2004 - 2005 Final Report

A Measurement and Evaluation Study of the 2004-2005 Limited Income Refrigerator Replacement & Lighting Program

Program 1376-04

Prepared for:
San Diego Gas & Electric Company

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Raising the bar in analytics™

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Table of Contents

Executive Summary

Evaluation Overview

The final report for the San Diego Gas & Electric's (SDG&E) Limited Income Refrigerator Replacement & Lighting Program (LIRRL, the Program) evaluation summarizes the results presented in the 2004 and 2005 interim reports and offers a comprehensive assessment of Program activities. Specifically, this report presents the findings of the Quantec Team across the following activities:

- Three waves of participant interviews and two waves of non-participant interviews
- On-site measure verification
- Process interviews with Program stakeholders
- An assessment of the multifamily market within SDG&E's service territory
- Statistical billing analysis of LIRRL measure savings

This evaluation meets the requirements for the Program Evaluation, Measurement, and Verification (EM&V) Plan as required by the California Public Utilities Commission's (CPUC) Energy Division outlined in the Energy Efficiency Policy Manual Version 2 (EE Policy Manual). It also adheres to International Performance Measurement and Verification Protocol (IPMVP) guidelines.

Program Description

The LIRRL Program is one of a family of programs offered by SDG&E that provide services and assistance to low- and limited-income residential customers. Implemented in Program Years 2004 and 2005, LIRRL targeted households with incomes slightly above the levels that qualify for the Direct Assistance Program (DAP) or for alternative rates as established in the California Alternate Rates for Energy (CARE) program.

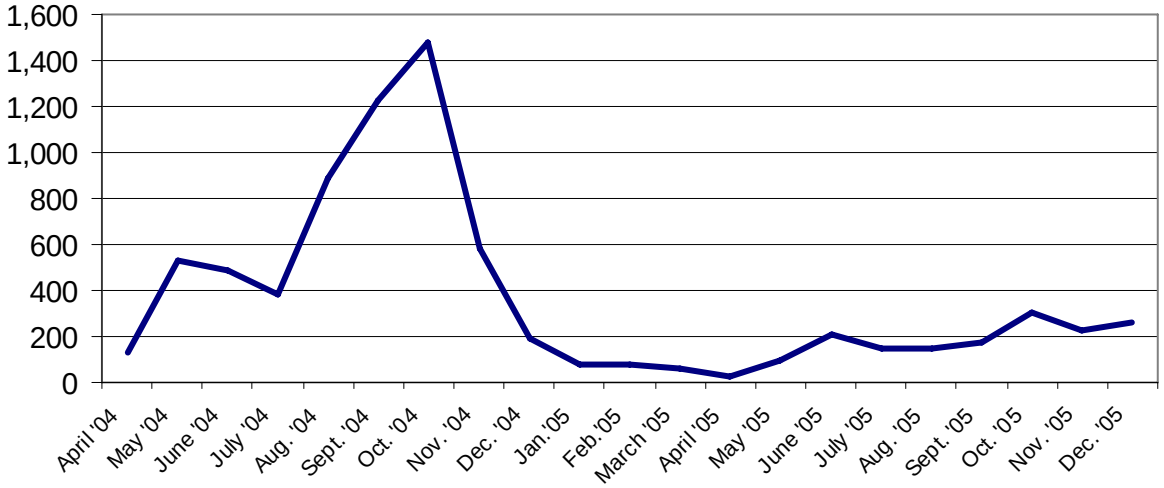
The Program was designed to fill perceived gaps between the Low Income Energy Efficiency (LIEE), DAP, and the Residential Appliance Rebate Program; it specifically targets customers with incomes too high to qualify for DAP but not high enough to make them likely participants in the statewide residential energy efficiency rebate program for single-family homes. The original implementation plan for LIRRL notes that, in their efforts to promote DAP, SDG&E representatives found "a considerable number of customers, while not eligible for the program, still need substantial assistance to purchase energy efficient appliances." LIRRL was implemented through a turnkey contract with Richard Heath and Associates (RHA), who has been implementing DAP on behalf of SDG&E for 15 years

Changes During 2004-2005 Implementation

Several key changes occurred over the course of the 2004-2005 LIRRL implementation.

- ***Lighting***: One of the primary changes to LIRRL during implementation was the discontinuation of its primary lighting-only installation subcontractor in early 2005, after concerns about managing the income qualification portion of the participation process. The lighting Program component became more challenging without a subcontractor specifically focused on lighting installations. In addition, the installation subcontractor had also been acting as primary outreach for large multifamily properties. After the departure of American Lighting Supply (ALS), RHA staff took on more of the outreach activities.
- ***Marketing***: While originally designed to provide energy efficiency services to limited-income customers identified through DAP, LIRRL was aggressively marketed independently of DAP in an effort to launch the Program. While these efforts were necessary at the Program's inception, LIRRL eventually became, as it was originally intended, purely a DAP "fall-out" program. As a result, participation in LIRRL decreased dramatically once the change took effect and when ALS stopped working with the Program. As evident in Figure ES.1, Program participation peaked in October and November of 2004, then tapered off after ALS ceased working for the Program. It is important to note that participation levels increase steadily over the Program's final months.

Figure ES.1. Participation in LIRRL



- ***Budget and Goals***: In early 2005, Program energy and demand goals were reduced by close to 50%, as $2.8 million was shifted from LIRRL to a new procurement component of the Statewide Multifamily Rebate Program. This fund shift reflected an inability to find enough LIRRL income-qualified customers who were also willing and able to return the necessary documentation. The SDG&E contact described realizing early in the Program implementation that the budget was too large for the number of identified qualified customers. Simultaneously, the Statewide Multifamily Rebate Program lacked

funds to support the demand for electrical efficiency measures. SDG&E subsequently filed a change order with the CPUC and initiated the fund shift. The original and revised budget and the Program's energy, demand, and lifecycle goals are provided in Table ES.1.

Table ES.1. Original and Revised 2004-2005 Program Goals

Metric	Original Goal	Revised Goal
Coincident Peak kW	1,521	815
Annual kWh	12,121,834	5,954,866
Lifecycle kWh	109,423,061	53,348,118
Budget	$6,000,000	$3,182,0881

Multifamily Property Owners and Managers

The evaluation team interviewed multifamily property owners and managers in the San Diego metropolitan area to explore local owner and manager familiarity with available energy efficiency programs that may apply to their properties, discover the portion of multifamily buildings with tenants likely to qualify for such programs, and obtain feedback about several Program aspects.

Amongst SDG&E's three low- and limited-income energy efficiency programs, Energy Team was most recognized, and the Statewide program was least recognized by the contacted multifamily building owners and managers. While more contacts reported their buildings had participated in Energy Team than in either of the other two programs, LIRRL had the highest percentage participation among those who were aware of the various programs, though this result was expected due to the program contractor's assistance in identifying potential survey candidates.

Other than the contacts from the list provided by RHA, the implementation contractor, only about 25% of the contacts from the lists of multifamily building owner and manager names obtained for this survey reported being aware of any of the three programs. This level of awareness suggests an opportunity to expand the reach of these programs.

There is interest among multifamily building owners and managers in taking advantage of programs that provide benefits to their tenants or to the properties themselves, and there is a high interest in participating in LIRRL in particular. However, there is also a level of inertia that must be overcome before some owners or managers will take the steps necessary to participate. The sources of this inertia are varied and include the time and effort required to comply with Program requirements, insufficient program information, problems with participation in earlier programs, remote decision making, and simple apathy.

[1] November 2004 CPUC Monthly Report Narrative

Email and direct mail are the best ways to reach multifamily property owners and managers with information about energy efficiency programs; telephone calls are the least effective. Other suggestions for reaching this population are through the Board of Realtors and the Apartment Owners Association. Lastly, while master-metered multifamily residences are not common, where they do exist, they are likely to have low- or limited-income residents.

Measure Verification

To verify the installation and assess the retention of Program-installed lighting and refrigeration measures, Quantec staff conducted on-site verifications of 298 participating units at 24 different participating multi-family complexes. The verifications took place at three different points (January 2005, June 2005, and February 2006) in order to gain insight into both installation and retention rates being achieved throughout the Program's implementation. The results of this effort are presented in Table ES.2.

Table ES.2. Measure Retention Rates (All Rounds)

	Database Quantity		Verified Quantity		Verified and Operating Quantity	
	n	%	n	%	n	%
CFLs	2,460	100%	2,263	92.0%	2,244	91.2%
Fixtures	422	100%	416	98.6%	416	98.6%
Torchieres	11	100%	11	100%	11	100%
Refrigerators	179	100%	179	100%	179	100%

Overall, 91.2% of Program-installed CFLs were verified and found to be operational. It is important to note that a 14.2% difference in the observed retention rate of CFLs between units with remaining and new tenants was determined (94.0 and 79.8%, respectively). Interestingly, the retention rate determined during the on-site verification process is higher than the self-reported retention rate provided by participating survey respondents (88% – see *Participant Survey Chapter*). However, both the on-site verification retention rate and the rate provided by survey respondents are reasonably close to the retention rate observed for CFLs a year or less after being installed for several other residential lighting programs in California.

Other than CFLs, all of the measure retention rates exceeded 98.6%. In fact, every torchiere and refrigerator detailed in the Program database was successfully verified on-site. All 11 of the torchieres were in units with the same tenant so it was not possible to detect any indication of whether tenant occupancy would affect the retention rate of torchieres similarly to CFLs. Lastly, very little differences were observed in retention rates between rounds of visits.

Program Impact

In an effort to determine the savings attributable to Program-installed refrigerators and lighting measures, Quantec employed a combination of approaches: a stipulated savings approach (IPMVP Option A) and a statistical adjusted engineering regression model (IPMVP Option C).

While the stipulated savings approach was used to confirm *ex ante* savings estimates and for reporting overall EM&V results to the CPUC for the LIRRL program, the statistically adjusted engineering model was employed to derive *ex post* savings estimates that may be utilized in future iterations of the Program.

Stipulated Savings Approach

To calculate the stipulated gross savings, the total number of measure installations recorded in the Program's final database were multiplied by the respective per-unit demand and energy savings. As presented in Table ES.3, the total stipulated gross demand, annual energy impacts, and lifecycle energy savings attributable to LIRRL are 990 kW, 7,059,383 kWh and 62,212,648 kWh, respectively.

Table ES.3. Total Stipulated Gross Savings

Measure Type	Measure Description	Database Quantity	Total Gross Coincident Peak Demand Savings (kW)	Total Gross Energy Savings (kWh)	Total Gross Lifecycle Energy Savings (kWh)
Appliance	Refrigerator	1,642	357	2,523,754	15,142,524
Lighting	Exterior CFL (13 W)	546	-	60,224	481,790
Lighting	Hardwired Fluorescent Porch Light	3,914	-	431,714	6,907,427
Lighting	Interior CFL (13 W)	55,098	408	2,606,135	20,849,083
Lighting	Interior CFL (20 W)	7,413	82	521,134	4,169,071
Lighting	Torchiere Lamp	275	13	80,850	1,293,600
Lighting	Ceiling Fixture (30 W)	9,336	131	835,572	13,369,152
Total		*78,224*	*990*	*7,059,383*	*62,212,648*

Applying the stipulated net-to-gross ratios to the gross demand and energy savings determines the stipulated Program net impacts. As presented in Table ES.4, the total stipulated net savings of the 2004-2005 LIRRL Program is 849 kW, 6,055,713 kWh annually and 54,006,430 kWh over the effective useful lives of the Program-installed efficiency measures.

Table ES.4. Total Stipulated Net Savings

Measure Type	Measure Description	Stipulated Net-To-Gross Ratio	Total Net Stipulated Coincident Peak Demand Savings (kW)	Total Stipulated Net Energy Savings (kWh)	Total Stipulated Net Lifecycle Energy Savings (kWh)
Appliance	Refrigerator	0.80	286	2,019,003	12,114,019
Lighting	Exterior CFL (13 W)	0.89	- - -	53,599	428,793
Lighting	Hardwired Fluorescent Porch Light	0.89	- - -	384,226	6,147,610
Lighting	Interior CFL (13 W)	0.89	363	2,319,461	18,555,684
Lighting	Interior CFL (20 W)	0.89	73	463,809	3,710,473
Lighting	Torchiere Lamp	0.89	11	71,957	1,151,304
Lighting	Ceiling Fixture (30 W)	0.89	116	743,659	11,898,545
Total			*849*	*6,055,713*	*54,006,430*

Using the net-to-gross ratios determined through the participant survey and on-site measure verification, the net adjusted stipulated savings were calculated. Table ES.5 presents these values. As evident in the table, Program savings are greater when the adjusted net-to-gross ratio is applied to the stipulated gross savings than when the stipulated net-to-gross ratios are utilized.

Table ES.5. Total Net Adjusted Stipulated Net Savings

Measure Type	Measure Description	Adjusted Net-To-Gross Ratio	Total Net Adjusted Coincident Peak Demand Savings (kW)	Total Net Adjusted Energy Savings (kWh)	Total Net Adjusted Lifecycle Energy Savings (kWh)
Appliance	Refrigerator	100.0%	357	2,523,754	15,142,524
Lighting	Exterior CFL (13 W)	79.4%	- - -	47,801	382,410
Lighting	Hardwired Fluorescent Porch Light	89.9%	- - -	388,310	6,212,960
Lighting	Interior CFL (13 W)	79.4%	324	2,068,560	16,548,477
Lighting	Interior CFL (20 W)	79.4%	65	413,638	3,309,104
Lighting	Torchiere Lamp	89.0%	11	71,957	1,151,304
Lighting	Ceiling Fixture (30 W)	89.9%	118	751,564	12,025,028
Total			*874*	*6,265,583*	*54,771,805*

Statistically Adjusted Engineering (SAE) Regression Model Approach

Once the appropriate participant sample was finalized, a customer-based SAE regression model was employed. SAE models rely on participant-specific engineering-based savings as independent variables to further explain energy savings realization for individual measures or groups of measures. The coefficient of the savings variables (γ_1 and γ_2) can be interpreted as the realization rates for their respective measures, using the *ex ante* savings estimates used for the program:

$$BASELOAD\ SAVINGS_i = \lambda + \gamma_1 REE_i + \gamma_2 LEE_i + \gamma_3 PREBASELOAD_i + \varepsilon$$

where:

- BASELOAD SAVINGS = the change in baseload consumption between the pre and the post periods from a separate daily consumption regression model
- REE = Engineering Estimates for Refrigerators
- LEE = Engineering Estimates for All Installed Lighting Measures
- PREBASE = Daily baseload Energy Consumption Prior to Participating in LIRRL

Realization rates for the above SAE model were determined (Table ES.6) utilizing the Program gross stipulated savings as engineering estimates for both refrigerators and all lighting measure savings. As evident in the model and table, the expected savings for all Program-installed lighting measures were aggregated to achieve greater statistical significance. As presented in the table, the model calculated savings realization rates of 44.0% and 19.6% for refrigerators and overall lighting installations, respectively.

Table ES.6. SAE Model Realization Rates

	Sample	Refrigerator Realization Rate*	Overall Lighting Realization Rate*
Overall LIRRL Participants	2,005	44.0%	19.6%

* Both realization rates were significant at the 1% level.

These realization rates can then be applied to the Program's stipulated gross per-unit savings to generate gross *ex post* per-unit savings for each Program-installed measure. Since all lighting measures were assessed collectively in the SAE model, the same realization rate is applied to all lighting measures. The initial gross *ex post* per-unit savings estimates, as determined by the SAE model, are presented in Table ES.7.

Table ES.7. Realized Gross Per-Unit Annual Demand and Energy Savings by Measure

Measure Type	Measure Description	Program Stipulated Gross Annual Demand Savings (kW)	Realized Gross Annual Demand Savings (kW)	Program Stipulated Gross Annual Energy Savings (kWh)	Realized Gross Annual Energy Savings (kWh)
Appliance	Refrigerator	0.2176	0.0957	1,537.0	676
Lighting	Exterior CFL (13 W)	-	-	110.3	22
Lighting	Hardwired Fluorescent Porch Light	-	-	110.3	22
Lighting	Interior CFL (13 W)	0.0074	0.0015	47.3	9
Lighting	Interior CFL (20 W)	0.0110	0.0022	70.3	14
Lighting	Torchiere Lamp	0.0460	0.0090	294.0	58
Lighting	Ceiling Fixture (30 W)	0.0140	0.0027	89.5	18

To determine the net demand and energy impacts of Program measures, the realized net-to-gross ratio was applied to the per-unit savings, provided in the previous table. A detailed discussion regarding net-to-gross ratios is offered in the following section.

Table ES.8. Realized Net Per-Unit Annual Demand and Energy Savings by Measure

Measure Type	Measure Description	Realized Net-To-Gross Ratio*	Realized Gross Annual Demand Savings (kW)	Realized Net Annual Demand Savings (kW)	Realized Gross Annual Energy Savings (kWh)	Realized Net Annual Energy Savings (kWh)
Appliance	Refrigerator	0.90	0.0957	0.0862	676	608
Lighting	Exterior CFL (13 W)	0.89	- - -	- - -	22	19
Lighting	Hardwired Fluorescent Porch Light	0.89	- - -	- - -	22	19
Lighting	Interior CFL (13 W)	0.89	0.0015	0.0013	9	8
Lighting	Interior CFL (20 W)	0.89	0.0022	0.0019	14	12
Lighting	Torchiere Lamp	0.89	0.0090	0.0080	58	51
Lighting	Ceiling Fixture (30 W)	0.89	0.0027	0.0024	18	16

* Note the Program stipulated net-to-gross ratio was utilized for all lighting measures while 0.90 (rather than 0.80) was applied to refrigerators. Explanation and discussion regarding this decision is provided in the "Additional Research" sub-chapter of the Program Impact chapter.

Finally, the realized net annual per-unit energy savings can be applied to the total number of Program installations and effective useful life (EUL) for each measure to determine the Program's overall annual and lifecycle impact (Table ES.9).

Table ES.9. Total Program Demand, Annual and Life Cycle Energy Savings by Measure and Overall

Measure Type	Measure Description	No. Installations	EUL*	Total Realized Net Annual Demand Savings (kW)	Total Realized Net Annual Energy Savings (kWh)	Total Realized Net Lifecycle Energy Savings (kWh)
Appliance	Refrigerator	1,642	10	141.5	998,993	9,989,928
Lighting	Exterior CFL (13 W)	546	8	-	10,505	84,044
Lighting	Hardwired Fluorescent Porch Light	3,914	16	-	75,308	1,204,932
Lighting	Interior CFL (13 W)	55,098	8	71.1	454,614	3,636,914
Lighting	Interior CFL (20 W)	7,413	8	14.2	90,907	727,253
Lighting	Torchiere Lamp	275	16	2.2	14,103	225,656
Lighting	Ceiling Fixture (30 W)	9,336	16	22.8	145,757	2,332,115
Total		*78,224*		*251.8*	*1,790,188*	*18,200,840*

* Again, note the EUL utilized for refrigerators differs from that stipulated by the Program. Similar to the difference in NTG, explanation and discussion regarding this decision is provided in the following "Additional Research" sub-chapter.

The achievement of Program energy and demand goals utilizing the stipulated savings, adjusted stipulated savings, and SAE methodologies are summarized in Table ES.10. As expected, and as evident in the table, the stipulated savings methodologies achieve a significantly higher percentage of the Program's intend energy and demand goals than the SAE model.

Table ES.10. Achievement of Program Goals – Stipulated, Adjusted and Realized Savings

Metric	Revised Goal	Total Stipulated Net Program Savings	% of Goal Achieved (Stipulated Savings)	Net Adjusted Stipulated Program Savings	Goal Realization Rate	Total Realized Savings (SAE Model)	% of Goal Achieved (Realized Savings)
Coincident Peak kW	815	849	104.2%	874	107.3%	252	29.7%
Annual kWh	5,954,866	6,055,713	101.7%	6,265,583	105.2%	1,790,188	29.6%
Lifecycle kWh	53,348,118	54,006,430	101.2%	54,771,805	102.7%	18,200,840	33.7%

Participant Surveys

Overall, a total of 420 surveys were conducted over the course of three "phases." Similar to the on-site measure verification methodology, surveys were conducted at three points in the Program's evaluation (November 2004, July 2005, and January 2006) in an effort to assess the consistency of Program during implementation, track changes over time, and to allow for mid-evaluation feedback to be coordinated with Program stakeholders. The following provides some of the highlights of the participant survey effort.

- Most participants heard about the Program through their apartment manager or landlord. The most common reasons for participation were reducing electric bills, pressure from the apartment manager or landlord, and saving energy.
- Satisfaction (defined by those assigning a "4" or a "5" on a five-point scale) with all measures was over 75%. Participant satisfaction with refrigerators diminished significantly over the course of the surveys. On the other hand, participant satisfaction with CFLs and fluorescent light fixtures increased significantly over the course of the surveys, possibly as a result of the steps taken to improve those measures.
- Measure retention is above 90% for refrigerators, torchieres, and light fixtures. It is lowest for CFLs, at 83%. Again, assuring that the quality of the bulbs is high and that the location of installation is appropriate will help keep a higher percentage of CFLs installed over time.
- Free-ridership was estimated at 13.0 and 8.8% for CFLs and fluorescent fixtures, respectively. No participants stated they had planned to purchase a high efficiency refrigerator or fluorescent torchiere prior to participating.

Non-Participant Surveys

Much like the participant surveys, non-participants were also interviewed in phases. However, since LIRRL was not independently marketed during most of 2005 (functioning exclusively as an adjunct to DAP), only two phases of non-participant interviews (November 2004 and July 2005) were conducted. Provided are some highlights.

- Non-participants tend to be younger than participants and are far more likely to live in single-family homes. About half of the non-participants surveyed reported household occupancy and income situations such that their incomes would probably exceed the

Program's caps for qualifying. Just under one-third of non-participant households probably would have qualified for the Program.

- Non-participants who probably qualify for the Program were somewhat more likely than those who probably don't qualify to have the top-freezer/bottom-refrigerator style of refrigerator. Almost half of non-participants say they have replaced their main refrigerator recently; nearly all of these report that they purchased a new refrigerator as opposed to a used one.
- With regard to how they view their electric bill, just over half of non-participants say it is affordable, with the rest saying it's either too high to afford or too high but they somehow manage to pay it.
- About half of non-participants remember being notified about the Program, but only about one-fourth specifically remember the notification letter. About nine in ten of those who remember there was a letter report that they read the letter. No single reason for non-participation was given by more than a small portion customers. The reason reported by the most non-participants was simply not feeling the need for a new refrigerator or already having a new one.
- However, when non-participants were asked whether they would participate in a program that would replace their refrigerator for free, more than three-fourths reported they would with the rest saying that they might. Just under half of non-participants reported that they would participate in a program that replaces lighting for free, with another 10% saying that they may do so. Among those saying that they would not participate in such a lighting program, the most commonly given reason was feeling that they had already done all they could to save energy and not wanting strangers going through their homes.
- About two-thirds of non-participants reported they are satisfied or very satisfied with SDG&E overall. The portion expressing strong satisfaction with the utility was much smaller among participants than non-participants, suggesting that, for participants, the Program experience was positive and gave them a rosier view of their utility.

Recommendations

Energy Savings by Refrigerator Size, Refrigerator Net-To-Gross and Effective Useful Lives

While the savings associated with refrigerator units of various sizes tend to differ, the current Program utilized a single stipulated demand and energy savings for all four unit sizes. To test for difference between the savings associated with LIRRL refrigerator installations of varying size, an additional regression model was run. The results of the model indicate significant variation in observed savings across the installed models. As expected, significantly larger savings were observed when larger units were replaced than smaller units. The *ex post* gross energy savings associated with each unit, as well as the total number of installations reported in the Program database, is provided in Table ES.11. As evident in the table, the *ex post* gross annual savings differ dramatically from the *ex ante* annual savings.

Table ES.11. Gross Energy Savings by Refrigerator Size

Fridge Sizes (cubic feet)	Total Program Installations	Gross Annual Savings	
		Ex Ante	Ex Post
15 cf	944	1,537	588
17 cf	184	1,537	611
19 cf	388	1,537	763
21 cf	126	1,537	1,167
Weighted Average	*1,642*	*1,537*	*676*

Based on the results of the regression, it appears that the current stipulated refrigerator savings are based on a larger model, as they exceed even the value observed for 21 cubic feet models. The Program database, however, indicates that the vast majority of the units installed by the Program are actually 15 cubic feet. This is likely due to the fact that the majority of the Program's participants lived in multi-family units. The disconnect between *ex ante* savings estimates and *ex post* realized savings underscores the necessity of varying savings estimates by refrigerator size.

To determine the net energy savings for each unit, the gross savings from the previous table need to be multiplied by a net-to-gross ratio to account for freeridership and spillover. Table ES.12 utilizes both the *ex ante* and *ex post* net-to-gross ratios to determine both the net *ex ante* and *ex post* annual energy savings. As evident in the table, an *ex post* net-to-gross ratio of 0.9 was applied. The decision to vary from the Program-stipulated *ex ante* value of 0.8 was based on both the results of the participant survey and the professional judgment of the evaluation team. Four hundred twenty LIRRL participants were surveyed in conjunction with this evaluation and showed no freeridership for refrigerators. While this likely underestimates actual freeridership (e.g., although the surveyed participants claim that they would not have installed without the Program, it is possible that those living in rental units might have their refrigerators replaced by property management), the results reinforce the notion that a net-to-gross ratio of 0.8 is too low. The adjusted results yield an *ex post* net-to-gross of 0.9 for all Program-installed refrigerators. It is recommended that a net-to-gross ratio of 0.9 be utilized for future iterations of the Program.

Both the *ex ante* and *ex post* net savings by refrigerator unit size are provided in the following table. It is recommended that LIRRL utilize these gross and net annual savings for future use as *ex ante* savings estimates.

Table ES.12. Gross Energy Savings by Refrigerator Size

Fridge Sizes (cubic feet)	Net-to-Gross Ratio		Net Annual Energy Savings (kWh)	
	Ex Ante	Ex Post	Ex Ante	Ex Post
15 cf	0.8	0.9	1,230	529
17 cf	0.8	0.9	1,230	550
19 cf	0.8	0.9	1,230	686
21 cf	0.8	0.9	1,230	1,050
Weighted Average	*0.8*	*0.9*	*1,230*	*608*

In addition to adjusting the *ex ante* and *ex post* net-to-gross ratio for refrigerators, the effective useful life of refrigerators was also adjusted in the final analysis. As evident in Table ES.9, an EUL of ten years (rather than the Program-stipulated six years) was employed because it is assumed that early refrigerator replacements for efficiency purposes remove units with approximately half of their existing EUL remaining. As a result, the EUL for the Program-installed efficient refrigerator is half that of a non-early replacement unit. Despite this, the six-year EUL utilized by the Program is less than half the EUL observed in a California Joint Utility Low Income study , a recent study that revisited EULs for the DEER database. Specifically, the 2004 Joint Utility study utilized an EUL of 15 years for refrigerators and the report updating the DEER database, published in July 2005, suggested using an EUL of 18 years. Half of both EULs, particularly the DEER update, are longer than that stipulated by the Program. Given that, among the Program's target population, refrigerators are likely to be replaced less frequently (as evident by both the aforementioned survey results and the fact that units in rental properties are likely to remain in place longer), for the purpose of this analysis, an EUL of ten years was utilized. It is recommended that an EUL of ten years be used in all future iterations of LIRRL.

Focus on Refrigerators

To assess the reasonableness of Program savings estimates, the *ex ante* gross LIRRL savings estimates were compared the savings realized by several similar recent evaluations. All of the energy savings estimates for lighting measures found in the various studies were less than the stipulated value employed by LIRRL for the same measure. Generally, it appears that the stipulated lighting savings are too high when compared to the savings generated by other similar programs.

While the effectiveness and ongoing need for the Program's lighting component appears limited, it is recommended that the Program utilize the realized gross energy savings as *ex ante* estimates if lighting measures are used in future iterations. However, given the evolution of San Diego's housing market, the increasing difficulty reaching LIRRL-eligible households, the saturation of CFLs in this demographic, and the low lighting savings realized in this evaluation, changes in the Program appear to be warranted. Specifically, future iterations of LIRRL should focus either predominately or exclusively on refrigerators.

Program Overview

Overview

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This evaluation meets the requirements for the Program Evaluation, Measurement, and Verification (EM&V) Plan as required by the California Public Utilities Commission's (CPUC) Energy Division outlined in the Energy Efficiency Policy Manual Version 2 (EE Policy Manual). It also adheres to International Performance Measurement and Verification Protocol (IPMVP) guidelines.

Program Description

The local LIRRL Program is one of a family of programs offered by SDG&E that provide services and assistance to low- and limited-income residential customers. Implemented in Program Year 2004 and 2005, LIRRL targeted households with incomes slightly above the levels required to qualify for the Direct Assistance Program (DAP) or for alternative rates as established in the California Alternate Rates for Energy (CARE) program.

The low- and limited-income programs implemented by SDG&E represent a mixture of state and federally mandated assistance and weatherization programs, statewide programs targeting multifamily buildings, and programs offered by SDG&E independently. Typically, there are income qualifications that must be met prior to participation – qualifications that are generally based upon meeting or exceeding some percentage of the federal poverty level.

There are overlaps in program offerings, as well. For example, a household qualifying for reduced rates through the CARE program may also qualify for free home improvement or energy-efficient appliances through Energy Team (or DAP). These programs include:[2]

- California Alternate Rates for Energy (CARE)
- Family Electric Rate Assistance (FERA)
- Medical Baseline

[2] There are other programs that offer services for specific segments of the population at risk for shut-off notices, or for those with medical requirements.

- Energy Team (DAP)
- Neighbor to Neighbor
- Low Income Home Energy Assistance Program (LIHEAP)
- Limited Income Refrigerator Replacement and Lighting (LIRRL)

LIRRL was developed and funded as part of SDG&E's procurement forecast plan. The Program was designed to fill perceived gaps between the Low Income Energy Efficiency (LIEE), DAP and the Residential Appliance Rebate Program. The Program specifically targets customers with incomes too high to qualify for DAP but not high enough to make them likely participants in the statewide residential energy efficiency rebate program for single-family homes.[3] The original implementation plan for LIRRL[4] notes that, in their efforts to promote the DAP, SDG&E representatives found "a considerable number of customers, while not eligible for the program, still need substantial assistance to purchase energy efficient appliances."

LIRRL was implemented through a turnkey contract with Richard Heath and Associates (RHA), who has been implementing DAP on behalf of SDG&E for 15 years. In implementing LIRRL, RHA brought in subcontractor American Lighting Supply (ALS) to conduct outreach to large multifamily buildings. ALS replaced lighting with Program-qualified lamps and fixtures and collects data on refrigerators. ALS brought familiarity with the large multifamily buildings in SDG&E's service territory due to their participation in other energy efficiency programs, including the Statewide Multifamily Rebate Program.

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[3] The Statewide Residential Retrofit Single-family Home Energy Efficiency Rebate Program operates in the service territories of each of the four California IOUs.

[4] Limited Income Refrigerator Replacement and Lighting Program Procurement. September 23, 2003. Sempra Energy

Process Evaluation

Program Context

The CPUC and the California IOUs, including SDG&E, have prioritized enrolling in energy-efficiency programs "hard-to-reach" (HTR) customers – consumers who, for a variety of reasons, participate in energy-efficiency programs at a lower rate than other populations. Low-income customers have been hard to reach with standard energy-efficiency programs for decades; often, programs are specifically designed to reach this market. In 2000, the California Public Utilities Commission (CPUC) expanded the definition of HTR to include moderate-income consumers (those with incomes less than 400% of the federal poverty level), which would include LIRRL participants.[5] LIRRL's target population also includes many customers who primarily speak a language other than English, another population deemed hard to reach by the CPUC.

LIRRL is based upon the hypothesis that a substantial number of customers have been underserved by the existing array of programs because their incomes are marginally above the allowable threshold for DAP, but insufficient for purchasing measures through standard rebate programs. In many ways, this group is one of the hardest to reach – neither tracked by the federal low-income assistance programs that provide free measures and reduced rates, nor participating sufficiently in standard residential programs that offer incremental incentives to offset the purchase price of high-efficiency appliances and products. These factors and the limited income represented by this group also combine to make the cost of energy a high burden for these households.

The factors that make it difficult for the targeted population to participate in standard energy efficiency programs are aggravated by the rapid rise of home prices in the San Diego area and the corresponding decrease in the supply of affordable housing. The impact of rising housing costs is particularly difficult for households living on limited or fixed incomes.

In the course of implementing DAP, SDG&E identifies customers likely to qualify by ZIP code or because the household has submitted an application for a rate assistance program. SDG&E and its agents work with the customer to determine whether or not they qualify for services through the low-income program. Prior to LIRRL, those found not to qualify were referred to standard SDG&E programs, most of which require a financial commitment from the customer. Given the limited income of these customers, many simply did not participate in or benefit from energy efficiency program offerings.

According to Program implementation documents, an analysis of 2000 Census data indicated that approximately 60% of the customers in the focus areas should qualify for the low-income program. The balance of these customers was expected to be eligible for the LIRRL Program.

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[5] LIRRL is offered in pre-specified areas to customers found to marginally exceed the eligibility threshold for DAP. DAP is offered to customers whose income places them at less than 175% of the federal poverty level, while LIRRL is offered to customers with incomes ranging from 176%-250% of federal poverty guidelines.

Since LIRRL targets customers in areas already identified as a focus for the low-income program, finding eligible participants was expected to be straightforward.

Implementation and Administration

The program launched in May 2004 after a final implementation contract was developed and signed. The activity levels in the early months of the Program were relatively low but picked up in August 2004, when a staff person at RHA was assigned to work on LIRRL full time. A contact at ALS also reported that she began focusing specifically on LIRRL coordination issues in August, at which time Program-related activity increased significantly.

LIRRL suffered from somewhat limited coordination and start-up confusion in its initial months. In part, this was because the Program had been conceived primarily as an add-on to other program duties related to DAP. The Program launched without fully developed administrative systems, and lacked contractor staff dedicated to its administration and coordination. According to RHA contacts, it soon became clear that LIRRL needed a higher level of attention and administrative support than originally envisioned if it was to meet its goals.

Implementers initially understood that in targeted zip codes or neighborhoods, any household with income too high to qualify for DAP was automatically qualified for LIRRL. Because of the way the demographic information was developed for the Program, the implementers thought this was an accurate assumption. For example, if Program representatives were conducting outreach in a given area and found someone with income too high to qualify for DAP, they were automatically assumed to be part of the 40% that qualified for LIRRL, and were signed up. Because this was not necessarily the case, SDG&E established, within 30 days of launching the Program, income documentation requirements. Although the documentation requirements reduced the uncertainty about eligibility, implementers perceived them to be an added, unforeseen burden that increased administrative costs.

Staff and Contractors

The SDG&E LIRRL Program Manager worked for the utility's hard-to-reach commercial programs before being assigned to the residential sector in June 2004. She is responsible for managing the program contractors, DAP Program management duties, tracking the budget and expenditures, and marketing the program. She also prepares information needed to meet CPUC reporting requirements and addresses any customer issues that arise. The SDG&E Program Manager spends approximately ten hours a week on the Program, a figure that is declining as start-up issues are resolved and program activities become routine.

LIRRL is implemented at RHA through the efforts of a Program Manager, a Program Coordinator, a Program Assistant, and two installers. The RHA Program Manager was the primary contact with SDG&E during the planning phase and designed the initial forms. He spent about 16 hours a week focusing on start-up details and Program management during the first few months; by November, his time requirements had dropped to about six hours per week. RHA assigned a full-time staff person to LIRRL to act as Program Coordinator in August, and this helped reduce the time required of the Program Manager. The LIRRL Program Coordinator has

worked for RHA for five years (primarily on Energy Team/DAP) and supported LIRRL prior to assuming her current role.

The RHA Program Coordinator manages most of the day-to-day implementation details. She contacts customers referred to the Program by SDG&E to schedule lighting installation. She also processes the refrigerator data collected by ALS during their lighting installations. Once refrigerators are age-dated, delivery and installation of new units is arranged for those that qualify. The Program Coordinator organizes the work and maintains the schedules of two installers. A Program Assistant at RHA also supports LIRRL. She spends less than 50% of her time on the Program and is responsible for closing the books on Program-installed measures and invoicing SDG&E every two weeks. She also works with the installers – checking paperwork at the end of the day to assure that the details are complete and correct.

Initially, RHA subcontracted most LIRRL lighting installations to ALS. ALS provided a Program Manager who focused mainly on the administrative issues associated with the program: handling paperwork and acting as a liaison between installers and sales people -- scheduling and communicating with customers as necessary. Customer issues that emerged were forwarded up to ALS management for resolution.

Outreach and Recruitment

According to Program staff at RHA, their efforts to market the Program rely on existing relationships established with property owners over the course of implementing low-income programs for SDG&E for 15 years. Once a resident has been contacted and identified as potentially qualifying for LIRRL, Program representatives provide a form to certify that the customer's income is within Program bounds and provide the property owner a property owner agreement (POA). The POA must be signed before lighting replacement. For multifamily participants, the owner or owner's representative signs the POA.

Program staff report that income verification can be intrusive, but the intrusion is manageable. Those qualifying for DAP must show proof of income, and the documents are digitally photographed for the program records. LIRRL is less intrusive since Program representatives simply ask the customer to certify that they meet the income requirements by signing a document. According to RHA staff, the initial forms did not clearly screen the income level of potential participants. These forms have since been revised to screen all participants for eligibility. Program contacts reported that customers occasionally respond to the Program with a measure of suspicion – they wonder what the catch is and why the utility is giving things away.

Other than referrals from those customers visited by the Energy Team outreach workers, there are three main avenues by which participants learn of the Program: (1) direct mail from SDG&E, (2) solicitation via multifamily and manufactured home park property managers, and (3) canvassing. These are discussed below.

Direct Mail. In the summer of 2004, a letter describing the LIRRL program opportunity was sent to 6,500 addresses in El Cajon. This was the only 2004 mailing that discussed LIRRL exclusively. Throughout 2004, however, SDG&E sent a direct mail piece out approximately once a month in batches of about 2,000 to addresses in targeted areas, on behalf of DAP. RHA

staff report that, in October, language was added to these mailings introducing both programs (DAP and LIRRL) to potential non-English speaking participants. The mailings include a self-addressed, stamped card the recipient could send in for more information or to request contact. Those expressing interest were contacted via telephone.

Based on the census data noted previously, about 40% of those who receive a direct mail piece are found to qualify for LIRRL, although this varies from one mailing to another. This general share was confirmed by the two rounds of non-participant interviews, where 284 of the 616 customers (46%) who agreed to answer the questionnaire were income eligible for LIRRL (See Non-Participant Survey Section).

Telemarketing subcontractor CIC Research also contacts non-respondents in an effort to increase participation. LIRRL-qualified customers are referred to RHA. RHA schedules lighting installations, during which installers will check for identifying information on the refrigerator. RHA contacts estimated that approximately 25% of the participants will be enrolled in the Program in this way.

Property Managers. A high proportion of LIRRL participants are contacted through the property manager or owner of the multifamily building or manufactured home park in which potential participants live. ALS was initially quite central to the multifamily effort due to their familiarity with this market in San Diego and because they have established relationships with many local property management companies. ALS identified potential properties and provided the list to RHA and SDG&E for screening. ALS relied on face-to-face contact with property management representatives. RHA tracked the marketing activities of ALS sales representatives, including which large multifamily buildings were contacted.

When contacting large multifamily complexes, property managers are considered customers. Property managers are contacted early in the process and encouraged to meet with a representative and learn about the Program opportunity. The time required for property managers to approve participating in LIRRL varies depending upon the ownership arrangement and the level of autonomy under which they operate. Direct communication between Program representatives and tenants of multifamily buildings is rare. Residents typically learn about the Program when their property manager or landlord provides a copy of the letter describing the income guidelines and the measures to be installed. RHA contacts estimate that approximately 50% of the Program participants are enrolled in this way.

Property managers distribute income verification forms to tenants and encourage them to turn in the forms with rent checks. It can take several months before enough forms have been turned in at a given property to warrant scheduling a lighting installation. Program contacts report that though this process may take time, all interested multi-family complexes are eventually served.

Contacts described the time required to get income forms back from tenants as the single biggest barrier to getting measures installed in multifamily buildings. ALS staff report that forms revised to include information about both DAP and LIRRL requirements are difficult for tenants to understand and has resulted in a low percentage returning completed forms. Other possible reasons cited for the slow return include: tenants that do not qualify, they are not highly

motivated to participate, questions are perceived as too personal, or the participation process is perceived as too intrusive.

Once an adequate portion of residents are qualified, Program representatives schedule a time during which installers will upgrade the lighting at all qualified residences. The installers gather information identifying the refrigerator (manufacturer and model number) during the lighting installation. This information is used to age-date the refrigerator and determine whether or not it is eligible for replacement under LIRRL.

The initial step of providing Program information can be complicated, particularly since two programs are listed on one form, each with different income requirements. Program contacts reported in 2004 that the number of new complexes signing up appeared to shrink with the introduction of the revised form listing the income requirements for both programs. One contact estimated that about 15% to 20% of those who express interest in the Program do not qualify – usually because their income is over the threshold. ALS began informing RHA of tenants that qualify for Energy Team by September 2004, something they had not done at the beginning of the Program.[6]

Energy Team/Canvassing. As noted above, participants can also enter the Program through direct contact with RHA. RHA canvasses targeted areas by representing both programs and assigns eligible customers to either DAP or LIRRL. Staff members report that co-marketing and cross-promoting allows them to offer both programs when they approach a complex or neighborhood.[7] Canvassing a multifamily complex involves distributing flyers and waiting for calls from interested residents or contacting people through door-to-door outreach. In the case of those completing the application during door-to-door outreach, measures can be installed immediately. RHA contacts estimate that approximately 25% of the program participants are enrolled in the Program in this manner.

Other Marketing. RHA relies in part on networks and relationships with community groups and community leaders – connections developed over years of implementing programs in the same neighborhoods. According to RHA staff, the organization prioritizes hiring staff with community connections and leverages these in their efforts to get information from the community about the DAP and LIRRL. Additionally, RHA requires that program staff speak a language other than English, and relies upon this in-house skill to reach out to residents who do not speak English.

RHA anticipates that manufactured home residents will also be contacted through coordination with manufactured park managers. Most manufactured home residents participating in LIRRL in 2004 came to the Program after they were denied participation in DAP because of their income. A small percentage of manufactured home participants came to LIRRL through word-of-mouth referrals.

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[6] ALS does not operate under established energy savings goals. They report accomplishments via invoices approximately once a month, depending on workflow. Invoices are turned in with completed forms for each participant, work order documents, and a list of measures installed by unit.

[7] In joint outreach activities Energy Team (DAP) is prioritized due to the high goals established for that program. DAP has different metrics, including therm goals, making it difficult to compare directly to LIRRL in terms of actual measures installed.

Participation and Measure Installation

After income qualification is established, participation typically involves these steps:

- The property owner must authorize access to units and installation of qualifying measures by filling out a POA, which is turned in to the Program.
- Installation appointments are scheduled (typically in two-hour increments).
- During the appointment, installers offer lighting measures, including installation of (up to 12) CFLs, ceiling fixtures, and halogen torchieres.
- Installers also collect the information required to age-date the refrigerator. If a refrigerator qualifies for replacement, the Program later contacts the owner to schedule a separate delivery.

The entire process is streamlined for single-family homes because they are contacted directly and can fill out paperwork immediately. Single-family residents can have measures installed within two weeks of initial contact. Multifamily complexes and manufactured home parks typically take more time at the beginning because of need to collect the forms documenting tenant income, a task that usually involves the property manager. Remote areas can be delayed until the Program has enough appointments in the area to justify sending out installers.

The number of measures installed varies by dwelling type and size. For example, three-bedroom units require more fixtures than one-bedroom units, and single-family homes may require an even larger number of lighting fixtures. According to staff, the number of fixtures ultimately installed in single-family homes depends upon how the owner feels about the style of the fixture: those who like the fixtures are likely to want them throughout the house for uniformity.

Given the relatively high energy savings goals for this new Program, the SDG&E Program Manager included language that allowed "all feasible measures." Therefore, there was initially no official limit on the number of fixtures that could be installed, but practicality tended to limit the fixtures to five or six per single-family dwelling and one or two in multifamily dwellings. The high numbers of lamps installed in some situations, although passing inspection process, was eventually capped at 12 lamps per site. Contacts estimate that approximately 25% of the participants have refrigerators that qualify for replacement. A much lower percentage has halogen torchieres eligible for replacement.

Contacts report that property owners and residents are happy to receive the measures (installed at no cost). There are, however, instances of measures being refused. Customers may refuse some or all of the eligible measures because the equipment they have in place is adequate, because they mistrust the Program or the utility, because they dislike the style of lighting, or because they desire a new refrigerator but not lighting. Program contacts reported few problems with customers and a good response to the Program overall, however, several contacts noted that more variety in lighting options would be beneficial in recruiting single-family participants.

Inspection. The Program relies upon the California Conventional Home and Mobile Home Weatherization Installation Standards – a thick manual outlining the technical requirements for all programs providing weatherization and in-home energy efficiency services in California.

Everything else related to Program implementation is outlined in the technical scope of work for LIRRL. Refrigerators can be replaced only if they are plugged into a three-pronged, grounded outlet.

SDG&E is responsible for assuring that measures are in place and operating. Early in the Program, the utility was inspecting every refrigerator installed, but reduced the inspection level in November after finding no problems. Locations with refrigerators and/or high numbers of lamps were more likely to be selected for verification.

Reporting and Tracking. LIRRL benefits from a streamlined program tracking and reporting system. The Program relies upon a database that is accessible electronically by the Program contractors and SDG&E staff simultaneously. The reporting required between the implementation contractor and the utility is minimal because the two parties can access the same information. The database is pre-programmed with reports that reflect SDG&E reporting requirements and allows the utility program manager to get up-to-date information on goal attainment, year-to-date spending, and measure counts.

The Program goals were developed through census tract analysis conducted by a consultant prior to Program launch. The goals are expressed in kW and kWh, with specific values assigned for each measure. The Program does not have specific goals for given measures – the ultimate mix that achieves the goals is less important than that the goals are achieved. LIRRL was originally expected to save 1,572 kW, and 12.1 million kWh over the 2004 and 2005 program years, though the goals were later revised.

Program Strengths and Concerns

Contacts identified several key Program strengths, including:

- Measures can be installed rapidly.
- The overall concept of creating synergy with DAP allowed the Program to be implemented simply and quickly.
- Cohesive outreach/promotion strategy creates one point of entry for potential DAP or LIRRL participants.
- Door to door, word of mouth "street marketing" was identified as an effective strategy that allowed them to not only offer the Program simultaneously with DAP, but also approach multifamily property owners directly.
- People like it (including tenants and property managers).
- SDG&E's energy-efficiency program tracking system, *Track-it-Fast*, allows Company staff to easily stay up-to-date on LIRRL and other Program accomplishments.

Three main areas of concern emerged in interviews with contacts, including: (1) coordination and competition between programs; (2) the challenge of attaining Program goals; and (3) the time required to fill out and collect necessary forms.

DAP Coordination and Competition

LIRRL was conceived as an extension of DAP and is implemented by the same contractor; however, the two programs do not have the same qualified measure list and parameters, which can create challenges in attempting to market the programs jointly. The different eligible measures and income requirements may appear arbitrary to the owners and managers of large multifamily properties with a mixture of qualifying and non-qualifying tenants. In cases where the resident population is highly mobile (or in complexes with high turnover), these differences could create participation barriers. This is particularly the case when measures stay in place when a tenant moves and serve someone with a different income level soon after their installation.

The difference in the mix of eligible measures can also create resistance in representatives of multifamily complexes seeking uniformity in appliances and products installed in their buildings.[8] Currently, if the tenant is found to qualify for DAP, the unit refrigerator can be replaced if it is more than ten years old, but if the tenant is found to qualify for LIRRL, the refrigerator must have been manufactured prior to 1990. It is easy to imagine two identical units with refrigerators manufactured in 1992 next door to each other, but only one being eligible for replacement. This challenge was described in monthly reports to the CPUC.

Additionally, running multiple programs in similar markets can potentially create competition, particularly if the programs are targeting the same customer with the same measures. This may be the case when the multifamily program ramps up again. Since there is no income qualification for the multifamily program, property owners may chose that program in order to avoid dealing with hassle of income verification.

Goal Attainment

There appears to be some disconnect between the goals established conceptually for the Program and practical goal attainment. This is because LIRRL was originally envisioned as a DAP add-on program, but LIRRL's ambitious participation and savings goals mean that it must be actively pushed and administered rather than merely relying on DAP administration and marketing.[9]

In 2003, DAP weatherized more than 12,000 dwellings. According to staff, approximately 200 applications were denied due to income over the threshold, or less than 2% of the population contacted by Energy Team representatives. Program staff estimates that, as of November 2004, they were enrolling one LIRRL customer for every 10 to 15 DAP customers. Though the contractor implementing both programs has 15 years of experience identifying and reaching customers that qualify for DAP, identifying and reaching those qualifying for LIRRL may require new tactics and market intelligence.

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[8] Buildings found to have 80% of tenants qualifying for DAP are treated as 100% DAP, the remaining 20% is not required to provide income documentation.

[9] SDG&E has stepped-up to do marketing for LIRRL, without changing the scope of work or their CPUC contract.

RHA staff members also perceive a declining concentration of low- or limited-income people in the targeted areas due in part to the high cost of housing in San Diego. According to staff, the income requirements for both programs are very low considering the soaring rents in San Diego zip codes. Higher rental costs result in fewer residents surviving on the established income requirements and more families sharing dwellings.

Given the evolution of San Diego's housing market and the increasing difficulty reaching LIRRL-eligible households, changes in the Program appear to be warranted. Specifically, it appears that limited opportunities exist to generate additional savings from lighting within the Program's target demographic. Considering the apparent saturation of CFLs, as well as the savings achieved by LIRRL lighting measures (See Program Impact section), future iterations of LIRRL should focus either predominately or exclusively on refrigerators.

Documentation Timelines

Measures can be installed quickly once a residence is identified as LIRRL-qualified. However, the time between initial contact with the Program and actual installation can sometimes be quite long, often due to the time required to fill out the necessary forms.

In LIRRL, there are delays while Program representatives wait for residents to fill out income documentation forms and turn them into their landlord. Income verification can be a sensitive issue, so some resistance or delay in reporting one's income to a landlord is not surprising. This is particularly true given the targeted population for LIRRL. Low-income customers are often used to having to provide income documentation, since it needs to be done to qualify for CARE, for food stamps, for Women Infants and Children (WIC), or for other government assistance. LIRRL, however, targets a slightly different population, and may encounter barriers related to pride among people who do not consider themselves "low-income." Program contacts reported working around these issues by using less sensitive terms, including "income-qualified" when speaking to participants.

Changes During Implementation

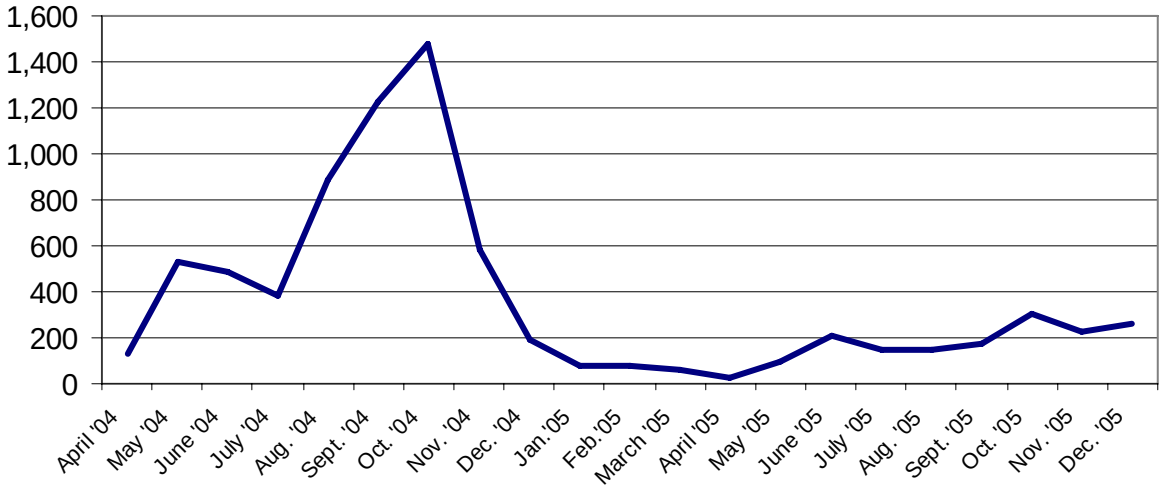
To help the evaluation team understand any other Program changes that occurred during the Program's implementation, three LIRRL staff members were interviewed in August 2005 and May 2006. To assess the Program's implementation, interviews were conducted with two contacts at RHA, and one at SDG&E.

Marketing

The primary change noted by all stakeholders was a significant shift in the Program's marketing efforts. As noted above, LIRRL was originally designed to provide energy efficiency services to limited-income customers identified through – but ineligible to participant in – DAP. However, in an effort to launch the Program, LIRRL was aggressively marketed independently of DAP. While these efforts were necessary at the Program's inception, LIRRL eventually became, as it was originally intended, purely a DAP "fall-out" program. While marketed independently, the Program enrolled significantly more customers than when marketing efforts shifted to reflect the

original intention for the Program. As a result, participation in LIRRL, as evident in Figure 1, decreased dramatically once the change took effect. As evident in the figure, Program participation peaked in October and November of 2004 and then tapered off after ALS ceased working for the program.

Figure 1. LIRRL Participation Over Time



In August 2005 two of the interviewed contacts described lower than expected installation numbers, however it is important to note that participation levels increase steadily over the Program's final months. The increase in participation is consistent with stakeholder comments regarding their ability to develop systems allowing them to be more effective, become a true DAP adjunct, and efficiently handle application requirements. As one stakeholder noted, "The longer we were involved with [LIRRL], the smoother it got. With practice, over time, we developed systems that made it pretty smooth."

Budget

In early 2005, Program energy and demand goals were reduced by close to 50%, as $2.8 million was shifted from LIRRL to a new procurement component of the Statewide Multifamily Rebate Program. This fund shift reflected an inability to find enough LIRRL income-qualified customers who were also willing and able to return the necessary documentation. The SDG&E contact described realizing early in the Program implementation that the budget was too large for the number of identified qualified customers. Simultaneously, the Statewide Multifamily Rebate Program lacked funds to support the demand for electrical efficiency measures. SDG&E subsequently filed a change order with the CPUC and initiated the fund shift. The original and revised budget and Program energy, demand, and lifecycle goals are provided in Table 1.

Table 1. Original and Revised 2004-2005 Program Goals

Metric	Original Goal	Revised Goal
Coincident Peak kW	1,521	815
Annual kWh	12,121,834	5,954,866
Lifecycle kWh	109,423,061	53,348,118
Budget	$6,000,000	$3,182,08810

Revised Forms and Letters; Enrollment Difficulties

Contacts attributed the low first quarter 2005 activity levels to several factors, including the use of a more complicated income qualification form. One contact described Program activity slowing after eligibility forms were revised at the end of 2004 to include the maximum income for both DAP and LIRRL. The revised forms asked participants to specify if they were qualified for either program, whereas before, the form simply asked participants if their income was above or below CARE guidelines. The forms were revised because of concerns that participants could have higher incomes than the LIRRL maximums if the maximums were not listed.

Contacts described the early 2005 forms as "too wordy; asking people to check a box if you qualify for something instead of a yes or no." According to interviewed Program staff, participation decreased further as soon as the revised forms were put into use. At that point, staff described working through current projects but noted that new projects slowed. "Whatever was in the pipeline went through," said one contact, "but we began using the new forms in January, February and March, and the program went dead." In April 2005, the DAP letter was reformatted to include information about both programs on a double-sided single sheet of paper. The English language version was on one side, and the Spanish language version was on the other. This letter was later revised in June to describe each program separately (on two separate pieces of paper), and both program letters included Spanish translations).

Contacts described continuing to struggle with the content of the outreach letter which is usually sent in conjunction with DAP outreach materials. "There are mailings by ZIP code and characteristic, but we can't get past the wall of getting those forms filled out," said one contact. All contacts described understanding that SDG&E needed to ensure participants were legitimately qualified, and that this concern justified the more complicated forms. However, these changes have made it more difficult to identify households falling within the required Program income range by making it less likely that potential participants will sift through all of the information on the form, complete it, and ultimately, submit it.

This difficulty in obtaining signed forms from qualifying households was also cited by multifamily building owners and operators who were interviewed for research described in the next chapter in this report. Staff contacts describe property management companies as varied in their Program activity support. Those management companies that recognize potential Program benefits or have positive past Program experience are more likely to provide resources needed to

[10] November 2004 CPUC Monthly Report Narrative

support Program outreach and implementation. While staff report having strong relationships with some of the property management companies, contacts also noted that the property management staff are often extremely busy and do not always prioritize energy efficiency upgrades. “If there is a low turnout or a long time frame, it can get tiresome for them,” said one contact, “I’ve had management companies falsify forms – filling them out for residents – so we don’t want to push it so much they just make it happen.”

According to one contact, working renters (who make up the bulk of LIRRL-qualified households) are often either not available to sign forms or are not motivated to receive services because the improvements benefit the landlord’s property. Finding eligible refrigerators also continues to be a challenge for Program staff. Contacts noted that it helped to have one contractor implementing both DAP and LIRRL because it allows outreach staff and installers to complete the eligibility screening and age-date refrigerators at the same time.

Lighting

One of the primary changes to LIRRL during implementation was the discontinuation of its primary lighting-only installation subcontractor in early 2005. This followed concerns about managing the income qualification portion of the participation process through a subcontracting relationship.

The lighting Program component became more challenging without a subcontractor specifically focused on lighting installations. In addition, the installation subcontractor had also been acting as primary outreach for large multifamily properties. Since the departure of ALS, RHA staff have taken on more of the outreach activities. RHA contacts describe marketing the Program first to the on-site manager at a multifamily building. If that person cannot authorize the work, the Program staff then contact the management company. Staff estimate that the process is stalled 30% to 40% of the time after contacting the management company because of difficulties connecting with the right person along with management companies not prioritizing the Program. According to RHA, the process works more smoothly when Program staff are able to start with the management company, establish interest, and then approach the on-site manager

Multifamily Property Owners and Managers

After reviewing the 2004 interim report and discussing findings with Program staff, the evaluation team contacted and interviewed multifamily property owners and managers in the San Diego metropolitan area. The purpose of this contact was to explore local owner and manager familiarity with available energy efficiency programs that may apply to their properties, discover the portion of multifamily buildings with tenants likely to qualify for such programs, and obtain feedback about several Program aspects.

More specifically, we sought the following feedback:

- Assessment of overall familiarity with and receptiveness to Program features
- Determination of qualifying units in the broader San Diego apartment market
- Identification of Program participation barriers

Identifying Survey Candidates

Two primary objectives were considered when listing potential multifamily contacts. First, the representation of the variety of different market actors involved in the decision-making process at multifamily properties. These market actors included multifamily property owners, property managers (both on- and off-site), brokers, and real estate firms. Second, being reproducible so contact information could be shared with SDG&E for potential LIRRL-qualifying properties marketing and contact avenues. .

The potential contact list was derived from several sources. The implementation contractor (RHA) provided 29 names of known property managers. The evaluation team assumed that a high percentage of the listed names would be eligible for and familiar with the Program, since they were known to the implementers. In order to obtain a broader sample of property owners and managers who were likely to be less familiar with SDG&E's programs, the evaluation team expanded this list using multiple Web sites listing property owners, realtors, and property managers in the San Diego metropolitan area – including suburbs such as El Cajon and Escondido. The assumption, later verified over the phone, was that some portion of the identified multifamily market actors would have tenants who qualified for the low- and limited-income programs and, therefore, could be included in the survey sample.

The evaluation team based its research on the presumption that there were four main groups of people involved in making multifamily property upgrade decisions:

- On-site property managers at many larger multifamily buildings who deal with day-to-day building management and act as a primary contact between third-party contractors and their tenants.
- Property management companies who are often responsible for hiring and managing on-site property managers and have staff members dealing with accounting, collections, property improvement, and liability issues.

- Commercial real estate agents who lease or sell multifamily properties. This is a smaller group.
- Multifamily property owners with varying levels of involvement ranging from hands-on property management to no property involvement at all.

An initial contact list representing these groups was compiled from the following sources:[11]

- ***Commercial Realtors Association – San Diego (CRASD)*** lists 21 multifamily specialists on its Web site.[12] Each of these contacts were added to the list.
- ***Property Management*** Web sites that allows visitors to select a building type and a state or region to generate a property manager listing for a specified area. Multifamily property types are broken down by number of units: 2 to 4 units, 5 to 19 units, 20 to 100 units and over 100 units. Each of the property managers managing the sites are also listed. The research team gathered contact information for 105 property managers involved with managing multifamily properties having between 5 and 19 units. After developing this list, a new query was generated listing property management companies involved in managing 20 to 100 units. After reviewing the list generated by the second query, it was apparent that the majority of names were already in the first query. To avoid duplicating efforts and to conserve resources, these names were not added to the list of 105. While it is possible that there are companies only managing larger properties, they are likely to represent only a small percentage of the entire multifamily population.[13]
- ***The National Association of Residential Property Managers***[14] allows Web-based searches for residential property managers by city. Entering "San Diego" in the "city" field resulted in seven property management companies; all of which were added to the list.
- ***ApartmentRatings.com*** is a Web site that allows searches by city. Selecting "San Diego" resulted in 174 apartment complexes throughout the San Diego metropolitan area. The complexes were not categorized by income requirement or cost of rent, so all 174 were added to the list.

The final list of 336 contacts, and their respective sources, is provided in Table 2. The varied sources only contained four duplicate contacts – an indication that the different sources represented relatively mutually exclusive populations, and that property management companies, brokers and realtors, and on-site managers operate in related but separate spheres.

11 While we did not locate a list of multifamily property owners in the San Diego area, several of the contacts from other lists spontaneously mentioned San Diego multifamily property ownership.

12 http://crasandiego.org/index.cfm?fuseaction=dsp&page=specialist

13 This search process can be duplicated at http://www.allpropertymanagement.com/find/form.php.

14 http://www.narpm.org

Table 2. Lists Used and Number of Contacts Per List

Source	Number	Percent of total list
Implementation Contractor	29	9%
Commercial Realtors Association – San Diego	21	6%
All Property Management.com	105	31%
NARPM	7	2%
Apartment Ratings.com	174	52%
Total	*336*	*100%*

Owner/Manager Interview Results

Property owners and managers were initially screened to determine whether any of their tenants were likely to qualify for LIRRL based on the contact's knowledge of their tenants' incomes. Contacts were also asked if they owned or managed any master metered buildings with low- or limited-income tenants. Ultimately, 30 owners/managers with low- or limited-income tenants were interviewed. Of these, seven contacts (23%) owned or managed master-metered buildings. However, five of these seven (71%) reported owning or managing master-metered buildings with low- or limited-income tenants. The final survey disposition of the combined contact lists of 336 members is provided in Table 3.

Table 3. Disposition

	Number	Percent
Status – Known (Contacted)		
Eligible (Completed survey)	30	9%
Eligible (Not surveyed)	27	8%
Ineligible (No low income tenants)	8	2%
Ineligible (No multifamily residences)	31	9%
Subtotal	96	28%
Status – Unknown (not contacted)		
Refused	4	1%
Left message, no contact made	83	25%
Unavailable during survey period	6	2%
Busy signal	3	<1%
No answer	5	2%
Fax tones	4	1%
Not attempted	120	36%
Subtotal	225	67%
Duplicate	4	1%
Disconnected/bad number	13	4%
Subtotal	17	5%
Total	*336*	*100%*

The surveys, conducted between July 5 and July 15, 2005, were intentionally short to ensure a greater level of participation and generally lasted less than 15 minutes.

Respondent Characteristics

To begin the interview, each contact was asked about the number of buildings they owned or managed. As presented in Table 4 below, the reported numbers revealed a wide range of building sizes and number in a given complex. Three contacts reported not knowing the total number of buildings they own or manage. The total number of buildings owned or managed by the contacts who knew the number of buildings ranged from one to 38, and totaled 240 for the entire respondent sample. Half of the contacts reported owning or managing five or fewer buildings, while the average number of buildings managed by each responding contact buildings was nine.

Table 4. Contacts' Counts of Low-Limited-Income Buildings

No. Buildings	Contacts in Given Range
1 to 5	15
6 to 10	4
15 to 20	4
21 to 30	3
38	1
Don't Know	3
Total	*30*

Contacts were also asked about the number of units under their management. The number of units is a more useful number than number of buildings because apartments units are more similar in size than buildings. The total number of units (including units occupied by ineligible tenants) ranged from four to 560 (Table 5). The average number of units managed by each contact was 160, and the median number of units owned or managed by each of the contacts was 125.

Table 5. Contacts with Low/Limited Income Buildings and Numbers of Units

No. Units	Contacts in Given Range
4 to 50	8
51 to 100	5
101 to 200	7
201 to 400	6
>400	2
Don't Know	2

Awareness of and Past Participation in SDG&E Programs

To assess familiarity with SDG&E low- and limited-income programs targeting multifamily properties, contacts were asked about their awareness of, and participation in, the Statewide Multifamily Rebate program, the DAP program, and LIRRL, respectively. Three contacts reported awareness of the Multifamily Rebate program, while 17 and 14 contacts reported awareness of DAP and LIRRL, respectively (Table 6).

Table 6. Program Awareness

Program	N	Yes		No		DK	
		N	%	N	%	n	%
Multifamily Rebate	30	3	10%	26	87%	1	3%
DAP	30	17	57%	12	40%	1	3%
LIRRL	30	14	47%	16	53%	0	0%

Contacts who reported being aware of one of SDG&E's programs were then asked whether any of their buildings had participated in that program. The results are presented in Table 7. Of the three contacts who reported awareness of the Multifamily Rebate program, only one said buildings under his management had participated in that program. Thirteen of the 17 contacts (76%) who said they were aware of DAP reported having buildings participating in that program, while 11of 14 contacts (79%) aware of LIRRL noted participating.

Table 7. Participation among Those Who Were Aware of Program

Program	N	Yes		No		DK	
		N	%	N	%	N	%
Multifamily Rebate (N=3)	3	1	33%	1	33%	1	33%
DAP (N=17)	17	13	76%	4	24%	- - -	
LIRRL (N=14)	14	11	79%	2	14%	1	7%

Table 8 provides the breakdown of LIRRL awareness by contact source. As evident in the table, roughly two-thirds (nine) of the RHA list contacts reported awareness of LIRRL, and eight of those nine reported owning or managing buildings that had participated in that Program. As expected, the list of names provided by RHA yielded both the highest percentages of contacts who had heard of and owned or managed buildings that had participated in not only LIRRL, but all three programs. In fact, two of the three contacts who reported being aware of the Multifamily Rebate program, and the only contact who reported participating in the program, were also identified from that list. In all, about one-quarter or less of the contacts identified from sources other than RHA reported being aware of any of the three programs.[15] This relatively low level of awareness suggests that there is opportunity to expand the reach of SDG&E's low- and limited-income programs.

[15] Tables similar to Table 8 are provided in Appendix A for the Statewide Multifamily Program and Energy Team.

Table 8. LIRRL Awareness by Contact Source

Contact Source	Aware of		Participated	
	Number	Percent	Number	Percent
AllPropertyManagement.com (N=17)	3	18%	1	6%
Crasandiego.com (N=8)	0	0%	0	0%
RHA (N=14)	9	64%	8	57%
Narpm.org (N=7)	0	0%	0	0%
Apartmentratings.com (N=23)	2	9%	2	9%
Total (N=65)	*14*	*22%*	*11*	*20%*

Of the 11 contacts with LIRRL-participating buildings, nine (82%) reported receiving lighting upgrades through the program (Table 9), seven (64%) mentioned receiving refrigerator replacements, while one contact even reported that programmable thermostats were installed in his buildings through LIRRL. By attributing the thermostat installation – a measure not offered by LIRRL and most likely installed by SDG&E's Multifamily Program – to the Program, the respondent exemplified the confusion experienced by many actors in the multifamily market regarding various services offered by each of SDG&E's low- and limited-income programs

Table 9. LIRRL Equipment and Services (Multiple Responses Allowed)

Equipment/service	Number	Percent (n=11)
Lighting	9	82%
Refrigerators	7	64%
Thermostats*	1	9%

* Not offered in LIRRL

Contacts who were aware of a program but had not participated in it were asked why their buildings had decided not to participate. The lone property manager who was familiar with the Multifamily Rebate program but didn't participate noted the owner's fear of involvement in the program as the primary barrier. Four contacts reported being aware of DAP but having no participating buildings. Of these four, three gave reasons for non-participation that could be described as apathy. Specifically, they commented that they "just haven't called to make it happen," "nobody has come out," and "not a high priority." The fourth contact said the contractors do not stand behind their work and also mentioned the Program's "hold-harmless" clause as reasons for non-participation. Lastly, with regard to LIRRL, the two non-participating contacts aware of the Program offered minimal additional comments regarding their non-participation – mainly describing a lack of follow-through on their part.

Interest and Disinterest in Programs

When asked about interest in participating in the respective programs, contacts expressed a variety of reasons. The most common reasons included helping tenants, improving apartment units, and saving money. Saving energy was also offered by some contacts as a reason for

interest in all of the programs (Table 10). Other reasons offered by contacts for program interest included success with other programs and the fact that participation (in DAP) does not cost the manager anything and does not require convincing the owner to pay for measures.

Table 10. Reasons for Interest in Programs (Multiple Responses Allowed)

Reason	Multifamily Rebate	Energy Team	LIRRL
Helps Tenants	3	5	5
Helps Apartments	3	1	2
Saves Money	3	2	2
Saves Energy	2	1	1
Other	1	1	5

The three most commonly mentioned reasons for disinterest in the three programs collectively were 1) the time and effort required to comply with program requirements, 2) disinterest on the part of the property owner, and 3) the participant themselves is not the final decision-maker (see Table 11).

Table 11. Reasons for Disinterest in Programs (Multiple Responses Allowed)

Reason	Multifamily Rebate	Energy Team	LIRRL
Participation Is Time Consuming/Difficult	6	5	3
Don't Need Program/Owner Not Interested	5	5	7
Not My Decision	4	1	2
Don't Have Enough Information	3	2	1
Had Problems with Earlier Program	2	5	2
Have Already Participated	2	1	2
Tenant Dissatisfaction with Lights	1	2	- - -
Other	1	5	- - -

Other reasons given for disinterest in the Multifamily Rebate program was the perception that the program does not benefit the property owner or manager. Another reason for disinterest in DAP included insufficient numbers of low- or limited-income properties (mentioned three times). In addition, other cited reasons included tenants who do not follow through with the paperwork, most of the properties under the contact's ownership or management do not provide refrigerators, and uncertainty about ability to manage the program's income-qualification requirement. Additional reasons for disinterest in the three programs, mentioned multiple times by respondents in descending order of frequency of mentions were:

- The contact had insufficient information about the programs
- There were problems with participation in earlier programs
- Tenant dissatisfaction with the lights installed by such programs

LIRRL Participation

As described earlier, 14 of the contacts were aware of LIRRL, and 11 of those contacts owned or managed a reported 86 properties that had participated in the Program. Of the participants, seven recalled signing a Property Owner Agreement (POA) before work began in their buildings. None of the seven contacts reported having questions about the document at the time they signed it. Of the 11 contacts whose properties had participated in LIRRL, eight said they had distributed the Program's income-qualification forms to their tenants. Nine of these 11 contacts (including some contacts who had not distributed those forms) said all or most of their tenants completed and returned the forms. Four contacts with LIRRL-participating buildings said some of their tenants expressed concerns about the income qualification forms, including a reluctance to disclose personal information (n=2) and confusion about income requirements (n=2).

Table 12. LIRRL Income-Qualification Forms (n=11)

Activity	Number	Percent
Contact Distributed Forms	8	73%
All or Most Forms Returned	9	82%
Tenants Expressed Concerns about Forms	4	36%

Three of the 11 LIRRL participating owners or managers offered comments about the Program's income-qualification requirement. One of the contacts observed that, even though the income requirement is not unreasonable, if the big picture goal is to save energy, there should be no such requirement. The reaction of another contact was that the income requirement was confusing to his tenants because the forms they filled out did not ask for their incomes. The third contact offered the curious statement that he was, "only aware of rebates for older appliances, and doesn't use any other program." This suggests the respective program details were not clear to him and is yet another example of confusion amongst the contacted multifamily actors.

When asked how the LIRRL program process could be improved for owners and managers or tenants, only five of the 11 participating respondents offered suggestions. Three of these six contacts who did not offer a suggestion for improvement noted the Program worked well the way it was, while two others singled out SDG&E as having done a good job of delivering the Program. Of the five contacts with suggestions for improving the process, three mentioned that a better or more responsive contractor would help – two of which specifically cited the same lighting contractor. The remaining contacts suggested the following, respectively: a desire for more information about the equipment being replaced and in which units the replacement was happening; a preference for an earlier refrigerator replacement program in which the old refrigerator was removed at no charge.

The evaluation team identified few contacts with master metered buildings. For example, only one of the 11 LIRRL participants owned or managed master-metered apartment buildings. We asked this one LIRRL participant about the requirement that the owner pay one-half of the new refrigerator cost when installed in master metered buildings. He replied that it would be nice to have SDG&E pay the entire cost, but noted that, "half seems reasonable."

LIRRL Participation Barriers

The 19 non-participating contacts (respondents with no LIRRL-participating buildings) were asked about several of the Program's components. This was in an effort to assess each Program component as a potential participation barrier. The refrigerator eligibility requirement of a manufacture date of 1989 or earlier emerged as the largest barrier, with eight of the 19 non-participants (42%) reporting that this requirement would constrain their buildings' participation since their refrigerators did not meet it. An additional six contacts (32%) did not know whether this requirement would pose a constraint on participation because they were not aware of the ages of the refrigerators in their buildings.

Four of these 19 contacts (21%) said that the tenant-income requirement would be a constraint. In addition, one of the LIRRL non-participants said the requirement that the owner pay one-half of the new refrigerator cost when installed in master metered buildings would be a constraint to his building's participation in the Program.

Table 13. LIRRL Participation Barriers (n=19)

Barrier	Number	Percent
Refrigerator Age Requirement	8	42%
Income Qualification Requirement	4	21%
Owner's 50% Refrigerator Cost Requirement for Master-Metered Buildings	1	5%

Earlier in the survey, each multi-family contact was asked to rate their initial interest in participating in LIRRL on a scale of 1 to 5 (1 = not at all interested; and 5 = very interested). After being informed of the three foregoing requirements for participation in LIRRL, non-participants were asked again to express their interest in having LIRRL services for limited-income residents in their buildings using the previous scale. Eight of the 19 contacts (42%) expressed little or no interest in the Program (a "1" or a "2"), while seven of them (37%) expressed high interest in the Program (a "4" or a "5"). Three of the 19 contacts (16%) had no opinion.

The second interest assessment results show that informing people about additional Program requirements reduces interest in LIRRL participation relative to initial interest levels. After learning about these Program requirements, contacts having a high Program participation interest diminished to seven of the 19 (37%), while those with little or no Program participation interest increased to eight of the 19 (42%). This change in interest in documented in Table 14.

Table 14. Non-Participant Interest in LIRRL (n=19)

Interest in LIRRL	Low Interest ..... High Interest					DK
	1	2	3	4	5	
First Assessment	5	1	1	6	5	- - -
Second Assessment	6	2	1	4	3	3

Multifamily Energy-Efficiency Services Improvement Suggestions

All contacts were asked if they had suggestions for improving energy efficiency services offered to San Diego area multifamily buildings. While 16 contacts (60%) had no suggestions for improvement, the remaining contacts offered several. The most common suggestions involved Program delivery improvement, including more efficient and careful installation with less tenant disturbance, more consistent service quality, and better communication follow through from SDG&E to the managers and tenants (Table 15).

Three contacts suggested energy efficiency services could be enhanced through improved dissemination of information regarding the programs. More specifically, one contact suggested creating a simple and easy-to-read brochure for tenants describing all of the available Program opportunities. Another suggested disseminating information through the Board of Realtors and the Apartment Owners Association. Other suggestions included expanding the kinds of appliances and services offered by all of the programs for multifamily buildings. Specific measures suggested for inclusion were air conditioners, water heaters, and skylights.

Contacts also suggested eliminating the income-qualification requirement for multifamily energy efficiency services provided through Energy Team and LIRRL or increasing the qualifying income levels. Other contacts asked for easier access to SDG&E to obtain program information and for lower utility rates. Another contact mentioned that many of the fluorescent light ballasts installed via a previous program failed prematurely.

Table 15. Improvement Suggestions
(Multiple Responses Allowed)

Suggestion	Number	Percent (n=12)
Better Program Delivery	4	27%
Better Information Dissemination	3	20%
Assistance with Other Appliances/Services	2	13%
Increase/Eliminate Income Requirement	2	13%
Other	4	27%

Communicating Program Information to Owners and Managers

Contacts were asked about the effectiveness of various communication strategies in reaching them with information about Program opportunities and details. Using a one-to-five scale where one means “ineffective” and five means “very effective,” contacts rated the effectiveness each of six information vehicles. As presented in Table 16, email and direct mail emerged as the most effective ways to communicate information about energy efficiency programs. Telephone calls and bill inserts were ranked as the least effective methods for communicating such information.

Table 16. Conveying Program Information to Owners/Managers (n=30)

Method	Least effective.....Most effective				
	1 or 2	Percent	3	4 or 5	Percent
Email	12	40%	4	14	47%
Bill Inserts	22	73%	- - -	8	27%
Telephone	23	77%	2	5	17%
Direct Mail	11	37%	5	14	47%
Apt. Managers' Assn.	16	53%	4	10	33%
Apt. Managers' Periodicals	15	50%	7	8	27%

Summary

Amongst SDG&E's three low- and limited-income energy efficiency programs, Energy Team was most recognized and the Statewide program was least recognized by the contacted multifamily building owners and managers. While more contacts reported their buildings had participated in Energy Team than in either of the other two programs, LIRRL had the highest percentage participation among those who were aware of the various programs, though this result was expected due to the program contractor's assistance in identifying potential survey candidates.

Other than the contacts from the list provided by RHA, the implementation contractor, only about 25% of the contacts from the lists of multifamily building owner and manager names obtained for this survey reported being aware of any of the three programs. This level of awareness suggests an opportunity to expand the reach of these programs. Indeed, the ApartmentRating.com list screening results suggest that there are nearly 100 buildings that may have limited income residents not currently on a list used by LIRRL's contractor.

Based upon the contacts' reports of having received equipment or services not available through the program to which they are attributed, there is confusion among multifamily building owners and managers about what the programs offer and the difference between the programs. Contacts were also confused, or reported tenant confusion, regarding the LIRRL income requirements.

There is interest among multifamily building owners and managers in taking advantage of programs that provide benefits to their tenants or to the properties themselves, and there is a high interest in participating in LIRRL in particular. However, there is also a level of inertia that must be overcome before some owners or managers will take the steps necessary to participate. The sources of this inertia are varied and include the time and effort required to comply with Program requirements, insufficient program information, problems with participation in earlier programs, remote decision making, and simple apathy. The age requirement for refrigerators is also a significant barrier to LIRRL participation, as is the Program's income requirement, to a lesser extent. The requirement that owners of master-metered buildings pay half of the cost of refrigerators does not appear to be a significant barrier to participation in LIRRL.

Email and direct mail are the best ways to reach multifamily property owners and managers with information about energy efficiency programs; telephone calls are the least effective. Other suggestions for reaching this population are through the Board of Realtors and the Apartment

Owners Association. Lastly, while master-metered multifamily residences are not common, where they do exist, they are likely to have low- or limited-income residents.

Measure Verification

Site Visits

In an effort to verify the installation and assess the retention of Program-installed lighting and refrigeration measures, Quantec staff conducted on-site verifications of 298 participating units at 24 different participating multi-family complexes. The verifications took place at three different points (January 2005, June 2005, and February 2006) in order to gain insight into both installation and retention rates being achieved throughout the Program's implementation.

Methodology

The first round of site visits were almost exclusively focused on observing the refrigerator replacement process in order to verify that the refrigerators being replaced met the Program's eligibility standards. Due to the need to coordinate closely with those removing the old units, the verification took place at a single, large multi-family facility and consisted of 59 multi-family unit verifications. During this first round of site visits, the number of lighting measures was also verified; however collecting detailed lighting data was not the focus of the visits.

The second and third round of site visits was intended to verify a larger sample of measures at a wider range of Program participants. Utilizing the latest version of the Program database, Quantec merged site- and measure-specific data to construct a workbook containing all the information necessary to complete the on-site verification. The workbook was then loaded on a laptop and taken to each verified participant to quickly and accurately record the results of the measure assessment.

Since accessing multifamily units requires that the property landlord provide the tenant with 24-hour notice, Quantec worked with RHA Inc., the Program implementers, to coordinate the locations and timing of the on-site visits. Due to the logistical difficulties and financial inefficiencies of visiting single-family participants, all three rounds of measure verification focused exclusively on multifamily participants. Working collaboratively with RHA, a sample of twenty-three participating multifamily facilities were selected for site visits based on the location of the facility, as well as the receptiveness of the property manager to place notices with tenants. In addition, each of the participating facilities was asked to provide a manager or maintenance staff to accompany Quantec during the visits. The presence of a staff member expedited the verification process and helped reassure the occupants of the verified units of the process' legitimacy.

Across all three rounds, site visits were conducted at 298 units at 24 participating multifamily facilities. At each unit, Quantec compared the number of observed compact fluorescent lamps (CFLs), hardwire fluorescent fixtures, and fluorescent torchieres to the quantity recorded in the Program's database, and verified that older model refrigerators was removed and replaced when appropriate. Table 17 provides the total verified measures count. In addition to verifying the presence of each Program-installed efficiency measure, Quantec also switched on each lighting measure to determine if the measure was still operating.

As can be seen from the table below, the majority of the verified measures were CFLs (2,460). In addition, fixtures (422), refrigerators (179) and torchieres (11) were also verified.

Table 17. Total Measures Subject to Verification

Measure	Database Quantity	Percent of Sample
CFLs	2,460	80.1%
Fixtures	422	13.7%
Torchieres	11	0.4%
Refrigerators	179	5.8%
Total	*3,072*	*100%*

Results

Round 1

As previously noted, the primary focus of the first round of site visits was to accompany Program staff during the removal of refrigerators and verify that the units met Program eligibility criteria. To do so, Quantec accompanied Program auditors and installers during their assessment of refrigerators in 59 participating units. In each case, the auditor recorded the brand and model number of the unit to be replaced by the Program, as well as recording the model numbers for the replacement refrigerator. All replacement units were identical in brand, size, and model. The 59 units represented 6.7% of the total refrigerators replaced at that date.

Of the 59 refrigerators to be installed, 58 were verified to be of eligible replacement age under Program guidelines. The lone machine Quantec found to be ineligible was also identified by the Program implementers as ineligible prior to removal and was subsequently dropped from the Program. As a result, and as presented in Table 18, Quantec was able to verify that all of the units that were replaced by the Program were built prior to 1990 and, therefore, eligible under the Program's criteria.

Table 18. Verification of Refrigerator Eligibility (Round 1)

	Assessed Units*	Verified Units	Retention Rate
Refrigerators	58	58	100%

* The lone refrigerator that did not meet Program criteria was reclassified by the auditor as ineligible and thereby excluded from the count of assessed and verified Program units.

While verifying the eligibility of replaced units was the focus of the first round of site visits, Quantec utilized its access to participants' homes to verify Program-installed lighting measures. Overall, 54 of the 58 participants receiving a refrigerator were able to be assessed.

Two lighting types constituted the vast majority of lighting measures installed at the site: CFLs and circular tube fluorescent fixtures. One fluorescent torchiere was listed as installed in the units included in our sample, but time did not permit verification of that particular unit.

Table 19 presents the lighting verification results by measure type. It is important to note that the "Verified Quantity" is a comprehensive count of all 13 and 20-watt CFLs identified by Quantec while in the participant's home. Therefore, it is possibly that this count includes CFLs of similar wattage independently installed by the participant prior to involvement in the Program. As a result, the CFL verification rate of 91.7% provided below should be interpreted as a maximum retention estimate of the Program-installed CFLs. With respect to the fluorescent fixtures, we verified that 50 of 53 fixtures (94.6%) installed still remain in place. In this case, the survey results are very similar, with 98% of respondents reporting that the fixtures still remain.

Table 19. Measure Verification: CFLs and Fixtures (Round 1)

Measure	Participants	Verified Quantity	Database Quantity	Share of Installations Verified
CFLs	54	488	532	91.7%
Fixtures	50	53	56	94.6%
Overall	*104*	*541*	*588*	*92.0%*

Round 2

Similar to the first round of site visits, Quantec compared the number of observed compact fluorescent lamps (CFLs), hardwire fluorescent fixtures, and fluorescent torchieres to their respective quantities recorded in the Program's database at each of the 102 multifamily dwellings Quantec also verified that the older model refrigerators were removed and replaced when appropriate.

According to the Program database, a total of 743 CFLs were installed at the 102 verified sites. After verifying the first few units, it became evident that there was a significant difference in the retention rate for CFLs at units where the participating residents still resided and new tenants in a Program-treated unit. As a result, Table 20 provides the CFL retention results for participating tenants, new tenants, as well as overall. The table also provides data for both the verified CFL quantity and the number of verified CFLs that were still properly operating.

As noted in the table, 90.2% of the total installed CFLs listed in the Program database were located during the site visits. Of those, all but nine bulbs were found in working order, resulting in an overall retention rate of 89.0%. However, note the significant difference in the retention rates for new and remaining tenants (81.6% and 94.1%, respectively). This disparity can likely be attributed to the fact that the Program installs CFLs not only in structural sockets, such as ceiling fans and bathroom mirrors, but also in the tenant's personal desk and table lamps. Not surprisingly, tenants that have left the unit do not remove the CFLs from their personal lamps and leave them with the unit. While the CFLs are no longer in place and operating in the participating unit in these cases, it is very likely that they are still being used and generated savings at the tenant's new residence.

Table 20. Measure Verification: CFLs (Round 2)

	Database Quantity		Verified Quantity		Verified and Operating Quantity	
	n	%	n	%	n	%
Same Tenants	439	100.0%	419	95.4%	413	94.1%
New Tenants	304	100.0%	251	82.6%	248	81.6%
Overall	*743*	*100.0%*	*670*	*90.2%*	*661*	*89.0%*

The second most commonly installed Program measure was hardwired fluorescent fixtures. Unlike CFLs, hardwired fixtures are part of the unit and not subject to occupancy variations. In fact, with the exception of a single hardwire fixture that could not be located during the site visits, all 139 fixtures recorded in the database were verified and found to be operational (99.3% retention rate). While the sample of fluorescent torchieres was very small (n=5), they were all verified and operational during the site visits. The retention rates for both hardwire fluorescent fixtures and fluorescent torchieres are provided in Table 21.

Table 21. Measure Verification: Fixtures and Torchieres (Round 2)

	Fluorescent Fixtures						Fluorescent Torchieres					
	Database Quantity		Verified Quantity		Verified and Operating Quantity		Database Quantity		Verified Quantity		Verified and Operating Quantity	
	n	%	n	%	n	%	n	%	n	%	n	%
Same Tenants	101	100.0%	100	99.0%	100	99.0%	5	100.0%	5	100.0%	5	100.0%
New Tenants	38	100.0%	38	100.0%	38	100.0%	- - -	- - -	- - -	- - -	- - -	- - -
Overall	*139*	*100.0%*	*138*	*99.3%*	*138*	*99.3%*	*5*	*100.0%*	*5*	*100.0%*	*5*	*100.0%*

As Table 22 indicates, all 45 Program-installed refrigerators cataloged in the Program database were still in place.[16] While not all of the refrigerators were in use – several of the verified units were vacant – all the refrigerators were found in working order. As expected, there was no difference between the retention rates of refrigerators at units occupied by the participating or new tenant.

Table 22. Measure Verification: Refrigerators (Round 2)

	Database Quantity		Verified Quantity		Verified and Operating Quantity	
	n	%	n	%	n	%
Same Tenants	29	100.0%	29	100.0%	29	100.0%
New Tenants	16	100.0%	16	100.0%	16	100.0%
Overall	*45*	*100.0%*	*45*	*100.0%*	*45*	*100.0%*

[16] Although it was not possible to inspect the previous refrigerator model, the results of the first round of site visits – which focused on observing the removal process – dismissed any concerns regarding the premature removal of ineligible refrigerators.

Round 3

As noted in Table 23, 93.2% of the total CFLs installed, according to the Program database, were located during the site visits. Of those, all but 19 bulbs were found in working order, resulting in an overall retention rate of 92.4%. Again, a significant difference existed between new and remaining tenants (74.0% and 94.0%, respectively). Interestingly, while the retention rate for remaining tenants was found to be almost identical to the previous round, the retention rate for new tenants dropped more than 7%.

Table 23. Measure Verification: CFLs (Round 3)

	Database Quantity		Verified Quantity		Verified and Operating Quantity	
	n	%	n	%	n	%
Same Tenants	1,089	100.0%	1,034	94.9%	1,024	94.0%
New Tenants	96	100.0%	71	74.0%	71	74.0%
Overall	*1,185*	*100.0%*	*1,105*	*93.2%*	*1,095*	*92.4%*

The majority of missing CFLs with the participating resident still occupying the unit can be attributed to two reasons. In several units, two of the CFLs had been removed from four bulb CFL fans. When the tenant was on hand during the site visit, the repeated complaint was that four CFLs were too bright. In all instances, the tenant did not replace the CFL with an incandescent but rather left the two remaining sockets empty. The second concern captured anecdotally from tenants' homes during the verification was that they did not like the light color emitted by the CFLs. This was particularly true in the bathroom as several tenants complained that the bulbs were "too yellow" for such use.

With the exception of two hardwire fixtures that could not be located during the site visits, all 227 fixtures recorded in the database were verified and found to be operational. While the sample of fluorescent torchieres was very small (n=6), all half dozen torchieres were verified and operational during the site visits. The resulting retention rates for both hardwire fluorescent fixtures and fluorescent torchieres are provided in Table 24. As seen during the second round of site visits, the retention rates for both lighting measures exceeds 99%.

Table 24. Measure Verification: Fixtures and Torchieres (Round 3)

	Fluorescent Fixtures						Fluorescent Torchieres					
	Database Quantity		Verified Quantity		Verified and Operating Quantity		Database Quantity		Verified Quantity		Verified and Operating Quantity	
	n	%	n	%	n	%	n	%	n	%	n	%
Same Tenants	213	100.0%	211	99.1%	211	99.1%	6	100.0%	6	100.0%	6	100.0%
New Tenants	14	100.0%	14	100.0%	14	100.0%	-	-	-	-	-	-
Overall	*227*	*100.0%*	*225*	*99.1%*	*225*	*99.1%*	*6*	*100.0%*	*6*	*100.0%*	*6*	*100.0%*

Quantec was able to successfully verify that the new model of refrigerator installed as part of the Program was in place and operational at all 76 units receiving the measures. Unlike the first round of site visits, there were three different types of refrigerators found: Kenmore, Whirlpool and Whirlpool Gold. As expected, there was no difference between the retention rates of refrigerators at units occupied by the participating or new tenant.

Table 25. Measure Verification: Refrigerators, by Tenant Type (Round 3)

Tenant Type	Database Quantity		Verified Quantity		Verified and Working Quantity	
	n	%	n	%	n	%
Same Tenants	66	100.0%	66	100.0%	66	100.0%
New Tenants	10	100.0%	10	100.0%	10	100.0%
Overall	*76*	*100.0%*	*76*	*100.0%*	*76*	*100.0%*

Overall

Table 26 below presents the overall results for all of the 298 verified units at 24 multifamily complexes. Overall, 91.2% of Program-installed CFLs were verified and found to be operational. As noted previously, a 14.2% difference in the observed retention rate of CFLs between units with remaining and new tenants was determined (94.0 and 79.8%, respectively). Interestingly, the retention rate determined during the on-site verification process is higher than the self-reported retention rate provided by participating survey respondents (88% – see *Participant Survey Chapter*). However, both the on-site verification retention rate and the rate provided by survey respondents are reasonably close to the retention rate observed for CFLs a year or less after being installed for several other residential lighting programs in California[17].

Other than CFLs, all of the measure retention rates exceeded 98.6%. In fact, every torchiere and refrigerator detailed in the Program database was successfully verified on-site. Unfortunately, all 11 of the torchieres were in units with the same tenant so it was not possible to detect any indication of whether tenant occupancy would affect the retention rate of torchieres similarly to CFLs. Lastly, very little differences were observed in retention rates between rounds of visits.

Table 26. Overall Retention Rates (All Rounds)

	Database Quantity		Verified Quantity		Verified and Operating Quantity	
	n	%	n	%	n	%
CFLs	2,460	100%	2,263	92.0%	2,244	91.2%
Fixtures	422	100%	416	98.6%	416	98.6%
Torchieres	11	100%	11	100%	11	100%
Refrigerators	179	100%	179	100%	179	100%

[17] SDG&E's 2002 Residential Hard-To-Reach Lighting Program (86%, RLW Analytics) and the South Bay *energy rewards* Program (93%, Quantec)

Program Impact

In an effort to determine the savings attributable to Program-installed refrigerators and lighting measures, Quantec employed a combination of approaches:; a stipulated savings (IPMVP Option A) and a statistical adjusted engineering regression model (IPMVP Option C). While the stipulated savings approach was used to confirm *ex ante* savings estimates, and for reporting overall EM&V results to the CPUC for the LIRRL program, the statistically adjusted engineering model was employed to derive *ex post* savings estimates that may be utilized in future iterations of the Program.

Stipulated Savings Approach

The stipulated energy savings, net-to-gross ratios and effective useful life of each LIRRL efficiency measure, as detailed in the Program's database, is provided in Table 27. As evident in the table, the stipulated net-to-gross ratio for refrigerators was 0.80, while 0.89 was used for all lighting measures. The effective useful life (EUL) also varies by measure as shown in the table.

Table 27. Program Stipulated Measure Savings

Measure Type	Measure Description	Gross Coincident Peak Demand Reduction (per unit - kW)	Gross Annual Energy Savings (per unit - kWh)	Net-To-Gross Ratio	EUL (Years)
Appliance	Refrigerator	0.2176	1,537.0	0.80	6
Lighting	Exterior CFL (13 W)	- - -	110.3	0.89	8
Lighting	Hardwired Fluorescent Porch Light	- - -	110.3	0.89	16
Lighting	Interior CFL (13 W)	0.0074	47.3	0.89	8
Lighting	Interior CFL (20 W)	0.0110	70.3	0.89	8
Lighting	Torchiere Lamp	0.0460	294.0	0.89	16
Lighting	Ceiling Fixture (30 W)	0.0140	89.5	0.89	16

To calculate the stipulated gross savings, the total number of measure installations recorded in the Program's final database were multiplied by the respective per unit demand and energy savings shown in Table 27. As presented in Table 28, the total stipulated gross demand, annual energy impacts, and lifecycle energy savings attributable to LIRRL are 990 kW, 7,059,383 kWh,and 62,212,648 kWh, respectively.

Table 28. Total Stipulated Gross Savings

Measure Type	Measure Description	Database Quantity	Total Gross Coincident Peak Demand Savings (kW)	Total Gross Energy Savings (kWh)	Total Gross Lifecycle Energy Savings (kWh)
Appliance	Refrigerator	1,642	357	2,523,754	15,142,524
Lighting	Exterior CFL (13 W)	546	-	60,224	481,790
Lighting	Hardwired Fluorescent Porch Light	3,914	-	431,714	6,907,427
Lighting	Interior CFL (13 W)	55,098	408	2,606,135	20,849,083
Lighting	Interior CFL (20 W)	7,413	82	521,134	4,169,071
Lighting	Torchiere Lamp	275	13	80,850	1,293,600
Lighting	Ceiling Fixture (30 W)	9,336	131	835,572	13,369,152
Total		*78,224*	*990*	*7,059,383*	*62,212,648*

Applying the stipulated net-to-gross ratios to the gross demand and energy savings determines the stipulated Program net impacts. As presented in Table 29, the total stipulated net savings of the 2004-2005 LIRRL Program is 849 kW, 6,055,713 kWh annually and 54,006,430 kWh over the effective useful lives of the Program-installed efficiency measures.

Table 29. Total Stipulated Net Savings

Measure Type	Measure Description	Stipulated Net-To-Gross Ratio	Total Net Stipulated Coincident Peak Demand Savings (kW)	Total Stipulated Net Energy Savings (kWh)	Total Stipulated Net Lifecycle Energy Savings (kWh)
Appliance	Refrigerator	0.80	286	2,019,003	12,114,019
Lighting	Exterior CFL (13 W)	0.89	-	53,599	428,793
Lighting	Hardwired Fluorescent Porch Light	0.89	-	384,226	6,147,610
Lighting	Interior CFL (13 W)	0.89	363	2,319,461	18,555,684
Lighting	Interior CFL (20 W)	0.89	73	463,809	3,710,473
Lighting	Torchiere Lamp	0.89	11	71,957	1,151,304
Lighting	Ceiling Fixture (30 W)	0.89	116	743,659	11,898,545
Total			*849*	*6,055,713*	*54,006,430*

In addition, Quantec calculated the net savings attributable to the Program utilizing net-to-gross ratios determined through on-site measure verification and participant surveying. Specifically, measure-specific retention rates determined during on-site verification (presented in the previous chapter) were multiplied by the self-reported level of free-ridership (provided in greater detail in the following Participant Survey chapter) found during three rounds of participant surveys. As evident in the Table 30, the adjusted net-to-gross ratios calculated by Quantec were relatively similar to the Program stipulated ratios for CFLs and fixtures measures.

Note that, since all refrigerator units were located during measure verification and none of the interviewed participants stated they both 'would have purchased without the Program" and

"planned to purchase prior to participating," refrigerators have a net-to-gross ratio of 1.0. While this likely overestimates the net-to-gross ratio, it is similarly unlikely that many multifamily participants (85% of total participation), many of which without the authority to make such changes, would have installed an energy efficient refrigerator independent of the Program. Given that assumption and the results of this evaluation, a net-to-gross ratio of 0.80 – 0.09 less than any of the lighting measures – appears low and possibly underestimates Program impact.

Table 30. Stipulated vs. Adjusted Net-To-Gross Ratios

Measure	Non-Freeridership*	Retention Rate**	Adjusted Net-To-Gross***	Stipulated Net-To-Gross
CFLs	87.0%	91.2%	0.79	0.89
Fixtures	91.2%	98.6%	0.90	0.89
Torchieres	89.0%	100.0%	0.89	0.89
Refrigerators	100.0%	100.0%	1.00	0.80

* One minus the mid-point free-ridership percentage presented in Table 65. Greater detail is provided regarding the calculation of free-ridership in the Participant Survey chapter.

** Retention rate observed during on-site measure verification. See preceding chapter for greater detail.

***Calculated by multiplying the percent of non-freeridership by the percent of retained measures.

The adjusted net-to-gross ratios from table above were then applied to the stipulated gross savings to calculate net adjusted stipulated savings. Table 31, similar to Table 29, presents these values. As evident in the table, Program savings are greater when the adjusted net-to-gross ratio is applied to the stipulated gross savings than when the stipulated net-to-gross ratios are utilized.

Table 31. Total Net Adjusted Stipulated Net Savings

Measure Type	Measure Description	Adjusted Net-To-Gross Ratio	Total Net Adjusted Coincident Peak Demand Savings (kW)	Total Net Adjusted Energy Savings (kWh)	Total Net Adjusted Lifecycle Energy Savings (kWh)
Appliance	Refrigerator	100.0%	357	2,523,754	15,142,524
Lighting	Exterior CFL (13 W)	79.4%	-	47,801	382,410
Lighting	Hardwired Fluorescent Porch Light	89.9%	-	388,310	6,212,960
Lighting	Interior CFL (13 W)	79.4%	324	2,068,560	16,548,477
Lighting	Interior CFL (20 W)	79.4%	65	413,638	3,309,104
Lighting	Torchiere Lamp	89.0%	11	71,957	1,151,304
Lighting	Ceiling Fixture (30 W)	89.9%	118	751,564	12,025,028
Total			*874*	*6,265,583*	*54,771,805*

Table 32 offers a comparison of the stipulated net and adjusted net coincident peak kW, annual kWh, and lifecycle kWh with the revised Program goals. As shown in the table, LIRRL exceeds each of its goals using both methodologies.

**Table 32. Achievement of Program Goals –
Net Stipulated and Net Adjusted Stipulated Savings**

Metric	Revised Goal	Net Stipulated Program Savings	Goal Realization Rate	Net Adjusted Stipulated Program Savings	Goal Realization Rate
Coincident Peak kW	815	849	104.2%	874	107.3%
Annual kWh	5,954,866	6,055,713	101.7%	6,265,583	105.2%
Lifecycle kWh	53,348,118	54,006,430	101.2%	54,771,805	102.7%

* Note the original Program goals were revised after a significant portion of the Program's budget was shifted to the Statewide Multifamily Rebate Program in early 2005. See the 'Changes During Implementation' section in the 'Process Evaluation' chapter for more detail.

Statistically Adjusted Engineering Regression Model Approach

As noted previously, the purpose of the statistically adjusted engineering regression analysis was to derive *ex post* savings estimates.

Methodology

To conduct the analysis, Quantec first collected monthly energy consumption billing data dating back to January 2003 for more than 5,000 LIRRL participants. To assess data integrity and ensure quality results, the raw billing data were organized to identify and remove missing values and anomalous readings. Extreme observations can bias average behavior when assessed in the aggregate and must be removed. To systematically check for such observations, statistical tools, as well as common sense, were applied.

For example, since the majority of the Program's participants reside in multi-family dwellings, it was not surprising that several master-meter accounts, were present in the raw billing data and needed to be removed. Specifically, all accounts exhibiting daily consumption over the course of a month less than 1.13 kWh (bottom 1%) and greater than 39.7 kWh (top 1%) a day were removed from the analysis (this is the equivalent of allowing annual consumption to vary between 413 and 14,490 kWh).

In addition, participant's were removed from the analysis. First, in order to make sure a minimum number of corresponding pre and post periods existed (e.g., billing months in either the pre or post period that could not be matched to a monthly reading in the corresponding period) some participants were dropped from the analysis. Second, accounts exhibiting a change in consumption greater than 50% between the pre and post periods was also excluded from the analysis.

Since Program measures affected only participant's baseload consumption, an initial regression model was developed to remove the effects of weather from the analysis. The models were then used to estimate each participant's baseload consumption.

Local weather data spanning the same period as the billing data were collected. Total cooling and heating degree days for each billing cycle[18], as well as average daily cooling and heating degree days were calculated for each participant. Once complete, a the following regression models were estimated (one for each participant).

$$DAILYKWH_{it} = \alpha_i + \beta_1 AVGDAILYCDD_{it} + \beta_2 AVGDAILYHDD_{it} + \varepsilon$$

where:

- $DAILYKWH_{it}$ = Daily Energy Consumption for participant i in month t.
- α_i = Baseload Energy Consumption for participant i
- $AVGDAILYCDD_{it}$ = Average Daily CDD for participant i in month t
- $AVGDAILYHDD_{it}$ = Average Daily HDD for participant i in month t

While model coefficients β_1 and β_2 provide the impact of average daily cooling and heating degree days on daily energy consumption in each period, the coefficient of the greatest interest is the model's intercept, α. Since the effects of weather upon energy consumption are captured in the model's other coefficients, the intercept represents the participant's daily baseload energy consumption. The difference in the value of α observed in the each participant's pre and post installation period was subsequently used as the dependent variable in the models below. Negative intercepts, while mathematically plausible, are physically impossible (i.e., a house cannot have negative baseload). All such participants were also removed from the analysis. Although it is possible that some baseload usage could be captured by the weather coefficients, this approach – while conservative – ensures all weather-related energy consumption is removed and allows a more accurate assessment of the impact of LIRRL measures. Moreover, the application of the various filters shown in Table 33 left over 2,000 participants in the SAE analysis with ample pre- and post-installation data who did not move or have a major change in household characteristics.

Table 33. SAE Participant Sample Disposition

Metric	Number of Unique Participants Removed	Percentage of Total Unique Participants Removed	Number of Unique Participants	Percentage of Total Unique Participants
Matched to Program Database	- - -	- - -	5,001	100.0%
All Monthly Readings Within Accepted Range	838	16.8%	4,163	83.2%
Minimum of Six Matching Months	726	14.5%	3,437	68.7%
Positive Baseload Consumption	1,432	28.6%	2,005	40.1%
Final Sample			*2,005*	*40.1%*

Once the appropriate participant sample was finalized, a customer-based SAE regression model was employed. SAE models rely on participant-specific engineering-based savings as

[18] A base temperature, or tau, of 65 degrees was used for determining both heating and cooling degree days.

independent variables to further explain energy savings realization for individual measures or groups of measures. The coefficient of the savings variables (γ_1 and γ_2) can be interpreted as the realization rates for their respective measures, using the *ex ante* savings estimates used for the program:

$$BASELOAD\ SAVINGS_i = \lambda + \gamma_1 REE_i + \gamma_2 LEE_i + \gamma_3 PREBASELOAD_i + \varepsilon$$

where:

- BASELOAD SAVINGS = the change in baseload consumption between the pre and the post periods from the DAILYKWH regression model above.
- *REE* = Engineering Estimates for Refrigerators,
- *LEE* = Engineering Estimates for All Installed Lighting Measures,
- *PREBASE* = Daily baseload Energy Consumption Prior to Participating in LIRRL

Results

Realization rates for the above SAE model were determined (Table 34) utilizing the Program gross stipulated savings as engineering estimates for both refrigerators and all lighting measure savings. As evident in the model and table, the expected savings for all Program-installed lighting measures were aggregated to achieve greater statistical significance. As presented in the table, the model calculated savings realization rates of 44.0% and 19.6% for refrigerators and overall lighting installations, respectively.

Table 34. SAE Model Realization Rates

	Sample	Refrigerator Realization Rate*	Overall Lighting Realization Rate*
Overall LIRRL Participants	2,005	44.0%	19.6%

* Both realization rates were significant at the 1% level.

These realization rates can then be applied to the Program's stipulated gross per-unit savings to generate gross *ex post* per-unit savings for each Program-installed measure. Since all lighting measures were assessed collectively in the SAE model, the same realization rate is applied to all lighting measures. The initial gross *ex post* per-unit savings estimates, as determined by the SAE model, are presented in Table 35.

Table 35. Realized Gross Per-Unit Annual Demand and Energy Savings by Measure

Measure Type	Measure Description	Program Stipulated Gross Annual Demand Savings (kW)	Realized Gross Annual Demand Savings (kW)	Program Stipulated Gross Annual Energy Savings (kWh)	Realized Gross Annual Energy Savings (kWh)
Appliance	Refrigerator	0.2176	0.0957	1,537.0	676
Lighting	Exterior CFL (13 W)	- - -	- - -	110.3	22
Lighting	Hardwired Fluorescent Porch Light	- - -	- - -	110.3	22
Lighting	Interior CFL (13 W)	0.0074	0.0015	47.3	9
Lighting	Interior CFL (20 W)	0.0110	0.0022	70.3	14
Lighting	Torchiere Lamp	0.0460	0.0090	294.0	58
Lighting	Ceiling Fixture (30 W)	0.0140	0.0027	89.5	18

To determine the net demand and energy impacts of Program measures, the realized net-to-gross ratio was applied to the per-unit savings, provided in the previous table. A detailed discussion regarding net-to-gross ratios is offered in the following section.

Table 36. Realized Net Per-Unit Annual Demand and Energy Savings by Measure

Measure Type	Measure Description	Realized Net-To-Gross Ratio*	Realized Gross Annual Demand Savings (kW)	Realized Net Annual Demand Savings (kW)	Realized Gross Annual Energy Savings (kWh)	Realized Net Annual Energy Savings (kWh)
Appliance	Refrigerator	0.90	0.0957	0.0862	676	608
Lighting	Exterior CFL (13 W)	0.89	-	-	22	19
Lighting	Hardwired Fluorescent Porch Light	0.89	-	-	22	19
Lighting	Interior CFL (13 W)	0.89	0.0015	0.0013	9	8
Lighting	Interior CFL (20 W)	0.89	0.0022	0.0019	14	12
Lighting	Torchiere Lamp	0.89	0.0090	0.0080	58	51
Lighting	Ceiling Fixture (30 W)	0.89	0.0027	0.0024	18	16

* Note the Program stipulated net-to-gross ratio was utilized for all lighting measures while 0.90 (rather than 0.80) was applied to refrigerators. Explanation and discussion regarding this decision is provided in the following "Additional Research" sub-chapter.

Finally, the realized annual per-unit energy savings provided in Table 36 can be applied to the total number of Program installations and effective useful life (EUL) for each measure to determine the Program's overall annual and lifecycle impact (Table 37).

Table 37. Total Program Demand, Annual and Life Cycle Energy Savings by Measure and Overall

Measure Type	Measure Description	No. Installations	Effective Useful Life*	Total Realized Net Annual Demand Savings (kW)	Total Realized Net Annual Energy Savings (kWh)	Total Realized Net Lifecycle Energy Savings (kWh)
Appliance	Refrigerator	1,642	10	141.5	998,993	9,989,928
Lighting	Exterior CFL (13 W)	546	8	- - -	10,505	84,044
Lighting	Hardwired Fluorescent Porch Light	3,914	16	- - -	75,308	1,204,932
Lighting	Interior CFL (13 W)	55,098	8	71.1	454,614	3,636,914
Lighting	Interior CFL (20 W)	7,413	8	14.2	90,907	727,253
Lighting	Torchiere Lamp	275	16	2.2	14,103	225,656
Lighting	Ceiling Fixture (30 W)	9,336	16	22.8	145,757	2,332,115
Total		*78,224*		*251.8*	*1,790,188*	*18,200,840*

* Again, note the EUL utilized for refrigerators differs from that stipulated by the Program. Similar to the difference in NTG, explanation and discussion regarding this decision is provided in the following "Additional Research" sub-chapter.

The achievement of Program energy and demand goals utilizing the stipulated savings, adjusted stipulated savings and statistically adjusted engineering methodologies are summarized in Table 38. As expected, and as evident in the table, the stipulated savings methodologies achieve a significantly higher percentage of the Program's intend energy and demand goals than the SAE model.

Table 38. Achievement of Program Goals – Stipulated, Adjusted and Realized Savings

Metric	Revised Goal	Total Stipulated Net Program Savings	% of Goal Achieved (Stipulated Savings)	Net Adjusted Stipulated Program Savings	Goal Realization Rate	Total Realized Savings (SAE Model)	% of Goal Achieved (Realized Savings)
Coincident Peak kW	815	849	104.2%	874	107.3%	252	29.7%
Annual kWh	5,954,866	6,055,713	101.7%	6,265,583	105.2%	1,790,188	29.6%
Lifecycle kWh	53,348,118	54,006,430	101.2%	54,771,805	102.7%	18,200,840	33.7%

Additional Research

Energy Savings by Refrigerator Size

An additional regression model was utilized to evaluate potential differences in the savings associated with different sizes of Program-installed refrigerators. As part of the 2004-2005 Program, LIRRL installed four sizes of refrigerators: 15, 17, 19 and 21 cubic feet. However, while the savings associated with the units of various sizes tend to differ, the Program utilized a single stipulated demand and energy savings for all four unit sizes. The results of the model indicate significant variation in observed savings across the installed models. As expected, significantly larger savings were observed when larger units were replaced than smaller units. The *ex post* gross energy savings associated with each unit, as well as the total number of

installations reported in the Program database, is provided in Table 39. As evident in the table, the *ex post* gross annual savings differ dramatically from the *ex ante* annual savings.

Table 39. Gross Energy Savings by Refrigerator Size

Fridge Sizes (cubic feet)	Total Program Installations	Ex Ante Gross Annual Savings (kWh)	Ex Post Gross Annual Savings (kWh)
15 cf	944	1,537	588
17 cf	184	1,537	611
19 cf	388	1,537	763
21 cf	126	1,537	1,167
Weighted Average	*1,642*	*1,537*	*676*

Based on the results of the regression, it appears that the current stipulated refrigerator savings are based on a larger model, as they exceed even the value observed for 21 cubic feet models. The Program database, however, indicates that the vast majority of the units installed by the Program are actually 15 cubic feet. This is likely due to the fact that the majority of the Program's participants lived in multi-family units. The disconnect between *ex ante* savings estimates and *ex post* realized savings underscores the necessity of varying savings estimates by refrigerator size.

To determine the net energy savings for each unit, the gross savings from the previous table need to be multiplied by a net-to-gross ratio to account for freeridership and spillover. Table 43 utilizes both the *ex ante* and *ex post* net-to-gross ratios to determine both the net *ex ante* and post annual energy savings. As evident in the table, an *ex post* net-to-gross ratio of 0.9 was applied. The decision to vary from the Program-stipulated *ex ante* value of 0.8 was based on both the results of the participant survey and the professional judgment of the evaluation team. 420 LIRRL participants were surveyed in conjunction with this evaluation and showed no freeridership for refrigerators. While this likely underestimates actual freeridership (e.g., although the surveyed participants claim they would not have installed without the Program, it is possible that those living in rental units might have their refrigerators replaced by property management), the results reinforce the notion that a net-to-gross ratio of 0.8 is too low. The results of the survey were adjusted according to the professional judgment of the evaluation team, yielding an *ex post* net-to-gross of 0.9 for all Program-installed refrigerators. It is recommended that a net-to-gross ratio of 0.9 is utilized for future iterations of the Program.

Both the *ex ante* and *ex post* net savings by refrigerator unit size are provided in the following table.

Table 40. Net Energy Savings by Refrigerator Size

Fridge Sizes (cubic feet)	Ex Ante Net-to-Gross Ratio	Ex Post Net-to-Gross Ratio	Ex Ante Net Annual Energy Savings (kWh)	Ex Post Net Annual Energy Savings (kWh)
15 cf	0.8	0.9	1,230	529
17 cf	0.8	0.9	1,230	550
19 cf	0.8	0.9	1,230	686
21 cf	0.8	0.9	1,230	1,050
Weighted Average	*0.8*	*0.9*	*1,230*	*608*

Refrigerator Effective Useful Lives

In addition to adjusting the *ex ante* and *ex post* net-to-gross ratio for refrigerators, the effective useful life of refrigerators was also adjusted in the final analysis. As evident in Table 37, an effective useful life (EUL) of 10 years, rather than the Program-stipulated 6 years, was employed. While the Program utilized traditionally stipulated EULs for lighting measures, the EUL for refrigerators is shorter, since it is assumed that early refrigerator replacements for efficiency purposes remove units with approximately half of their existing EUL remaining. As a result, the EUL for the Program-installed efficient refrigerator is half that of the EUL of a non-early replacement units. Despite this, the six year EUL utilized by the Program is less than half the EUL observed in a California Joint Utility Low Income study , a recent study that revisited EULs for the DEER database. Specifically, the 2004 Joint Utility study[19] utilized an EUL of 15 years for refrigerators and the report updating the DEER database, published in July 2005,[20] suggested using an EUL of 18 years. Half of both EULs, particularly the DEER update, are longer than that stipulated by the Program. Given that, among the Program's target population, refrigerators are likely to be replaced less frequently (as evident by both the aforementioned survey results and the fact that units in rental properties are likely to remain in place longer), for the purpose of this analysis, an EUL of 10 years was utilized. It is recommended that an EUL of 10 years be used in all future iterations of LIRRL.

Comparison of Realized Savings

To evaluate the overall appropriateness of the stipulated Program savings, Quantec reviewed, as outlined in the evaluation workplan, both of the most recent Statewide Cross-Cutting Residential Lighting Program Evaluation reports, as well as the California Refrigerator Dual Metering Study. However, while the statewide lighting evaluation was completed and available as a resource, the refrigerator study had been delayed and was not available at the time of this analysis. To replace the missing refrigerator study, as well as to supplement the findings of the lighting evaluation,

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[19] *Joint Utility Low Income Energy Efficiency Program*, 2004 Costs and Bill Savings Report, April 20, 2005, pages 8-9

[20] Revised /Updated EULs Based on Retention and Persistence Studies Results, July 2005

results from a number of different residential programs in California and nationwide were collected. Reviewing the studies also provided an opportunity to compare the realized energy savings, determined through the SAE analysis, to those observed for similar Programs.

Specifically, the following resources were reviewed:

- 2005 CFL Metering Study (All California Utilities)
- Joint Utility Low-Income Energy Efficiency Programs 2005 Costs and Bill Savings Report
- Measurement and Evaluation Study of the 2002 SDG&E Residential Hard-to-Reach Lighting Program
- ACEEE's Online Consumer Guide
- Home Energy Online Consumer Information
- KEMA California Statewide Study (April 2003)

While no single resource contained all of the necessary information, collectively the resources offered sufficient data regarding the energy savings associated with Program-installed efficiency measures. In addition, although it was not always possible to locate the energy savings estimates for some Program measures, as applied in LIRRL (e.g., savings associated with the installation of a 17 cubic foot refrigerator), considerable effort was made to find the most appropriate comparison. Where appropriate, details regarding all data augmentation and assumptions are provided.

The savings estimates obtained from each of the aforementioned reports, as well information regarding augmentation of the data, is reported in Table 41. As evident in the table, available information and savings estimated varied considerably between resources. Disparities can be attributed to both imperfect comparisons (e.g., unit size vs. home type) and differences in the study's various methodological approaches.

Table 41. Alternative Savings Estimates

Measure Type/ Description	Measure Units	Gross Annual Energy Savings (kWh)		2005 CFL Metering Study*	Joint Utility Low-Income Energy Efficiency Programs 2005 Costs and Bill Savings Report**	2002 SDG&E Residential Hard-to-Reach Lighting Program***	KEMA Statewide Study (April, 2003), Appendix F****	ACEEE and Home Energy Guide*****
		Program Stipulated	Realized					
Appliance								
Refrigerator	15 cf	1,537.0	588		665.1		859.0	468.9
	17 cf	1,537.0	611		665.1		859.0	460.5
	19 cf	1,537.0	763		794.8		1,048.0	492.6
	21 cf	1,537.0	1,167		794.8		1,048.0	553.5
Lighting								
Exterior CFL	13 W	110.3	22	53.2				
Hardwired Porch Light		110.3	22		25.1			
Interior CFL	13 W	47.3	9	40.1	17.0	24.1		
	20 W	70.3	14	34.2		37.0		
Torchiere Lamp		294.0	58	129.5		220.8		
Ceiling Fixture	30 W	89.5	18	69.2				

* Applied average hours of operation for both indoor and outdoor (2.34/day and 3.1/day, respectively) and most common existing incandescent pre-wattage (60W).

** Since refrigerator unit size was not available, but household type was, the savings associated with multi-family units (typically smaller size) was applied for 15 and 17 cf, while the savings associated with single-family replacements (generally larger units) was used for 19 and 21 cf. In addition, since lighting savings were provided by household type rather than wattage, a weighted average of the multi-family, manufactured, and single-family savings was calculated based on LIRRL participation.

*** Applied per-unit energy savings for 14W and 27W CFLs, as well as 32W hardwire fixture. Average of 55-64W and 65-70W torchieres energy savings utilized.

**** Again, since refrigerator unit size was not available, but household type was, the savings associated with multi-family units (typically smaller size) was applied for 15 and 17 cf, while the savings associated with single-family replacements (generally larger units) was used for 19 and 21 cf.

***** Difference between 1990 (Home Energy Guide) annual energy consumption (determined by averaging annual consumption of all models with top freezer for 15, 17,19 and 21 cubic feet refrigerators) and 15% above current refrigerator codes (Energy Star threshold)

A comparison of the alternative savings estimates provided in Table 41 to the net realized annual energy savings, determined by the SAE model, indicates that the observed savings for refrigerators are actually in line with the results of other studies. For example, the gross realized per-unit annual energy savings of 676 (weighted average) is very similar to those found in the 2005 Joint Studies report and larger than those determined by assessing consumption data from ACEEE and Home Energy. Utilizing values from these resources in the SAE model would likely provide realization rates equal to or greater than 1.

While the gross realized energy savings for lighting measures, specifically CFLs, do not align as closely with the estimates indicated by some studies, they are not dramatically less than the 17.0 kWh found in the 2005 Joint Studies report. All of the energy savings estimates for lighting measures found in the various studies were less than the stipulated value employed by LIRRL for the same measure. The realized LIRRL lighting results are likely lower than many of the other studies for two reasons. First, as a result of the increasing market saturation of CFLs in this

population, Program-installed CFLs are being placed in sockets in lower use areas with less energy saving potential. Second, the Program employed a policy of installing CFLs in all available sockets without considering hours of use. For example, during on-site verification numerous examples of multiple-socket (in some cases up to 6 or 8) bathroom vanities filled with Program-installed CFLs were observed. While such installations increase the total number of bulbs installed by the Program and work towards the larger goal of 100% CFL market penetration, they also put quantity ahead of quality. Although well-intended, in the case of this Program, such installations practices resulted in low per-unit energy savings.

Generally, it appears that the stipulated lighting savings are too high when compared to the net savings generated by other similar programs. While the effectiveness and ongoing need for the Program's lighting component appears limited, if lighting measures are utilized in future iterations of the Program, it is recommended that the Program utilize the realized gross energy savings as *ex ante* estimates in the future. Although lower than the other assessed studies, these per-unit lighting savings reflect the impact of future Program lighting installations on the LIRRL target market if current installation practices are continued.

CPUC Energy Impact Reporting Table

Table 42. CPUC Energy Impact Reporting Table

Program ID: 1376-04
Program Name: Limited Income Refrigerator Replacement & Lighting Program

Year	Calendar Year	Ex Ante Gross Program-Projected Program MWh Savings (1)	Ex Post Net Evaluation Confirmed Program MWh Savings (2)	Ex Ante Gross Program-Projected Peak Program MW Savings (1**)	Ex Post Evaluation Projected Peak MW Savings (2**)	Ex Ante Gross Program-Projected Program Therm Savings (1)	Ex Post Net Evaluation Confirmed Program Therm Savings (2)
1	2004	7,059	1,790	0.9899	0.2518		
2	2005	7,059	1,790	0.9899	0.2518		
3	2006	7,059	1,790	0.9899	0.2518		
4	2007	7,059	1,790	0.9899	0.2518		
5	2008	7,059	1,790	0.9899	0.2518		
6	2009	7,059	1,790	0.9899	0.2518		
7	2010	4,536	1,790	0.6326	0.2518		
8	2011	4,536	1,790	0.6326	0.2518		
9	2012	1,348	1,234	0.1434	0.1665		
10	2013	1,348	1,234	0.1434	0.1665		
11	2014	1,348	235	0.1434	0.0250		
12	2015	1,348	235	0.1434	0.0250		
13	2016	1,348	235	0.1434	0.0250		
14	2017	1,348	235	0.1434	0.0250		
15	2018	1,348	235	0.1434	0.0250		
16	2019	1,348	235	0.1434	0.0250		
17	2020						
18	2021						
19	2022						
20	2023						
Total	*2004-2023*	*62,213*	*18,201*				

Participant Survey

This chapter provides final results of surveys conducted with customers who participated in the LIRRL Program from its start in April 2004 to its completion in December 2005. Overall, a total of 420 surveys were conducted over the course of three "phases." Similar to the on-site measure verification methodology, surveys were conducted at three points in the Program's evaluation (November 2004, July 2005, and January 2006) in an effort to assess the consistency of Program during implementation, track changes over time, and to allow for mid-evaluation feedback to be coordinated with Program stakeholders.

Sampling Methodology

In order to create samples for each phase of the participant surveys, Quantec filtered and organized two raw data tables from the Program tracking system containing measure installations and site information. Measure data were aggregated by site number and paired with the corresponding contact information for each site. However, participants for whom no valid telephone numbers were available were dropped from the samples. In addition, in an effort to obtain the opinions and perspectives of only the Program participants who had participated during the phase being assessed, all participants who received measures during previous phases of Program interviews were excluded from the sample. Table 43 details data attrition, by building type, related to the creation of each sample, as well as the overall total of completes.

It should also be noted that participants from building types with fewer participants (manufactured and single-family homes) were over sampled in order ensure sample sizes adequate for analysis. While the information presented in this chapter focuses on comparing survey results across phases –not weighted by housing type – weighted overall results for all the tables found in this chapter are provided in Appendix A.

Table 43. Comparison of Population and Completed Surveys by Building Type

	Population	Percent of Population	Completed Surveys	Percent of Completed Survey
Phase I Surveys				
Multifamily	3,083	85%	80	57%
Manufactured Homes	387	11%	31	22%
Single-family	151	4%	30	21%
*Total**	*3,621*	*100%*	*141*	*100%*
Phase II Surveys				
Multifamily	5,581	88%	92	67%
Manufactured Homes	397	6%	0	0%
Single-family	348	6%	46	33%
Total	*6,326*	*100%*	*138*	*100%*
Phase III Surveys				
Multifamily	6,680	87%	121	86%
Manufactured Homes	417	5%	0	0%
Single-family	611	8%	20	14%
Total	*7,708*	*100%*	*141*	*100%*
Overall				
Multifamily	6,680	87%	293	70%
Manufactured Homes	417	5%	31	7%
Single-family	611	8%	96	23%
Total	*7,708*	*100%*	*420*	*100%*

* Again, the population total does not equal the total noted in the text above because one participant was not classified into a building type

The participant sample disposition for each of the three rounds of surveys is shown in Table 44. Overall, 4% of participants were not able to communicate with the interviewer because they spoke only Spanish.[21] For 3% in the first round and 6% in the second, there was no one in the household aware that Program measures had been installed; however, the number unaware of household participation was only 1% in the third wave of surveys.

[21] The actual number of non-English speaking households was determined to be too low to warrant translating the survey.

Table 44. Disposition

Disposition	Phase I		Phase II		Phase III		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Completed	141	24%	138	20%	141	23%	420	22%
Not available	248	41%	253	36%	241	39%	742	39%
Bad number	127	21%	180	26%	131	21%	438	23%
Refusal	29	5%	43	6%	66	11%	138	7%
Communication barrier: Spanish	30	5%	31	4%	21	3%	82	4%
Communication barrier: non-Spanish	7	1%	14	2%	13	2%	34	2%
Duplicate number	2	0%	0	0%	0	0%	2	0%
No one in household aware of participation	16	3%	45	6%	7	1%	68	4%
Miscellaneous not qualified	0	0%	0	0%	2	0%	0	0%
Total called	600	100%	704	100%	622	100%	1926	100%

Survey Results

Respondent Household and Housing Characteristics

In each of the three phases of the survey, samples include slightly more females than males (Table 45).

Table 45. Respondent Gender

Gender	Phase I (n=141)	Phase II (n=138)	Phase III (n=141)	Total (n=420)
Male	47%	44%	48%	46%
Female	53%	56%	52%	54%
Total	*100%*	*100%*	*100%*	*100%*

The portion of participants age 65 or older changed significantly over the three phases of the survey ($\chi^2 < 0.01$), making up one third of the Phase I sample, declining to 17% in Phase II, and rising again to 24% in Phase III (Table 46). This difference may be explained by differing marketing strategies over the course of offering the Program. The overall portion of participants age 65 or older (25%) was considerably larger than that of the general population of the city of San Diego (10.5%).[22]

[22] 2000 Census.

Table 46. Respondent Age

Age Group	Phase I (n=141)	Phase II (n=138)	Phase III (n=141)	Total (n=420)
18 to 34 years old	20%	33%	26%	26%
35 to 44 years old	21%	25%	22%	22%
45 to 54 years old	18%	17%	18%	18%
55 to 64 years old	9%	9%	10%	9%
65 or older	33%	17%	24%	25%

Most participating households have either one or two members (including the participant) in total; almost half of households include two adults (Table 47).

Table 47. Household Size

Members of Household	Phase I (n=139*)		Phase II (n=138)		Phase III (n=141*)		Total (n=418*)	
	Total	Adults	Total	Adults	Total	Adults	Total	Adults
One	27%	40%	23%	31%	38%	45%	29%	39%
Two	38%	47%	35%	53%	35%	46%	36%	49%
Three	18%	9%	18%	9%	16%	6%	18%	8%
Four or more	17%	4%	24%	7%	11%	3%	17%	4%

* Two individuals indicated that they didn't know how many members live in their household.

The portion of participants whose homes were between 500 and 1,000 square feet in size increased significantly over the three phases of the survey ($\chi^2 < 0.01$), beginning in Phase I at 40% and rising to a two-thirds majority in Phase III (Table 48).

Table 48. Home Size

Home Size	Phase I (n=117*)	Phase II (n=103)	Phase III (n=111)	Total (n=331)
Under 500 sqft	2%	3%	5%	3%
501 to 1,000 sqft	40%	50%	68%	53%
1,001 to 1,500 sqft	38%	35%	16%	30%
1,501 to 2,000 sqft	14%	11%	8%	11%
2,001 to 2,500 sqft	3%	1%	3%	2%
Over 2,500 sqft	3%	0%	1%	1%

* Twenty-four participants in Phase I, 35 in Phase II, and 30 in Phase III who could not provide an estimate of the size of their homes were excluded.

Program Activities

Over the course of the Program, just over a quarter (28%) of surveyed participants received refrigerators, though the portion of respondents receiving refrigerators in Phase III was slightly larger (34%) than the other phases (Table 49). The portion of surveyed participants receiving

CFLs rose significantly over the three phases of the survey: in Phase I, nearly nine in 10 (89%) participants received CFLs, while in Phase III virtually all (99%) participants received them.

While the portion of participants living in manufactured homes receiving refrigerators was about the same as participants in other building types, the portion receiving CFLs (13%) was far smaller than that of other building types (94% and 93%, multifamily and single-family, respectively), and the portion receiving fluorescent light fixtures was somewhat larger (90%) than other building types (70%). Since manufactured homes represented a small percentage of overall Program participation and were only surveyed during the first phase, data regarding responding multifamily participants reflect only Program activity prior to November 2004.

Table 49. Measures Implemented at Responding Household, by Housing Type

Measures Installed	Multi-Family	Manu-factured	Single Family	Total
CFLs				
Phase I (n=80, 31, 30, 141)	88%	13%	87%	71%
Phase II (n=92, 0, 46, 138)	94%	- - -	98%	95%
Phase III (n=121, 0, 20, 141)	99%	- - -	90%	98%
Total (n=293, 0, 96, 420)	*94%*	*13%*	*93%*	*88%*
Fluorescent light fixtures				
Phase I (n=80, 31, 30, 141)	68%	90%	67%	72%
Phase II (n=92, 0, 46, 138)	77%	- - -	76%	77%
Phase III (n=121, 0, 20, 141)	67%	- - -	60%	66%
Total (n=293, 0, 96, 420)	*70%*	*90%*	*70%*	*72%*
Torchiere lamps				
Phase I (n=80, 31, 30, 141)	1%	3%	10%	4%
Phase II (n=92, 0, 46, 138)	3%	- - -	17%	8%
Phase III (n=121, 0, 20, 141)	5%	- - -	0%	4%
Total (n=293, 0, 96, 420)	*3%*	*3%*	*11%*	*5%*
Refrigerator				
Phase I (n=80, 31, 30, 141)	26%	32%	53%	33%
Phase II (n=92, 0, 46, 138)	21%	- - -	48%	30%
Phase III (n=121, 0, 20, 141)	34%	- - -	45%	35%
Total (n=293, 0, 96, 420)	*28%*	*32%*	*49%*	*33%*

According to Program records, the median number of program-installed CFLs, fluorescent light fixtures, and fluorescent torchiere lamps was nine, two, and one, respectively. There was little change in these averages over the three phases of the survey.

Participation

Participants were asked how they heard about the Program, and interviewers coded their responses into categories; multiple responses were allowed for this question so percentages add up to more than 100%. Most (61%) of those who could remember reported hearing about the Program from their landlords or apartment managers. The portion of participants reporting they

heard about the Program from their landlord or apartment manager was larger in Phase III (71%) than earlier phases of the survey (53%, 57%), though the difference was not significant.

Table 50. How Participants Heard of Program, Multiple Responses Allowed

Source	Phase I (n=129*)	Phase II (n=131*)	Phase III (n=140*)	Total (n=400*)
Apartment manager/owner/landlord	53%	57%	71%	61%
A letter	15%	25%	15%	18%
Word of mouth/friend/relative	15%	4%	8%	9%
A phone call	7%	5%	2%	5%
Other contact with SDG&E	6%	2%	3%	4%
SDG&E came by in person	4%	3%	0%	2%
Newspaper article	2%	0%	1%	1%
TV advertisement	2%	4%	2%	3%
Home Depot	1%	0%	0%	0%
Bill insert	0%	4%	1%	2%

* Twelve Phase I participants, seven Phase II participants, and one Phase III participant did not recall how they heard about the Program and were excluded.

Participants were asked to choose which of a number of possible reasons best described why they participated. The reason cited by the greatest portion of participants (31%) was a desire to reduce electricity bills. Nearly as many (28%) participants reported their main reason for participation was that their landlord or property manager wanted them to; in Phase III, the portion citing this reason surpassed the portion citing a desire to reduce electricity bills. Nearly a quarter (23%) of participants reported participating mainly to save energy.

Table 51. Main Reason Customers Participated

Reason	Phase I (n=141)	Phase II (n=137*)	Phase III (n=140*)	Total (n=418*)
Wanted to reduce electric bill	35%	33%	27%	31%
Property manager wanted me to	26%	27%	31%	28%
Wanted to save energy	21%	23%	24%	23%
Items were offered free of charge	9%	10%	7%	9%
Wanted to help the environment	6%	4%	4%	5%
Have a very old refrigerator/needed a new one	1%	1%	4%	1%
Believed participation was mandatory	0%	2%	0%	1%
Positive prior experience with utility program	1%	0%	0%	0%
Curious about fluorescent lighting	1%	0%	0%	0%

* One participant in Phase II and one in Phase III could not remember the reason for participation

When prompted, just over two thirds of participants (85 in Phase I, 107 in Phase II, and 99 in Phase III) provided an additional reason for participating (Table 52). Considering *all* the reasons participants cited – both with and without prompts – reveals that the majority of respondents participated at least partially out of a desire to reduce their electric bills. Almost half (48%) cited

a desire to save energy; about one third (35%) mentioned that their property manager or landlord had urged them to participate.

Table 52. Why Customers Participated, Multiple Responses Allowed

Reason	Phase I (n=141)	Phase II (n=137*)	Phase III (n=140*)	Total (n=418*)
Wanted to reduce electric bill	62%	55%	53%	56%
Wanted to save energy	45%	51%	50%	48%
Property manager wanted me to	30%	33%	42%	35%
Items were offered free of charge	32%	31%	21%	28%
Wanted to help the environment	26%	25%	24%	25%
Have a very old refrigerator/needed a new one	4%	1%	8%	5%
Was behind in electric bills	2%	4%	3%	3%
Believed participation was mandatory	0%	2%	0%	<1%
Curious about fluorescent lighting	1%	0%	0%	<1%
Wanted some new fixtures	1%	0%	0%	<1%
Reduce water usage**	1%	0%	0%	<1%

* Two participants were unable to remember or describe any reasons why they participated.

** It is unclear how participating in the Program would help the customer reach this goal.

Overall, 15% of respondents had participated in some other program designed to help them save energy prior to their participation in LIRRL (Table 53). Most reported that the prior program participation took place in the same home as they live in now.

Table 53. Participation in Programs Designed to Help Save Energy

Home	Phase I (n=141)	Phase II (n=138)	Phase III (n=141)	Total (n=420)
This home	8%	12%	11%	10%
Prior home	6%	5%	3%	4%
Total	*13%*	*17%*	*13%*	*15%*

Participants who reported they had participated in a prior energy efficiency program were asked if their prior participation experience had been with any of several specific programs offered by SDG&E: Energy Team, Fuel Assistance, and Weatherization. Table 54 shows that fewer than about 2% reported participating in each of those three programs. Interestingly, the percentage of LIRRL participants who had previously participated in another SDG&E program was significantly lower in Phase III than the previous two phases.

Table 54. Participation in SDG&E Programs

Program	Phase I (n=141)	Phase II (n=138)	Phase III (n=141)	Total (n=420)
Energy Team	3%	1%	2%	2%
Fuel Assistance	3%	2%	1%	2%
Weatherization	4%	1%	1%	2%
Participated, but don't remember in which program	4%	2%	1%	2%
Total	*14%*	*6%*	*4%*	*8%*

Participation Satisfaction

Participants were also asked a number of questions regarding their satisfaction with various aspects of their LIRRL Program participation experience. Participants used a five-point scale (1 = not at all satisfied; and 5 = very satisfied) to answer these questions.

One area covered by these questions included participant satisfaction with Program-specific measures installed in their homes. Table 55 shows that the majority of respondents who received each of the four measures expressed strong satisfaction with them.

Intriguingly, the portion of refrigerator recipients who counted themselves very satisfied with their refrigerators decreased significantly over the three phases of the survey, to just under half (48%) in Phase III, from the previous levels of more than thee fourths (77-80%, ($\chi^2 < 0.05$).

Conversely, satisfaction levels for both CFLs and fluorescent light fixtures increased significantly over the three phases of the survey ($\chi^2 < 0.05$).

Table 55. Satisfaction with Installed Devices

Survey Phase	1 (not at all satisfied)	2	3	4	5 (very satisfied)
CFLs					
Phase I (n=97)	8%	7%	11%	16%	57%
Phase II (n=125)	0%	4%	15%	20%	61%
Phase III (n=134)	2%	4%	9%	18%	67%
Total (n=356)	*3%*	*5%*	*12%*	*18%*	*62%*
Fluorescent Light Fixtures					
Phase I (n=94)	5%	4%	10%	19%	62%
Phase II (n=71)	0%	0%	8%	13%	79%
Phase III (n=64)	0%	3%	6%	6%	84%
Total (n=229)	*2%*	*3%*	*8%*	*14%*	*73%*
Torchiere Lamps					
Phase I (n=3)	0%	0%	0%	0%	100%
Phase II (n=10)	0%	0%	10%	20%	70%
Phase III (n=5)	0%	0%	20%	0%	80%
Total (n=18)	*0%*	*0%*	*11%*	*11%*	*78%*
Refrigerators					
Phase I (n=46)	2%	2%	7%	9%	80%
Phase II (n=39)	3%	0%	5%	15%	77%
Phase III (n=48)	0%	13%	8%	31%	48%
Total (n=133)	*2%*	*5%*	*7%*	*19%*	*68%*

Note: Only respondents who received these measures were asked these questions. Respondents who responded "don't know" were excluded. .

The survey also explored whether various factors influenced customer satisfaction with the measures they received. The results indicate that participants receiving CFLs who reported that their main reason for participating was "their property manager or landlord wanted them to" were significantly less likely to be satisfied with their CFLs (χ^2, $p < 0.05$) than those who participated for other reasons. Participants receiving refrigerators who cited their landlord as the main reason for their participation were also significantly less likely to be satisfied with their refrigerators (χ^2, $p < 0.05$).

Participants were also asked about their satisfaction with the workers who installed the equipment in their homes and with SDG&E overall. More than three-fourths (80%) of participants who received lighting equipment and a similar portion (85%) of those who received a refrigerator reported they were very satisfied with the installation workers. Almost two-thirds (64%) of all participants reported they were very satisfied with SDG&E overall. Levels of satisfaction with both types of installation workers and with SDG&E overall remained relatively stable over the three phases of the survey.

Table 56. Satisfaction with Installers and SDG&E

Survey Phase	1 (not at all satisfied)	2	3	4	5 (very satisfied)
Lighting Equipment Installers					
Phase I (n=104)	2%	2%	4%	13%	79%
Phase II (n=107)	0%	0%	4%	16%	80%
Phase III (n=119)	0%	0%	3%	15%	82%
Total (n=330)*	*1%*	*1%*	*4%*	*15%*	*80%*
Refrigerator Installers					
Phase I (n=42)	2%	0%	5%	7%	86%
Phase II (n=36)	0%	0%	0%	8%	92%
Phase III (n=39)	0%	0%	8%	13%	79%
Total (n=117)*	*1%*	*0%*	*4%*	*9%*	*85%*
SDG&E Overall					
Phase I (n=139)	1%	2%	11%	23%	63%
Phase II (n=136)	2%	2%	7%	25%	63%
Phase III (n=139)	1%	1%	9%	23%	67%
Total (n=414)*	*1%*	*2%*	*9%*	*24%*	*64%*

* Participants who reported they were not at home when the event in question happened or responded "don't know" to these questions were excluded.

To further explore participant satisfaction with their Program experience, participants were again asked to indicate their level of agreement with a series of statements using a five-point scale (1 = strongly disagree; 5 = strongly agree).

All statements were worded such that agreement with them signaled a positive outcome for SDG&E. Because of the high portion of participants indicating strong agreement with the statements, and in order to ease comprehension and aid comparison of the findings, Table 57 presents only the portion of participants indicating strong agreement with each statement. As evident in the table, the majorities in all phases of the survey—heavy majorities in most cases—strongly agreed with each of the statements; for most participants, the experience was a positive one in every respect discussed.

The proportion of participants in strong agreement was above three-fourths for all but a few of the statements. Among these descriptive statements, the statement that engendered the least agreement among participants was regarding their first contact with a Program representative, with only 59% of participants strongly agreeing the representative clearly explained the Program during the first call.

Table 57. Strong Agreement with Statements Describing Experience

Statement (Phase I *n*, Phase II *n,* Phase III *n,* Total *n*)	Strongly Agree			
	Phase I	Phase II	Phase III	Total
General				
The representative clearly explained the Program during the first call (n=84, 74, 76, 234)	58%	66%	54%	59%
Installation was scheduled at a convenient time (n=118, 111, 128, 357)	78%	73%	77%	76%
The representative was courteous throughout the visit to my home (n=109, 102, 116, 327)	87%	83%	88%	86%
Lighting				
Installation was scheduled at a convenient time (n=103, 96,125, 324)	80%	83%	74%	79%
Installation was done in a professional manner (n=103, 95, 125, 323)	85%	87%	86%	86%
Installer was careful removing old lighting (n=103, 94, 121, 318)	85%	86%	83%	85%
Installer was careful installing new lighting (n=103, 93, 121, 317)	85%	86%	86%	86%
Installer clearly explained how the lighting operates and saves energy (n=101, 91, 113, 305)	71%	68%	65%	68%
Installer was courteous while in my home (n=102, 90, 116, 308)	89%	83%	87%	87%
Refrigerators				
Removal and installation were scheduled at a convenient time (n=41, 35, 47, 123)	80%	83%	66%	76%
Removal of old and installation of new unit were done in a professional manner (n=40, 35, 45, 120)	90%	91%	78%	86%
Installer was careful removing the old unit (n=39, 35, 44, 118)	87%	89%	82%	86%
Installer was careful installing the new unit (n=39, 35, 44, 118)	85%	89%	77%	83%
Installer clearly explained how to operate the new unit (n=38, 35, 39, 112)	68%	89%	56%	71%
Installer was courteous while in my home (n=39, 34, 39, 112)	87%	91%	82%	87%

* Participants who reported they were not at home when the event in question happened, and those who responded "don't know" to these questions, were excluded.

To garner a comparison between LIRRL and other utility programs, interviewers asked those participants who had previously participated in another energy-efficiency program whether their experience participating in LIRRL was better, worse, or the same as the other programs. In all, there were 57 individuals, (18 in Phase I, 20 in Phase II and 19 in Phase III) indicating prior Program participation (14% of all participants). Of those participants, only 52 were able to provide an opinion of how favorably LIRRL compared to other programs in which they participated. Overall, most (58%) participants responding to this question indicated LIRRL was better than the other programs. Unlike the Phase II and Phase III samples, in Phase I, the majority (56%) indicated LIRRL was about the same as other programs; the difference was not significant.

Table 58. Comparing LIRRL with prior utility program experiences

Opinion	Phase I (n=16)	Phase II (n=20)	Phase III (n=16)	Total (n=52)
LIRRL was better	44%	65%	63%	58%
LIRRL was about the same	56%	20%	31%	35%
LIRRL was worse	0%	15%	6%	8%

The participants who said that the LIRRL program is better or worse than previous programs were asked why they thought so. Across all phases of the survey, those who thought the Program was better mostly reported feeling that way because it offered more to participants. A few participants thought this was so because they had noticed subsequent energy savings. Two individuals reported that the Program's active outreach, made it better than others because they didn't have to seek out Program services.

Table 59. Why LIRRL Program is better than others (multiple responses allowed)

Reason	Phase I (n=7)	Phase II (n=13)	Phase III (n=9)	Total (n=29)
Offers more to participants	5	4	4	13
Noticed energy savings	1	3	3	7
They came to us		2		2
Generally easier or more convenient			2	2
More knowledgeable staff	1			1
Total offering any reason	7	9		16

No Phase I participants who had participated in prior programs reported that LIRRL was worse than their previous experience, but there were three Phase II participants and one Phase III participant who did say LIRRL was worse. One reason was cited by two participants: a problem with the refrigerator. As for the other two participants, one explained that he felt he didn't need a new refrigerator, and the other felt the refrigerators were not being fairly allocated.

All participants were asked whether they had noticed a reduction in their electricity usage on their utility bills since receiving new Program equipment. Overall, 43% of participants reported they had noticed energy savings. Not surprisingly, an analysis revealed that participants receiving refrigerators from the program were more likely to report they had noticed energy savings since their participation ($\chi^2 < 0.05$).

Table 60. Energy Savings Noticed by Participants

Phase	Noticed Energy Savings
Phase I (n=141)	35%
Phase II (n=138)	49%
Phase III (n=141)	45%
Total (n=420)	*43%*

All participants were given the opportunity to suggest possible improvements for the Program. Table 45 shows the themes that emerged in participant suggestions. Overall, the most common suggestion for improving the Program (given by 22% of the participants who provided a response) focused on improving some aspect of the installations, including that installers should be more knowledgeable and/or accommodating.

Table 61. Suggestions for Improvement

Suggestion	Phase I (n=49)	Phase II (n=35)	Phase II (n=31)	Total (n=115)
Improve installations: installers should be more knowledgeable/quicker/punctual/flexible/do more follow-up	27%	11%	26%	22%
More advertising, raise awareness	12%	29%	10%	17%
No improvements needed/positive comments	31%	3%	6%	16%
Provide additional services/implement other measures	4%	17%	29%	15%
Provide brighter light bulbs	16%	3%	6%	10%
Provide more bulbs or greater variety of bulbs/torchieres	6%	14%	6%	9%
Adjust requirements for Program qualification	6%	9%	6%	7%
Better quality control	0%	6%	13%	5%
Provide information about how to shop for energy-efficient products	2%	3%	0%	2%
Surveys should be shorter	2%	0%	0%	1%
More information in advance about expected money savings	2%	0%	0%	1%
Make participation less time consuming	0%	3%	0%	1%
Keep participants better informed	0%	3%	0%	1%

Measure Retention

Participants were asked whether any measures they received from the Program had been removed or replaced since installation. Eighty-eight percent of participants either kept their CFLs in place or replaced them with another CFL. As shown in Table 62, fluorescent fixtures fared even better, with 99% still in place or replaced with other fluorescent fixtures. Retention rates for the CFLs and the fluorescent light fixtures appeared to trend upward over the three phases of the survey, but these differences were not significant.

Of the 19 participants receiving fluorescent torchieres, only one removed the measure; this participant replaced it with another torchiere lamp. The participant reported the replacement was done because someone said the new halogen torchiere would save energy.

Of the 133 people receiving a refrigerator from the Program, only one person reported the refrigerator had been removed. This individual was an assistant property manager, and explained that the refrigerator was given away to another tenant in the building when that tenant's refrigerator stopped working. This participant received a new refrigerator to replace the program-installed one.

Table 62. Status of Installed Measures

Measure	Removed Measure(s)	Replaced		Measure still in Place
		Similar Measure	Non-Program Measure	
CFLs				
Phase I (n=98)	9%	6%	10%	76%
Phase II (n=126)	9%	3%	5%	85%
Phase III (n=134)	7%	7%	3%	86%
Total (n=358)	*8%*	*5%*	*6%*	*83%*
Fluorescent Fixtures				
Phase I (n=95)	1%	2%	1%	96%
Phase II (n=71)	1%	- - -	- - -	99%
Phase III (n=66)	- - -	- - -	- - -	100%
Total (n=232)	*1%*	*1%*	- - -	*98%*
Fluorescent Torchieres				
Phase I (n=4)	- - -	- - -	- - -	100%
Phase II (n=10)	- - -	- - -	- - -	100%
Phase III (n=5)	20%	- - -	- - -	80%
Total (n=19)	*5%*	- - -	- - -	*95%*
Refrigerators				
Phase I (n=46)	- - -	- - -	- - -	100%
Phase II (n=39)	- - -	- - -	- - -	100%
Phase III (n=48)	- - -	2%	- - -	98%
Total (n=133)	- - -	*1%*	- - -	*99%*

We explored whether various factors were related to customers removing Program measures or whether they replaced the measure with a non-energy efficient item. While retention rates for CFLs and fluorescent light fixtures appear to trend slightly upward over the three phases of the survey, this was not statistically significant; analysis revealed no factors that significantly affect retention rates.

Free-Ridership

Participants were asked several questions to assess how likely it was they would have purchased Program measures themselves and installed them in their homes had they not participated in LIRRL. For participants who received lighting measures, the questions included whether the participant had ever purchased the measure before and whether the participant would have purchased the measure even if they had not participated in LIRRL. Participants who indicated they would have purchased the measure independently were prompted with the following question: "Just to clarify, were you planning to purchase and install CFLs/fluorescent light fixtures/fluorescent torchieres prior to participating in the program?" This question was asked in order to increase confidence that participants clearly understood the question and would accurately describe their plans prior to participation.

Refrigerator recipients were not asked whether they had purchased a new refrigerator before, but only whether they would have purchased a new refrigerator independently. If a refrigerator

recipient reported they would have purchased a refrigerator independently, they were asked whether they would have done so at about the same time the Program provided the refrigerator, or whether they would have done so sooner or later. Portions of lighting measure and refrigerator recipients responding in the affirmative to these questions are reported in Table 63.

For CFL bulbs, overall 39% reported they had purchased at least one CFL prior to participating in LIRRL. Just over one third (36%) reported they would have purchased the bulbs anyway, but only about one forth (23%) reported having planned to do so prior to participation. For fluorescent light fixtures, about one fourth (23%) reported having purchased the fixtures before, with about the same portion (25%) reporting they would have purchased them anyway. Fewer (12%) reported having planned to purchase and install fluorescent fixtures prior to participating in LIRRL.

For fluorescent torchieres, again about one fourth (26%) reported having purchased the lamps before, but closer to one third (32%) reported they would have purchased the lamps anyway. Again, however, only 11% reported actually having planned to purchase the lamps before participating in LIRRL.

One fifth (20%) of refrigerator recipients reported they would have purchased a new refrigerator even if they had not participated in LIRRL.

Table 63. Free-Ridership Indicators

Measure	Purchased before	Would have purchased anyway	Planned purchase prior to Program	Overlap between 'purchased before' and...	
				'would have purchased anyway'	'planned purchase prior to Program'
CFLs					
Phase I (n=98)	39%	36%	29%	28%	22%
Phase II (n=126)	36%	32%	18%	23%	14%
Phase III (n=134)	42%	40%	23%	26%	17%
Total (n=358)	*39%*	*36%*	*23%*	*26%*	*17%*
Fluorescent Fixtures					
Phase I (n=95)	27%	22%	14%	14%	9%
Phase II (n=71)	21%	24%	11%	13%	7%
Phase III (n=66)	21%	29%	11%	14%	6%
Total (n=232)	*23%*	*25%*	*12%*	*14%*	*8%*
Fluorescent Torchieres					
Phase I (n=4)	50%	25%	25%	25%	25%
Phase II (n=10)	30%	40%	10%	10%	10%
Phase III (n=5)	- - -	20%	- - -	- - -	- - -
Total (n=19)	*26%*	*32%*	*11%*	*11%*	*11%*
Refrigerator					
Phase I (n=46)	- - -	30%	- - -	- - -	- - -
Phase II (n=39)	- - -	15%	- - -	- - -	- - -
Phase III (n=48)	- - -	15%	- - -	- - -	- - -
Total (n=133)	- - -	*20%*	- - -	- - -	- - -

Lighting measure recipients who reported they would have purchased the measures independently of the Program, and especially those who reported having planned to do so (in response to the second prompt), could be considered free-riders. However, only those who say they would have purchased the same number of the measures, or more, as they received through the Program could be considered full free-riders; those saying they would have purchased fewer than they received through the Program would be considered partial free-riders.

Participants who said they were planning to purchase a lighting measure that the Program provided to them for free were told the average price of the measure[23] and asked how many they would have purchased in the absence of the Program (torchiere recipients were asked only whether they still would have purchased one on their own, given the average price, not how many they would have bought). This number was compared to Program data for the number of that type of measure each customer received through the Program.

Table 64 shows that about one fourth (24%) of those saying that they would have purchased CFLs reported they would have purchased at least the same number this year in the absence of the Program as they received through the Program. Thus, of the overall 23% participants who planned to purchase CFLs independently (who therefore could be considered free-riders at least partially) only about one fourth (24%, or 5% of all those receiving CFLs) reported that they would have purchased as many CFLs as they received from the Program.

With regard to the overall 12% of participants who received lighting fixtures and stated that they planned to purchase fluorescent fixtures independently, 45% (or 3% of those receiving fluorescent fixtures) reported they would have purchased the same number or more fluorescent fixtures as they received from the program.

The two participants who said they planned to purchase fluorescent torchiere lamps independently of the Program (representing 11% of the total of 19 fluorescent torchiere recipients) both indicated they would have still purchased a fluorescent torchiere after being told the average price.

[23] CFLs $4, fluorescent fixtures $50, and torchieres $25

Table 64. Percent of Program-Installed Measures that Participants Would Have Purchased on Their Own

Measure	0% to 24%	25% to 50%	51% to 99%	100% or more
CFLs				
Phase I (n=26)	31%	27%	15%	31%
Phase II (n=21)	14%	33%	33%	19%
Phase III (n=31)	14%	41%	24%	21%
Total (n=78)	*20%*	*34%*	*23%*	*24%*
Fluorescent Fixtures				
Phase I (n=9)	0%	23%	46%	31%
Phase II (n=8)	13%	38%	13%	38%
Phase III (n=7)	- - -	29%	- - -	71%
Total (n=24)	*4%*	*30%*	*22%*	*45%*
Fluorescent Torchieres				
Phase I (n=1)	- - -	- - -	- - -	100%*
Phase II (n=1)	- - -	- - -	- - -	100%*
Phase III (n=0)	- - -	- - -	- - -	- - -
Total (n=2)	- - -	- - -	- - -	*100%**

* Torchiere recipients were only asked if they would have purchased a fluorescent torchiere given the average price – they were not asked how many they would purchase.

As noted in Table 63, a smaller percent of respondents in both Phase II and III stated they were planning to install CFLs and fluorescent fixtures, prior to participating in the Program. However, this is not a proper estimation of free-ridership since the majority of those respondents further noted that they had planned to install fewer lamps or fixtures than did the Program. Therefore, the simple percentages provided in Table 63 overstate Program free-ridership for these measures. Utilizing the data presented in both Table 63 and Table 64, more accurate estimates of the free-ridership were developed at the measure level rather than the customer level.

Participants were not specifically asked what percent of the Program-installed measures they would have installed independently, but rather, as presented in Table 64, the general level of installation of measures relative to the Program-installed measures. Therefore, three different estimations of net free-ridership were determined:

- ***The low estimate*** utilizes the lower boundary of each interval presented in Table 64 to calculate free-ridership
- ***The high estimate*** uses the upper boundary
- ***The midpoint of each interval*** was also employed to provide a third estimate of free-ridership

The results of these three approaches are presented in Table 65. As evident in the table, the highest level of CFL and fluorescent fixture free-ridership was evident during Phase I. Overall, the midpoint estimates of free-ridership at the measure level for all respondents was 13.0% and 8.8% for CFLs and fluorescent fixtures, respectively.

Table 65. Measure Level Free-Ridership Estimates

Measure*	Low	High	Midpoint
Phase I			
CFLs (n=26)	13.2%	19.4%	16.3%
Fluorescent fixtures (n=9)	8.4%	12.3%	10.3%
Phase II			
CFLs (n=21)	8.0%	13.0%	10.5%
Fluorescent fixtures (n=8)	5.9%	7.9%	6.9%
Phase III			
CFLs (n=31)	10.0%	15.8%	12.9%
Fluorescent fixtures (n=7)	8.6%	9.4%	9.0%
Total			
CFLs (n=78)	10.2%	15.8%	13.0%
Fluorescent fixtures (n=24)	7.6%	9.9%	8.8%

* The two respondents who stated they would have independently installed a fluorescent torchiere each claimed they had planned on installing the same amount as the Program. Therefore, for fluorescent torchieres free-ridership is 11% - as presented in Table 63.

Participants who received refrigerators through the Program and also reported they had been planning to purchase a new refrigerator prior to their participation were asked whether they would have purchased it at around the same time they received their refrigerator from the Program, sooner, or later. Of the 20% of refrigerator recipients who reported they would have purchased a new refrigerator independently of the Program, 22% (or 5% of all who received refrigerators) reported they would have independently purchased it at around the same time or prior to when the Program provided their refrigerator; the rest reported they would have done so sometime during the next year or didn't know when.

The 20% of refrigerator recipients who stated they were planning to buy a refrigerator independently were also asked whether they would have bought a new or used refrigerator. More than three fourths (81%, or 17% of all responding refrigerator recipients) reported they would have purchased a new refrigerator. Those who would have purchased a used refrigerator would not be considered free-riders, because the refrigerator they received from the Program likely represents an energy savings over the used refrigerator, these participants report they would have purchased independently.

Table 66. Condition of Refrigerator Participants Planned to Purchase

Phase	New	Used	Don't Know
Phase I (n=14)	79%	21%	0%
Phase II (n=6)	67%	17%	17%
Phase III (n=7)	100%	0%	0%
Total (n=27)	*81%*	*15%*	*4%*

When participants were asked what they would have done with their old refrigerator if they had replaced their own refrigerator without the help of LIRRL, the greatest portion (44%) reported

they would have given it away, nearly as many 37% report they would have recycled the old refrigerator.

Table 67. Fate of Old Units if Participants had Replaced Refrigerator

Phase	Given Away	Recycled	Kept	Something else/ don't know
Phase I (n=14)	50%	36%	7%	7%
Phase II (n=6)	33%	50%	- - -	17%
Phase III (n=7)	43%	29%	- - -	29%
Total (n=27)	44%	37%	4%	15%

Participants who reported that they would have independently purchased lighting measures which they received for free from LIRRL were asked the reason why they planned to purchase measures. For all of the measures, a majority of participants explain why they would have purchased the measures by citing a belief the measures would save energy and money.

Table 68. Why Participants Planned to Purchase Lighting Measures

Reason	CFLs (n=79)	Fluorescent Fixtures (n=15)	Fluorescent Torchieres (n=2)
Think they save energy and money	61%	73%	100%
Friends or family told me they were a good idea	14%	13%	- - -
Advertising says they save energy and cost less	15%	- - -	- - -
Heard about them from Flex Your Power advertising	5%	7%	- - -
Heard about them from SDG&E	4%	7%	- - -

Participants who said that they had previously purchased CFLs, fluorescent light fixtures, or fluorescent torchieres were asked how many they had purchased. In the case of CFLs and fluorescent light fixtures, most reported having previously purchased at least three. None of those reporting they had purchased fluorescent torchiere lamps reported they had purchased more than two.

Table 69. Prior Purchases: Number Purchased

Measure	1 or 2	3 to 5	6 or more
CFLs			
Phase I (n=37*)	38%	35%	27%
Phase II (n=41)	27%	29%	44%
Phase III (n=54*)	20%	46%	33%
Total (n=132)*	*27%*	*38%*	*35%*
Fluorescent Light Fixtures			
Phase I (n=24)	25%	46%	38%
Phase II (n=13)	62%	23%	15%
Phase III (n=14)	21%	29%	50%
Total (n=51)	*33%*	*35%*	*35%*
Fluorescent Torchieres			
Phase I (n=2*)	100%	- - -	- - -
Phase II (n=3)	100%	- - -	- - -
Phase III (n=0)	- - -	- - -	- - -
Total (n=5)*	*100%*	- - -	- - -

* Participants who said they didn't know how many they had purchased were excluded.

Spillover

Often analysis of free-ridership is accompanied by an assessment of Program spillover – energy efficiency improvements made by participants that were made independently and as a result of their participation in the Program. However, since all existing CFL and fixture locations were equipped with high efficiency lighting measures as part of the Program, there is little opportunity for lighting spillover. While spillover in the form of other energy efficiency improvements (e.g., general weatherization, other types of appliances, and behavioral changes) are possible and can be assessed at a general level, they are likely to be minimal, and determining the specific energy savings they generate and directly attributing them to the Program is problematic.

As a result of the constrained opportunities for spillover in limited-income multifamily homes and the difficulty associated with quantifying the energy saving achieved by wide gambit of measures that could be installed in participating single-family and mobile homes, this analysis does not assess Program spillover.

Summary

Most participants heard about the Program through their apartment manager or landlord. The most common reasons for participation were reducing electric bills, pressure from the apartment manager or landlord, and saving energy.

Satisfaction (defined by those assigning a "4" or a "5" on a five-point scale) with all measures was over 75%. Participant satisfaction with refrigerators diminished significantly over the course of the surveys. On the other hand, participant satisfaction with CFLs and fluorescent light

fixtures increased significantly over the course of the surveys, possibly as a result of the steps taken to improve those measures.

Measure retention is above 90% for refrigerators, torchieres, and light fixtures. It is lowest for CFLs, at 83%. Again, assuring that the quality of the bulbs is high and that the location of installation is appropriate will help keep a higher percentage of CFLs installed over time.

Non-Participant Surveys

This chapter provides information about customers who were solicited but did not participate in the LIRRL Program, and details how they responded to the questions in the survey. Much like the participant surveys, non-participants were interviewed in phases. However, since LIRRL was not independently marketed during most of 2005 (functioning exclusively as an adjunct to DAP), only two phases of non-participant interviews (November 2004 and July 2005) were conducted.

Sampling Methodology

The evaluation team created a survey instrument for use in telephone interviews with non-participant customers. One aim of the survey is to learn more about the characteristics of customers who did not participate and whether they indeed qualified for the program. Another is to reveal how many of these non-participants have purchased energy-saving measures on their own, measures they might have received for free had they participated.

During the summer of 2004, approximately 6,500 customers received a mail solicitation to sign up to participate in the LIRRL Program. The overwhelming majority of these customers did not decide to participate in the Program. Since LIRRL was not actively marketing the Program during the second phase of the evaluation – rather employing LIRRL as it was originally intended as a DAP "fall-out" program, no new marketing databases where available. Therefore, similar to the first phase of non-participant interviews, the original Program marketing mailing list was used to generate a sample of non-participants. Gilmore Research Group conducted the first wave of telephone interviews with 146 non-participants between January 14 and January 30, 2004. The second wave of telephone interviews was conducted between June 20 and July 7, 2005. Most interviews took less than ten minutes.

The customers of interest to the current study are those who would have qualified for the Program but simply chose not to sign up. As customers whose incomes are greater than $60,000 per annum are unlikely to qualify, the survey included a screening question about household income. Although they were not interviewed, customers with incomes greater than $60,000 amounted to 20% of those called in the first Phase of surveys and 16% in the second Phase.

Two to three percent of those called were not able to communicate with the interviewer because they spoke only Spanish. The final sample disposition is provided in Table 70.

Table 70. Sample Disposition

Disposition	Phase I		Phase II	
	n	Percent	n	Percent
Completed	146	15%	138	17%
Refusal	137	14%	120	15%
Bad number	171	17%	156	19%
Communication Barrier: Spanish	7	1%	7	1%
Communication Barrier: Non-Spanish	21	2%	10	1%
Not Available	279	28%	238	29%
Duplicate Number	1	0%	0	0%
Not Payer of Electric Bill	2	0%	0	0%
Income $60,000 or above (probably would not qualify)	199	20%	133	16%
Don't know/Refused to provide Income	16	2%	21	3%
Total called	979	100%	823	100%

Survey Results

Sample Characteristics

Table 71 presents the age and gender distribution of the Phase I and II non-participant samples, with the numbers for participants included in the table for comparison.

Table 71. Age and Gender of Sampled Non-Participants

Age Category	Male	Female	All Non-Participants	Participants
Phase I				
n	51	95	146	141
18-24 years old	0%	1%	1%	4%
25-34 years old	10%	6%	8%	16%
35-44 years old	18%	16%	16%	21%
45-54 years old	12%	19%	16%	18%
55-64 years old	18%	18%	18%	9%
65 or older	43%	40%	41%	33%
Phase II				
n	54	84	138	138
18-24 years old	0%	2%	1%	33%
25-34 years old	17%	4%	9%	25%
35-44 years old	15%	19%	17%	17%
45-54 years old	11%	20%	17%	9%
55-64 years old	22%	20%	21%	17%
65 or older	35%	35%	35%	33%

In both Phases of the survey, most of the households represented in the sample were composed of one or two individuals.

Table 72. Number of Persons, Adults in Household

Number of Persons in Household	Non-Participants		Participants	
	Persons	Adults	Persons	Adults
Phase I				
Sample size	144*	146	141	141
1	16%	5%	27%	17%
2	37%	65%	38%	65%
3	24%	23%	18%	13%
4 or more	21%	6%	16%	5%
Phase II				
Sample size	138	138	138	138
1	20%	20%	23%	31%
2	35%	7%	35%	53%
3	19%	58%	18%	9%
4 or more	26%	15%	24%	7%

* Two individuals refused to report the number of persons in their household.

In Phase I, almost half (47%) of non-participants reported incomes less than $45,000 per year; in Phase II, the portion was 59%. About 15% of non-participants in both Phases did not know their incomes or refused to divulge the information.

Table 73. Income

Income Category	Phase I (n=146)	Phase II (n=138)
Under $20K	8%	8%
$20K to $35K	22%	28%
$35K to $45K	17%	23%
$45K to $55K	21%	17%
$55K to $65K	15%	12%
Over $65K	1%	1%
Don't Know/Refused	16%	11%

LIRRL imposes income caps on participating households that vary according to the number of persons in a household. We used customer responses to questions about age, income, and household size to determine whether non-participants likely would have qualified for LIRRL. To increase cooperation on this question, customers were not asked which range their incomes or ages fit into. Unfortunately, because of the complexity of Program parameters, it was not feasible for category boundaries to closely correspond to relevant Program parameters. Therefore, the portions reported below as likely qualifying for the Program or not must be considered rough estimates. In cases where responses indicated that a customer was as likely as not to qualify for LIRRL, we counted them as qualifying. Table 58 shows that almost one-third of non-participants

probably would have qualified for LIRRL while about half of non-participants would probably not qualify because their incomes exceed Program limits.

Table 74. Likelihood that Non-Participants Would Qualify for LIRRL

Estimate	Phase I (n=122*)	Phase II (n=138)
Income likely too low (DAP Eligible)	18%	21%
Likely would qualify	32%	31%
Income likely too high	50%	48%

* Some individuals did not know their households' incomes or refused to divulge this information. As a result, we cannot determine whether they are likely to have qualified for LIRRL.

Within the non-participant sample there were dramatically more single-family home dwellers than there were in the participant sample; this was equally true in both Phases of the survey (Table 75). This is likely related to the large number of participants who participated at the behest of their property managers.

Table 75. Housing Type

Housing type	Income too Low	Likely Qualify	Income too High	All Non-Participants	Participants
Phase I					
Sample size	22	39	61	146	141
A manufactured or mobile home	5%			1%	22%
A single-family home	82%	90%	90%	89%	21%
A multifamily home with 2 to 4 units	14%	8%	3%	6%	57%
Or a multifamily home with 5 or more units			5%	2%	
Other/Don't Know		3%	2%	2%	
Phase II					
Sample size	29	43	66	138	138
A manufactured or mobile home	0%	0%	0%	0%	
A single-family home	83%	81%	92%	87%	33%
A multifamily home with 2 to 4 units	10%	9%	5%	7%	67%
Or a multifamily home with 5 or more units	3%	9%	3%	5%	
Other/don't Know	3%	0%	0%	1%	

Since replacing antiquated refrigerators is one of LIRRL's components, non-participants were asked both how many refrigerators they have in their homes that are plugged in and their age Overall, about three-fourths reported having only one refrigerator. Non-participants who likely qualify for LIRRL had a slightly higher proportion with only one refrigerator than those with incomes too high or too low to qualify (Table 76). Almost half of non-participants report that their refrigerator is between two and seven years old (Table 77). Additional tables regarding the style of refrigerators used by non-participants, as well as when they purchased them and whether they received a rebate for the purchase are provided in the Appendix.

Table 76. Refrigerators

No. Refrigerators	Income too low	Likely qualify	Income too high	Total
Phase I				
Sample size	22	39	61	146
None				
1	64%	85%	72%	74%
2	32%	13%	28%	25%
3 or more	5%	3%		1%
Phase II				
Sample size	29	43	66	138
None	7%	5%		3%
1	66%	81%	79%	77%
2	24%	14%	21%	20%
3 or more	3%			1%

Table 77. Age of Main Refrigerator

Style	Income too low	Likely qualify	Income too high	Total
Phase I				
Sample size	20*	35*	61	140*
Less than two years old	35%	17%	20%	19%
2-7 years	25%	54%	52%	48%
8-10 years	25%	11%	8%	17%
11-14 years	5%		11%	7%
Or 15 or more years old	10%	17%	8%	9%
Phase II				
Sample size	28*	43	66	137*
Less than two years old	29%	19%	29%	25%
2-7 years	46%	42%	44%	44%
8-10 years	18%	19%	14%	16%
11-14 years	7%	12%	5%	8%
Or 15 or more years old		9%	8%	7%

* Some individuals did could not provide an estimate of the age of their refrigerator. They were excluded.

Past Participation in Utility Programs

Few (16%) non-participants reported having participated in any energy programs while living in their current residence (Table 62). No Phase I participants reported having participated in Fuel Assistance, but a few (4%) Phase II non-participants did. Participant findings are shown for comparison.

Table 78. Past Utility Program Participation

Program	Income too Low	Likely Qualify	Income too High	All Non-Participants	Participants
Phase I					
Sample size	22	39	61	146	141
Energy team/weatherization/other SDG&E programs	9%	18%	13%	14%	11%
Fuel assistance					3%
Other non-SDG&E energy program	9%		2%	2%	--
Phase II					
Sample size	29	43	66	138	138
Energy team/weatherization/other SDG&E programs	14%	12%	18%	15%	2%
Fuel assistance	3%	5%	5%	4%	2%
Other non-SDG&E energy program			2%	1%	--

The 21 non-participants in Phase I and the 21 in Phase II who recalled having participated in a previous SDG&E program were asked how long ago that participation occurred. Table 79 shows that most non-participants who previously participated did so within the past three years.

Table 79. Timing of Past Utility Program Participation

	Income too Low	Likely Qualify	Income too High	Total
Phase I				
In the last year	2	3	1	7
2 to 3 years ago	0	2	3	5
4 to 5 years ago				1
Or more than 5 years ago	0	1	4	7
Don't know	0	1	0	1
Total	*2*	*7*	*8*	*21*
Phase II				
In the last year	3	2	5	10
2 to 3 years ago	1	1	1	3
4 to 5 years ago	0	1	3	4
Or more than 5 years ago	0	1	4	5
Don't know	0	0	0	0
Total	*4*	*5*	*12*	*21*

All non-participants were asked whether they view their electric bill as too high to afford, affordable, or if they don't pay attention to it. If customers stated the bill is too high but that they manage to pay it, that answer was recorded as well. The most common response in Phase I (43%) was that the bill is affordable; this response was given by a majority (59%) of Phase II

non-participants. Those who likely qualify for LIRRL had among the highest portions saying their electric bill is affordable.

Table 80. How Non-Participants View Electric Bills

View	Income too Low	Likely qualify	Income too High	Total
Phase I				
Sample size	21*	39	61	144*
It is too high to afford	38%	23%	38%	33%
It is affordable	33%	54%	39%	43%
Don't pay attention to your electric bill	10%	3%	2%	4%
It is too high to afford, but I manage to pay it	19%	21%	21%	20%
Phase II				
Sample size	29	43	63*	135
It is too high to afford	24%	23%	16%	20%
It is affordable	45%	61%	65%	59%
Don't pay attention to your electric bill	10%			2%
It is too high to afford, but I manage to pay it	21%	16%	19%	19%

* Some non-participants didn't know how to answer this question.

Suggestions

According to Program records, all of the non-participants who were contacted for this survey received a letter about LIRRL. At the beginning of the interviews, interviewers gave a brief description of LIRRL and asked customers whether they remember receiving any notification of the Program. If customers did not remember receiving notification, they were asked if anyone in the household who might remember was available – if so, that person was interviewed rather than the one who originally answered.

Of the 36 Phase I non-participants and the 42 Phase II non-participants who remembered receiving the Program notification letter, more than nine in ten (92% in Phase I, 93% in Phase II) reported reading the letter. All non-participants were asked whether they felt a letter was an effective way to be notified of SDG&E programs. Interviewers also asked whether a phone call would be effective. With regard to phone calls about half of non-participants believe it would be an effective method of disseminating information regarding the Program. The portion who felt a phone call would be effective was higher among non-participants who probably qualify for LIRRL than those whose incomes are too high or too low to qualify (Table 81).

Table 81. Effective Notification Methods

	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Sample size	22	39	61	146
Letter	82%	82%	84%	79%
Phone call	46%	51%	44%	47%
Phase II				
Sample size	29	43	66	138
Letter	93%	63%	82%	78%
Phone call	48%	63%	52%	54%

The 33 Phase I non-participants and 39 Phase II non-participants who remembered being notified of the Program by the letter and reported reading the letter, and the one Phase I non-participant who remembered the scheduling phone call, were asked the main reason why they chose not to participate. The reason most commonly given for not participating (given by ten Phase I non-participants and 17 Phase II non-participants) was already having a new refrigerator (Table 82).

Table 82. Main Reason for Non-Participation

Reason	Income too Low	Likely Qualify	Income too High	Total
Phase I				
I already have a new refrigerator	2	5	2	10
I already have new lights	2		2	5
I've already done everything I can to save electricity			3	4
Don't feel I need a new refrigerator			2	3
My income is too high	1	1		2
I'm a renter/refrigerator is provided by landlord		1	1	2
My electric bills are not that high		1		1
Too much time was needed to get services through the program			1	1
I participated in an Energy Team program and didn't qualify		1		1
I sent in the form and never heard back	1			1
I doubt it's really free		1		1
Don't occupy home often enough to be worthwhile			1	1
Don't know enough about program				1
Don't know/Don't remember		1		1
Total	*6*	*11*	*12*	*34*
Phase II				
I already have a new refrigerator	4	6	7	17
I already have new lights	1	1	1	3
I've already done everything I can to save electricity	1	1	4	6
Don't feel I need a new refrigerator				
My income is too high		1		1
My electric bills are not that high			1	1
Too much time was needed to get services through the program	1			1
I doubt it's really free			1	1
Don't know enough about program	1			1
Installed CFLs myself instead of participating			1	1
Bad timing	1		1	2
Don't know/Don't remember	2	1	4	7
Total	*10*	*10*	*19*	*39*

After they explained the main reason they did not participate, these 31 non-participants in Phase I and the 39 in Phase II were asked if there were any other reasons besides the one they had just mentioned. Aggregating responses to both this question and the previous one reveals that, in Phase I, the most common reason reported for non-participation was not feeling the need for a new refrigerator (Table 83). That option was not available in Phase II surveys; the most common reason for non-participation reported by Phase II participants was already having a new refrigerator.

Table 83. All Reasons for Non-Participation
(Multiple Responses Allowed)

Reason	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Don't feel I need a new refrigerator	3	6	9	21
I already have a new refrigerator	4	6	4	16
I already have new lights	2	3	3	10
I've already done everything I can to save electricity			4	5
Too much time was needed to get services through the program			2	2
My income is too high	1	1		2
I'm a renter/refrigerator is provided by landlord		1	1	2
My electric bills are not that high		1		1
I participated in an Energy Team program and didn't qualify		1		1
Sent in form, never heard back	1			1
Don't occupy home often enough to be worth it			1	1
Don't know enough about program				1
I doubt it's really free		1		1
Bad timing				1
Don't have time	1			1
Don't know/Don't remember		1		1
Total asked	6	11	12	34
Phase II				
I already have a new refrigerator	5	10	9	24
I already have new lights	3	4	3	10
I've already done everything I can to save electricity	4	3	8	15
Too much time was needed to get services through the program	1	2	1	4
My income is too high		2	1	3
My electric bills are not that high	1	1	1	3
Don't know enough about program	1			1
I doubt it's really free	1			1
Bad timing	1		1	2
Don't want people going through my home		1		1
Installed CFLs myself instead of participating			1	1
Don't know/Don't remember	2	1	4	7
Total	10	10	19	39

The 30 non-participants in Phase I and the 23 in Phase II who reported that their refrigerator was more than ten years old or reported that they did not know how old their refrigerator was were asked whether they were interested in participating in a program in which they could get a new efficient refrigerator to replace their old refrigerator, at no cost. More than three-fourths of non-participants indicated they would participate in such a program.

Table 84. Participating in a Program that Replaces Refrigerator

Satisfaction Level	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Sample size	5	10	12	30
Would participate	100%	70%	92%	83%
May participate		10%		3%
Phase II				
Sample size	3	9	11	23
Would participate	33%	78%	82%	74%
May participate	33%		18%	13%

The five Phase I non-participants and six Phase II non-participants whose refrigerators may have been old enough to qualify for replacement under LIRRL, and who indicated they would not participate in such a program, were asked why not. The table below presents their responses.

It is striking that one of these non-participants – one who previously indicated that her refrigerator was more than ten years old – gave her reason for not participating in such a program is that she already had a new refrigerator. This suggests a perception that refrigerators remain new for many years.

Table 85. Why Not Have the Refrigerator Replaced for Free

Reason	Income too Low	Likely Qualify	Income too High	Total
Phase I				
My electric bills are not that high			1	1
I'm not going to qualify		1		1
I don't own the refrigerator		1		1
I doubt you would replace a built-in refrigerator		1		1
Don't know				1
Total	*0*	*3*	*1*	*5*
Phase II				
My electric bills are not that high		1	1	2
I don't own the refrigerator	1			1
Don't know			1	1
Don't want people going through my home		1		1
Already have a new refrigerator	1			1
Total	*2*	*2*	*2*	*6*

All non-participants were asked whether they would be interested in participating in a program in which they could get new efficient lighting such as CFLs, fluorescent fixtures, or floor lamps installed in their homes for free. Almost half reported they would be interested in such a program (Table 86).

Table 86. Participating in a Program that Replaces Lighting

Satisfaction Level	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Sample size	22	39	61	146
Would participate	50%	44%	56%	48%
May participate	9%	5%	8%	10%
Phase II				
Sample size	29	43	66	138
Would participate	48%	49%	38%	44%
May participate	10%	5%	14%	10%

The 57 Phase I non-participants and 66 Phase II non-participants reporting they would not participate in a program that would provide them with free efficient lighting were asked why they would not participate. In both Phases of the survey, most common reasons given were: already having done everything they could to save energy, not wanting people going through their houses, and already having new lights.

Table 87. Why Not Have the Lighting Replaced for Free (Multiple Responses Allowed)

Reason	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Sample size	8	11	21	57
I've already done everything I can to save electricity	38%	18%	19%	21%
Don't want people going through my house	50%	18%	10%	21%
I already have new lights	25%	18%	24%	18%
Efficient lights are no good		18%	19%	14%
Too much time would be needed to get services through the program	13%	18%	5%	11%
Not interested in new lights			10%	7%
My electric bills are not that high		9%	5%	5%
Negative feelings about fluorescent lighting			5%	4%
I am behind in my bills				2%
I'm a renter, not sure I can make those decisions.		9%		2%
I'm not going to qualify		9%		2%
Nothing is free			5%	2%
I'm moving soon			5%	2%
Already getting new lights				2%
My electric bill is very high				2%
Remodeling the whole house	13%			2%
Don't know/refused				4%
Phase II				
Sample size	12	20	34	66
I've already done everything I can to save electricity	33%	25%	26%	27%
Don't want people going through my house	17%	20%	24%	21%
I already have new lights	25%	20%	15%	18%
Efficient lights are no good	0%	5%	3%	3%
Too much time would be needed to get services through the program	17%	5%	15%	12%
Not interested in new lights	0%	15%	12%	11%
My electric bills are not that high	25%	20%	15%	18%
Negative feelings about fluorescent lighting	8%	5%	6%	6%
I am behind in my bills				
I'm a renter, not sure I can make those decisions.	0%	5%	0%	2%
Don't know/refused	25%	10%	15%	15%

All non-participants used a five-point scale (1 = not at all satisfied; 5 = very satisfied) to indicate their level of overall satisfaction with SDG&E. Overall, slightly more than one-third counted themselves very satisfied in both Phases of the survey. Combined with those who rated their satisfaction with SDG&E at "4," about two-thirds are satisfied with SDG&E. By comparison, participants were much more satisfied with SDG&E, with almost two-thirds saying they were very satisfied.

Table 88. Overall Satisfaction with SDG&E

Satisfaction Level	Income too Low	Likely Qualify	Income too High	All non-Participants	Participants
Phase I					
Sample Size	22	39	61	146	141
Very satisfied	23%	41%	33%	34%	62%
4	18%	39%	36%	34%	23%
3	46%	18%	23%	25%	11%
2	9%	3%	8%	7%	2%
Not at all satisfied	5%			1%	1%
Don't Know					1%
Phase II					
Sample size	29	43	66	138	138
Very satisfied	45%	30%	38%	37%	62%
4	21%	40%	26%	29%	25%
3	21%	19%	29%	24%	7%
2	3%	5%	5%	4%	2%
Not at all satisfied	3%	2%	3%	3%	2%
Don't Know	7%	5%		3%	2%

All non-participants were asked if they had any suggestions for programs in which SDG&E could assist people like them lower their electric bills. Table 89 shows the suggestions they offered.

Table 89. Suggestions for Programs (Multiple Responses Allowed)

Suggestion	Income too Low (n=5)	Likely Qualify (n=6)	Income too High (n=14)	Total (n=36)
Phase I				
Advertise/make us aware of some guidelines to follow/come to our house and evaluate	2	1	3	7
Offer solar power	1	1	3	5
Give seniors/low income a discount	1	3		4
Give rebates for appliances/higher rebates			3	4
Charge less for electricity/lower the cost			2	4
Insulate houses	1		2	3
Conserve, use renewable energy sources, cheaper sources			2	3
Renovate windows			2	2
Replace electric appliances with gas ones			1	1
Spend less on executive salaries				1
More help buying energy efficient appliances			1	1
Encourage turning off lights when unneeded				1
Offer bounty and replacement of old light bulbs				1
Inform people how to use fluorescent lights		1		1
Offer bounty on old equipment	1			1
Total	5	6	14	36
Phase II				
Advertise/make us aware of some guidelines to follow/come to our house and evaluate		1	6	7
Offer solar power		1	4	5
Give seniors/low income a discount	1		3	4
Give rebates for appliances/higher rebates			4	4
Charge less for electricity/lower the cost	2	2	5	9
Insulate houses		4		4
Conserve, use renewable energy sources, cheaper sources	2	5	5	12
Renovate windows		7	1	8
More help buying energy efficient appliances	1		1	2
Offer real-time metering of energy use on the Web			1	1
Offer special discounts for people with medical conditions		1		1
Total	8	25	39	72

Summary

Non-participants tend to be younger than participants and are far more likely to live in single-family homes. About half of the non-participants surveyed reported household occupancy and income situations such that their incomes would probably exceed the Program's caps for

qualifying. Just under one-third of non-participant households probably would have qualified for the Program.

Probably because non-participants are so much more likely to live in single-family homes, they are also far more likely to use natural gas to heat their homes: while a bare majority of participants use electricity for home heating, almost nine in ten non-participants use natural gas.

Non-participants who probably qualify for the Program were somewhat more likely than those who probably don't qualify to have the top-freezer/bottom-refrigerator style of refrigerator. Almost half of non-participants say they have replaced their main refrigerator recently; nearly all of these report that they purchased a new refrigerator as opposed to a used one.

With regard to how they view their electric bill, just over half of non-participants say it is affordable, with the rest saying it's either too high to afford or too high but they somehow manage to pay it.

About half of non-participants remember being notified about the Program, but only about one-fourth specifically remember the notification letter. About nine in ten of those who remember there was a letter report that they read the letter. No single reason for non-participation was given by more than a small portion customers. The reason reported by the most non-participants was simply not feeling the need for a new refrigerator or already having a new one.

However, when non-participants were asked whether they would participate in a program that would replace their refrigerator for free, more than three-fourths reported they would with the rest saying that they might. Just under half of non-participants reported that they would participate in a program that replaces lighting for free, with another 10% saying that they may do so. Among those saying that they would not participate in such a lighting program, the most commonly given reason was feeling that they had already done all they could to save energy and not wanting strangers going through their homes.

About two-thirds of non-participants reported they are satisfied or very satisfied with SDG&E overall. The portion expressing strong satisfaction with the utility was much smaller among participants than non-participants, suggesting that, for participants, the Program experience was positive and gave them a rosier view of their utility.

Appendix A. Appendix A: Additional Tables

Multifamily Property Owners and Managers

Table 90. Awareness of Multifamily Rebate Program by Contact Source

Contact Source	Aware of		Participated	
	Number	Percent	Number	Percent
AllPropertyManagement.com (N=17)	1	6%	0	0%
Crasandiego.com (N=8)	0	0%	0	0%
RHA (N=14)	2	14%	1	7%
narpm.org (N=7)	0	0%	0	0%
Apartmentratings.com (N=23)	0	0%	0	0%
Total (N=65)	*3*	*5%*	*1*	*2%*

Table 91. Awareness of Energy Team by Contact Source

Contact Source	Aware of		Participated	
	Number	Percent	Number	Percent
AllPropertyManagement.com (N=17)	5	29%	4	24%
Crasandiego.com (N=8)	2	25%	--	0%
RHA (N=14)	6	43%	5	36%
narpm.org (N=7)	2	29%	2	29%
Apartmentratings.com (N=23)	2	9%	2	9%
Total (N=65)	*17*	*26%*	*13*	*20%*

Participants – Weighted Results

Provided below are the results of the survey for the overall sample of 420 participants, weighted by building type: weights were assigned to participants' responses based on type of residence (single family, multifamily, and manufactured housing) to ensure that participants of the three different residence types were represented in proportions equal to that of the overall population of LIRRL participants.

Respondent Household and Housing Characteristics

Table 92. Respondent Gender

Gender	Total (n=420)
Male	46%
Female	54%
Total	100%

Table 93. Respondent Age

Age Group	Total (n=420)
18 to 34 years old	31%
35 to 44 years old	21%
45 to 54 years old	17%
55 to 64 years old	10%
65 or older	21%

Table 94. Household Size

Members of Household	Total (n=418*)	Adults (n=417*)
One	31%	41%
Two	37%	49%
Three	18%	7%
Four or more	14%	2%

* Individuals who indicated they didn't know how many members or adults are in their household were excluded.

Table 95. Home Size

Home Size	Total (n=324*)
Under 500 sqft	4%
501 to 1,000 sqft	62%
1,001 to 1,500 sqft	26%
1,501 to 2,000 sqft	6%
2,001 to 2,500 sqft	1%
Over 2,500 sqft	1%

* Participants who could not provide an estimate of the size of their homes were excluded.

Participation

Table 96. How Participants Heard of Program, Multiple Responses Allowed

Source	Total (n=412*)
Apartment manager/owner/landlord	73%
A letter	12%
Word of mouth/friend/relative	6%
A phone call	3%
Other contact with SDG&E	3%
SDG&E came by in person	2%
TV advertisement	1%
Bill insert	1%
Newspaper article	<1%
Home Depot	<1%

* Twenty participants did not recall how they heard about the Program and were excluded.

Table 97. Main Reason Customers Participated

Reason	Total (n-417)*
Property manager wanted me to	35%
Wanted to reduce electric bill	28%
Wanted to save energy	20%
Items were offered free of charge	7%
Wanted to help the environment	5%
Have a very old refrigerator/needed a new one	2%
Believed participation was mandatory	1%
Positive prior experience with utility program	<1%
Curious about fluorescent lighting	<1%

* Participants who could not report their main reason for participation were excluded.

Table 98. Why Customers Participated, Multiple Responses Allowed

Reason	Total (n=417*)
Wanted to reduce electric bill	52%
Wanted to save energy	45%
Property manager wanted me to	43%
Items were offered free of charge	24%
Wanted to help the environment	24%
Have a very old refrigerator/needed a new one	4%
Was behind in electric bills	3%
Believed participation was mandatory	1%
Curious about fluorescent lighting	<1%
Wanted some new fixtures	<1%
Reduce water usage**	<1%

* Participants who were unable to remember or describe any reasons why they participated were excluded.

** It is unclear how participating in the Program would help the customer reach this goal.

Table 99. Participation in Prior Programs Designed to Help Save Energy

Home	Total (n=420)
This home	8%
Prior home	4%
Total who participated in prior utility program	*12%*

Table 100. Participation in SDG&E Programs

Program	Total (n=420)
Energy Team	2%
Fuel Assistance	2%
Weatherization	2%
Participated, but don't remember in which program	2%
Don't know	3%
Total	*10%*

Participation Satisfaction

Table 101. Satisfaction with Installed Devices

Measure	1 (not at all satisfied)	2	3	4	5 (very satisfied)
CFLs (n=356)	4%	5%	13%	19%	61%
Fluorescent Light Fixtures (n=229)	2%	3%	9%	15%	72%
Torchiere Lamps (n=18)	---	---	12%	12%	76%
Refrigerators (n=133)	1%	7%	7%	22%	63%

Note: Only respondents who received these measures were asked these questions. Respondents who responded "don't know" were excluded. .

Table 102. Satisfaction with Installers and SDG&E

Item	1 (not at all satisfied)	2	3	4	5 (very satisfied)
Lighting equipment installers* (n=319)	1%	1%	4%	15%	80%
Refrigerator installers* (n=101)	1%	0%	4%	9%	85%
SDG&E Overall* (n=412)	1%	2%	9%	24%	64%

* Participants who reported they were not at home when the event in question happened or responded "don't know" to these questions were excluded.

Table 103. Agreement with Statements Describing Experience

Statement (Total *n*)	1 (strongly disagree)	2	3	4	5 (strongly agree)
General					
The representative clearly explained the Program during the first call (n=201)	8%	3%	9%	23%	58%
Installation was scheduled at a convenient time (n=342)	3%	3%	4%	14%	76%
The representative was courteous throughout the visit to my home (n=308)	1%	1%	4%	10%	84%
Lighting					
Installation was scheduled at a convenient time (n=311)	2%	3%	6%	12%	77%
Installation was done in a professional manner (n=309)	2%	1%	3%	9%	85%
Installer was careful removing old lighting (n=304)	2%	<1%	4%	11%	83%
Installer was careful installing new lighting (n=303)	1%	2%	4%	10%	85%
Installer clearly explained how the lighting operates and saves energy (n=289)	10%	4%	11%	11%	64%
Installer was courteous while in my home (n=291)	2%	1%	3%	10%	85%
Refrigerators					
Removal and installation were scheduled at a convenient time (n=107)	5%	3%	7%	12%	72%
Removal of old and installation of new unit were done in a professional manner (n=104)	---	1%	3%	10%	86%
Installer was careful removing the old unit (102)	<1%	1%	4%	8%	86%
Installer was careful installing the new unit (n=102)	<1%	2%	4%	12%	81%
Installer clearly explained how to operate the new unit (n=95)	12%	4%	11%	7%	66%
Installer was courteous while in my home (n=95)	1%	---	4%	12%	82%

Table 104. Comparing LIRRL with prior utility program experiences

Opinion	Total (n=43)
LIRRL was better	58%
LIRRL was about the same	34%
LIRRL was worse	7%

Table 105. Energy Savings Noticed by Participants

Response	Percent
Noticed energy savings	42%
Did not notice energy savings, or don't know	58%

Measure Retention

Table 106. Status of Installed Measures

Measure	Removed Measure(s)	Replaced		Measure still in Place
		Similar Measure	Non-Program Measure	
CFLs (n=368)	8%	5%	5%	81%
Fluorescent Fixtures (n=232)	2%	3%	4%	96%
Fluorescent Torchieres (n=19)	- - -	- - -	- - -	100%
Refrigerators (n=133)	- - -	- - -	- - -	100%

Free-Ridership

Table 107. Free-Ridership Indicators

Measure	Purchased before	Would have purchased anyway	Planned purchase prior to Program	Overlap between 'purchased before' and...	
				'would have purchased anyway'	'planned purchase prior to Program'
CFLs (n=364)	32%	35%	23%	24%	17%
Fluorescent Fixtures (n=220)	21%	23%	11%	10%	6%
Fluorescent Torchieres (n=14)	19%	28%	18%	7%	7%
Refrigerators (n=119)	---	17%	---	---	---

Table 108. Condition of Refrigerator Participants Planned to Purchase

Condition	Percent (n=20)
New	82%
Used	12%
Don't know	6%

Table 109. Fate of Old Units if Participants had Replaced Refrigerator

Fate	Percent (n=19)
Given away	48%
Recycled	35%
Kept	2%
Something else/ don't know	13%

Table 110. Prior Purchases: Number Purchased

Measure	1 or 2	3 to 5	6 or more
CFLs (n=132*)	27%	38%	35%
Fluorescent Fixtures (n=51)	33%	35%	35%
Fluorescent Tor (n=5*)	100%	- - -	- - -

* Participants who said they didn't know how many they had purchased were excluded.

Non-Participants

Table 111. Housing Size

Home size	Income too Low	Likely Qualify	Income too High	All Non-Participants	Participants
Phase I					
Sample size	22*	39*	61*	125*	117*
Under 500 square feet					2%
501 to 1000 square feet	11%	13%	14%	12%	40%
1001 to 1500 square feet	32%	40%	25%	32%	39%
1501 to 2000 square feet	37%	17%	36%	31%	14%
2001 to 2500 square feet	11%	3%	22%	14%	3%
2501 to 3000 square feet	5%	20%	2%	8%	3%
More than 3000 square feet	5%	7%	2%	3%	
Phase II					
Sample size	22*	34*	62*	118*	103*
Under 500 square feet	0%	3%	0%	1%	3%
501 to 1000 square feet	0%	24%	15%	14%	51%
1001 to 1500 square feet	32%	44%	40%	40%	35%
1501 to 2000 square feet	41%	21%	23%	25%	11%
2001 to 2500 square feet	18%	9%	15%	14%	1%
2501 to 3000 square feet	5%	0%	3%	3%	0%
More than 3000 square feet	5%	0%	5%	3%	3%

*Some individuals could not provide an estimate of the size of their homes. They have been excluded.

Table 112. Home Ownership

Home Ownership	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Sample size	22	39	61	146
Own	68%	80%	89%	85%
Rent	32%	18%	12%	14%
Refused		3%		1%
Phase II				
Sample size	29	43	66	138
Own	72%	84%	89%	84%
Rent	28%	16%	11%	16%
Refused				

Table 113. Main Heating Fuel

Fuel	Income Too Low	Likely Qualify	Income too High	All Non-Participants	Participants
Phase I					
Sample size	21*	38*	60*	143*	138*
Electricity	14%	8%	12%	11%	50%
Natural Gas	81%	89%	87%	87%	48%
Wood			2%	1%	
Propane					1%
None/don't use heating fuel	5%	3%		1%	
Phase II					
Sample size	29	43	66	138	121*
Electricity	10%	12%	8%	9%	51%
Natural Gas	90%	84%	85%	86%	48%
Wood	0%	5%	3%	3%	1%
Propane	0%	0%	2%	1%	
None/don't use heating fuel			3%	2%	

*Some individuals did not know what fuel is used to heat their homes. They have been excluded.

Table 114. Main Water Heating Fuel

Fuel	Income too Low	Likely Qualify	Income too High	All Non-Participants	Participants
Phase I					
Sample size	19*	33*	59*	135*	113
Electricity	5%		10%	6%	33%
Natural Gas	95%	94%	90%	93%	65%
Solar		6%		2%	
Propane					2%
Phase II					
Sample size	29	43	66	138	92*
Electricity	4%	10%	2%	5%	26%
Natural Gas	96%	91%	97%	95%	72%
Solar					1%
Propane			2%	1%	1%

*Some individuals did not know the type of fuel used to heat water in their homes. They have been excluded.

Table 115. Air Conditioning

Type of air conditioning	Income Too Low	Likely Qualify	Income too High	All Non-Participants	Participants
Phase I					
Sample size	22	39	61	146	141
Central system	36%	44%	48%	47%	43%
One room air conditioner	9%	18%	16%	14%	18%
Two or more room air conditioners	0%	3%	0%	2%	1%
Both central and room air conditioners	0%	0%	2%	1%	1%
Total with any air conditioning	45%	64%	66%	64%	62%
No air conditioning	55%	36%	34%	36%	38%
Phase II					
Sample size	29	43	66	138	138
Central system	34%	40%	58%	47%	32%
One room air conditioner	17%	16%	8%	12%	11%
Two or more room air conditioners	0%	7%	8%	6%	1%
Both central and room air conditioners	0%	0%	2%	1%	1%
Total with any air conditioning	51%	63%	74%	66%	45%
No air conditioning	48%	37%	26%	34%	55%

Table 116. Style of Main Refrigerator

Style	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Sample size	22	38*	61	145*
Single door	5%		3%	3%
Top Freezer - bottom refrigerator	50%	55%	39%	46%
Top refrigerator - bottom freezer	9%	3%	16%	11%
Or side by side refrigerator freezer doors	36%	42%	41%	40%
Phase II				
Sample size	29	43	66	138
Single door	10%		2%	3%
Top Freezer - bottom refrigerator	24%	58%	38%	41%
Top refrigerator - bottom freezer	10%	9%	14%	12%
Or side by side refrigerator freezer doors	55%	33%	47%	44%

*One individual did not know what style of refrigerator was in his/her home.

Table 117. Refrigerator Purchases

Circumstance	Income too Low (n=22)	Likely Qualify (n=39)	Income too High (n=61)	Total (n=146)
Phase I				
Sample size	22	39	61	146
Purchased a new refrigerator recently	45%	51%	54%	48%
Planning to purchase a new refrigerator soon	14%	5%	3%	6%
Maybe planning to purchase a new refrigerator soon	0%	5%	3%	3%
Phase II				
Sample size	29	43	66	138
Purchased a new refrigerator recently	45%	44%	53%	49%
Planning to purchase a new refrigerator soon	0%	9%	23%	14%
Maybe planning to purchase a new refrigerator soon	0%	4%	13%	8%

Table 118. Type of Refrigerator Purchased

Purchase	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Sample size	10	20	33	70
Used		10%	3%	6%
New	100%	90%	97%	94%
Received rebate	10%	10%	27%	20%
Phase II				
Sample size	13	19	35	67
Used	0	5%	3%	3%
New	100%	90%	97%	96%
Received rebate	15%	16%	23%	19%

Table 119. Sponsor of Rebates Received

Sponsor Organization	Income too Low	Likely Qualify	Income too High	Total
Phase I				
The utility/SDG&E	0	1	2	5
Refrigerator manufacturer	0	0	2	2
State Organization	0	0	1	1
Don't know/Don't remember	1	1	4	6
Total	1	2	9	14
Phase II				
The utility/SDG&E	1	0	5	6
Refrigerator manufacturer	0	2	2	4
State Organization	0	0	0	0
Don't know/Don't remember	1	1	1	3
Total	2	3	8	13

Table 120. Customers' Recollection of How They Were Notified of LIRRL (Multiple Responses Allowed for Method of Notification)

Notification Method	Income too Low	Likely Qualify	Income too High	Total
Phase I				
Sample size	22	39	61	146
Don't remember being notified at all	45%	51%	62%	55%
Letter	36%	28%	20%	25%
Word of mouth	5%	3%	3%	3%
Newspaper	0%	5%	3%	3%
Phone call	0%	3%	2%	1%
Bill insert/other mail	5%	0%	0%	1%
At a fair	0%	3%	0%	1%
On own initiative	0%	3%	2%	1%
Don't remember how notified	9%	13%	8%	12%
Phase II				
Sample size	29	43	66	138
Don't remember being notified at all	55%	54%	47%	46%
Letter	38%	28%	30%	31%
Word of mouth	0%	2%	3%	2%
Newspaper	0%	0%	2%	1%
Phone call	3%	0%	0%	1%
Bill insert/other mail	0%	2%	2%	1%
At a fair	0%	0%	0%	0%
On own initiative	0%	0%	0%	0%
Don't remember how notified	7%	9%	14%	11%

Appendix B. Participant Survey Instrument

Hello, my name is _____. I'm calling on behalf of San Diego Gas and Electric Company. Could I please speak with <FNAME> <LNAME> or "with the person who most often pays the electric bills")? IF NEEDED: SDG & E is evaluating its refrigerator replacement and lighting program and would very much appreciate your input. REINTRODUCE IF NECESSARY AND CONTINUE: San Diego Gas and Electric Company is gathering information regarding customers' opinions about the services and products you received through the Refrigerator Replacement and Lighting Program. Do you have about 15 minutes to answer some questions? IF NO, ARRANGE CALL-BACK

RA1:

RECALL IN A IF CLFS WERE INSTALLED
N = ...
some compact fluorescent light bulbs..... 1
NONE..... 5

RA2:

RECALL IN A IF FIXTURES WERE INSTALLED
N = ...
one or more fluorescent lighting fixtures..... 2
NONE..... 5

RA3:

RECALL IN A IF TORCHIERE WERE INSTALLED
N = ...
a touchier lamp 3
NONE..... 5

RA4:

RECALL IN A IF REFRIGERATOR WAS INSTALLED
N = ...
a new refrigerator..... 4
NONE..... 5

QA:

According to our records, your household participated in the Refrigerator Replacement and Lighting Program. Just to verify, do you recall receiving . . . READ PAUSING AFTER EACH: <RA1>, <RA2>, <RA3>, <RA4>?

N = ...

Compact fluorescent light bulbs (CFL's) 1
Lighting fixtures 2
Touchier lamp 3
A new refrigerator 4
NO did not receive anything 5
NO, didn't get what record says 6
Don't know 8
Refused 9

INT02:

Is there anyone else in your household who might know if you received this? IF YES: May I speak to that person?

SKIP IF QA=1-4

N = ...

91 WILL GET SOMEONE ELSE/NOT AVAILABLE ..... 91 => INTRO
60 NO, NO ONE IN HOUSEHOLD AWARE OF PRODUCTS ..... 60 => TERM
61 DK/REF AWARENESS OF PRODUCT ..... 61 => TERM

Q1:

DO NOT READ.

How did you hear about the Refrigerator Replacement and Lighting Program?

N = ...

A letter 01
A phone call 02
My apartment manager/Owner/Landlord 03
Word of mouth/friend/relative 04
Newspaper article 05
Ads on television 06
SDG&E came by in person 07
Other SDG&E contact 08
Other (SPECIFY:) 97
Don't know/Don't remember 98
Refused 99

Q4:

Which of the following BEST describes why you decided to participate in the Program...

N = ...

Wanted to save energy	01	
Wanted to reduce the electric bill	02	
The items were offered free of charge	03	
Wanted to help the environment	04	
Because you were behind in your electric bill payments	05	
Property manager wanted you to (READ IF MULTI-FAMILY)	06	
Or some other reason (SPECIFY:)	97	
(DO NOT READ) Don't know/Don't remember	98	=> Q5
(DO NOT READ) Refused	99	=> Q5

Q4A:

Were there other reasons?

N = ...

Wanted to save energy	01
Wanted to reduce the electric bill	02
The items were offered free of charge	03
Wanted to help the environment	04
Because you were behind in your electric bill payments	05
Property manager wanted you to	06
Have a very old refrigerator/needed a new one	07
Some other reason (SPECIFY:)	96
(DO NOT READ) NO OTHER REASON	97
(DO NOT READ) Don't know/Don't remember	98
(DO NOT READ) Refused	99

Q5:

Have you participated in other utility programs designed to help you save energy? PROBE: SDG&E or other energy companies may have offered you things like light bulbs, water heater wraps, rebates for energy efficient heaters and air conditioners, or insulation.

N = ...

Yes	1	
No	2	=> Q7
Don't know/Don't remember	8	=> Q7
Refused	9	=> Q7

Q5A:

Was that in this home or some other home?

N = ...

This home	1
Some other home	2
Don't know/Not sure	8
Refused	9

Q5B:

Which of the following types of energy saving devices were installed through these OTHER programs?

N = ...

Energy efficient light bulbs 01
Energy efficient ceiling light fixtures 02
Attic insulation 03
Weather seals around windows/doors 04
Water heater wrap 05
Hot water pipe insulation 06
Energy efficient heating systems 07
Programmable thermostat on heating or air conditioning 08
Low flow shower heads 09
Faucet aerators 10
Energy efficient water heaters 11
Or something else (SPECIFY:) 97
(DO NOT READ) Don't know/Don't remember 98
(DO NOT READ) Refused 99

Q6:

Compared to other utility programs designed to help you save energy, was the Refrigerator Replacement and Lighting Program...

N = ...

Better than previous programs 1
the Same ..... 2 => Q7
or Worse than previous programs 3
Don't know 8
Refused 9

Q6A:

Why do you think the Refrigerator Replacement and Lighting Program is better than previous programs?

ASK IF Q6=1

N = ...

Your bill has gone down 01
It offered more than previous programs 02
The personal visit 03
Knowledge of people who came to your home 04
More information about saving energy 05
Took enough time to explain benefits 06
Other (SPECIFY:) 97
Don't know 98
Refused 99

Q6B:

Why did you rate the Refrigerator Replacement and Lighting Program as worse than previous programs?

ASK IF Q6=3

N = ...
RECORD VERBATIM 97
Don't know 98
Refused 99

Q7:

Have you participated in an Energy Team program or SDG&E fuel assistance or weatherization program? IF YES, PROBE FOR WHICH.

N = ...
Energy Team program 1
Fuel assistance 2
Weatherization 3
Yes, but not sure which one 4
None of the above ..... 6 => Q8
Don't know ..... 8 => Q8
Refused ..... 9 => Q8

Q7A:

In what year did you have your home weatherized?

ASK IF Q7=3

N = ...
Don't know 9998
Refused 9999
..... 1994
..... 1997
..... 2000
..... 2001
..... 2003
..... 2004

Q8:

Now I have a few questions about the services you received. On a scale from 1 to 5 where 1 means "not at all satisfied" and 5 means "very satisfied", how would you rate your satisfaction with . . ?

Q8A:

The representative that installed lighting equipment? IF NECESSARY, CLARIFY THAT THIS IS GENERAL SATISFACTION, NOT SATISFACTION WITH PROGRAM

ASK IF QA=1,2,3

N = ...
5-Very Satisfied..... 5
4..... 4
3..... 3
2..... 2
1-Not At All Satisfied..... 1
Was not there..... 6
Don't know 8
Refused..... 9

Q8B:

the installers of the new refrigerator in your home? IF NECESSARY, CLARIFY THAT THIS IS GENERAL SATISFACTION, NOT SATISFACTION WITH PROGRAM

ASK IF QA=4

N = ...
5-Very Satisfied..... 5
4..... 4
3..... 3
2..... 2
1-Not At All Satisfied..... 1
Was not there..... 6
Don't know 8
Refused..... 9

Q9:

And, how would you rate your OVERALL satisfaction with San Diego Gas and Electric?

N = ...
5-Very Satisfied..... 5
4..... 4
3..... 3
2..... 2
1-Not At All Satisfied..... 1
Was not there..... 6
Don't know 8
Refused..... 9

Q10:

Again using a scale from 1 to 5, where 1 equals strongly disagree to 5 equals strongly agree, please rate the following statements. You may use any number between 1 and 5.

Q10A:

The representative clearly explained the program during the first telephone call.

N = ...
5-Strongly Agree 5
4 4
3 3
2 2
1-Strongly Disagree 1
Was not there 6
Don't know 8
Refused 9

Q10B:

The installation was scheduled at a convenient time for me.

N = ...
5-Strongly Agree 5
4 4
3 3
2 2
1-Strongly Disagree 1
Was not there 6
Don't know 8
Refused 9

Q10C:

The representative was courteous throughout the visit to my home.

N = ...
5-Strongly Agree 5
4 4
3 3
2 2
1-Strongly Disagree 1
Was not there 6
Don't know 8
Refused 9

Q1114:

Now, I would like to ask you about the things that were installed in your home.

Q11A:

Please rate your satisfaction with the...

Compact fluorescent light bulbs. Use a scale from 1 to 5, where 1 is not at all satisfied and 5 is very satisfied.

=> Q12A if NOT QA=1

N = ...
5 - Very Satisfied 5
4 4
3 3
2 2
1 - Not At All Satisfied 1
Don't know 8
Refused 9

Q11B1:

Had you ever purchased compact fluorescent bulbs before you participated in the program?

N = ...
Yes 1
No 2
Don't know 8
Refused 9

Q11B2:

How many did you purchase?

ASK IF Q11B1=1

N = ...
Don't know 98
Refused 99
..... 1
..... 2
..... 3
..... 4
..... 5
..... 6
..... 8
..... 10
..... 12
..... 20

Q11B:

Would you have installed compact fluorescent bulbs in the last year if you had not received bulbs through the Program?

N = ...
Yes, I would have 1
Yes, and I have installed additional bulbs since the program 2
No 3
Don't know 8
Refused 9

Q11C:

Have you removed or replaced any of the compact fluorescent bulbs installed through the San Diego Gas and Electric program? IF YES, ASK: Did you remove or replace them? IF REPLACE, ASK: Was that with another compact fluorescent or an incandescent bulb? MULTIPLE RESPONSE.

N = ...
Yes, one or more removed 1
Yes, one or more replaced with a CFL 2
Yes, one or more replaced with incandescent bulb 3
No, neither removed nor replaced 4
Don't know 8
Refused 9

Q11D:

Why did you remove or replace the bulbs?

ASK IF Q11C=1-3

N = ...
Other (SPECIFY:) 97
Bulbs did not fit light fixture 01
Bulbs burned out 02
Bulbs are not bright enough/too bright/didn't like lighting level in general 03
Turned on too slowly 04
Bulbs were too bright/didn't like lighting level in general 05
Problem with bulbs/they didn't save energy 06
Don't know 98
Refused 99

Q11E:

Just to clarify, were you planning to purchase additional compact fluorescent light bulbs prior to participating in the program?

ASK IF Q11B=1,2

N = ...
Yes 1
No 2
Don't know/Don't remember 8
Refused 9

Q11F:

Which one of the following five reasons best describes why you were not planning to purchase compact fluorescent light bulbs?

ASK IF Q11E=2

N = ...
Didn't see any need 01
Too expensive 02
Didn't like the light 03
Didn't know where to buy them 04
Or didn't know how to install them 05
(DO NOT READ) Not my property 06
(DO NOT READ) Some other reason (no specify) 97
(DO NOT READ) Don't know 98
(DO NOT READ) Refused 99

Q11G:

The average price of compact fluorescent bulbs is $4 for each bulb. Given that price, how many bulbs would you have purchased (or did you purchased) on your own, without help from SDG&E?

ASK IF Q11E=1

N = ...
Don't know 9998
Refused 9999
..... 0
..... 2
..... 3
..... 4
..... 5
..... 6
..... 7
..... 8
..... 10

Q11H:

Which one of the following five statements best describes why you were planning to purchase compact fluorescent bulbs?

SKIP IF Q11G==0 OR NOT Q11E=1

N = ...
Heard about them from San Diego Gas and Electric 1
Heard about them from Flex Your Power advertising 2
The advertising says they save energy and cost less 3
My friends or family told me they were a good idea 4
Think they save energy and money 5
(DO NOT READ) Some other reason 7
(DO NOT READ) Don't know 8
(DO NOT READ) Refused 9

Q12A:

Please rate your satisfaction with the fluorescent fixtures. Use a scale from 1 to 5, where 1 is not at all satisfied and 5 is very satisfied.

=> Q13A if NOT QA=2

N = ...
Very Satisfied 5
4 4
3 3
2 2
Not At All Satisfied 1
Don't know 8
Refused 9

Q12B1:

Had you ever purchased any fluorescent fixtures before you participated in the program?

N = ...
Yes 1
No 2
Don't know 8
Refused 9

Q12B2:

How many did you purchase?

ASK IF Q12B1=1

N = ...
Don't know 98
Refused 99
..... 2
..... 3
..... 4
..... 5
..... 6
..... 7
..... 8
..... 10
..... 20

Q12B:

Would you have installed fluorescent fixtures in the last year if you had not received them through the Program?

N = ...
Yes, I would have 1
Yes, and I have installed additional since the program..... 2
No 3
Don't know 8
Refused 9

Q12C:

Have you removed or replaced any of the fixtures since they were installed through the San Diego Gas and Electric program? IF YES, ASK: Did you remove or replace them? IF REPLACE, ASK: Was that with another fluorescent or an incandescent one? MULTIPLE RESPONSE

N = ...
Yes, one or more removed 1
Yes, one or more replaced with a fluorescent 2
Yes, one or more replaced with incandescent 3
No, neither removed nor replaced 4
Don't know 8
Refused 9

Q12D:

Why did you remove or replace the fixtures?

ASK IF Q12C=1-3

N = ...
Not bright enough 01
Fixture did not work 02
They burned out 03
Other (SPECIFY:) 97
Don't know 98
Refused 99

Q12E:

Just to clarify, were you planning to purchase and install additional fluorescent lighting fixtures prior to participating in the program?

ASK IF Q12B=1-2

N = ...
Yes 1
No 2
Don't know/Don't remember 8
Refused 9

Q12F:

Which one of the following five reasons best describes why you were not planning to purchase and install a fluorescent lighting fixture?

ASK IF Q12E=2

N = ...
Didn't see any need 01
Too expensive 02
Didn't like the light 03
Don't know where to buy them 04
Don't know how to install 05
(DO NOT READ) Some other reason (no specify) 97
(DO NOT READ) Don't know 98
(DO NOT READ) Refused 99

Q12G:

The average cost of installing a new fluorescent fixture is $50. Given that price, would you have (or did you) installed them on you own, without help from SDG&E?

ASK IF Q12E=1

N = ...
Yes 1
No 2
Don't know 8
Refused 9

Q12H:

Which one of the following five statements best describes what led you to plan to install a fluorescent lighting fixtures?

SKIP IF Q12G=2--9 OR NOT Q12E=1

N = ...
Heard about them from San Diego Gas and Electric 1
Heard about them from Flex Your Power advertising 2
The advertising says they save energy and cost less 3
Friends or family told me they were a good idea 4
Think they save energy and money 5
(DO NOT READ) Some other reason (no specify) 7
(DO NOT READ) Don't know 8
(DO NOT READ) Refused 9

Q13A:

Please rate your satisfaction with the fluorescent touchier lamp. Use a scale from 1 to 5, where 1 is not at all satisfied and 5 is very satisfied.

=> Q14A if NOT QA=3

N = ...
5 - Very Satisfied 5
4 4
3 3
2 2
1 - Not At All Satisfied 1
Don't know 8
Refused 9

Q13B1:

Had you ever purchased a fluorescent touchier lamp before you participated in the program?

N = ...
Yes 1
No ..... 2 => Q13B
Don't know 8
Refused 9

Q13B2:

How many did you purchase?

N = ...
Don't know 98
Refused 99
..... 1

Q13B:

Would you have installed a touchier lamp in the last year if you had not received them through the Program?

N = ...
Yes, I would have 1
Yes, and I have installed a fluorescent touchier lamp since the program 2
No 3
Don't know 8
Refused 9

Q13C:

Have you removed or replaced any of the fluorescent the touchier lamps since they were installed through the San Diego Gas and Electric program? IF YES, ASK: Did you remove or replace them? IF REPLACE, ASK: Was that with another touchier lamp or a different kind? MULTIPLE RESPONSE.

N = ...
Yes, one or more removed 1
Yes, one or more replaced with a touchier lamp 2
Yes, one or more replaced with a different kind of lamp 3
No, neither removed nor replaced 4
Don't know 8
Refused 9

Q13D:

Why did you remove or replace the touchier lamps?

ASK IF Q13C=1-3

N = ...
RECORD VERBATIM 97
Don't know 98
Refused 99

Q13E:

Just to clarify, were you planning to purchase and install an additional Fluorescent touchier lamp prior to participating in the program?

ASK IF Q13B=1-2

N = ...
Yes 1
No 2
Don't know 8
Refused 9

Q13F:

Which one of the following five reasons best describes why you were not planning to purchase a fluorescent touchier lamp?

ASK IF Q13E=2

N = ...
Didn't see any need 01
Too expensive 02
Didn't like the light 03
Don't know where to buy them 04
Don't know how to install 05
(DO NOT READ) Some other reason (no specify) 97
(DO NOT READ) Don't know 98
(DO NOT READ) Refused 99

Q13G:

The average price of a fluorescent touchier lamp is $25. Given that price, would you have purchased one on your own, without help from SDG&E?

ASK IF Q13E=1

N = ...
Yes 1
No 2
Don't know 8
Refused 9

Q13H:

Which one of the following five statements best describes what led you to plan to purchase a fluorescent touchier lamp?

SKIP IF Q13G=2-9 OR NOT Q13E=1

N = ...
Heard about them from San Diego Gas and Electric 1
Heard about them from Flex Your Power advertising 2
The advertising says they save energy and cost less 3
Friends or family told me they were a good idea 4
Think they save energy and money 5
(DO NOT READ) Some other reason (no specify) 7
(DO NOT READ) Don't know 8
(DO NOT READ) Refused 9

Q14A:

Please rate your satisfaction with the refrigerator. Use a scale from 1 to 5, where 1 is not at all satisfied and 5 is very satisfied.

=> Q15 if NOT QA=4

N = ...
5 - Very Satisfied 5
4 4
3 3
2 2
1 - Not At All Satisfied 1
Don't know 8
Refused 9

Q14B:

Would you have installed a new refrigerator in the last year if you had not received it through the Program?

N = ...
Yes, would have 1
No 2
Don't know 8
Refused 9

Q14C:

Have you removed or replaced the refrigerator since it was installed through San Diego Gas and Electric Program?? IF YES, ASK: Did you remove or replace it IF REPLACE, ASK: Was that with another new refrigerator or a used one? MULTIPLE RESPONSE.

N = ...
Yes, one or more removed 1
Yes, one or more replaced with new refrigerator 2
Yes, one or more replaced with a used refrigerator 3
No, neither removed nor replaced 4
Don't know 8
Refused 9

Q14D:

Why did you remove or replace the refrigerator?

ASK IF Q14C=1-3

N = ...
RECORD VERBATIM 97
Don't know 98
Refused 99

Q14E:

If you had purchased a refrigerator on your own, would you have purchased it about the same time as the program, or some later time during the year?

ASK IF Q14B=1

N = ...
Earlier than I received the one from the Program 1
Same time as the one through the Program 2
Sometime during the year 3
(DO NOT READ) Some other time (no specify) 7
(DO NOT READ) Don't know 8
(DO NOT READ) Refused 9

Q14F:

If you had purchased it on your own, were you planning to buy a new or used refrigerator?

ASK IF Q14B=1

N = ...
New refrigerator 1
Used refrigerator 2
Don't know 8
Refused 9

Q14G:

How much would you have been willing to spend on purchasing a new refrigerator? Stop me when I get to range you would be willing to spend.

ASK IF Q14F=1

N = ...
$200-$299 1
$300-$399 2
$400-$499 3
$500-$599 4
$600-$699 5
more than $700 6
Don't know 8
Refused 9

Q14H:

What would you have done with the old refrigerator? Would you have?

ASK IF Q14F=1,2

N = ...
Kept it 1
Given it away 2
Recycled it 3
Sold It 4
(DO NOT READ) Other (no specify) 7
(DO NOT READ) Don't know 8
(DO NOT READ) Refused 9

Q15:

I have some questions about the refrigerator that was installed in your home. Using the scale again where 1 equals strongly disagree and 5 equals strongly agree, please rate your experience with the delivery and installation of your appliance on the following. First...

=> Q16 if NOT QA=4

Q15A:

The removal and installation was scheduled at a convenient time.

N = ...
5 - Strongly Agree 5
4 4
3 3
2 2
1 - Strongly Disagree 1
Was not home at time ..... 6 => Q16
Don't know 8
Refused 9

Q15B:

The removal of my old refrigerator and installation of the new refrigerator were done in a professional manner.

N = ...
5 - Strongly Agree 5
4 4
3 3
2 2
1 - Strongly Disagree 1
Was not home at time ..... 6 => Q16
Don't know 8
Refused 9

Q15C:

The installer was careful when removing the old refrigerator.

N = ...
5 - Strongly Agree 5
4 4
3 3
2 2
1 - Strongly Disagree 1
Was not home at time ..... 6 => Q16
Don't know 8
Refused 9

Q15D:

The installer was careful when installing the new refrigerator.

N =		
5 - Strongly Agree	5	
4	4	
3	3	
2	2	
1 - Strongly Disagree	1	
Was not home at time	6	=> Q16
Don't know	8	
Refused	9	

Q15E:

The installer clearly explained how to operate the new refrigerator.

N =		
5 - Strongly Agree	5	
4	4	
3	3	
2	2	
1 - Strongly Disagree	1	
Was not home at time	6	=> Q16
Don't know	8	
Refused	9	

Q15F:

The installer was courteous while in my home.

N =		
5 - Strongly Agree	5	
4	4	
3	3	
2	2	
1 - Strongly Disagree	1	
Was not home at time	6	=> Q16
Don't know	8	
Refused	9	

Q15AA:

Did the installer fill out the warranty form for you or did you fill it out yourself?

N =	
Installer filled out	1
You filled out	2
Both filled it out	3
No warranty form	4
Don't know	8
Refused	9

Q16:

Now, I would like to ask you some questions about the lighting that was installed in your home. Using the scale again where 1 equals strongly disagree and 5 equals strongly agree, please rate your experience with the installation of light bulbs and lighting fixtures.

=> Q17 if NOT QA=1,2,3

Q16A:

The installation was scheduled at a convenient time.

N =		
5 - Strongly Agree	5	
4	4	
3	3	
2	2	
1 - Strongly Disagree	1	
Was not home at time	6	=> Q17
Don't know	8	
Refused	9	

Q16B:

The lighting installations were done in a professional manner.

N =		
5 - Strongly Agree	5	
4	4	
3	3	
2	2	
1 - Strongly Disagree	1	
Was not home at time	6	=> Q17
Don't know	8	
Refused	9	

Q16C:

The installer was careful when removing the old lighting.

N =		
5 - Strongly Agree	5	
4	4	
3	3	
2	2	
1 - Strongly Disagree	1	
Was not home at time	6	=> Q17
Don't know	8	
Refused	9	

Q16D:

The installer was careful when installing the new lighting.

N =		
5 - Strongly Agree	5	
4	4	
3	3	
2	2	
1 - Strongly Disagree	1	
Was not home at time	6	=> Q17
Don't know	8	
Refused	9	

Q16E:

The installer clearly explained how the lighting operates and saves energy.

N =		
5 - Strongly Agree	5	
4	4	
3	3	
2	2	
1 - Strongly Disagree	1	
Was not home at time	6	=> Q17
Don't know	8	
Refused	9	

Q16F:

The installer was courteous while in my home.

N =	
5 - Strongly Agree	5
4	4
3	3
2	2
1 - Strongly Disagree	1
Was not home at time	6
Don't know	8
Refused	9

Q17:

Now a few questions about your appliances. (For each, tell me if you have one and, if you do, does it need to be replaced or repaired....)

Q17A:

Clothes washer? IF YES, PROBE: Does it need to replaced or repaired?

N =	
Yes, needs to be replaced or repaired	1
Yes, doesn't need to be replaced or repaired	2
Don't have one	3
Don't know	8
Refused	9

Q17B:

Clothes dryer? IF YES, PROBE: Does it need to replaced or repaired?

N = ...
Yes, needs to be replaced or repaired 1
Yes doesn't need to be replaced or repaired 2
Don't have one 3
Don't know 8
Refused 9

Q17C:

Stove? IF YES, PROBE: Does it need to replaced or repaired?

N = ...
Yes, needs to be replaced or repaired 1
Yes doesn't need to be replaced or repaired 2
Don't have one 3
Don't know 8
Refused 9

Q17D:

Dishwasher? IF YES, PROBE: Does it need to replaced or repaired?

N = ...
Yes, needs to be replaced or repaired 1
Yes doesn't need to be replaced or repaired 2
Don't have one 3
Don't know 8
Refused 9

Q17E:

Freezer? IF YES, PROBE: Does it need to replaced or repaired?

N = ...
Yes, needs to be replaced or repaired 1
Yes doesn't need to be replaced or repaired 2
Don't have one 3
Don't know 8
Refused 9

Q17F:

Oven? IF YES, PROBE: Does it need to replaced or repaired?

N = ...
Yes, needs to be replaced or repaired 1
Yes doesn't need to be replaced or repaired 2
Don't have one 3
Don't know 8
Refused 9

Q17G:

Room Air Conditioner? IF YES, PROBE: Does it need to replaced or repaired?

N = ...
Yes, needs to be replaced or repaired 1
Yes doesn't need to be replaced or repaired..... 2
Don't have one 3
Don't know 8
Refused 9

Q19:

Have you noticed a decrease in electricity usage on your utility bill since receiving the new equipment from the program?

N = ...
Yes..... 1
No 2
Don't know/Not sure..... 8
Refused 9

Q20:

Do you have any suggestions for improving any aspect of this program?

N = ...
Other (SPECIFY:) 97
No/Can't think of anything 00
No improvements needed/Positive comments 01
More advertising needed/make public more aware 02
Want brighter bulbs/too dull..... 03
Installment improvements needed/not knowledgeable/slow/no follow-up..... 04
Concerns about the qualification requirements..... 05
Give more light bulbs/wrong shape/wants softer lighting 06
Don't know 98
Refused 99

Q21:

Now, I have a few questions about your home. What is the approximate size of your home? IF NEEDED: In square feet.

N = ...
Less than 500 square feet..... 1
501 to 1000 square feet..... 2
1001 to 1500 square feet..... 3
1501 to 2000 square feet..... 4
2001 to 2500 square feet..... 5
2501 to 3000 square feet..... 6
More than 3000 square feet 7
Don't know 8
Refused 9

Q22:

What is the main heating fuel that is used to heat the home? IF NEEDED: The main heating fuel is the type that is used the most.

N = ...

Electricity	01	
Natural Gas	02	
Propane	03	
Oil	04	
Wood	05	
Kerosene	06	
Solar	07	
Other (SPECIFY:)	97	
Don't know	98	=> Q24
Refused	99	=> Q24

Q23:

What other heating fuels are used to heat your home?

N = ...

Electricity	01
Natural Gas	02
Propane	03
Oil	04
Wood	05
Kerosene	06
Solar	07
Other (SPECIFY:)	96
No other/None	97
Don't know	98
Refused	99

Q24:

What type of fuel or energy is used to heat the water used in your home? IF HOT WATER HEATER MENTIONED, ASK: What fuel does it use to heat the water?

N = ...

Electricity	01
Natural Gas	02
Propane	03
Oil	04
Wood	05
Kerosene	06
Solar	07
Other (SPECIFY:)	97
Don't know	98
Refused	99

Q25:

Does your home have air conditioning?
N = ...
Yes 1
No 2
Don't know 8
Refused 9

Q25A:

Do you have a central system or a room air conditioner? IF ROOM AIR CONDITIONER, ASK: Do you have one or more than one?

ASK IF Q25=1

N = ...
Central system 1
One room air conditioner 2
Two or more room air conditioners 3
Both central and room air conditioners 4
Don't know/Not sure 8
Refused 9

Q26:

Now I have a few questions to help us group your answers with others. Please stop me when I reach the age range you are in.? READ 1-6
N = ...
18 to 24 years old 1
25 to 34 years old 2
35 to 44 years old 3
45 to 54 years old 4
55 to 64 years old 5
Or 65 or older 6
Don't know 8
Refused 9

Q27:

Including yourself, how many people live in your household?
N = ...
Don't know ..... 98 => Q29
Refused ..... 99 => Q29
..... 1 => Q29
..... 2
..... 3
..... 4
..... 5
..... 6
..... 7

Q28:

Including yourself, how many are adults, aged 18 and older?

N = ...
Don't know 98
Refused 99
..... 1
..... 2
..... 3
..... 4
..... 6

Q29:

Has the number of people in your household changed since the time you participated in the Refrigerator Replacement and Lighting Program?

N = ...
Yes 1
No ..... 2 => Q32
Don't know 8
Refused 9

Q30:

How many people lived in your household when you participated in the program?

N = ...
Don't know 98
Refused 99
..... 1 => Q32
..... 2
..... 3
..... 4

Q31:

How many of these people were adults?

N = ...
Don't know 98
Refused 99
..... 1
..... 2
..... 3

Q32:

Have there been any other changes in your household since the <qa:1> <qa:2> <qa:3> <qa:4> were changed that might affect your electricity bill such as a new baby, a new housemate, someone changing work hours, new appliances or a remodel to your house?

N = ...
Yes 1
No 2
Don't know 8
Refused 9

Q33:

What other changes have there been in your household since the <qa:1> <qa:2> <qa:3> <qa:4> were changed?

ASK IF Q32=1

N = ...
Changed work shifts 01
Remodeled house 02
New appliances/equipment 03
People working now 04
Other (no specify) 97
Don't know 98
Refused 99

Q34:

RECORD GENDER
N = ...
Male 1
Female 2

Appendix C. Non-Participant Survey Instrument

INTRO:

IF NOT AVAILABLE, ARRANGE CALL-BACK

Hello, my name is _____. I'm calling on behalf of San Diego Gas and Electric Company. Could I please speak with <INAME> or the person who most often pays the electric bills? IF NO NAME, SAY: May I speak with the person who most often pays the electric bills? (IF ASKED, EXPLAIN THAT SDG&E IS GATHERING OPINIONS ABOUT ENERGY EFFICIENCY PROGRAMS THAT SDG&E SPONSORS) REINTRODUCE IF NECESSARY AND CONTINUE: San Diego Gas and Electric Company is gathering information regarding customers' opinions about energy efficiency programs that SDG&E sponsors. Do you have a few minutes to answer some questions? IF NO, ARRANGE CALL-BACK. IF NEEDED: SDG&E is evaluating its energy efficiency programs and would very much appreciate your input. This is not a sales call, we're only doing research.

QA:

According to our records, your household may have received a letter or a phone call about an energy efficiency program last year in which SDG&E could install energy efficient light bulbs, new lighting fixtures, or replace your refrigerator. Do you recall learning about this program? IF NEEDED: The program where you could receive energy saving devices such as new light bulbs, fixtures, or a refrigerator

N = ...
Yes ..... 1 => Q1
No 2
Don't know/Don't remember 8
Refused 9

QB:

Is there anyone else in your household who might know if you received this letter or phone call? IF YES, ASK TO SPEAK TO PERSON.

N = ...
Yes - WILL GET/NOT AVAILABLE WILL GO BACK TO INTRO SCREEN ... 1
No ..... 2 => Q4
Don't know/Don't remember ..... 8 => Q4
Refused ..... 9 => Q4

Q1:

Did you hear about SDG&E's Refrigerator Replacement and Lighting Program from a letter, a phone call or something else?

N = ...
A letter 01
A phone call 02
Word of mouth/friend/relative 03
Newspaper 04
Bill insert/Other mail 05
Other (SPECIFY:) 97
Don't know/Don't remember 98
Refused 99

Q2:

If you received a letter about the program, did you read it?

ASK IF Q1=01

N = ...
Yes 1
No 2
Don't know/Don't remember 8
Refused 9

Q3:

Did you receive a phone call from a representative who described the Program and asked to set up a time to visit your home?

ASK IF Q1=02

N = ...
Yes 1
No 2
Don't know/Don't remember 8
Refused 9

Q4:

Do you think a letter <is/was> an effective tool for letting you know about SDG&E programs?

N = ...
Yes 1
No 2
Don't know/Don't remember 8
Refused 9

Q5:

Do you think a phone call <is/was>an effective way to discuss SDG&E programs with you?

N = ...
Yes 1
No 2
Don't know/Don't remember 8
Refused 9

Q6:

Which of the following BEST describes why you did not choose to participate in the Refrigerator Replacement and Lighting Program?

=> Q7 IF NOT Q2=1 AND NOT Q3=1

N = ...
My electric bills are not that high 01
I already have new lights 02
I already have a new refrigerator 03
Too much time was needed to get services through the program 04
I've already done everything I can to save electricity 05
I am behind in my bills 06

Not read
Don't want people going through my house- DO NOT READ 07
My income is too high - DO NOT READ 08
I participated in an Energy Team program and didn't qualify - DO NOT READ 09
Don't feel I need a new refrigerator 10
I'm a renter/refrigerator is provided by landlord 11
Some other reasons (SPECIFY:) - DO NOT READ 97
Don't know/Don't remember - DO NOT READ 98
Refused - DO NOT READ 99

Q6A:

Were there other reasons?

SKIP IF Q6=98,99

N = ...
My electric bills are not that high 01
I already have new lights 02
I already have a new refrigerator 03
Too much time was needed to get services through the program 04
I've already done everything I can to save electricity 05
I am behind in my bills 06
Don't want people going through my house 07
My income is too high 08
I participated in an Energy Team program and didn't qualify 09
NO OTHER REASONS 10
Some other reasons (SPECIFY:) 97
Don't know/Don't remember 98
Refused 99

Q7:

Have you participated in an Energy Team program or an SDG&E fuel assistance or weatherization program while living in this residence? IF YES, PROBE FOR WHICH. MULTIPLE RESPONSE

N = ...
Energy team/weatherization/other SDG&E energy programs 1
Fuel assistance (help paying bills) 2
Other non-SDG&E energy program volunteered 3
No/None of the above 4
Don't know 8
Refused 9

Q7A:

Did you participate in those programs...? READ 1-4

ASK IF Q7=1

N = ...
In the last year 1
2 to 3 years ago 2
4 to 5 years ago 3
or more than 5 years ago 4
Don't know - DO NOT READ 8
Refused 9

Q8:

On a scale from 1 to 5 where 1 means "not at all satisfied" and 5 means "very satisfied", how would you rate your overall satisfaction with SDG&E? IF NEEDED: This is your overall general satisfaction, not satisfaction with any particular program.

N = ...
Very Satisfied 5
4 4
3 3
2 2
Not At All Satisfied 1
Don't know/Don't remember 8
Refused 9

Q9:

Households with moderate incomes may qualify for some energy efficient appliance programs. Would you say that your household income is above or below $60,000 a year?

N = ...
Above $60,000 1
Below $60,000 2
Right at $60,000 3
Don't know 4
Refused 5

INT03:

THANK AND TERMINATE REASON: That's all my questions. Thank you for your time and helping SDG&E better understand its customers.

SKIP IF Q9=2-3

N = ...
70 INCOME ABOVE $60,000 ..... 70 => TERM
71 DK/REFUSED INCOME ..... 71 => TERM

Q10:

How many refrigerators do you have plugged in?
N = ...
None 1
1 2
2 3
3 or more..... 4
Don't know 8
Refused 9

Q11:

Did you purchase a refrigerator in the last few years? ONLY IF NEEDED: Since 2000.
N = ...
Yes 1
No ..... 2 =>Q12A
Don't know/Don't remember ..... 8 =>Q12A
Refused ..... 9 =>Q12A

Q11A:

Did you receive a rebate on the refrigerator?
N = ...
Yes 1
No ..... 2 =>Q12
Don't know/Don't remember ..... 8 =>Q12
Refused ..... 9 =>Q12

Q11B:

What type of business or organization sponsored the rebate? IF NEEDED: such as the store, the manufacturer, the utility, etc.
N = ...
MISC. COMMENTS: 01
The utility/SDG&E 02
Refrigerator manufacturer 03
State Organization 04
Don't know/Don't remember 98
Refused 99

Q12:

Was the refrigerator you purchased...(READ 1-2)
N = ...
Brand new 1
Or used 2
Don't know/Don't remember - DO NOT READ 8
Refused - DO NOT READ 9

Q12A:

Are you considering purchasing a refrigerator in the next year?

ASK IF Q11=2

N = ...
Yes 1
No 2
Maybe/depends 3
Don't know/Don't remember 8
Refused 9

Q13:

Is your main refrigerator a...? (READ 1-4)
N = ...
Single door 1
Top Freezer - bottom refrigerator 2
Top refrigerator - bottom freezer 3
Or side by side refrigerator freezer doors 4
Don't know/Don't remember 8
Refused 9

Q13A:

Is your main refrigerator...? (READ 1-5)
N = ...
Less than two years old 1
2-7 years 2
8-10 years 3
11-14 years 4
Or 15 or more years old 5
Don't know - DO NOT READ ..... 8 =>Q13C
Refused - DO NOT READ ..... 9 =>Q13C

Q13B:

Do you know the year when it was made?

N = ...
Yes, RECORD YEAR: 01
No 00
1970 02
1978 03
1981 04
1982 05
1988 06
1991 07
1992 08
1996 09
1999 10
2000 11
2001 12
2002 13
2003 14
2004 15
Don't know/Don't remember 98
Refused 99

Q13C:

What color is the refrigerator?

SKIP IF Q13B=01-15

N = ...
Almond / cream / off-white 01
Avocado / green 02
Black 03
Brown 04
Stainless steel/Silver 05
White 06
Yellow/Gold 07
Other (SPECIFY:) 97
Don't know 98
Refused 99

Q15A:

Would you be interested in participating in an SDG&E program in which you could get new efficient lighting such as compact fluorescent bulbs, fluorescent fixtures and floor lamps installed in your home for free?

N = ...
Yes 1
Maybe/depends 2
No 3
Not interested because already have CFLs, etc. 4
Don't know 8
Refused 9

Q15B:

Would you be interested in participating in a program in which you could get a new efficient refrigerator to replace your old refrigerator at no cost?

ASK IF Q13A=4-5,8

N = ...
Yes 1
Maybe/depends 2
No 3
Don't know 8
Refused 9

Q16:

READ 1-6 IN ORDER SHOWN

Which of the following BEST describes why you would choose NOT to participate in a program that offered to install free efficient lighting in your home?

=> Q16B IF NOT Q15A=2-3,8

N = ...
My electric bills are not that high 01
I already have new lights 02
Too much time would be needed to get services through the program 03
I've already done everything I can to save electricity 04
I am behind in my bills 05
Don't want people going through my house 06
Not interested in new lights - DO NOT READ 07
Efficient lights are no good - DO NOT READ 08
Negative feelings about flourescent lighting 09
I'm a renter, not sure I can make those decisions 10
I'm not going to qualify 11
Or Some other reason (SPECIFY:) 97
Don't know - DO NOT READ ..... 98 => Q16B
Refused - DO NOT READ ..... 99 => Q16B

Q16A:

READ 1-8 IF NEEDED. UP TO 9 RESPONSES

And are there other reasons?

N = ...
My electric bills are not that high 01
I already have new lights 02
Too much time would be needed to get services through the program 03
I've already done everything I can to save electricity 04
I am behind in my bills 05
Don't want people going through my house 06
Not interested in new lights 07
Efficient lights are no good 08
No other reasons 96
Or Some other reason (SPECIFY:) 97
Don't know - DO NOT READ 98
Refused - DO NOT READ 99

Q16B:

READ 1-6 IN ORDER SHOWN

Which of the following BEST describes why you would choose NOT to participate in a program that offered to replace your existing refrigerator for free if it was manufactured before 1990?

=> Q16D IF NOT Q15B=2-3,8

N = ...

My electric bills are not that high	01	
I already have a new refrigerator (newer than 1990)	02	
Too much time would be needed to get services through the program	03	
I've already done everything I can to save electricity	04	
I am behind in my bills	05	
Don't want people going through my house	06	
Not interested in a new refrigerator - DO NOT READ	07	
I'm not going to qualify	08	
I don't own the refrigerator	09	
Or some other reason (SPECIFY:)	97	
Don't know - DO NOT READ	98	=> Q16D
Refused - DO NOT READ	99	=> Q16D

Q16C:

READ 1-97 IF NEEDED. UP TO 7 RESPONSES

And are there other reasons?

N = ...

My electric bills are not that high	01
I already have a new refrigerator (newer than 1990)	02
Too much time would be needed to get services through the program	03
I've already done everything I can to save electricity	04
I am behind in my bills	05
Don't want people going through my house	06
Not interested in a new refrigerator	07
No other reasons	96
Or some other reason (SPECIFY:)	97
Don't know - DO NOT READ	98
Refused - DO NOT READ	99

Q16D:

Which of the following BEST describes how you view your current electric bill? READ 1-3

N = ...

It is too high for you to afford	1
It is affordable	2
You don't pay attention to your electric bill	3
It is too high to afford, but I manage to pay it - DO NOT READ	4
Don't know - DO NOT READ	8
Refused - DO NOT READ	9

Q17:

Do you have further suggestions for programs in which SDG&E could assist people like you to lower their electric bills? OPEN-END

N = ...

Give seniors/low income a discount 02
Renovate windows 03
Insulate houses 04
Offer solar power 05
Advertise/make us aware of some guidelines to follow/come to our house and evaluate 06
Give rebates for appliances/higher rebates 07
Charge less for electricity/lower the cost 08
Conserve, use renewable energy sources, cheaper sources 09
No/Can't think of anything 00
Other (SPECIFY:) 97
Don't know 98
Refused 99

Q18:

Now, I just want to ask you a few brief questions for classification purposes. Do you own or rent your residence?

N = ...

Own 1
Rent 2
Don't know 8
Refused 9

Q19:

Is your residence...? READ 1-4

N = ...

A manufactured or mobile home 1
A single-family home 2
A multi-family home with 2 to 4 units 3
Or a multi-family home with 5 or more units 4
(DO NOT READ) Other (no specify) 7
(DO NOT READ) Don't know 8
(DO NOT READ) Refused 9

Q20:

What is the approximate size of your home? IF NEEDED: In square feet. READ 1-7 IF NECESSARY.

N = ...

Less than 500 square feet 1
501 to 1000 square feet 2
1001 to 1500 square feet 3
1501 to 2000 square feet 4
2001 to 2500 square feet 5
2501 to 3000 square feet 6
More than 3000 square feet 7
(DO NOT READ) Don't know 8
(DO NOT READ) Refused 9

Q21:

What is the main heating fuel that is used to heat the home? IF NEEDED: The main heating fuel is the type that is used the most

N = ...

Electricity	01	
Natural Gas	02	
Propane	03	
Oil	04	
Wood	05	
Kerosene	06	
Solar	07	
None/don't use heating fuel	08	
Other (SPECIFY:)	97	
Don't know	98	=>Q23
Refused	99	=>Q23

Q22:

What other heating fuels are used to heat your home? MULTIPLE RESPONSE.

N = ...

Electricity	01
Natural Gas	02
Propane	03
Oil	04
Wood	05
Kerosene	06
Solar	07
Other (SPECIFY:)	97
NO OTHER	96
Don't know	98
Refused	99

Q23:

What type of fuel or energy is used to heat the water used in your home? IF "HOT WATER HEATER" IS MENTIONED, ASK: What fuel does it use to heat the water? ONE RESPONSE.

N = ...

Electricity	01
Natural Gas	02
Propane	03
Oil	04
Wood	05
Kerosene	06
Solar	07
Other (SPECIFY:)	97
Don't know	98
Refused	99

Q24:

Does your home have air conditioning?
N = ...
Yes 1
No 2
Don't know 8
Refused 9

Q24A:

Do you have a central system or a room air conditioner? IF ROOM AIR CONDITIONER IS MENTIONED, ASK: Do you have more than one?

ASK IF Q24=1

N = ...
Central system 1
One room air conditioner 2
Two or more room air conditioners 3
Both central and room air conditioners 4
(DO NOT READ) Don't know/NOT SURE 8
(DO NOT READ) Refused 9

Q25:

Please stop me when I reach the age range you are in...? READ 1-6
N = ...
18-24 years old 1
25-34 years old 2
35-44 years old 3
45-54 years old 4
55-64 years old 5
65 or older 6
Don't know - DO NOT READ 8
Refused - DO NOT READ 9

Q26:

Including yourself, how many people live in your household?
N = ...
Don't know 98
Refused 99
..... 1 =>Q31
..... 2
..... 3
..... 4
..... 5
..... 6

Q27:

Including yourself, how many are adults, aged 18 and older?

N = ...
Don't know ..... -8
Refused ..... -9
..... 1
..... 2
..... 3
..... 4
..... 5
..... 9

Q31:

Have there been any changes in your household in the last year that might affect your electricity bill, such as a new baby, a new housemate, someone changing work hours, new appliances or a remodel to house.

N = ...
Yes 1
No ..... 2 => Q33
Don't know ..... 8 => Q33
Refused ..... 9 => Q33

Q33:

Was your total income in the past 12 months above or below $35,000? Please include all members of your household and income from all sources- wages, interest, alimony, Social Security, and so forth - before taxes and deductions.

N = ...
below $35,000 1
above $35,000 2
Don't know 8
Refused 9

Q33A:

Would that be...

ASK IF Q33=1

N = ...
Less than $20,000 1
$20,000 up to $35,000 2
Don't know - DO NOT READ 8
Refused - DO NOT READ 9

Q33B:

Would that be...

ASK IF Q33=2

N = ...
$35,000 up to but not including $45,000 3
$45,000 up to, but not including $55,000 4
$55,000 up to 65,000 5
Or more than $65,000 6
Don't know - DO NOT READ 8
Refused - DO NOT READ 9

Q34:

RECORD GENDER
N = ...
Male 1
Female 2

That's all my questions. Thank you very much for your time and cooperation.
