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1994 Residential New Construction Program

First Year Load Impact Evaluation

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San Diego Gas & Electric
Marketing Programs & Planning

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Executive Summary

The Residential New Construction (RNC) Program is intended to encourage new home builders to incorporate energy saving building technologies and to install energy efficient measures and appliances, both of which exceed Title 24 State Building Energy Efficiency Standards by a minimum of five percent. This study calculates the net load impacts for space heating, space cooling, and water heating by subtracting the Unit Energy Consumption's (UEC's) of program participants from the UEC's of the comparison group.

The methodology of this study estimates the net effects directly without estimating the gross impacts. Therefore, the traditional net-to-gross (NTG) ratio definition is not applicable to this analysis. In order to estimate the NTG ratios for this study, building simulations are utilized. In this analysis, the NTG ratio is defined as 1 minus the nonparticipants' compliance over Title 24 State Building Energy Efficiency Standards. The estimated load impacts and net-to-gross ratios are shown in the following table.

		TABLE 1 Gross Ratios and Annu ew Construction Progr	al Savings for ram Participants (SFD	U)
End Use	Net-to-Gross Ratio	Annual kWh Savings	Peak kW Savings	Annual Therm Savings
Space Heating	1.10	100	0	33
Space Cooling	.81	187	.36	. N/A
Water Heating	.99	Insufficient Data	Insufficient Data	-11

For additional savings verification, this study also utilizes building simulations from the participants and a sample of nonparticipants. On average, the home builders participating in SDG&E's program exceeded Title 24 requirements by over 14%, while the nonparticipants exceeded Title 24 requirements by over 3.5%. Therefore, the building simulation comparisons show that participation in the 1994 SDG&E Residential New Construction Program increased energy efficiency by nearly 11% over nonparticipants in the program.

Introduction

Program Overview

The 1994 Residential New Construction Program was intended to encourage new home builders to incorporate energy saving building technologies and to install energy efficient measures and appliances, both of which exceeded Title 24 State Building Energy Efficiency Standards. By so doing, developers were able to take advantage of conservation opportunities at the optimum time. All residential builders who exceeded space cooling, space heating, or water heating standards of Title 24 by a minimum of five percent were eligible to participate in the program. A dual approach was used to encourage builders to participate in the program:

Executive Summary Page 1

- 1. Financial incentives were offered to builders to help offset additional costs of installing the more energy-efficient measures, e.g., window shading and high-efficiency air conditioning. An incentive structure for measures installed in either coastal or inland climate zones was established. Although Title 24 served as the program guideline, builders also were considered for financial incentives for the installation of cost-effective measures outside of Title 24 regulations. Unique situations were handled on a case-by-case basis.
- 2. An advertising campaign was used to develop potential homeowners' and nonparticipating builders' awareness of the program, increase general customer energy awareness, and recognize builders who were participating in the program. Emphasis was placed on the value of an energy efficient home as a long-term personal investment and on the positive environmental impacts of energy efficiency.

In the first quarter of 1994, the program was evaluated due to concerns about potential non cost-effectiveness. The results of the evaluation confirmed that the program was not cost effective. In May 1994, the findings were presented to SDG&E's DSM Advisory Committee with a recommendation to terminate the program. The Committee agreed to termination by year-end. All proactive selling of the program was discontinued to allow the program to wind down by the end of the year.

In 1995, the program continued in a "maintenance" mode in order to fulfill obligations to builders with outstanding contracts. This "maintenance" program will continue through 1996.

"Miscellaneous measures" are not addressed in this report. These items include compact fluorescent fixtures and all measures installed in multi-family dwellings. The M&E Protocol requirements for miscellaneous measures require the completion of first, fourth, and ninth year retention studies. It is reasonable to believe that since these homes are new, no significant renovations are being done that would cause measures to be removed in the first year. Therefore, SDG&E requested and received a retroactive waiver for the first year retention study, a copy of which is attached to the end of this report.

Sampling & Data Collection

Various sources of data were utilized in this analysis, including:

- 1. Building simulations for samples of program participants and nonparticipants;
- 2. Customer name, address, and participation date from the program tracking database;
- 3. Residential appliance saturation surveys for samples of program participants and nonparticipants;
- 4. Electric and gas consumption history from the Customer Master File, as well as the source for the nonparticipant comparison group; and
- 5. Hourly weather data for two climate zones from NOAA files.

Participant Sample - Load Impact Analysis

For the load impact analysis, the 1,732 participants in the 1994 Residential New Construction Program are defined as having signed an agreement after July 1993, and completed construction in calendar year 1994. After eliminating participants with missing or duplicate account numbers and merging with the Customer Master File, there were 1,310 participants for analysis. Further screening to eliminate files with missing names, names of

building developers (i.e., unoccupied sites), and having the last month of consumption of at least 10 kWh (another occupancy check), left a list of 923 participants. These 923 participants were asked to complete SDG&E's residential energy use survey, known as the MIRACLE survey (Marketing Information Research and Customer Load Estimate). The MIRACLE survey provides detailed information about household characteristics, appliance saturation levels, conservation measures adopted, and energy use practices.

Of the 923 participants who received a MIRACLE survey, 450 completed it. One question on the survey asks the year the house was built; 427 responded that their home was built in 1994. In order to analyze these customers in accordance with the M&E Protocols, nine months of consumption after the DSM installation is required, further lowering the analytical sample to 360 participants. Finally, the M&E Protocols for residential new construction concerns only single family dwelling units, leaving a participant database of 309 for analysis purposes.

Nonparticipant Sample - Load Impact Analysis

The M&E Protocols require a nonparticipant sample of the Residential New Construction Program as a comparison group. The comparison group sample was developed from SDG&E's Customer Master File with a "meter set date" (date the meter was originally placed in service) and "meter turn on date" (the date service was established in the current customer's name) both of which were in calendar year 1994. From this filtered group, a random sample of 1,300 was selected. After eliminating participants and names of building developers (i.e., vacant sites) from the sample, the remaining 1,187 nonparticipants were asked to fill out the MIRACLE survey, of which 516 responded. Screening on the responses lowered our nonparticipant sample for comparative analysis as follows: 421 responded that their home was built in 1994; the 421 was lowered to 363 in order to satisfy the nine months of consumption data requirement, and out of this subset, 272 responded that their home is a single family dwelling unit, thus creating the nonparticipant database for analysis purposes.

The Econometric Framework

The load impact analysis estimates the net impact directly without estimating the gross impact. This is done through the regression models described below.

Electricity Model

The electricity consumption model was designed to take advantage of variation in weather over time (with months indexed by t), which allows the regression model to yield estimates of weather-related consumption for individual customers (indexed by i):

Equation 1 (The Customer-Specific Electricity Consumption Model)

$$kWh_{it} = \alpha_i + \beta_i^c (cdh_{it}) + \beta_i^h (hdh_{it}) + \epsilon_{it}$$

The parameter α_i represents all the static elements of household electricity consumption, such as refrigeration. The remaining two regression components in Equation 1 are the cooling and heating elements based on cooling

degreehours (cdh_{it}) and heating degreehours (hdh_{it}), respectively. The regression equation contains the usual random disturbance term ϵ_{it} .

Equation 1 was estimated at the customer level using ordinary least-squares. When it was known that a particular customer was without either space cooling or space heating, the appropriate coefficient (either β_i^c or β_i^h) was constrained to zero. The annual weather-normalized consumption averages for cooling and heating (found in Table 2) can be calculated for both participants and nonparticipants based on long-term averages $\overline{cdh_i}$ and $\overline{hdh_i}$:

Equation 2 (Estimated Annual Cooling Consumption, per Household)

$$\bar{c} = 12 \times \frac{\sum_{i} \beta_{i}^{c} \left(\overline{cdh}_{i} \right)}{n}$$

Equation 3 (Estimated Annual Heating Consumption, per Household)

$$\overline{h} = 12 \times \frac{\sum_{i} \beta_{i}^{h} \left(\overline{hdh}_{i} \right)}{n}$$

Gas Model

The gas model follows the structure of the electricity model, although a second phase is added to the estimation process.

Phase 1 of the Gas Model

Equation 4 (The Customer-Specific Gas Consumption Model--Phase 1)

therms_{it} =
$$\alpha_i + \beta_i^h (hdh_{it}) + \epsilon_{it}$$

This regression equation (estimated at the customer level using ordinary least-squares) allows for the construction of an expression identical to Equation 3 for therms. The annual weather-normalized consumption averages are provided in Table 2 for participants and nonparticipants.

Phase 2 of the Gas Model

Phase 2 of the gas model involves identifying the individual elements of static consumption. To do this, a regression equation is formed with static consumption α_i (from Phase 1) as the dependent variable:

Equation 5 (The Elements of Static Gas Usage)

$$\alpha_i = WH_i + CD_i + RNG_i + SPA_i + \eta_i$$

The independent variables are associated with gas water heaters (WH), gas clothes dryers (CD), gas ranges (RNG), and gas-heated spas (SPA). The exact specifications for these end uses are given by,

$$\begin{split} WH_{i} &= \gamma_{1}^{WH} \left(d_{i}^{WH} \right) + \gamma_{2}^{WH} \left(d_{i}^{WH} \right) \left(nhh_{i} \right) + \gamma_{3}^{WH} \left(d_{i}^{WH} \right) \left(d_{i}^{DW} \right) \left(nhh_{i} \right) + \gamma_{4}^{WH} \left(d_{i}^{WH} \right) \left(d_{i}^{CW} \right) \left(nhh_{i} \right) \\ CD_{i} &= \gamma_{1}^{CD} \left(d_{i}^{CD} \right) + \gamma_{2}^{CD} \left(d_{i}^{CD} \right) \left(nhh_{i} \right) \\ RNG_{i} &= \gamma_{1}^{RNG} \left(d_{i}^{RNG} \right) + \gamma_{2}^{RNG} \left(d_{i}^{RNG} \right) \left(nhh_{i} \right) + \gamma_{2}^{RNG} \left(d_{i}^{RNG} \right) \left(d_{i}^{MIC} \right) \left(nhh_{i} \right) \\ SPA_{i} &= \gamma_{1}^{SPA} \left(d_{i}^{SPA} \right) + \gamma_{1}^{SPA} \left(d_{i}^{SPA} \right) \left(nhh_{i} \right) \\ \end{split}$$

Here d_i^K is a simple zero-one indicator variable for end use K, nhh_i is the number of members in household i, and income, is household income. The water heater component contains both a dishwasher and clothes washer interaction. Similarly, the range term contains a microwave oven interaction term. The γ 's themselves are the regression coefficients in the final regression equation, which is purely cross-sectional in nature.

Once the model is estimated (for both participants and nonparticipants, using ordinary least-squares), the average water heater element can be calculated:

Equation 6 (Gas Water Heater Usage--Annual Therms)

$$\overline{WH} = 12 \times \left\{ \gamma_1^{WH} + \gamma_2^{WH} \left(\overline{nhh} \right) + \gamma_3^{WH} \overline{\left(d_i^{DW} \right) nhh_i} \right) + \gamma_4^{WH} \overline{\left(d_i^{CW} \right) nhh_i} \right\}$$

The results for Equation 6 are also contained in Table 2.

Results

The methodology described produced the following UEC's for the participants and nonparticipants:

	Estimated Annual UEC	TABLE 2 C's for 1994 Reside	ential New Construction	
End Use	Participants	(SFDU)	Nonparticipan	ts (SFDU)
	kWh	Therms	kWh	Therms
Space Heating	1,107	241	1,207	274
Space Cooling	1,170	N/A	1,357	N/A
Water Heating	Insufficient Data	103	Insufficient Data	92

Energy Savings Estimates

The savings estimate were calculated by subtracting the UEC's of the participant group from the UEC's of the nonparticipant group. For single family dwelling units, the annual savings for space cooling are 187 kWh, for space heating the savings are 100 kWh for electricity and 33 therms for natural gas. For water heating, the savings are a negative 11 therms for gas water heaters. Conclusive results of an estimate of electric water heating savings cannot be drawn due to extremely small sample sizes (8 participants, 10 nonparticipants). Complete savings

estimates, including confidence intervals and the various designated units of measurements are provided in M&E Protocols Table 6 of this report.

Capacity Savings Estimates

In order to estimate the capacity (kW) savings, peak factors (ratio of demand coincident with system peak to annual consumption) were multiplied by the load impacts. The peak factors were developed by SDG&E in preparing the Residential UEC Study in 1995. The peak factors are .00192 for space cooling, .00005721 for electric water heaters, and 0 for space heating. These factors are applied to the energy savings reported in M&E Protocols Table 6 and appear in the capacity savings portion of that Table. In general, a single family dwelling unit in the 1994 RNC program saved .36 kW for space cooling and 0 kW for space heating. Conclusive results of capacity savings for electric water heaters cannot be drawn due to the small sample sizes (8 participants, 10 nonparticipants).

Summary of Results

The following table summarizes the savings associated with participants in the 1994 Residential New Construction Program for single family dwelling units.

Savings f	TABl or 1994 Residential New Const	· · · ·	ants (SFDU)
	Annual kWh Savings	Peak kW Savings	Annual Therm Savings
Space Heating	100	0	33
Space Cooling	187	.36	N/A
Water Heating	Insufficient Data	Insufficient Data	-11

Building Simulation Comparisons

In an effort to supplement the above findings and to calculate a net-to-gross estimates, SDG&E conducted a set of building simulations. To participate in SDG&E's Residential New Construction Program, builders must submit their Title 24 building simulation compliance reports and a building simulation with the proposed energy efficiency enhancements (SDG&E requires the CEC approved MICROPAS4 building simulation model). If this enhanced simulation surpasses Title 24 State Building Energy Efficiency Standards by at least 5%, then the project is eligible for participation.

The enhanced building simulation documentation is the basis for the participant sample. Building simulations representing 1,119 participant lots were analyzed. This group passed the simple criteria of signing contracts and completing the projects in 1994 (contracts signed prior to 1994 and/or not completed by the end of 1994 were excluded for comparison purposes.) On average, this group of participants exceeded Title 24 requirements by over 14%.

Summary of Results Page 6

A sample of 46 nonparticipants was randomly selected from the 272 nonparticipants in the database described in the Nonparticipant Sample - Load Impact Analysis section as representative of residential new construction customers who did not the participate in SDG&E's 1994 Residential New Construction Program. This group was defined as having a home built and completed in 1994. These nonparticipants had building simulations run after completion of on-site audits. On average, this group of nonparticipants exceeded Title 24 requirements by over 3.5%. Therefore, the building simulation comparisons as shown in Table 4 indicate that participation in the 1994 SDG&E Residential New Construction Program increased energy efficiency by nearly 11% over nonparticipants in the program.

		Building Simi	TABLE ulation (MICR	•	nparisons		
		199	94 RNC PART	ICIPANTS			
				Perce	ntage Over '	Title 24 Stan	dards
CliZone	# of Lots	Tot Sq Ft	Avg Sq Ft	Heat	Cool	Water	Total
7	807	1,415,320	1,754	14.23%	26.68%	12.55%	15.94%
10	312	548,488	1,758	15.37%	4.40%	12.87%	10.17%
Combined	1,119	1,963,808	1,755	14.55%	20.46%	12.64%	14.33%
· · · · · ·		1994	RNC NONPAI	RTICIPANT	S		
			· · · · · · · · · · · · · · · · · · ·	Perce	ntage Over	Title 24 Stan	dards
CliZone	# of Lots	Tot Sq Ft	Avg Sq Ft	Heat	Cool	Water	Total
7	33	63,237	1,916	-15.51%	29.09%	0.02%	4.71%
10	13	26,347	2,027	4.78%	-3.75%	3.52%	1.01%
Combined	46	89,584	1,947	-9.54%	19.43%	1.05%	3.62%
· · · · · · · · · · · · · · · · · · ·	DIFFEREN	CE BETWEE	N PARTICIPA	ANTS AND	NONPARTI	CIPANTS	
			· · · · · · · · · · · · · · · · · · ·	Perce	ntage Over	Title 24 Star	dards
CliZone	# of Lots	Tot Sq Ft	Avg Sq Ft	Heat	Cool	Water	Total
7	774	1,352,083	(162)	29.74%	-2.41%	12.53%	11.23%
10	299	522,141	(269)	10.59%	8.15%	9.35%	9.16%
Combined	1,073	1,874,224	(193)	24.09%	1.03%	11.59%	10.71%

¹ In a statewide study conducted for CADMAC, the compliance margin using July 1993 standards for a sample of 26 homes exceeded Title 24 by 3% in climate zone 10. The statewide average for compliance was -3%, both numbers being based on field audits. Berkeley Solar Group, 1993 Residential Field Data Project, Energy Characteristics, Code Compliance and Occupancy of California 1993 Title 24 Houses, April 30, 1995, p.1-11.

Net-to-Gross Ratios

The load impact analysis in this study estimates the net effects directly without estimating the gross impacts. Therefore, the traditional net-to-gross (NTG) ratio definition is not applicable to this analysis. In order to estimate the NTG ratios for this study, the building simulations are utilized. In this analysis, the NTG ratio is defined as 1 minus the nonparticipants' compliance over Title 24 State Building Energy Efficiency Standards, since the purpose of the Program is to get builders to install measures that exceed Title 24 Standards. The estimated net-to-gross ratios are shown in the following table.

	TABLE 5 Estimated Net-to-Gross Ratios	
(A) End Use	(B) Nonparticipant Compliance Over Title 24	(C) Net-to-Gross Ratio 1-(B)
Space Heating	-9.54%	1.10
Space Cooling	19.43%	.81
Water Heating	1.05%	.99

Measure Cost

Average incremental measure cost estimates for the Residential New Construction Program were based on SDG&E's customer cost-effectiveness analysis. For space cooling, the measure costs represent central air conditioning units. SDG&E administered air conditioner incentives through "per ton/SEER improvements," and the costs were recorded in this manner. Conversely, space heating and water heating improvements were included within "custom budgets" of the Residential New Construction Program, and those costs were tracked accordingly. The average incremental costs are shown in Table 6.

1994 Residenti	TABLE 6 al New Construction Measure Costs
End Use	Average Incremental Costs
Space Heating	\$289.37 per Custom Budget (Electric and Gas)
Space Cooling	\$34.32 per Ton/SEER improvement
Water Heating (Gas only)	\$74.45 per Custom Budget (Gas Only)

Suggested Changes to the Protocols

Having just completed this impact evaluation, SDG&E would like to take this opportunity to address an issue with regards to the M&E Protocols. The Residential New Construction first year retention study for miscellaneous measures should be dropped. The M&E Protocols for miscellaneous measures require the completion of first, fourth, and ninth year retention studies. It is reasonable to believe that since these homes are new, no significant renovations are being done that would cause measures to be removed in the first year. For program year 1994, SDG&E has requested and received a retroactive waiver for the first year retention study. SDG&E is now suggesting a change to the Protocols that would permanently eliminate the first year retention study.

M&E PROTOCOLS TABLE 6 RESULTS USED TO SUPPORT PY94 SECOND EARNINGS CLAIM

FOR

RESIDENTIAL NEW CONSTRUCTION PROGRAM FIRST YEAR LOAD IMPACT EVALUATION

FEBRUARY 1996

STUDY ID NO. 932

SAN DIEGO GAS & ELECTRIC MAE PROTOCOLS TABLE 6 - RESULTS USED TO SUPPORT PY94 SECOND EARNINGS CLAIM FOR RESIDENTIAL NEW CONSTRUCTION PROGRAM FIRST YEAR LOAD IMPACT EVALUATION, FEBRUARY 1996, STUDY ID NO. 932 END USE: SPACE COOLING

5. B. 80% CONFIDENCE LEVEL

5. A. 90% CONFIDENCE LEVEL

				C4170 CUANO 1	CIWICO COCCI	CANCO DAY		CALCO COASO	_	Can So day	CHICOGO CO
			2000 0000	LOWER BOUND	OFFER BOOK	CONCR BOOK	OFFER BOOK	CONER DOOR	_	CONER BOOK	OFFER BOOK
1. Average Participant G	1. Average Participant Group and Average Comaprison Group	PART GRP	CAP GRO	١	אאו פאלי	SOME GROS	COMP GRO	PAKI GRA		COMP GRO	COMP GRO
A. Pre-install usage:	Pre-install kW	N/A	N/A		WA.	ΝA	N/A	WA		N/A	N/A
		N/A	N/A		¥	WA.	N/A	N/A		N/A	N/A
		WA	N/A	ĺ	A/A	ΑN	ΑΝ	NA		ΝΑ	V/A
		N/A	A/A		N/A	N/A	ΥN	W.A		N/A	N/A
	designated unit of measurement	N/A	N/A		ΑΛ	N/A	Ϋ́	ΑN		N/A	N/A
	=	N/A	N/A		AWA	N/A	N/A	NA		N/A	N/A
B. Impact year usage:		2.2	2.6		2.4	2.5	2.7	2.2		2.5	2.7
	4	1,170	1,357	l	1,232	1,294	1,420	1,122	1,218	1,308	1,406
	esionated unit	2.2	2.6		2.4	2.5	2.7	2.2		2.5	2.7
	4	1,170	1,357	1,108		1,294	1,420	1,122			1,406
2. Average Net and Gross End Use Load Impacts		AVG GROSS	VG NET	AVG GROSS	ı	AVG NET	AVG NET	AVG GROSS			AVG NET
		WA	0.36	Ϋ́	ΥN	0.2	0.5	N/A	N/A	0.2	0.5
	4	NA	187	ΝA		8	275	W.A			556
	sated unit - kW	N/A	0.36	ΥN		0.2	0.5	ΥA	П		0.5
	۽	ΑN	187	ΑN		66	275	N/A			256
	>	ΑN	ΥX	W/A		N/A	N/A	N/A			N/A
	۔	ΑN	ΥN	Ϋ́		Y/N	N/A	N/A			N/A
	>	N/A	A/A	¥		N/A	N/A	NVA			N/A
	-	N/A	N/A	ΥN		N/A	N/A	N/A			N/A
D Realization Rate		N/A	71%	ΥN		*0*	401%	N/A			95%
		A/N	%68	N/A		20%	127%	N/A			118%
	eal rate	N/A	71%	N/A		40%	101%	WA	N/A		95%
	l.	N/A	%68	N/A		20%		N/A		29%	118%
2 Net for Green Reffee		RATIO		RATIO	RATIO			RATIO	RATIO		
	A i Average Load Impacts - kW	81%		81%	81%			81%	81%		
		81%		81%	81%			81%	81%		
	unit of measurement -		,								
	kW	81%		81%	81%			81%	81%		
	B. ii. Avg Load Impacts/designated unit of measurement - i-vuh.	81%	٠	81%	81%	-		81%	81%		
	C. i. Ava Load impacts based on % cho in usage in impact										
	year relative to Base usage in Impact year - kW	N/A		N/A	N/A			ΝΑ	ΝΑ		
	ediul (iii) ed			***	,,,,						
	to Base usage in Impact year - kWh	¥		N/A	¥		200	N/A	AWA COOR	000 0000	200
4. Designated Unit Intermediate Data		PARTGRE	COMP GRO	PARI GRO	T	25 A B C C	COMP GRO	PARI GRO	PAK! GRO	COMP GRO	COMP GRA
		V/V	W/W	W.A	T	¥/N	YA.	YA.	¥ .	42	¥2.
	B. Post-install average vakue	V/A	¥/¥	W.A		W.A	¥.	N/A	WA	WA	Y.V
6. Measure Count Data	1	NUMBER	INC COST								
	nstalled by participants in Part	700									
	Group (CENTRAL A/C's)	168									
	B. Number of measures installed by all program										
	participants in the 12 months of the program year	F04	\$34.32 per ton SEED								
	Chimber of management installed by Come Green	65	200								
	CENTRAL ACS.	164	:								
7 Market Segment Date		CZone 7	CZone 10								
THE PERSON CONTRACTOR IN CONTR	Number of Participants	194	397								

NOTE: Net-to-gross ratio determined from building simulations and defined as 1 minus the percentage nonparticipants exceed Title 24 Compliance requirements

SAN DIEGO GAS & ELECTRIC MAE PROTOCOLS TABLE 6 - RESULTS USED TO SUPPORT PY94 SECOND EARNINGS CLAIM FOR RESIDENTIAL NEW CONSTRUCTION PROGRAM FIRST YEAR LOAD IMPACT EVALUATION, FEBRUARY 1996, STUDY ID NO. 932

Designated Unit of Measurement: LOAD IMPACTS PER SQUARE FOOT END USE: SPACE COOLING

END USE: SPACE COOLING	ING				S A 90% CONE	S. A. 90% CONFIDENCE FVF			S. B. 80% CONF	S. R. 80% CONFIDENCE EVEL	
				LOWER BOUND	UPPER BOUND	LOWER BOUND	UPPER BOUND	LOWER BOUND	UPPER BOUND	ما	UPPER BOUND
1. Average Participant G	1. Average Participant Group and Average Comparison Group	PART GRP	COMP GRP	PART GRP	PART GRP	COMP GRP	COMP GRP	PART GRP	PARTGRP	COMP GREE	COMP GRP
A. Pre-install usage:		N/A		W/A	N/A	N/A	N/A	N/A	N/A	W/A	NA
		¥		N/A	WA	N/A	N/A	N/A	N/A	N/A	N/A
	Base kW	N/A	N/A	N/A	N/A	N/A	WA	N/A	WA	N/A	WA.
	Base kWh	V/V		N/A	NA	ΝA	WA	W/A	NA	N/A	N/A
	Base kW/ designated unit of measurement	N/A		N/A	N/A	N/A	ΜA	N/A	N/A	VΑ	ΚA
	signated unit of measurement	N/A	N/A	N/A	N/A	NA VA	N/A	Ϋ́	N/A	WA	N/A
B. Impact year usage:		2.2		2.1	2.4	2.5	2.7	2.2	2.3	2.5	2.7
		1,170		1,108	1,232	1,294	1,420	1,122	1,218	1,308	1.406
		0.00103	٥	0.00098	0.00109	0.00105	0.00116	0.00099	0.00108	0.00108	0.00115
	42	0.539	0.575	0.512	0.566	0.548	0.603	0.518	0.560	0.554	0.597
2. Average Net and Gros	2. Average Net and Gross End Use Load Impacts	AVG GROSS	AVG NET	AVG GROSS	AVG GROSS	AVG NET	AVG NET	AVG GROSS	AVG GROSS	AVG NET	AVG NET
		ΝΆ	0.36	N/A	N/A	0.2	0.5	N/A	N/A	0.2	0.5
	4	N/A	П	N/A	N/A	66	275	N/A	NA	118	256
	ated unit - kW	N/A	ľ	N/A	N/A	000000	0.00014	N/A	WA	0.00001	0.00013
	£	N/A	ľ	W/A	N/A	-0.002	0.075	N/A	WA	200.0	0.067
		N/A		ΥN	N/A	ΑN	N/A	N/A	N/A	ΝA	N/A
	E	N/A	N/A	W/A	N/A	N/A	N/A	ΝA	NA	N/A	N/A
		N/A		A/A	N/A	N/A	N/A	ΝA	N/A	N/A	N/A
	E	NA		V/N	N/A	N/A	N/A	N/A	N/A	N/A	W/A
D. Realization Rate:		N/A		N/A	NA	N/A	W/A	N/A	NA	¥/¥	ΝA
	2	N/A		N/A	N/A	N/A	ΝA	N/A	NA	Ϋ́Α	N/A
		N/A		W/A	N/A	N/A	N/A	N/A	NA	ΝΆ	ΝA
	D.B. ii. Load Impacts/designated unit - kWh, real rate	N/A		٧N	N/A	N/A	NA	N/A	NA	ΑN	N/A
3. Net-to-Gross Ratios		RATIO		RATIO	RATIO			RATIO	RATIO		
		81%		81%	81%			81%	81%		
	۔	81%		81%	81%			81%	81%		•
	 Avg Load impacts/designated unit of measurement - lux 	818		81%	81%			81%	81%	,	
	B. ii. Avg Load Impacts/designated unit of measurement -										
	kwn	81%		81%	81%			81%	81%		
	C. i. Avg Load Impacts based on % chg in usage in Impact	****		***	***			W.	ø.		
	year relative to base usage in impact year - nvv	V/2		V 2	C/A			Ca.			
	Vear relative to Base usage in Impact year - KWh	N/A		Α <u>Ν</u>	Š.	1		N/A	N/A		
4. Desjonated Unit Intermediate Data	mediate Data	PART GRP	COMP GRP	PART GRP	PARTGRP	COMP GRP	COMP GRP	PART GRP	PART GRP		COMP GRP
	A. Pre-install average value	W.A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ΝA	N/A
	B. Post-install average value SQUARE FOOTAGE	2171	2358	2141	2201	2329	2387	2148	2194	2335	2381
6. Measure Count Data		NUMBER	INC COST								,
	A. Number of measures installed by participants in Part										
	Group (CENTRAL A/C's)	168									
	B. Number of measures installed by all program										
	participants in the 12 months of the program year (CENTRAL A/C's)	591	SEER SEER								
	C. Number of measures installed by Comp Group										
	(CENTRAL A/C's)	164									
7. Market Segment Data	Т	CZone 7	220me 10								
	Number of Participants	10.0	100								

NOTE: Net-to-gross ratio determined from building simulations and defined as 1 minus the percentage nonparticipants exceed Title 24 Compliance requirements

NOTE: The standard error associated with the confidence intervals for the designated unit of measurement is calculated from the standard error of the individual ratios of load impact/square footage

NOTE: There is no ex ante estimate for this DUOM, therefore, there is no realization rate

SAN DIEGO GAS & ELECTRIC MALE PROTOCOLS TABLE 6 - RESULTS USED TO SUPPORT PT44 SECOND EARNINGS CLAIM FOR RESIDENTIAL NEW CONSTRUCTION PROGRAM Designated Unit of Measurement LOAD MAPACTS PER SINGLE FAMILY DWELLING UNIT END USE: SPACE HEATING

				5. A. 90%, CONFIDENCE LEVEL	FIDENCE LEVEL	Chicogo Bound	CHING GAM	5. 8. 80%	CONFIDENCE LEVEL	CIMICA GROOM
Austers Bertinians Comm and Australe Consentants Grant	PARTORP	COMP GRP	2	PART ORP	ı	COMP GRP	PART GRP	PART GRE		
Pre-install kW		N/A		WA		NA	NA	ı		N/A
Pre-install kWfh	¥	٧N	NA	W.	Y.	¥.	S.	¥	Y.V	YN .
Pre-install Therms		≨	1	Y.		4	4	1	ı	YA!
Base kW		Y Z		474		VA VA	Z M	ı	İ	V V
Base KWh		N/A		AM		¥	W.	L	l	¥
Date MM decimated in a measurant		YN.		¥		WA	WA	ı		ΥN
Base kWW designated unit of measurement		A/A		WA	П	W.	WA	Н	П	ΑN
Base Therms/ designated unit of measuremen		ΑN		WA		WA	WA	П		ΥN
B Impact year usage Impact Yr kW		•		0		0	0	П		O
T		1,207		1,347		1,447	920	ı		1,394
Impact Yr Therms		274		246		279	237			278
Impact Yr kWidesignated unit		0		0		D	٥	ı		0
Impact Yr kWh/designated unit		1,207		1,347		1,447	026		ı	1,394
Impact Yr Therms/designated unit		274		246		579	237			278
Average Met and Gone End the Lond Impachs		AVG NET	L	AVG GROSS	l	AVG NET	AVG GROSS			AVG NET
IA i Load impacts - KW		0	l	¥		0.0	WA			0.0
A ii t and tenancts - KMh	ΥN	905	l	¥		099	W.A			365
A iii Load Impacts - Therms	¥N2	33		WA		04	N/A		۱	33
B i Load Impacts/designated unit - kW	ΥN			ΥM		0.0	N/A			٥
B # Load Impacts/designated unit - kWh	¥N	100		N/A		440	WA		-165	365
B. iii. Load Impacts/designated unit - Therms		33		Ψ¥		ş	¥	ļ	27	ee .
C. i. e. % change in usage - Part Grp - kW		N/A		¥χ	İ	WA	¥N.	١	¥2	¥.
C. i. b. % change in usage - Part Grp - kWh		¥Χ	1	¥	١	¥.	¥	ı	¥.	¥
C. i. c. % change in usage - Part Grp - Therms	Y.	ĕ.	١	¥		¥.	Y N	W.	¥ ***	AN AN
C. ii. a. % change in usage - Comp Grp - kW		ž	١	Y		4/4	Y W	ı	N/A	S N
C. ii. b. % change in usage - Corro Grp - KWh		¥ .	1	Y M		Y N	Y A	ĺ	N/A	¥N
C. s. c. % change in usage - Comp Grp - Iner				Y N		WA	VAN.	١	A/VA	¥
D.A. i. Load impacts - KW, restration rate		¥ 444	l	V.W		NA NA	W.	1	¥	¥
D.A. II. Load Impacts - KVM, rentzation rate	1	200		VAN .		7880	MA		87%	%¥6
D.A. B. COSO IMPROS - IMPRIMS, INSECTION 1881	1	1		¥.		ΑN	¥N.		WA	¥
U.B. I. Load impacts/designated unit - xvv. rea	1	4/12	l	V/V	١	ΑN	¥N.		WA	¥
D.B. II. Loyd impacts/designated unk - kywi, re		808	l	¥.		%96	¥N		67%	¥08
The state of the s			۱	RATIO	l		RATIO	l		
_ I	110%		109%	110%			109%	110%		
A is Average Load Impacts - KWh	110%		109%	110%			109%	110%		
A iii Average Load Impacts - Therms	T	_	109%	110%			109%	110%		
ID i Ave I and improductionaled into of measurement	١.									
WAY	110%		109%	110%			109%	110%		
B ii. Avg Load Impacts/designated unit of measuremen	ن									
KW	110%		109%	10%			*60±	468		
B # Avg Load Impacts/designated unit of measurement			700	4106			1004	1108		
Therms	ROLL .		REDI	2			200			
Very relative to Rase usage in tribuct vest - IV	AN		×	¥			WA	NA		
C. ii. Avg Load Impacts based on % chg in usa	L									
year relative to Base usage in Impact year - ki	AN NA		WA	ΨA			¥	¥¥		
C iii. Avg Load Impacts based on % chg in usage in Impact	_		4/14	**			W.	¥		
_	MIN AND TOWN	990 9900	DAD TOAD	DART CAR	1	COMP GRP	PART GRP	PART GRP	l	COMP GRP
4. Designated Unit Intermediate URB	AND IN	AM			l	V.V	ΑN	×		AN.
A Pre-install average value	S AN	¥N	W.W	¥N.	¥¥.	WA	WA	ΥN	WA	ΝA
D. FURNISHER PARK	NUMBER	INC COST			l					
A Number of measures installed by participants in Part	Г									
Group (CENTRAL HEATING ONLY)	Gas 24									
8. Number of measures installed by all program participants	m participants									
in the 12 months of the program year (CUSTC	OM BUDGET									
COUNTY - GAS & ELECTRIC)	Flectr	1								
•										
Market Segment Data	H	CZone 10								
Number of Participants -Gas (BUDGET COUNT)	+									
Number of Participants - Electric (BUDGET CC	1									
	1									

NOTE. Net-to-gross ratio determined from building simulations and defined as 1 minus the percentage nonparticipants exceed Title 24 Compliance requirements NOTE. There is no as ante estimate for electric space heating, therefore, there is no residanton rate

SAM DIEGO GAS & ELECTRIC M&E PROTOCOLS TABLE 8 - RESULTS USED TO SUPPORT PYSA SECOND EARNINGS CLAM FOR RESIDENTIAL WEW CONSTRUCTION PROGRAM FIRST YEAR LOAD IMPACT EVALUATION, FEBRUARY 1996, STUDY ID NO. 932

5. B. 80% CONFIDENCE LEVEL

5. A 90% CONFIDENCE LEVEL

Designated Unit of Messurement: LOAD IMPACTS PER SQUARE FOOT END USE: SPACE HEATING

				LOWER BOUND	LOWER BOUND JUPPER BOUND	LOWER BOUND UPPER BOUND	UPPER BOUND	LOWER BOUND	UPPER BOUND	LOWER BOUND	UPPER BOUND
1. Average Participant Gr	1. Average Participant Group and Average Comaprison Group	PART GRIP	COMP GRP	PART GRP	PART GRP	COMP GRP	COMP GRIP	PART GRIP	PART GIRP	COMP ORP	COMP GRP
A Pre-instalf usage:	Pre-install kW	-1	¥	¥	¥	¥.	¥.	Y.	¥≱	¥¥.	W.A
	Pre-install KWh	П	¥2	¥N.	Š	¥	V.	YN.	¥	1	¥
	Pre-install Therms	П	Y/N	¥	Š	Š	¥	YN.	ΨM	١	¥
	Base KW	П	YA.	VA.	YN.	ž	V.V	ž	¥	1	¥
	Base KWM	П	VIV.	VA.	YA.	ž	Y.	¥	ž	1	¥
	- 1	-1	¥	¥.	YN.	¥	VAV	Y/N	Ϋ́	1	¥
	Base KWF designated unit of measurement	П	Y S	¥.	S .	¥2	YA.	YN.	¥.		ž
	Case KVMV designated Link of measurement	П	NA.	4	2	¥ 2	NA NA	4	¥ 2	Š	¥
D Impact towns	Inches treatment of any of the sound of the	П	5	1		ı		1	2	ł	4
D. Harbory See condition	tennact Vr MAR	ı	1 207	Į	120	ı	147	İ	200	1	36.
	Impact Yr Therms	П	27.4		246	L	279	l	245	l	97.6
	Impect Yr kWitdesignated unit	L	0	1	•	Ĺ	0	l	•		2
	*		0.58941	0.40123	0.64905	0.47426	0.70457	۴	0.62170	0.49967	0 67916
	unit		0.12193	0.11843	0.12308	ı	0.12420	L	0.12257	0.12016	0.12370
2 Average Met and Gross			AVG MET	AVG GROSS	AVG GROSS	ı	AVG NET	18	AVG GROSS	AVG MFT	AVG MET
A. i. Load Impacts - KW			0	¥	¥¥		0.0	¥₹	×Ν	0	0
	4	ΥN	95	ΥN	ş	ŀ	011	¥	NA NA	165	382
	TITE	¥≱	33	¥	¥	82	9	¥Ž	MA	27	39
	unit - kW	¥	0	ΥN	ΥN	0.0	0.0	٧N	WA	00	0.0
		V.V	0.06427	WA	WA	-0.10488	0.23343	WA	¥	-0.06755	0.19610
	unit - Therms	¥.N	0.00117	WA	¥Ν	-0.00207	0.00442	NA AN	WA	-0.00136	0.00370
	t Grp - kW	¥₩	ΝΑ	WA	N/A	WA	₩	¥	٧N	ΑΝ	W.A
	Part Grp - kWh	Y.	N/A	WA	WA	N/A	. WA	ΝA	WA	NA	WA
	t Grp - Therms	ΑW	NA	WA	WA	WA	WA	WA	WA	¥Æ	WA
	mp Grp - kW	WA	NA	WA	N/A	MA	WA	WA	٧	NA	ΝA
	mp Grp - kWh	WA	WA	WA	¥N	WA	WA	Υ×	¥	¥	WA
	omp Grp - Therms	¥	¥	WA.	¥	ĕ	¥	¥×	¥	ž	¥.
D. Reakzation Rate:	Т	¥	¥N.	¥	¥.	¥.	¥	VA.	Y.	ž	¥
	Т	ž	¥.	¥	Y.	WA	WW	¥2	Y.	ž	Š
	Т	W.Y	Š	¥	¥	¥.	¥	¥N.	¥.	ž	¥
	Τ	5	4	¥		YN.	V2	V.	W.	2	¥.
	D.B. I. Load impactaroesignated unit - Avvn, rearrant	AWA	V 1	Z Z	VAIN N	N/A	4/14	MA	NAME OF THE PERSON NAME OF THE P	42	Z Z
T Met. to General Button	Т	OT AN		PATIO	RATIO			МТА	OTAR	S	
Γ	A i Average I gad trapacts - KW	110%		109%	110%			7601	10%	**:	
		110%		*60±	10%			7,601	110%		
	A iii. Average Load Impacts - Therms	110%		109%	110%			109%	110%		
	B i Avg Load Impacts/designated unit of measurement -										
		110%		109%	110%			109%	110%		
	B. ii. Avg Load Impacts/designated unit of measurement -	40.0		1004	3055			100%	100		
	R iii Avo i nad Impacts/designated and of measurement -							200			
	Therms	110%		109%	110%		*	109%	110%		
	C. i. Avg Load Impacts based on % chg in usage in Impact										
	year relative to Base usage in impact year - kW	¥		WA	ΥN			NA	N/A		
	C. ii. Avg Load Impacts based on % chg in usage in Impact	W.		AW	***			W.	A N	٠	
	C # Ava Load Impacts based on % chain usage in Impact										
	year relative to Base usage in Impact year - Thms	NA		WA	WA			WA	WA		
4. Designated Unit Interna	ediate Data	PART GRP		PART GRP	PART GRP		COMP GRP	PART GRP		П	COMP GRP
	A. Pre-install average value	WA	¥Χ	MA.	¥		××	¥¥			¥
	Post-install average value SQ FOOT (Electric)	2108	2048	2080	2136	2025	2070	2066	2130	2030	2065
7	B. Post-install average value SQ FOOT (Gas)	1996	2247	1967	2025	1	2276	1973		1	2269
6. Measure Count Data		TOWNER	INC COST								
	A. Number of measures insumed by participants in Part Group (CENTRAL HEATING ONLY)	Ges 24									
	B. Number of measures installed by all program participants in the 12 months of the program was (CLISTOM BUINGET		\$289.37 per								
	COUNTS - GAS & ELECTRIC)	3190	budget								
	C. Number of measures installed by Comp Group (CENTRAL HEATING ONLY)	Electric 1 Ges 18									
7. Market Segment Data		CZome 7	CZone 10								
	Number of Participants - Gas (BUDGET COUNT) Number of Destrictions - English (BUDGET COUNT)	126	655								
	NATIONAL OF PRINCIPORTS - ERGINE (DOUGNET) COMMAND	260	000								

NOTE. Net-to-gross ratio determined from building simulations and defined as 1 minus the percentage nonparticipants exceed Title 24 Compliance requrements

NOTE. The standard error associated with the confidence intervals for the designated unit of measurement is calculated from the standard error of the individual ratios of load impad/square footage.

NOTE. There is no ex ante estimate for this DUOM, therefore, there is no realization rate.

SAN DIEGO GAS & ELECTRIC MAE PROTOCOLS TABLE 6 - RESULTS USED TO SUPPORT PY94 SECOND EARWINGS CLAIM FOR RESIDENTIAL NEW CONSTRUCTION PROGRAM Designated Unit of Measurement: LOAD IMPACTS PER SINGLE FAMILY DWELLING UNIT END USE: WATER HEATING

END USE: WATER HEATING	TING					FIDENCE LEVEL	THE RESERVE		5. B. 90% CON	FIDENCE LEVEL	
6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		990400	ago anos	DABT GOD	DABY ABB	COMEN BOOM		DADT ABO		TOTAL BOOK	
1. Average Participant L	1. Average Participant Group and Average Companion Group	באנו מעו	-	PAR URF	PARI GRO		The same	TAK! WAT	PARI UNG	DE COMP	COMP GAR
A. Pre-install usage:		¥N.	¥	YA.	¥.	١	¥.	¥	ď.	¥¥.	VA.
		¥		¥Ν	ž		≨	¥	ž	ž	¥
		ž		¥	ž		WA	¥×	¥	¥	¥2
		Y/N		W.	××		YAY	Y.N	¥	ΑN	¥χ
The state of the s		MAN AND AND AND AND AND AND AND AND AND A		AN.	MA.		¥	N/A	AW	WA	WA
		V/V		M/M	A/A	l	MA.	NA NA	A.A.	W.A	WA
	Done 1988 Assistanted smith of presented	N/M		N/A	W/W	l	A/N	AMA	W/W	W/W	MIA
	1	And		N/A	ALIA .	l	W/W	A/M	W/W	WATER	W/NV
	rsuremen.	¥ .		V	2	ı	£ .		¥	<u> </u>	V
	designated unit of measurement	¥2		W.W	YA!	ı	YN.	YA.	YN.	YAY.	¥¥
Impact year usage:		N.E.		ž	Ž		ž	ž	ž	Ž	E S
		Z.		N/E	æ		NE.	M	ME	2	ž
	2	103		8	=		\$	8	Ξ	2	25
		ž		NE.	¥		¥	2	3	¥	3
		Z/N		2	2	l	2	200	2	No.	ş
		101		S		l	705	5		2	9
;	man possession in the manual state of the	501		200 000	ALLA CARCOS	I	2000	A CONTRACTOR	445 46566	TANK PROPERTY.	200
2. Average Net and Gros		AVG GROSS		AVG GRUSS	AVG GRUSS	1	AVURE	AVG GRC55	AVG GROSS	AVG ME!	AVGRE
	A. i. Load Impacts - kW	¥	ž	¥	¥¥	ļ	ž	ď.	W/W	ž	ž
	A. ii. Load Impacts - KWh	WA	ž	W.A	¥		¥	¥	¥	ž	¥
	A. iii. Load Impacts - Therms	AW	Ŧ.	W.A.	N/A			¥.	ΥN	92	3
	IB. i. Load Impacts/designated unit - kW	×	ž	¥	¥	l	₩.	N/A	¥,N	N.E.	¥
	R is a confirmachatring in the train - 1996	N/A	2	WA	¥N.	2	N.	W.	AM.	Ž	N.
	12 In and Income Manhon And and Therman	N/A	-	NA/A	V/N	8	-	A/Z	M/A	*	-
	D. M. LOGG HISPORT CONTROL OF THE LINE	Z A	N/A	M/A	44	1	N/M	4/2	AVA	AWA	N.W
	C. I. & Grange at usage - Tex Cop - NV			A1/4	VAIN .	472	4/17	4/2	V/N	5/2	4/4
	C. I. D. 76 Change at usage - Part Cop - Kran	¥ .				4			VM4		
	C. I. c. % change in usage - Part Gro - Therms	¥.	ž	Y.V	¥N.	ž	¥.	2	ž	¥.	¥
	C. ii. a. % change in usage - Comp Grp - kW	¥	¥	Y.	W.A	VAV.	YN.	ž	Y.	¥.	YA
	C. ii. b. % change in usage - Comp Grp - NWh	¥	¥	YN.	Y.	Š	¥	¥	YA.	ž	ž
1	C. ii. c. % change in usage - Comp Gro - Therms	WA	MA	ş	¥¥	¥×	¥	¥	¥	¥.	¥
D. Realization Rate:	D.A. I. Load Impacts - ItW, realization rate	Y.V	W.A	WA	¥¥	ΥA	Y.	¥₩	N/A	N/A	WA
	D.A. ii. Load Impacts - kWh, realization rate	WA	WA	WA	WA	WA	N/A	¥	N/A	WA	N/A
	D.A. iii. Load Impacts - Therms, realization rate	N/A	WA	MA	W.A	W.A	₩¥	WA	WA	N/A	M/A
	D.B. i. Load Impacts/designated unit - kW, real rate	MA	W.A	W.A	¥¥.	WA	ž	W.	W.A	WA	¥
	D.B. ii. Load impacts/designated unit - kWh, rest rate	W.	¥¥	N/A	V/N	N/A	NA	N/A	WA	NA	N/A
	8	N/A	¥#	W.A	VAV	N/A	N.A	N/A	N/A	¥.¥	W.A.
3 Met-to-Gross Ratios	ı.	RATIO		RATIO	IRATIO			RATIO	RATIO		
.1		766		%66	%66			%66	%66	-	
		700		7600	7400			700	×66	_	
	A III A III A	700		700	7800			200	7900	_	
	A. B. Average Load Impacts - Incins	200		2 20	N CC						
•	•	ě		ì	-			è	ğ		
	, , , , , , , , , , , , , , , , , , ,	22.9		2.66	200			2 20	200		•
	D. B. Avg Load ingracts/designated Unit of Intersolvenient -	8		200	7606			760	700		
	D III A. I a. I a. I be a few few few and a fe										_
	D. M. Avg Load impacts/designated time of interstated incit.	7600		**	***			766	8		
	C. I Awn I and lessants based on % chain means in limesed									, .	
	ver relative to Rese meste in temper year - KW	N/A		ž	×			¥N	¥		
	C. if Averal and learners have d on % attain season in Impact									1	
	vear relative to Base usage in Impact vear - KMB:	¥		ş	ž			¥	AN A		
	IC. III. Avg Load Impacts based on % chg in usage in										
	in Impact year - Thms	¥		ž	¥			¥	MA.	٠.	
4. Designation Unit Intern		PART GRP	COMP GRP	PART GRP	PART GRP	COMP GRP	COMP GARP	PART GRP	PART GRP	COMP GRP	COMP GRP
		V/N	AMA	N/M	WA	N/A	M/A	W/A	AW	WA	Α/N
	Doct leaded average value	W.	Y W	AWA	N/A	Y.	NAME OF THE PERSON NAME OF THE P	V/PV	N/A	AN.	M/A
1		0200	TANK VAR								
e. measure count para	١	The state of the s	1000								
	A. Number of measures instance by parecipants in Part	Cecure Car									
	Good (was the state of the	97 995									
	p. National of menautes malaned by an program		£74 45 per gas								
	CUSTOM BUDGET COUNTS - GAS ONLY)	1582	pridae								
	C. Number of measures installed by Comp Group (WATER)	Electric 1									
	HEATING OMLY)	Gas 24			-						
7. Market Segment Data		CZone 7	CZOME								
	Number of Participants -Gas (BUDGET COUNT)	126	Ш								

NOTE: Net to-gross ratio determined from building simulations and defined as 1 minus the percentage nonparticipants exceed Title 24 Compliance requirements NOTE: ME means no estimate; due to small sample sizes (8 participants, 10 non-participants), the results would be misleading NOTE: There is no ex anth estimate for this DUOM, therefore, there is no realizarion rate

SAN DIEGO GAS & ELECTRIC MAE PROTOCOLS TABLE 6 - RESULTS USED TO SUPPORT PY94 SECOND EARNINGS CLAIM FOR RESIDENTIAL NEW CONSTRUCTION PROGRAM FIRST YEAR LOAD IMPACT EVALUATION, FEBRUARY 1996, STUDY ID NO. 932

Designated Unit of Measurement LOAD IMPACTS PER PERSON END USE: WATER HEATING

END USE: WATER HEATING	DN				5. A. 90%	FIDENCE LEVEL			5. B. 80%	DENCE LEVEL	
			ı	LOWER BOUND	UPPER BO	UND LOWER BOUND	UPPER BOUND	₹	UPPER BOUND	COWER BOUND	UPPER BOUND
1. Average Participant G.	1. Average Participant Group and Average Comaprison Group			PART GRIP	PART GREE	COMP CHICA	COMP GROV	PAK GO	PAUK! (SPC)	NA PAR	AWA
A. Pre-install usage:	Pre-install kW		¥.	1	ı	l	4/2		YAN	Y.	YAN
	Pre-install kWh		¥.	1	-	l	VA.		W. W.	472	4/12
	Pre-install Therms		ΨN	1	-	١	4114		VIV.	444	VIVA I
	Base kW		¥N.	1	-	l	VIV.		V V	W.W	N/N
	Bese kWh		¥N.	1	ŀ	l	417		V AM	Z AVA	Y N
	Base Therms		¥.	1	1	1	VA.		V/N	S AM	Y Y
	Base kW designated unit of measurement	ğ	V.	44	1	Z M	NAM .		NA.	W.A.	YN.
	Base kWW designated unit of measurement		YA.	1	1		VAVA		N/A	WA	Ž
١	Base Therms/ designated unit of measurement		¥.	Т	1	1	Y V			L L	N.
B. Impact year usage:	Impact Yr kW		¥ !	Т	1	ı	300		7 7	NA NA	3/1
	Impact Yr kWh		ž	1	1	1	100			2	505
	Impact Yr Therms		35	- 1	-1	1	3			3	
	Impact Yr kW/designated unit		Ž	١	- 1		₩.		2	ž	ž
	Impact Yr kWhidesianated unit		JA.				NE.		ž	₽	ž
	Impact Vr Thermeldesignated unit		29.2	ı	ı		25.2	36.3	29.6	32.3	28.1
	Feed than I and Immedia		AVG NET	1	ł	l	AVG NET	AVG GROSS	AVO GROSS	AVG NET	AVG NET
Z. Average rest and Gross	Cha use Loss markets		37	L	ı	l	¥	¥	¥	¥	¥
	A. t. Load impacts - KW			L	1	ž	ž	ž	ž	3	¥
	A. II. LOSG Impacts - KWM		-	ı	ı	8	_	¥	V/N	Ŗ	9
	A # Load Impacts - Therms		- 1	L	ı	3 3	ME	AW	¥N	¥	ž
	B i Load Impacts/designated unit - KW		2 2	i.	1	2	N.	V.V.	¥N.	¥	¥
	B # Load Impacts/designated unt - KYM		2 2	i	ı	80	21	WA	ž	93	8
	B. ii. Load Impacts/designated unit - Therms		7	ı	1	AVA	N/A	MA	A/M	WA	¥/N
	C. I. a. % change in usage - Part Grp - MV		¥	1	-	V/M	477	477	4/4	AVA	NAME OF THE PERSON NAME OF THE P
	C. i. b. % change in usage - Part Grp - kWh		¥	-	-	YN.	YN Y	NA ANA	4/2	N/A	V V
	C. i. c. % change in usage - Part Grp - Therms		¥2	١	ŧ	Y.		4	4	4/4	457
	C. it. a. % change in usaga - Comp Grp - kW		¥	١	ŀ	×	Š	ž	V.		
	C. ii. b. % change in usage - Comp Grp - kWfn		WA	١	1	ě	YN.	¥.	YN.	¥.	
	C. ii. c. % change in usage - Comp Grp - Therms		N/A	.	- 1	¥χ	≨	¥×	٧×	¥	¥.
O Realization Rate	D.A. i. Load Impacts - kW. realization rate		ΥN			WA	¥¥	¥	¥	¥	¥.
1	D.A. ii foad tropacts - tWh. restitation rate		٧×			N.A	WA	Υ×	ş	WA	¥
	D.A. is losed impacts - Therms, realization rate		W.A			WA	W.A	¥¥	¥	¥	≨
	In B. i. and impactualdesignated unit - kW. real rate		Α¥	ı		N/A	WA	N/A	W.	¥	¥
	O. D. S. and burnered februmented unit . MAR. real rate		AW	ı	ı	NA	Y.N	××	Š	¥	WA
	O. B. Lond Impediately and Ind. Therms test rate	YN.	¥	ı	1	W.A	WA	ΥN	WA	WA	NA
	U.D. H. LONG Myheratropagnesses um	OT VO		ı	1			RATIO	RATIO		
3. Net-to-Gross Ratios		2		2	700			1	200	T	
		866		Ś	S			2000	700	_	
		86		*66	866			200	200	_	
	tms	98%		%66	*6			5	R		
	B. i. Avg Load Impacts/designated unit of measurement -								į		
		99%		%66	% 66			¥66	888	_	
	B. n. Avg Load Impacts/designated unit of measurement -			1	į			3000	7600		
	KW#	Š		200	RAS					1	
	B. iii. Avg Load Impacts/designated unit of measurement -	ğ		8	Š			%	% 66		
	Inems	200				-				_	
	C. 1. Avg Latel impacts based on he ung in usage in impact to a rate at the face seams in Impact water - IVM	¥.		¥	¥			WA	N/A		
	C. ii. Ava Load Impacts based on % chg in usage in Impact										
	year relative to Base usage in Impact year - MWh	WA		N/A	ΑΝ			¥.	¥×		
	% chg							***	***		
	year relative to Base usage in Impact year - Thms	ž		ž	W.	0000	Tooler Con	200 2000	SADT ABO	ogo galos	COMP GROOT
4. Designated Unit Inform	rmediate Data	PARTORP	COMP GRO	PART GRO	MAKI GROV	COMP GRAP	COMP. GRO.	W.	AN AN	N N	NA NA
	A. Pre-install average value	ž	YA.	¥Ž,		4 70	5	5	7	2.06	422
	B. Post-install average value (PER PERSON)	3.13	3.18	8.	80.		20.				
6. Measure Count Outs		NC MOREN	INC COST								
	A Number of measures installed by participants in Part	Electric Gas 28									
	GOUD (WATER MEATING CALLT)	680									
	is the 12 months of the troops were (CUSTOM BUDGET		\$74.45 per gas								
	COUNTS - GAS ONLY)	1582	budget								
	C. Number of measures installed by Comp Group (WATER	Electric 1									
	HEATING ONLY)	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	\$ 00000								
7. Market Segment Data	THE COLLEGE OF THE PARTY OF THE	200	הבסחום זו								
	Number of Participants -Cas (BUDGET COUNT)	37.	666								

NOTE. Net to gross ratio determined from building simulations and defined as 1 minus the percentage nonparticipants exceed Tate 24 Compliance requirements

NOTE. NET means no expiritive, due to a rand sample State (§ participants, 10 mon-participants), the results would be misleading

NOTE in a standard error associated with the confidence intervals for the designated unit of measurement is calculated from the standard error of the ratios of load impacts/number of people in household

NOTE. There is no example estimate for this DUOM, therefore, there is no realization rate.

M&E PROTOCOLS TABLE 7 DATA QUALITY AND PROCESSING DOCUMENTATION

FOR

RESIDENTIAL NEW CONSTRUCTION PROGRAM FIRST YEAR LOAD IMPACT EVALUATION

FEBRUARY 1996

STUDY ID NO. 932

M&E PROTOCOLS TABLE 7 DATA QUALITY AND PROCESSING DOCUMENTATION

For Residential New Construction Program
First Year Load Impact Evaluation
February 1996
Study ID No. 932

A. OVERVIEW INFORMATION

- 1. Study Title and Study ID: 1994 Residential New Construction Program: First Year Load Impact Evaluation, February 1996, MIAP-94-P05-932-603, Study ID No. 932
- 2. Program, Program Year(s), and Program Description (design): Residential New Construction Program for the 1994 program year. The Program is intended to encourage new home builders to incorporate energy saving advanced building technologies and to install energy efficient measures and appliances, both of which exceed Title 24 State Building Energy Efficiency Standards by a minimum of five percent.
- **3. End Uses and/or Measures Covered:** Space cooling, space heating, and water heating.
- **4. Methods and models used:** See the section of the report entitled "The Econometric Framework" on page 3 for a complete description of the final model specifications.
- Participant and comparison group definition: For the load impact analysis: 5. the participants in the 1994 Residential New Construction Program are defined as having signed an agreement after July 1993, and completed construction in calendar year 1994. The comparison group sample was developed from SDG&E's Customer Master File with a "meter set date" (date the meter was originally placed in service) and "meter turn on date" (the date service began to the current customer) both with a date in calendar year 1994. For the building simulations: building simulations representing 1,119 participant lots were This group passed the simple criteria of signing contracts and analyzed. completing the projects in 1994. (Those contracts signed prior to 1994 and/or not completed by the end of 1994 were excluded for comparison purposes.) A sample of 46 nonparticipants had building simulations run after completion of onsite audits. This sample was randomly selected from the 272 nonparticipants in the database described in the Nonparticipant Sample - Load Impact Analysis section as representative of residential new construction customers who did not the participate in SDG&E's 1994 Residential New Construction Program. This group was defined as having a home built and completed in 1994.

6. Analysis sample size:

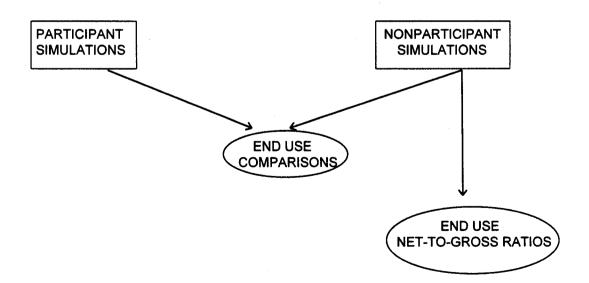
PARTIC	PANT SAMPLE FOR	1994 RESIDENTIAL N	IEW CONSTRUCTIO	N (SFDU)
End Use	# of Customers	# of Installations	# of Measures	Avg. # of Months of Data
Space Heat-ELE	36	36	1608	16.4
Space Heat-GAS	248	248	1582	15.5
Space Cooling	168	168	168	15.8
Water Heat-ELE	8	8	N/A	N/A
Water Heat-GAS	280	280	1582	15.4

NONPART	ICIPANT SAMPLE FO	R 1994 RESIDENTIAL	NEW CONSTRUCT	ION (SFDU)
End Use	# of Customers	# of Installations	# of Measures	Avg. # of Months of Data
Space Heat-ELE	15	15	N/A	16.8
Space Heat-GAS	186	186	N/A	16.4
Space Cooling	164	164	164	16.3
Water Heat-ELE	10	10	N/A	N/A
Water Heat-GAS	249	249	N/A	16.3

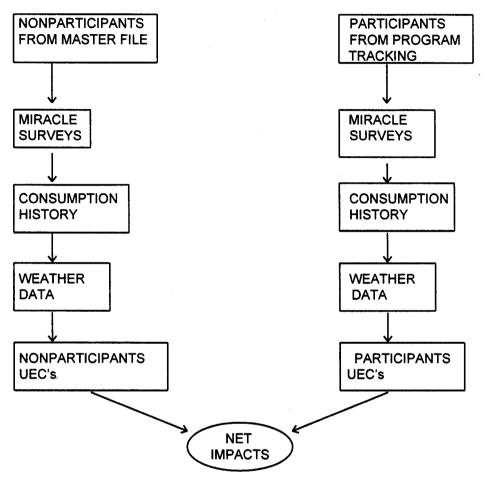
B. DATABASE MANAGEMENT

1. Flow Charts:

DATA FLOW DIAGRAM BUILDING SIMULATIONS



DATA FLOW DIAGRAM LOAD IMPACTS



2. Data sources: the data came from the following sources:

- Building simulations for samples of program participants and nonparticipants;
- Customer name, address, and participation date from the program tracking database;
- MIRACLE surveys for samples of program participants and nonparticipants;
- Electric and gas consumption history from the Customer Master File, as well as the source for the nonparticipant comparison group; and Hourly weather data for two climate zones from NOAA files.

The building simulations were the basis for the net-to-gross ratios. The other data were merged together to form the dataset for the regression analysis leading to the estimated energy savings for space cooling, space heating, and hot water heaters.

3. Data Attrition:

a. Participant Sample - Load Impact Analysis

For the load impact analysis, the 1,732 participants in the 1994 Residential New Construction Program are defined as having signed an agreement after July 1993, and completed construction in calendar year 1994. After eliminating participants with missing or duplicate account numbers and merging with the Customer Master File, there were 1,310 participants for analysis. Further screening to eliminate files with missing names, names of building developers (i.e., unoccupied sites), and having the last month of consumption of at least 10 kWh (another occupancy check), left a list of 923 participants. These 923 participants were asked to fill out SDG&E's residential energy use survey, known as the MIRACLE survey (Marketing Information Research and Customer Load Estimate). The MIRACLE survey provides detailed information about household characteristics, appliance saturation levels, conservation measures adopted, and energy use practices.

Of the 923 participants who received a MIRACLE survey, 450 completed it. One question on the survey asks the year the house was built; 427 responded that their home was built in 1994. In order to analyze these customers in accordance with the M&E Protocols, nine months of consumption after the DSM installation is required, further lowering the analytical sample to 360 participants. Finally, the M&E Protocols for residential new construction concerns only single family dwelling units, leaving a participant database of 309 for analysis purposes.

Number of Participants for Load Impact Analysis	
Signed contract after 7/93 & completed in '94	1,732
Merge w/master file, eliminate duplicate or missing account numbers	1,310
Screen for missing names, developers, & occupancy: sent MIRACLES	923
MIRACLE responses	450
MIRACLE answer that home was built in '94	427
Had nine months of post consumption data	360
MIRACLE answer that home was single family dwelling unit (SFDU)	309

b. Nonparticipant Sample - Load Impact Analysis

The M&E Protocols require a nonparticipant sample of the Residential New Construction Program as a comparison group. The comparison group sample was developed from SDG&E's Customer Master File with a "meter set date" (date the meter was originally placed in service) and "meter turn on date" (the date service was established in the current customer's name) both of which were in calendar year 1994.

From this filtered group, a random sample of 1,300 was selected. After eliminating participants and names of building developers (i.e., vacant sites) from the sample, the remaining 1,187 nonparticipants were asked to fill out the MIRACLE survey, of which 516 responded. Screening on the responses lowered our nonparticipant sample for comparative analysis as follows: 421 responded that their home was built in 1994; the 421 was lowered to 363 in order to satisfy the nine months of consumption data requirement, and out of this subset, 272 responded that their home is a single family dwelling unit, thus creating the nonparticipant database for analysis purposes.

Number of Nonparticipants for Load Impact Analysis		
Random sample of Master file with set date and turn on date in 1994	1,300	
Eliminate participants & developers(occupancy check): sent MIRACLES	1,187	
MIRACLE responses	516	
MIRACLE answer that home was built in '94		
Had nine months of post consumption data		
MIRACLE answer that home was single family dwelling unit (SFDU)	272	

Building simulations representing 1,119 participant lots were analyzed. This group passed the simple criteria of signing contracts and completing the projects in 1994 (contracts signed prior to 1994 and/or not completed by the end of 1994 were excluded for comparison purposes.) A sample of 46 nonparticipants had building simulations run after completion of on-site audits. This sample was randomly selected from the 272 nonparticipants in the database described in the Nonparticipant Sample - Load Impact Analysis section as representative of residential new construction customers who did not the participate in SDG&E's 1994 Residential New Construction Program. This group was defined as having a home built and completed in 1994.

- **4. Data Quality Checks:** The data sets for the regression analysis were merged in SAS by the appropriate key variables. Counts of the data sets before and after the merges were verified to ensure accurate merging.
- 5. All data collected for this analysis was utilized.

C. SAMPLING

1. Sampling procedures and protocols: A census of participants was attempted to fill out the MIRACLE surveys. Please see the section of the report entitled Participant Sample - Load Impact Analysis on page 2 for a detailed description. The section of the report entitled Nonparticipant Sample - Load Impact Analysis on page 3 describes the sampling process for the nonparticipants in an attempt to get 450 nonparticipants as prescribed in the Protocols.

- 2. Survey information: A copy of the MIRACLE survey is attached at the end of the report. Response rates for the participants was 450 out of 923, or 49%. 516 nonparticipants responded out of a random sample of 1,187 who received the MIRACLE survey, or 43%. This was a mail survey; no reasons for refusal are available, nor was there any effort to account for non-response bias.
- 3. Statistical Descriptions: the descriptive statistic is annual consumption:

	Avg Annual kWh	Avg Annual Therms
Participants	5,157	336
Nonparticipants	5,423	333

D. DATA SCREENING AND ANALYSIS

- 1. There were no outliers in the data. Missing data points were ignored in all calculations. Weather adjustments are described in the Econometric Framework section of the report on page 3.
- 2. No adjustments were made to control for the effect of "background" variables.
- 3. See the sections of the report entitled Participant Sample Load Impact Analysis on page 2 and Nonparticipant Sample Load Impact Analysis on page 3 for screening data for inclusion in the final analysis dataset.

4. Regression statistics:

Regres	sion Statistics for the Parti	cipants
End Use	Mean of the UEC's	Standard Error
Space Heat-ELE	1,107	145.73
Space Heat-GAS	241	3.00
Space Cooling	1,170	37.77
Water Heat-GAS	103	8.13
Regressi	on Statistics for the Nonpa	rticipants
End Use	Mean of the UEC's	Standard Error
Space Heat-ELE	1,207	146.19
Space Heat-GAS	247	3.18
Space Cooling	1,357	38.26
Water Heat-GAS	92	7.67

5. Specification:

- a. The electricity model is estimated entirely at the customer level (the extreme case of accounting for customer heterogeneity); the sole source of variation is variation in weather over time. Phase 1 of the gas model has the same property. Phase 2 of the gas model uses only cross sectional variation.
- b. The cooling degreehour and heating degreehour regressors are quite straightforward. They are based on estimates of hourly temperature (which are, in turn, based on daily high and low temperatures). The base for the cooling degreehour and heating degreehour are 65 degrees Fahrenheit. No other time dependent regressors were included.
- c. There is no explicit treatment for self-selection. The study follows the straightforward framework found in the measurement protocols, and adopts the assumption of the protocols that the nonparticipant group is an estimate for the actions of the participant group in the absence of the program.
- d. NA
- e. See the Results section of the report on page 5.
- **6. Error in measuring variables:** A series of reasonability checks were run on survey data to verify fuel types and account for missing answers to the MIRACLE survey. Billing data were screened for changes in occupancy.
- 7. Autocorrelation: Not Addressed.
- 8. Heteroskedasticity: Not Addressed.
- 9. Collinearity: Not Addressed.
- 10. Influential data points: Not Addressed.
- 11. Missing Data: Missing data points were ignored in all calculations.
- **12. Precision:** The standard errors for the estimates were calculated from the variances of the samples of participants and nonparticipants on the variable(s) in question, unless noted on Table 6.

E. DATA INTERPRETATION AND APPLICATION

1. Calculation of net impacts: This study calculates the net load impacts for space heating, space cooling, and water heating by subtracting the UEC's of program participants from the UEC's of the comparison group. The methodology of this study estimates the net effects directly without estimating the gross impacts. Therefore, the traditional net-to-gross (NTG) ratio definition is not applicable to this analysis. In order to estimate the NTG ratios for this study.

building simulations are utilized. In this analysis, the NTG ratio is defined as 1 minus the nonparticipants' compliance over Title 24 State Building Energy Efficiency Standards.

2. This methodology is an option in the Protocols Table C-7, Participant Group item 3, option (a), and utilizes SDG&E's in-house expertise. In this analysis, the NTG ratio is defined as 1 minus the nonparticipants' compliance over Title 24 State Building Energy Efficiency Standards, since the purpose of the Program is to get builders to install measures that exceed Title 24 Standards.