability model where the varable z = (-MinAVG$_y$ - γ) / θ, for each year, y, is presumed to follow a T_Dist with location parameter, γ, and scale parameter, θ, and a third parameter, v, that represents the number of degrees of freedom. For a given number of years of data, N, then v=N-2.

The following mathematical expression specifies the T_Dist model we fit to the data for "-MinAVG$_y$ " shown in Table 5.1 and Table 5.2, below.

(3) ECDF(-MinAVG$_y$) = Prob { -T < -MinAVG$_y$ }= T_Dist{z; γ, θ, v=N-2},

where "T_Dist{ . }" is the cumulative probability distribution function for Student's T-Distribution[1], and

[1] A common mathematical expression for Student's T-Distribution is provided at http://en.wikipedia.org/wiki/Student%27s_t-distribution; with a probability density function

$$f(t) = \frac{\Gamma(\frac{\nu+1}{2})}{\sqrt{\nu\pi}\,\Gamma(\frac{\nu}{2})}\left(1+\frac{t^2}{\nu}\right)^{-\frac{\nu+1}{2}},$$

(4) $z = (-MinAVG_y - \gamma) / \theta$, for each year, y, and

the parameters "γ" and "θ" are estimated for this model for given degrees of freedom v=N-2. The estimated values for γ and θ are shown in Table 5.2 along with the fitted values of the model CDF (the column: "Fitted" Model CDF).

Now, to calculate a *peak-day design temperature*, $TPDD_\delta$, with a specified likelihood, δ, that a value less than $TPDD_\delta$ would be observed, we use the equation below:

(5) $\delta = Prob\{ T \leq TPDD_\delta \}$, which is equivalent to

(6) $\delta = Prob\{ [(-T - \gamma) / \theta] \geq [(-TPDD_\delta - \gamma) / \theta] \}$, $= Prob\{ [(-T - \gamma) / \theta] \geq [z_\delta] \}$,

where $z_\delta = [(-TPDD_\delta - \gamma) / \theta]$. In terms of our probability model,

(7) $\delta = 1 - T\_Dist\{ z_\delta; \gamma, \theta, v=N-2\}$,

which yields the following equation for z_δ,

(7') $z_\delta = \{ TINV\_Dist\{ (1-\delta); \gamma, \theta, v=N-2\}$, where "TINV_Dist{ . }" is the inverse function of the T_Dist{ . } function[2]. The implied equation for $TPDD_\delta$ is:

(8) $TPDD_\delta = - [\gamma + (z_\delta)(\theta)]$.

To calculate the minimum daily (system average) temperature to define our extreme weather event, we specify that this COLDEST-Day be one where the temperature would be lower with a "1-in-35" likelihood. This criterion translates into two equations to be solved based on equations (7) and (8) above:

(9) solve for "z_δ" from equation (7') above with $(1-\delta) = (1 - 1/35) = 1 - 0.0286$,

(10) solve for "$TPDD_\delta$" from $TPDD_\delta = - [\gamma + (z_\delta)(\theta)]$.

The value of $z_\delta = 1.938$ and $TPDD_\delta = - [\gamma + (z_\delta)(\theta)] = 40.1$ degrees Fahrenheit, with values for "v=N-2"; along with "γ" and "θ" in Tables 5.1 & 5.2, below.

SoCalGas' peak-day design temperature of 41.9 degrees Fahrenheit, is calculated in a methodologically similar way as for the 40.1 degree peak day temperature. The criteria specified in equation (9) above for a "1-in-35" likelihood would be replaced by a "1-in-10" likelihood.

(9') solve for "z_δ" from equation (7') above with $(1-\delta) = (1 - 1/10) = 1 - 0.1000$,

which yields a "z_δ" value of $z_\delta = 1.295$ and, $TPDD_\delta = - [\gamma + (z_\delta)(\theta)] = 41.9$ with values for "v=N-2"; along with "γ" and "θ" in Tables 5.1 and 5.2, below.

A plot of the cumulative distribution function for $MinAVG_y$ based on "v=N-2", the fitted model parameters, "γ" and "θ" with values in Tables 5.1 and 5.2, below, is shown in Figure 1.

---

such that $T\_Dist\{z; \gamma, \theta, v=N-2\} = \int f(t)\, dt$, from $t=-\infty$ to $t=z$. Also, the notation Γ(.) is known in mathematics as the GAMMA function; see http://www.wikipedia.org/wiki/Gamma_function for a description. Also, see *Statistical Theory*, 3rd Ed., B.W. Lindgren, MacMillian Pub. Inc, 1976, pp. 336-337.

[2] Computer software packages such as SAS and EXCEL have implemented statistical and mathematical functions to readily calculate values for T_Dist{ . } and TINV_Dist{ . } as defined above.

Table 4.1

YEAR	MINAVG	Month(MinAvg)
1950	40.8585	Jan
1951	44.5693	Dec
1952	43.0700	Jan
1953	45.6549	Feb
1954	45.6758	Dec
1955	45.8255	Dec
1956	44.9003	Feb
1957	39.4876	Jan
1958	46.2613	Nov
1959	48.2481	Feb
1960	42.3228	Jan
1961	47.2081	Dec
1962	43.4118	Jan
1963	42.5866	Jan
1964	45.2272	Nov
1965	44.7932	Jan
1966	46.7014	Jan
1967	40.7518	Dec
1968	40.6224	Dec
1969	44.8364	Jan
1970	46.8176	Dec
1971	42.9711	Jan
1972	41.4097	Dec
1973	45.0571	Jan
1974	42.9762	Jan
1975	44.6276	Jan
1976	44.8362	Jan
1977	48.3407	Jan
1978	41.6430	Dec
1979	41.3713	Jan
1980	50.3423	Jan
1981	49.3340	Jan
1982	45.3367	Jan
1983	48.6653	Jan
1984	46.8997	Dec
1985	45.1165	Feb
1986	48.5883	Feb
1987	43.4540	Dec
1988	43.2798	Dec
1989	40.6049	Feb
1990	38.9961	Dec
1991	48.6632	Mar
1992	47.3393	Dec
1993	46.0990	Jan
1994	47.1409	Nov

Table 4.2

YEAR	MINAVG	Month(MinAvg)
1995	49.8180	Dec
1996	44.9337	Feb
1997	48.3420	Jan
1998	43.6265	Dec
1999	48.9997	Jan
2000	48.7823	Mar
2001	47.1493	Feb
2002	45.8155	Jan
2003	47.0826	Dec
2004	48.2113	Nov
2005	47.2722	Jan
2006	45.7798	Mar
2007	41.5229	Jan
2008	45.8133	Dec
2009	45.2533	Dec
2010	44.7062	Dec
2011	46.7475	Feb
2012	46.7767	Dec
2013	43.9100	Jan
2014	48.0708	Dec
2015	45.6066	Jan

Table 5.1

alpha= 0.375

YEAR	Month(- MinAvg)	Days/Yr	-MinAvg	Rank	Empirical CDF	Fitted Model CDF
1980	Jan	366	-50.3423	1	0.0094	-2.409
1995	Dec	365	-49.8180	2	0.0245	-2.006
1981	Jan	365	-49.3340	3	0.0396	-1.784
1999	Jan	365	-48.9997	4	0.0547	-1.623
2000	Mar	366	-48.7823	5	0.0698	-1.496
1983	Jan	365	-48.6653	6	0.0849	-1.388
1991	Mar	365	-48.6632	7	0.1000	-1.295
1986	Feb	365	-48.5883	8	0.1151	-1.211
1997	Jan	365	-48.3420	9	0.1302	-1.136
1977	Jan	365	-48.3407	10	0.1453	-1.066
1959	Feb	365	-48.2481	11	0.1604	-1.001
2004	Nov	366	-48.2113	12	0.1755	-0.940
2014	Dec	365	-48.0708	13	0.1906	-0.882
1992	Dec	366	-47.3393	14	0.2057	-0.827
2005	Jan	365	-47.2722	15	0.2208	-0.774
1961	Dec	365	-47.2081	16	0.2358	-0.724
2001	Feb	365	-47.1493	17	0.2509	-0.675
1994	Nov	365	-47.1409	18	0.2660	-0.628
2003	Dec	365	-47.0826	19	0.2811	-0.583
1984	Dec	366	-46.8997	20	0.2962	-0.538
1970	Dec	365	-46.8176	21	0.3113	-0.495
2012	Dec	366	-46.7767	22	0.3264	-0.452
2011	Feb	365	-46.7475	23	0.3415	-0.410
1966	Jan	365	-46.7014	24	0.3566	-0.369
1958	Nov	365	-46.2613	25	0.3717	-0.329
1993	Jan	365	-46.0990	26	0.3868	-0.289
1955	Dec	365	-45.8255	27	0.4019	-0.249
2002	Jan	365	-45.8155	28	0.4170	-0.210
2008	Dec	366	-45.8133	29	0.4321	-0.172
2006	Mar	365	-45.7798	30	0.4472	-0.133
1954	Dec	365	-45.6758	31	0.4623	-0.095
1953	Feb	365	-45.6549	32	0.4774	-0.057
2015	Jan	365	-45.6066	33	0.4925	-0.019
1982	Jan	365	-45.3367	34	0.5075	0.019
2009	Dec	365	-45.2533	35	0.5226	0.057
1964	Nov	366	-45.2272	36	0.5377	0.095
1985	Feb	365	-45.1165	37	0.5528	0.133
1973	Jan	365	-45.0571	38	0.5679	0.172
1996	Feb	366	-44.9337	39	0.5830	0.210
1956	Feb	366	-44.9003	40	0.5981	0.249
1969	Jan	365	-44.8364	41	0.6132	0.289
1976	Jan	366	-44.8362	42	0.6283	0.329
1965	Jan	365	-44.7932	43	0.6434	0.369
2010	Dec	365	-44.7062	44	0.6585	0.410
1975	Jan	365	-44.6276	45	0.6736	0.452

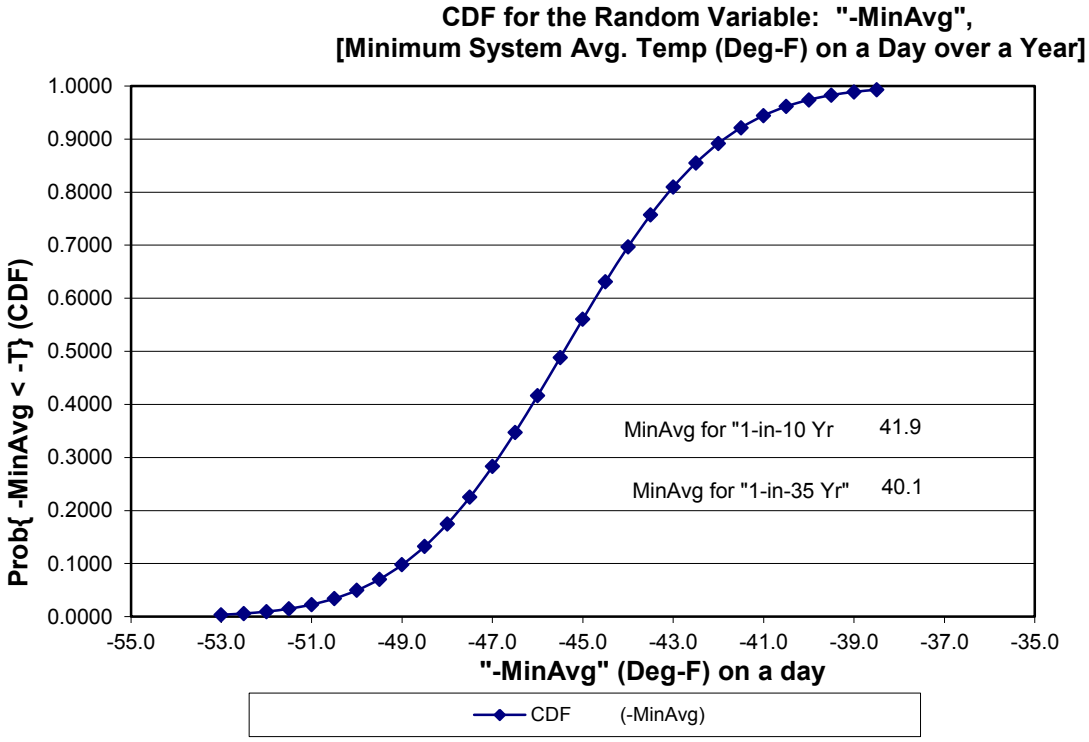
Table 5.2

alpha= 0.375

YEAR	Month(-MinAvg)	Days/Yr	-MinAvg	Rank	Empirical CDF	Fitted Model CDF
1951	Dec	365	-44.5693	46	0.6887	0.495
2013	Jan	365	-43.9100	47	0.7038	0.538
1998	Dec	365	-43.6265	48	0.7189	0.583
1987	Dec	365	-43.4540	49	0.7340	0.628
1962	Jan	365	-43.4118	50	0.7491	0.675
1988	Dec	366	-43.2798	51	0.7642	0.724
1952	Jan	366	-43.0700	52	0.7792	0.774
1974	Jan	365	-42.9762	53	0.7943	0.827
1971	Jan	365	-42.9711	54	0.8094	0.882
1963	Jan	365	-42.5866	55	0.8245	0.940
1960	Jan	366	-42.3228	56	0.8396	1.001
1978	Dec	365	-41.6430	57	0.8547	1.066
2007	Jan	365	-41.5229	58	0.8698	1.136
1972	Dec	366	-41.4097	59	0.8849	1.211
1979	Jan	365	-41.3713	60	0.9000	1.295
1950	Jan	365	-40.8585	61	0.9151	1.388
1967	Dec	365	-40.7518	62	0.9302	1.496
1968	Dec	366	-40.6224	63	0.9453	1.623
1989	Feb	365	-40.6049	64	0.9604	1.784
1957	Jan	365	-39.4876	65	0.9755	2.006
1990	Dec	365	-38.9961	66	0.9906	2.409

"Gamma" (Fitted) =	**-45.42**
"Theta" (Fitted) =	**2.74**
Deg. Freedom=	**64**

Figure 1


CDF for the Random Variable: "-MinAvg",
[Minimum System Avg. Temp (Deg-F) on a Day over a Year]
Prob{ -MinAvg < -T} (CDF)
1.0000
0.9000
0.8000
0.7000
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000
-55.0
-53.0
-51.0
-49.0
-47.0
-45.0
-43.0
-41.0
-39.0
-37.0
-35.0
"-MinAvg" (Deg-F) on a day
MinAvg for "1-in-10 Yr 41.9
MinAvg for "1-in-35 Yr" 40.1
CDF (-MinAvg)

V. Estimating the Uncertainty in the Peak-Day Design Temperature

The calculated peak-day design temperatures in section IV above also have a statistical uncertainty associated with them. The estimated measures of uncertainty recommended for our use are calculated from the fitted model for the probability distribution and are believed to be reasonable, although rough, approximations.

The basic approach used the estimated parameters for the probability distribution (see the results provided in Tables 5.1 and 5.2, above) to calculate the fitted temperatures as a function of the empirical CDF listed in Tables 5.1 and 5.2, above. These fitted temperatures are then compared with the observed temperatures by calculating the difference = "observed" – "fitted" values. The full set of differences are then separated into the lower third (L), the middle third (M) and the upper third (U) of the distribution. Finally, values of the root-mean-square error (RMSE) of the differences in each third of the distribution are calculated, along with the RMSE for the entire set of differences overall. The data in Tables 6.1 and 6.2, below, show the temperature data and the resulting RMSE values.

The formula below is used to calculate the RMSE for a specified set of "N" data differences:

$$\text{RMSE} = \text{SQRT}\left\{ \left(\sum_{i=1, \ldots, N} e[\,i\,]^{2} \right) / (N-2) \right\},$$

where e[i] = *observed* less *fitted* value of temperature, T[i]. The number of estimated paramters (3 for the GEV model, 2 for the T-Dist and EV1 models) is subtracted from the respective number of data differences, N, in the denominator of the RMSE expression.

Since both the "1-in-35" and "1-in-10" peak-day temperature values are in the lower third quantile of the fitted distribution, the calculated standard error for these estimates is 0.5 Deg-F.

Table 6.1

Quantile: (Lower, Middle, Upper 3rd's)	Observed $T_{[i]}$ Temp. Ranked	Fitted Value of $T_{[i]}$	Residual $e_{[i]}$: Obs'd. less Fitted Value of $T_{[i]}$	Square of $e_{[i]}$:
U	50.3423	52.0185	-1.6762	2.809482
U	49.8180	50.9147	-1.0967	1.202706
U	49.3340	50.3046	-0.9706	0.942038
U	48.9997	49.8660	-0.8662	0.750380
U	48.7823	49.5167	-0.7344	0.539338
U	48.6653	49.2228	-0.5575	0.310770
U	48.6632	48.9666	-0.3034	0.092069
U	48.5883	48.7379	-0.1497	0.022398
U	48.3420	48.5302	-0.1882	0.035419
U	48.3407	48.3389	0.0018	0.000003
U	48.2481	48.1608	0.0873	0.007623
U	48.2113	47.9936	0.2177	0.047393
U	48.0708	47.8356	0.2352	0.055341
U	47.3393	47.6852	-0.3459	0.119631
U	47.2722	47.5413	-0.2691	0.072433
U	47.2081	47.4032	-0.1951	0.038072
U	47.1493	47.2699	-0.1206	0.014555
U	47.1409	47.1409	0.0000	0.000000
U	47.0826	47.0157	0.0669	0.004480
U	46.8997	46.8938	0.0060	0.000035
U	46.8176	46.7747	0.0429	0.001844
U	46.7767	46.6582	0.1186	0.014059
M	46.7475	46.5439	0.2037	0.041489
M	46.7014	46.4315	0.2699	0.072856
M	46.2613	46.3208	-0.0595	0.003539
M	46.0990	46.2117	-0.1127	0.012700
M	45.8255	46.1037	-0.2782	0.077404
M	45.8155	45.9969	-0.1814	0.032910
M	45.8133	45.8909	-0.0776	0.006018
M	45.7798	45.7856	-0.0059	0.000035
M	45.6758	45.6809	-0.0051	0.000026
M	45.6549	45.5766	0.0783	0.006138
M	45.6066	45.4725	0.1341	0.017974
M	45.3367	45.3685	-0.0318	0.001009
M	45.2533	45.2644	-0.0110	0.000122
M	45.2272	45.1600	0.0671	0.004505
M	45.1165	45.0553	0.0612	0.003740
M	45.0571	44.9501	0.1071	0.011464
M	44.9337	44.8441	0.0897	0.008040
M	44.9003	44.7372	0.1631	0.026594
M	44.8364	44.6293	0.2071	0.042903
M	44.8362	44.5201	0.3161	0.099916
M	44.7932	44.4095	0.3838	0.147286
M	44.7062	44.2971	0.4091	0.167388
L	44.6276	44.1828	0.4448	0.197824

Table 6.2

Quantile: (Lower, Middle, Upper 3rd's)	Observed $T_{[i]}$ Temp. Ranked	Fitted Value of $T_{[i]}$	Residual $e_{[i]}$: Obs'd. less Fitted Value of $T_{[i]}$	Square of $e_{[i]}$:	
L	44.5693	44.0663	0.5030	0.253056	L
L	43.9100	43.9472	-0.0372	0.001383	L
L	43.6265	43.8253	-0.1988	0.039512	L
L	43.4540	43.7000	-0.2460	0.060536	L
L	43.4118	43.5710	-0.1593	0.025361	L
L	43.2798	43.4378	-0.1580	0.024965	L
L	43.0700	43.2996	-0.2297	0.052742	L
L	42.9762	43.1558	-0.1796	0.032264	L
L	42.9711	43.0054	-0.0343	0.001179	L
L	42.5866	42.8473	-0.2607	0.067960	L
L	42.3228	42.6801	-0.3573	0.127681	L
L	41.6430	42.5021	-0.8591	0.738088	L
L	41.5229	42.3108	-0.7878	0.620679	L
L	41.4097	42.1030	-0.6933	0.480664	L
L	41.3713	41.8743	-0.5030	0.253031	L
L	40.8585	41.6182	-0.7597	0.577158	L
L	40.7518	41.3243	-0.5725	0.327736	L
L	40.6224	40.9750	-0.3526	0.124347	L
L	40.6049	40.5364	0.0685	0.004694	L
L	39.4876	39.9263	-0.4387	0.192478	L
L	38.9961	38.8225	0.1736	0.030154	L

Overall RMSE ($e_{[i]}$):	0.4	°F
Upper 3rd RMSE ($e_{[i]}$):	0.6	°F
Middle 3rd RMSE ($e_{[i]}$):	0.2	°F
Lower 3rd RMSE ($e_{[i]}$):	0.5	°F

VI. The Relationship between Annual Likelihoods for Peak-Day Temperatures and "Expected Return Time"

The event whose probability distribution we've modeled is the likelihood that the minimum daily temperature over a calendar year is less than a specified value. And, in particular, we've used this probability model to infer the value of a temperature, our *peak-day design temperature* ($TPDD_{\delta}$), that corresponds to a pre-defined likelihood, δ, that the observed minimum temperature is less than or equal to this design temperature.

(1) δ = Prob{ Minimum Daily Temperature over the Year < $TPDD_{\delta}$ }.

For some applications, it is useful to think of how this specified likelihood (or "risk level" δ) relates to the expected number of years until this Peak-Day event would first occur. This expected number of years is what is meant by the *return period*. The results stated below are found in the book: ***Statistics of Extremes***, E.J. Gumbel, Columbia University Press, 1958, on pages 21-25.

(2) E[#Yrs for Peak-Day Event to Occur] = 1 / δ,

1 / Prob{ Minimum Daily Temperature over the Year < $TPDD_{\delta}$ }.

For our peak-day design temperature (40.1°F) associated with a 1-in-35 annual likelihood, the return period is 35 years (δ=1/35). For the 41.9°F peak-day design temperature, the return period is 10 years (δ=1/10). Occasionally, a less precise terminology is used. For example, the 40.1°F peak-day design temperature may be referred to as a "1-in-35 year cold day"; and the 41.9°F peak-day design temperature may be referred to as a "1-in-10 year cold day."

The probability model for the *return period*, as a random variable, is a geometric (discrete) distribution with positive integer values for the *return period*. The parameter δ = Prob{ Minimum Daily Temperature over the Year < $TPDD_{\delta}$ }.

(3) Prob{ *return period* = r } = $(1 - \delta)^{(r-1)} \delta$, for r = 1, 2, 3, . . .

The expected value of the *return period* is already given in (2) above; the variance of the *return period* is:

(4) Var[*return period*] = $(E[\textit{ return period }])^2 \times (1 - (1 / E[\textit{ return period }]))$,

(4') Var[*return period*] = $(E[\textit{ return period }]) \times (E[\textit{ return period }] - 1)$.

Equations (4) and (4') indicate that the standard deviation (square root of the variance) of the *return period* is nearly equal to its expected value. Thus, there is substantial variability about the expected value—a *return period* is not very precise.

2016 CALIFORNIA GAS REPORT

GAS PRICE FORECAST
JULY 2016

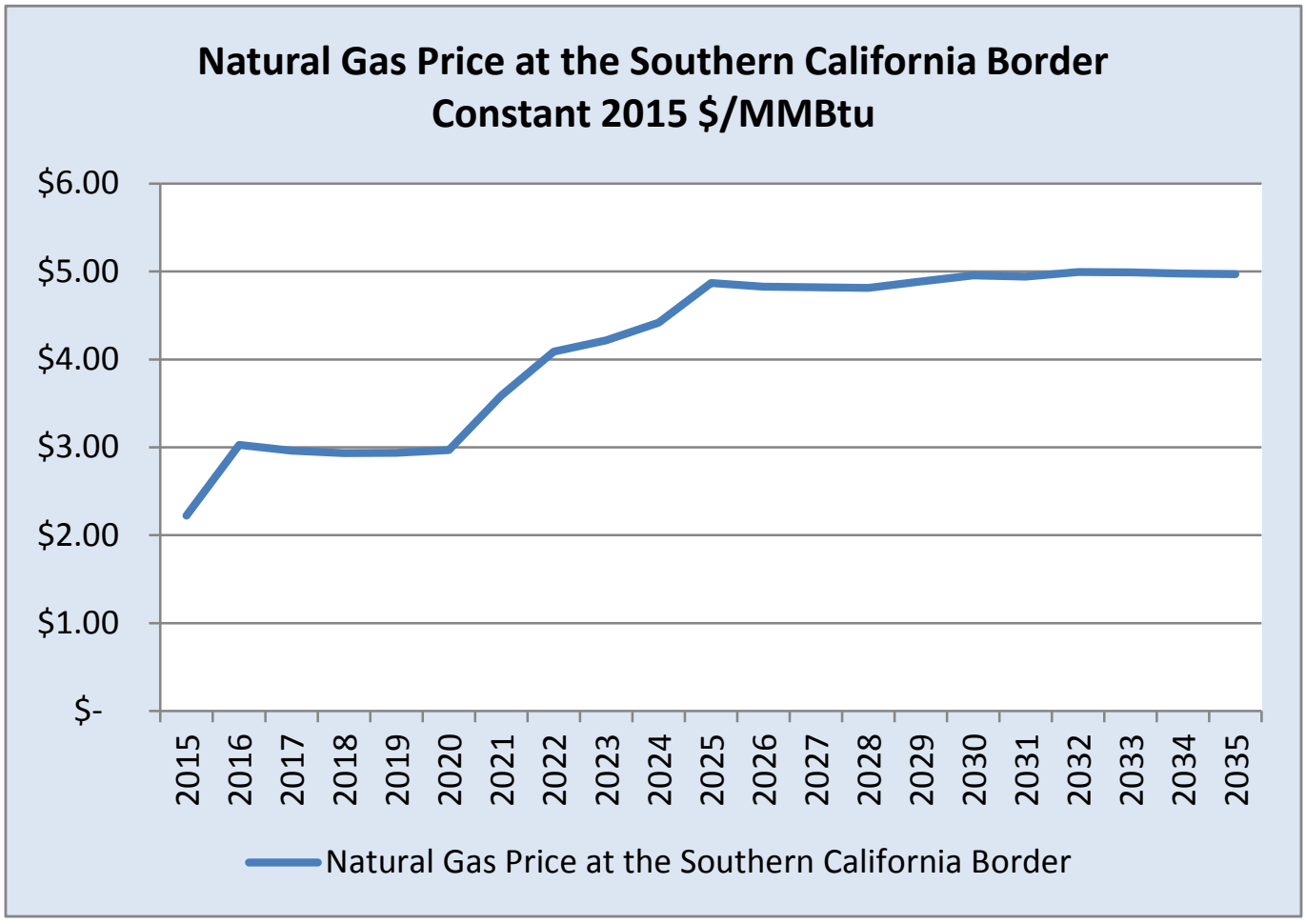
The Gas Company

A Sempra Energy utility™

2016 CGR Gas Price ForecastCurrent $/MMBtu
SoCalBorder
($/MMBtu)

Consistent with the prior CGR practices, the 2016 CGR gas price forecast was developed using a combination of market prices and fundamental forecasts.
NYMEX futures prices were used for the 2016-2020 period. Fundamental price forecasts were used for 2021 and beyond. The forecasts for 2021 and 2022 reflect a blending of market and fundamental prices, with declining weights for market prices over the two year period.
The fundamental gas price forecast represents an average of the forecasts developed by the CEC and independent consultants.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	REAL Gas Price (base CPI (Base 20	year 2015)
2011	$ 4.35	$ 4.17	$ 3.91	$ 4.23	$ 4.24	$ 4.55	$ 4.42	$ 4.17	$ 4.14	$ 3.53	$ 3.50	$ 3.48	$ 4.06		
2012	$ 2.92	$ 2.74	$ 2.30	$ 2.22	$ 2.46	$ 2.59	$ 2.91	$ 2.96	$ 3.07	$ 3.53	$ 3.66	$ 3.52	$ 2.91		
2013	$ 3.53	$ 3.52	$ 3.86	$ 4.11	$ 4.03	$ 3.82	$ 3.76	$ 3.55	$ 3.73	$ 3.75	$ 3.69	$ 4.62	$ 3.83		
2014	$ 4.64	$ 6.57	$ 4.98	$ 4.66	$ 4.64	$ 4.72	$ 4.34	$ 4.13	$ 4.09	$ 3.82	$ 4.16	$ 3.49	$ 4.52		
2015	$ 2.96	$ 2.62	$ 2.55	$ 2.42	$ 2.72	$ 2.75	$ 2.91	$ 2.85	$ 2.69	$ 2.39	$ 2.18	$ 2.22	$ 2.61	100	$ 2.22
2016	$ 2.36	$ 1.85	$ 1.46	$ 1.79	$ 1.83	$ 1.97	$ 2.23	$ 2.31	$ 2.30	$ 2.31	$ 2.48	$ 3.06	$ 2.16	101.05	$ 3.03
2017	$ 2.72	$ 2.95	$ 2.66	$ 2.45	$ 2.50	$ 2.63	$ 2.79	$ 2.79	$ 2.72	$ 2.67	$ 2.80	$ 3.06	$ 2.73	103.39	$ 2.96
2018	$ 2.94	$ 3.16	$ 2.84	$ 2.53	$ 2.57	$ 2.69	$ 2.84	$ 2.84	$ 2.77	$ 2.72	$ 2.85	$ 3.11	$ 2.82	106.1	$ 2.93
2019	$ 2.99	$ 3.21	$ 2.90	$ 2.59	$ 2.63	$ 2.75	$ 2.90	$ 2.90	$ 2.84	$ 2.80	$ 2.92	$ 3.20	$ 2.89	108.86	$ 2.94
2020	$ 3.08	$ 3.30	$ 2.98	$ 2.69	$ 2.72	$ 2.84	$ 3.00	$ 3.00	$ 2.94	$ 2.90	$ 3.03	$ 3.32	$ 2.98	111.74	$ 2.97
2021	$ 3.26	$ 3.54	$ 3.17	$ 2.90	$ 2.97	$ 3.12	$ 3.29	$ 3.33	$ 3.31	$ 3.29	$ 3.76	$ 4.12	$ 3.34	114.71	$ 3.59
2022	$ 3.98	$ 4.27	$ 3.52	$ 3.34	$ 3.41	$ 3.55	$ 3.72	$ 3.77	$ 3.74	$ 3.72	$ 4.41	$ 4.81	$ 3.85	117.68	$ 4.09
2023	$ 4.60	$ 4.86	$ 3.78	$ 3.62	$ 3.68	$ 3.79	$ 3.95	$ 3.96	$ 3.90	$ 3.85	$ 4.55	$ 5.08	$ 4.14	120.6	$ 4.22
2024	$ 4.74	$ 5.00	$ 3.94	$ 3.82	$ 3.88	$ 3.99	$ 4.18	$ 4.21	$ 4.12	$ 4.07	$ 4.86	$ 5.46	$ 4.36	123.57	$ 4.42
2025	$ 5.00	$ 5.27	$ 4.18	$ 4.05	$ 4.11	$ 4.22	$ 4.42	$ 4.45	$ 4.35	$ 4.30	$ 5.20	$ 6.16	$ 4.64	126.47	$ 4.87
2026	$ 5.43	$ 5.70	$ 4.51	$ 4.36	$ 4.42	$ 4.54	$ 4.73	$ 4.76	$ 4.67	$ 4.62	$ 5.53	$ 6.24	$ 4.96	129.36	$ 4.83
2027	$ 5.55	$ 5.82	$ 4.61	$ 4.45	$ 4.52	$ 4.64	$ 4.83	$ 4.85	$ 4.77	$ 4.72	$ 5.64	$ 6.38	$ 5.06	132.35	$ 4.82
2028	$ 5.68	$ 5.95	$ 4.71	$ 4.56	$ 4.63	$ 4.74	$ 4.93	$ 4.96	$ 4.87	$ 4.83	$ 5.77	$ 6.52	$ 5.18	135.41	$ 4.81
2029	$ 5.93	$ 6.20	$ 4.92	$ 4.76	$ 4.83	$ 4.95	$ 5.14	$ 5.17	$ 5.08	$ 5.04	$ 6.02	$ 6.77	$ 5.40	138.5	$ 4.89
2030	$ 6.15	$ 6.43	$ 5.11	$ 4.95	$ 5.02	$ 5.14	$ 5.33	$ 5.37	$ 5.28	$ 5.23	$ 6.25	$ 7.02	$ 5.61	141.62	$ 4.96
2031	$ 6.28	$ 6.55	$ 5.22	$ 5.05	$ 5.12	$ 5.24	$ 5.44	$ 5.47	$ 5.38	$ 5.34	$ 6.38	$ 7.16	$ 5.72	144.91	$ 4.94
2032	$ 6.50	$ 6.78	$ 5.41	$ 5.23	$ 5.30	$ 5.42	$ 5.63	$ 5.66	$ 5.57	$ 5.53	$ 6.60	$ 7.40	$ 5.92	148.23	$ 5.00
2033	$ 6.65	$ 6.92	$ 5.52	$ 5.35	$ 5.42	$ 5.54	$ 5.75	$ 5.78	$ 5.69	$ 5.65	$ 6.74	$ 7.57	$ 6.05	151.65	$ 4.99
2034	$ 6.84	$ 7.12	$ 5.68	$ 5.51	$ 5.58	$ 5.70	$ 5.91	$ 5.95	$ 5.85	$ 5.81	$ 6.93	$ 7.73	$ 6.22	155.23	$ 4.98
2035	$ 6.99	$ 7.27	$ 5.81	$ 5.63	$ 5.70	$ 5.83	$ 6.04	$ 6.08	$ 5.98	$ 5.94	$ 7.09	$ 7.90	$ 6.36	158.87	$ 4.97


Natural Gas Price at the Southern California Border
Constant 2015 $/MMBtu
$6.00
$5.00
$4.00
$3.00
$2.00
$1.00
$-
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
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2035
Natural Gas Price at the Southern California Border

2016 CALIFORNIA GAS REPORT

SERVICE AREA ECONOMIC FORECAST

SOUTHERN CALIFORNIA GAS COMPANY SERVICE AREA ECONOMIC FORECAST

(based on Global Insight's February 2016 Regional Forecast)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
EMPLOYMENT (1000's)		3.14%	2.70%	2.66%	1.80%	1.16%	0.92%	0.97%	1.02%	0.81%	0.91%	0.94%
Total	8,123.1	8,378.1	8,598.9	8,819.2	8,983.1	9,086.5	9,169.3	9,256.7	9,349.1	9,423.4	9,508.6	9,596.9
Agriculture	228.0	235.0	235.5	233.8	243.0	244.9	246.4	247.6	248.3	249.2	250.4	251.8
Total Non-farm	7,895.1	8,143.1	8,363.4	8,585.4	8,740.0	8,841.6	8,922.9	9,009.1	9,100.8	9,174.2	9,258.2	9,345.2
Mining	22.7	22.7	23.0	20.3	18.3	18.3	19.0	19.6	20.0	20.4	20.9	21.0
Construction	301.9	325.7	345.7	365.2	388.0	407.4	424.4	439.2	454.2	468.0	481.5	494.2
Manufacturing	716.1	717.7	720.0	723.9	721.6	727.2	733.1	737.9	741.7	745.8	747.1	746.7
Transportation, Information, Utilities	501.0	515.5	522.9	532.1	538.1	544.0	552.7	559.9	563.3	568.5	573.2	576.6
Trade	1,374.9	1,408.8	1,447.8	1,482.6	1,508.3	1,515.2	1,513.3	1,518.6	1,525.2	1,527.6	1,529.4	1,532.4
Retail	940.3	957.4	981.0	996.9	1,012.6	1,011.6	1,002.5	1,000.7	1,001.0	999.5	996.7	995.3
Wholesale (including warehousing)	434.6	451.4	466.8	485.7	495.7	503.6	510.7	517.9	524.2	528.1	532.7	537.2
Restaurants	622.8	656.7	694.8	730.0	741.6	740.8	734.2	732.8	733.0	731.9	729.9	728.9
Finance, Insurance & Real Estate	418.1	424.4	423.3	428.1	429.7	422.5	413.4	408.1	406.6	406.3	407.1	408.3
Services	2,514.2	2,645.9	2,738.5	2,823.1	2,898.6	2,962.0	3,009.7	3,051.4	3,096.7	3,139.8	3,191.2	3,247.7
Accomodation	120.2	124.2	127.8	129.4	134.2	135.7	137.6	139.0	139.9	140.8	141.2	141.5
Personal & Laundry Services	84.7	88.2	92.3	95.9	96.4	95.5	95.0	94.4	93.9	93.4	92.9	92.6
Professional & Business Services	1,095.4	1,135.0	1,164.0	1,200.4	1,232.7	1,272.4	1,300.7	1,321.3	1,349.6	1,375.7	1,410.0	1,448.8
Health & Social Services	995.2	1,073.1	1,119.2	1,155.1	1,191.8	1,217.1	1,236.5	1,258.1	1,276.1	1,293.9	1,312.3	1,330.9
Misc. Services	218.7	225.4	235.1	242.2	243.6	241.3	239.8	238.6	237.2	236.0	234.7	233.8
Government & Education	1,423.4	1,425.9	1,447.4	1,480.1	1,495.8	1,504.2	1,523.1	1,541.6	1,560.2	1,565.9	1,577.8	1,589.4
OTHER INDICATORS												
Southern California Consumer Inflation*	2.0%	1.1%	1.3%	0.9%	1.0%	2.3%	2.6%	2.6%	2.6%	2.7%	2.6%	2.5%
Inflation--US Gross Domestic Product**	1.8%	1.4%	1.6%	0.3%	0.6%	1.7%	2.2%	2.2%	2.2%	2.3%	2.3%	2.2%

* Consumer Price Index for Greater Los Angeles area (Los Angeles, Orange, and Riverside Counties)

** Chained Price Index--US GDP, from Global Insight's February 2016 Long-Term Forecast of the U.S. Economy.

SOUTHERN CALIFORNIA GAS COMPANY SERVICE AREA ECONOMIC FORECAST

(based on Global Insight's February 2016 Regional Forecast)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
EMPLOYMENT (1000's)												
Total	9,683.3	9,760.9	9,840.6	9,915.6	9,977.9	10,041.9	10,114.0	10,179.4	10,248.3	10,318.2	10,389.8	10,461.3
Agriculture	252.8	253.4	253.9	254.5	254.8	255.2	255.6	256.2	256.8	257.4	257.8	258.0
Total Non-farm	9,430.5	9,507.5	9,586.7	9,661.1	9,723.1	9,786.7	9,858.4	9,923.2	9,991.5	10,060.8	10,132.0	10,203.3
Mining	21.1	21.0	20.8	20.5	20.3	20.2	20.0	19.8	19.7	19.4	19.2	19.1
Construction	506.3	515.8	523.0	531.5	538.0	544.9	554.7	563.5	568.0	572.8	581.1	591.9
Manufacturing	746.2	743.9	741.1	738.3	733.7	729.1	724.8	721.1	717.2	713.6	710.0	706.4
Transportation, Information, Utilities	580.1	583.7	587.4	589.4	590.9	592.8	593.4	594.3	595.7	597.0	597.9	598.0
Trade	1,536.8	1,540.4	1,545.6	1,549.4	1,549.2	1,550.1	1,549.7	1,550.9	1,551.2	1,553.7	1,554.8	1,556.7
Retail	995.1	994.8	997.3	999.7	1,001.8	1,004.3	1,006.9	1,010.6	1,014.2	1,019.0	1,023.1	1,027.5
Wholesale (including warehousing)	541.7	545.6	548.3	549.7	547.4	545.8	542.8	540.4	537.0	534.8	531.8	529.2
Restaurants	728.7	728.5	730.4	732.1	733.6	735.5	737.4	740.0	742.7	746.2	749.2	752.5
Finance, Insurance & Real Estate	410.0	409.5	409.0	408.8	409.0	410.2	412.1	413.6	414.5	417.0	420.4	423.8
Services	3,299.4	3,348.4	3,398.4	3,445.6	3,487.0	3,527.1	3,569.3	3,616.1	3,666.4	3,713.0	3,758.4	3,801.4
Accomodation	141.7	141.4	141.3	141.6	142.2	142.9	143.4	144.2	144.9	145.8	146.4	147.1
Personal & Laundry Services	92.2	92.1	92.2	92.4	92.7	92.8	92.9	92.8	92.8	92.9	92.9	92.9
Professional & Business Services	1,482.8	1,514.8	1,547.8	1,578.6	1,601.0	1,621.1	1,644.4	1,670.8	1,700.0	1,724.5	1,748.6	1,774.7
Health & Social Services	1,349.8	1,367.6	1,384.3	1,399.7	1,417.0	1,435.8	1,454.1	1,473.9	1,494.3	1,515.3	1,535.8	1,552.0
Misc. Services	233.0	232.6	232.9	233.3	234.1	234.5	234.5	234.4	234.3	234.6	234.6	234.7
Government & Education	1,601.8	1,616.4	1,631.0	1,645.6	1,661.3	1,676.8	1,697.1	1,703.9	1,716.1	1,728.1	1,741.0	1,753.5
OTHER INDICATORS												
Southern California Consumer Inflation*	2.5%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.4%	2.3%
Inflation--US Gross Domestic Product**	2.2%	2.1%	2.1%	2.1%	2.1%	2.0%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%

* Consumer Price Index for Greater Los Angeles area (Los Angeles, Orange, and Riverside Counties)

** Chained Price Index--US GDP, from Global Insight's February 2016 Long-Term Forecast of the U.S. Economy.