The Impact of a Long Term Intervention on the Used Refrigerator Market

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ABSTRACT

This paper describes the used refrigerator market and the effects that a refrigerator recycling program is having on that market. Increased funding, a more intense focus on marketing, improvements to the logistic system, the resulting increase in convenience, and an increase in the incentive have combined to increase the number of units removed from the market by about half. The program's market share of used refrigerators has almost doubled. The paper analyzes response to marketing in terms of changes in calls to schedule appointments. The new logistics system has helped to reduce the time from scheduling an appointment to the time of removal from an average of 15 days in 2004 – 05 to 5 days in 2008. The paper also discusses the characteristics of households with second and third refrigerators.

Introduction

Southern California Edison (SCE) has operated a refrigerator and freezer recycling program for more than 15 years. In the most recent program year, the program recycled nearly 90,000 units, a 50 percent increase from the previous year. Increased funding and a highly focused marketing campaign have substantially increased participation. The utility has also instituted several innovations in the refrigerator recycling program that have helped to support the large increases in the number of units removed from households.

The gross and net impacts of refrigerator recycling program have been widely discussed (ADM, 2008; KEMA, 2004; Peterson, 2007). Until recently, the used refrigerator market has received substantially less attention (Bailey, 2007; Nexus, 2005; Westberg, 2007). This paper discusses trends in the refrigerator and freezer markets, especially the used refrigerator market, over the last six years. The paper presents data showing how households dispose of refrigerators has changed as a result of changes in the refrigerator recycling program. It also discusses how the used appliance market has changed.

In order to accomplish this, the following topics are discussed:

- SCE Appliance Recycling Program (ARP) pick-up information
- Changes to ARP marketing and the resulting changes in awareness
- ARP's penetration into the used market, where it is believed used refrigerators are currently going, and how that has changed over the last three years
- Motivation for program participation
- Significant changes to the logistics of the ARP program in terms of logistics and the immediate results of those changes
- Recent findings on the characteristics of non-primary refrigerators

Methods

This paper is based on two evaluations of the SCE refrigerator and freezer recycling programs: a 2004-05 evaluation (ADM, 2008) that focused on three IOU service territories (SCE, PG&E and SDG&E) and a 2006-08 evaluation (Reed, *et. al*., 2010) of SCE's ARP. Data for SCE has been extracted from the 2004-05 study to allow comparison with the 2006-08 study. The results from the evaluations are based on data from numerous sources including in-depth interviews, participant tracking records, participant surveys, and surveys of disposers in the general population. The participant and disposer surveys had sample sizes of more than 400 respondents.

Units Disposed of Through the Appliance Recycling Program

In 2004 and 2005 the ARP collected and de-manufactured 120,335 units from 112,894 orders in the SCE territory. From 2006 to 2008 the program collected and de-manufactured 219,609 units from 208,342 orders. Roughly the same number of units was collected in 2005 and 2006 but there was a 13 percent decline in 2007 (Table 1). In 2008 there was nearly a 50 percent increase in the number of units collected over the previous year. These fluctuations are due to funding levels as well as a significant increase in marketing in 2008.

Table 1. Total Orders and Units Collected From 2004-08 by Program Year

	2004	2005	2006	2007	2008
Orders	47,730	65,164	64,611	57,255	86,476
Units collected	50,899	69,436	69,052	60,315	90,242

Appliance Type

ARP allowed customers to turn in working refrigerators between 10-27 cubic feet and working standalone freezers. For 2004 and 2005, more than 145,500 refrigerators and nearly 21,000 freezers were removed. From 2006 through 2008, more than 191,000 refrigerators and 28,000 freezers were removed. In each of the years, between 86 and 89 percent of the units that were removed were refrigerators (Table 2).

Table 2. Total Units Collected from 2004 to 2008 by Program Year

Units	2004	2004 percent	2005	2005 percent	2006	2006 percent	2007	2007 percent	2008	2008 percent
Refrigerators	45,273	89	60,183	87	59,359	86	52,353	87	79,756	88
Freezers	5,626	11	9,253	13	9,594	14	7,962	13	10,486	12
Unknown	0		0		99		0		0	
Total	50,899		69,436		69,052		60,315		90,242	

Marketing

Marketing Channels

In the 2006-08 program years, SCE conducted a broad spectrum of marketing activities that used multiple marketing channels and varied content to which there was good response. SCE marketing channels included but were not limited to:

- Customer Connections — This is a bifold included with the customer's bill. Each issue contains a number of stories and information that focus on safety, energy saving opportunities, human interest, rates, and other themes.
- Drop mailers — These are a letter or a multicolor brochure or both that were typically mailed to the customer in a 6 inch by 9 inch envelope. Some contain a letter and an item such as a pad of to do lists with a magnet or just a magnet intended for the refrigerator.
- Direct mail — SCE sent direct mail pieces to a select group of customers who were targeted because of the high likelihood that they would have a second refrigerator.
- General radio — These are radio ads supporting ARP that are placed with radio stations.
- Hispanic radio — These are radio ads placed on Hispanic radio stations.
- On-line webpage — SCE has a page on its website that describes the program and how to apply. The web page emphasizes the cost savings to the customer, the incentive, and the fact that the refrigerator is dismantled in an environmentally responsible way.
- Other channels — The program is promoted on most occasions when SCE has a booth or participates in a community or other type of public event. A number of the local government programs in California have also promoted the program.

Message Content

The message content that SCE has conveyed has changed substantially since 2004 and 2005 when the message was largely focused on the cash incentive ($35) and the free pick-up, with some focus on the benefits of getting the old refrigerator out of service. The following are examples of some of the messages that have consistently appeared in the mail collateral for the 2006-08 program, especially in 2007 – 08.

Energy cost savings statements:

- An old refrigerator uses 50 percent more energy than a newer model
- Getting rid of an old refrigerator can save enough energy to light a home for a month and a half
- Save $260 annually (in 2007; or $292 in 2008) when you remove a refrigerator or freezer

Environmental statements:

- Do something good for the environment / benefit the environment
- The environment thanks you and so do we
- It is bad for the environment to keep and use that old refrigerator

Recycling statements:

- Recycle so it doesn't end up back in use
- Properly dispose of your refrigerator so that it doesn't harm the environment

Program Incentive Statements:

- Free pick-up
- Get $35 ($50 in 2008) cash/rebate/incentive for your old refrigerator

Other Statements:

- Make a smart choice. Don't give the old refrigerator to family or a friend. That will increase their bills and harm the environment
- The monster in your garage

The statements reflect both the benefits and consequences of recycling. The statements were intermixed between the letters and the brochure and most were repeated in some form twice or even three times within a mailing or mail drop.

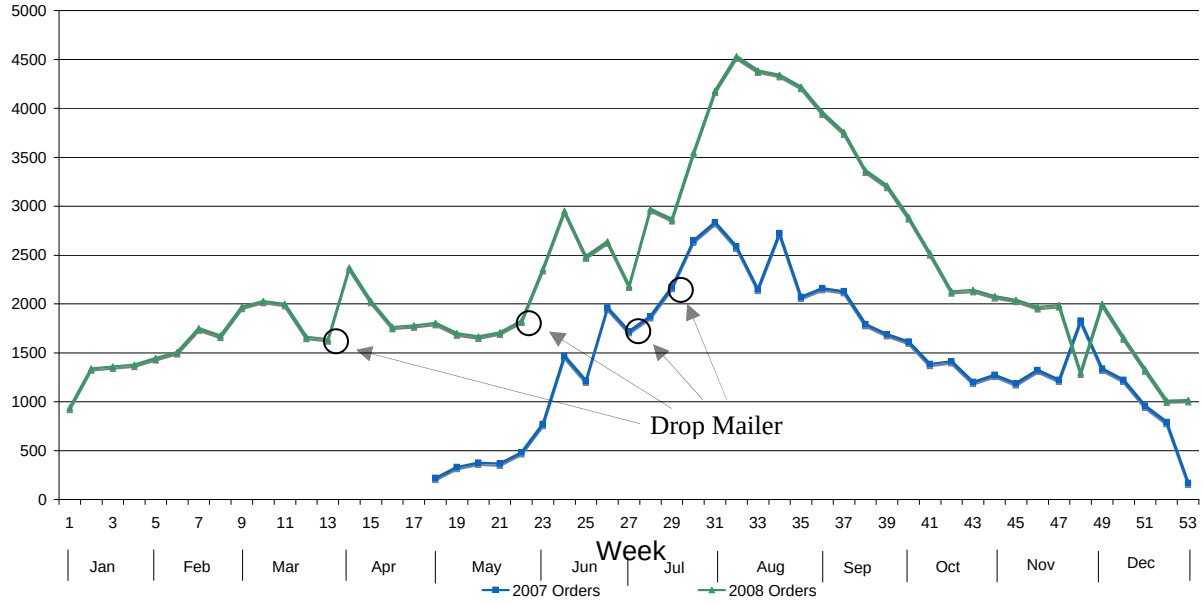
Public Response to the Messages

Figure 1 shows the customer response to the marketing efforts. The data series are the number of customer orders by date taken from Enerpath (new logistic system). These are customer orders and not removals. Actual removals are less than orders and removals can lag an order by days or weeks. The blue line is the 2007 data and the green line is the 2008. The weeks and months of the year are shown on the horizontal axis and the number of orders is shown on the vertical axis. The weeks in May and June do not represent all orders that the program received.

The shapes of the two curves are essentially the same. The two series highlight the very different level of activity in 2007 and 2008. There is a difference of approximately 2,700 orders between the peak weeks in 2007 and 2008 and a difference of 400 to 500 orders in off-peak weeks. The peak in July is clearly visible in both years. The decline after the advertising stopped for the summer marketing campaign is also quite evident beginning around the middle of August. A slight drop for the Fourth of July week is visible in both data series. There is also a very noticeable drop in the 2008 data that represents Thanksgiving with a sharp increase in the following week. The sharp increase is also visible in the 2007 data. The tailing off at the end of the year as the holidays approach is also visible in both series.

Figure 1 shows the response to the advertising. In 2007 there was a drop mailing at the beginning of July and another in the middle of the month. There was an increase of about a thousand orders in the first weeks of July. In 2008, there were drop mailings in late March and again the last day in May. There were subsequent increases of about 1,200 orders in April and about 1200 orders in June. Between July 14, 2008 and August 1, 2008 there was a Customer Connection released, one drop mailer, two direct mailings, as well a radio advertisements. There was a run-up of approximately 1,600 orders between July 14, 2008 and the end of the first week in August 2008. Clearly, the drop mailers, the direct mailings, and the advertisements were having their affect.

Figure 1. ARP Removal Orders from July 2007 to December 2008



Program Awareness

One of the concerns that surfaced in the 2004-05 evaluation was that many people that disposed of refrigerators were not aware of the program. As part of the 2004-05 evaluation, customers in the SCE service territories that disposed of a refrigerator or freezer during the previous four years were surveyed. These represent the general population of customers who disposed of a refrigerator by any method including the use of the RARP[1]. They were asked if they were aware of RARP. For the 2006-08 evaluation, a sample of households in the general disposer population that disposed of a refrigerator or freezer were asked the same question.

In the 2006-08 evaluation, 70 percent of disposers were aware of the ARP. In the 2004-05 disposer survey, 58 percent of the disposer households were aware of the RARP program. In other words, the percentage of awareness of the ARP program increased between the two surveys. This implies that market efforts increased the level of awareness.

Penetration of the Market

Both evaluations assessed the degree to which the program is penetrating the appliance transfer market. The information for the 2004-05 study and the 2006-08 program is from the respective disposer surveys of the general population.

Respondents to the disposers survey in the general population were asked if they had disposed of a refrigerator in the last four years. Respondents who said that they had disposed of a refrigerator were asked how they did that. It was made clear to respondents that disposing of a refrigerator included any type of transfer.[2] In each survey, the respondents were also asked whether the refrigerator was working on not.

[1]The acronym for the 2004-05 program was RARP.

[2]Unit transfers refer to an appliance unit changing hands. Someone may sell a unit, give it away, or give it to an appliance dealer. Ultimately there are three possible outcomes: a unit is placed or remains in service, it is kept but not used (i.e., it is effectively stored), or a unit leaves the grid and is destroyed.

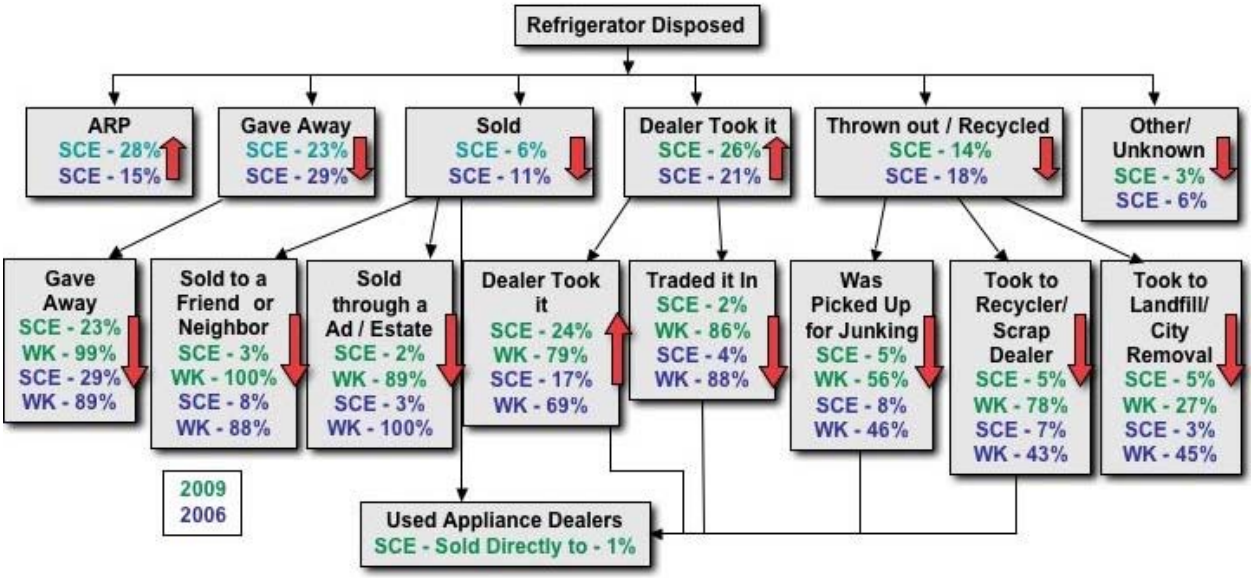
Figure 2 represents describes what happens to used refrigerators that are transferred. The first row describes the general type of transfer. The boxes in the first row contain data for two years: the percent of units in the SCE territory following that path in 2006 – 08 survey (green) and the percent of units in the SCE territory following that path in 2004 – 05 survey (blue). Adding the percentages across the row results in 100 percent of units. The cells in the second and third row provide more refined information about paths that a refrigerator can take.

The red arrow indicates whether there was an increase or decrease for SCE between the two studies. The boxes in the second row contain four levels of data. Along with the two levels shown in row one, these boxes also contain the percent of working units. For example, 99 percent of the units that were given away in the 2006 - 08 survey were working compare to 89 percent in the 2004 – 05 survey. By contrast, five percent of the units taken to a landfill in the 2006 - 08 survey that were working. Finally, the third row contains one box, used appliance dealers, which shows the estimated percent of units that are sold directly to this source by customers.

In terms of the overall method of disposal (top row) the most common method of transfer in the 2006-08 survey (2009 data) was the ARP (28 percent). This was followed by dealers (26 percent), those who gave the units away (23 percent), those who used some sort of community recycling mechanism (14 percent), and those who sold the unit (6 percent). Respondents in the 2004-05 study (2006 data) stated that the most common removal method was by giving the unit away (29 percent), followed by the new appliance dealer (21 percent), some sort of community recycling mechanism (18 percent), and the ARP program (15 percent).

The key finding shown in Figure 2 is that the percentage of units captured by ARP between the 2004-05 study and the 2006-08 study has almost doubled (15 percent to 28 percent). In other words, ARP has significantly increased its market share. This is a consequence of the availability of funding and the enhanced marketing that was done in 2008. Secondly, the percentage of transfers occurring through dealers has increased by about a fifth from 21 percent to 26 percent. Dealers are taking more used refrigerators.

Figure 2. Changing Patterns of Refrigerator Disposal



The number of units being given away to friends and neighbors has declined by about 20 percent and the number of units being sold has dropped by about 60 percent. This is significant because, based on the survey, units that are sold or given away are likely to remain in use. The percentage that is being junked, taken by a recycler, or taken to the landfill has also declined. Because the program does not take nonworking units, it would appear that the declines in the number of units being taken to the trash/recycling are probably going to new appliance dealers. It is likely that the increase in units being taken by the program are coming from households that would have given away or sold them. The recommendations from 2004-05 recommended that the IOUs try to do precisely what SCE has done.

What Motivated Customers to Participate in the Program

In the ARP participant survey, customers were asked their main reason for participation and if there was another reason. Ninety-seven percent of the respondents gave a first reason and 36 percent offered a second. The first and second reasons are combined and summarized in Table 3 along with similar data for the 2004-05 study.[3]

In the 2006-08 ARP program, participants mentioned the $50 incentive most frequently (55 percent) as a motivating factor for using the program. This is an increase compared with 46 percent in the 2004-05 study. When asked if the incentive was essential to their participation, approximately 71 percent of the respondents said that they would have participated in the ARP without the incentive compared to 81 percent in 2004-05.

Convenience and free pick-up was the next most frequently mentioned motivating factor. Along with "the convenience" and "the free pick-up service," responses such as "the easiest way," "don't have to take it anywhere," and "others don't take it" were also included in this category. Approximately 44 percent of the respondents gave a response in the convenience category. This is a significant decrease from the 2004-05 study, where 66 percent were in this category.

It is also worthy of note that the percentage indicating environmental factors as a motivator declined from 22 percent to 17 percent.

The 'other' category in Table 3 included "not being aware of other options," "savings on electric bill "utility sponsorship of the program," "recommendations from a friend, neighbor or retailer," "no other options," and "other unspecified reasons." The percentage of respondents saying the savings on the electric bill increased by four percent.

Thus, between 2004-05 and 2006-08, convenience and the incentive switched places in terms of the most common motivator between the two time periods and the concern about the environment declined a bit while interest in energy savings increased. There are at least three reasons why this switch may have occurred. The incentive increased by $15. The increased participation in 2009 may have tapped market segments that included more people interested in participating because of the incentive. The 2008-09 recession that was on everyone's mind may have made the incentive and the electric savings more attractive.

[3]The percentages in this table are the total combined first and second responses for the "reason" divided by the number of respondents. Percentaging in this way captures the results for people that offered more than one reasons. It does result in a total grater than 100 percent.

Table 3. Customers' Motivational Reasons for Participating in the ARP

Reason for Disposal	2004-05		2006-08	
	Category Percent*	Sub-category Percent*	Category Percent*	Sub-category Percent*
Incentive payment ($35 in 2004-06 and $50 in 2007-08)	46		55	
Convenient/Free pick-up	65		44	
Easy way/convenient		44		31
Free pick-up service/Others don't pick up		21		13
Environmentally safe disposal/Recycled/Good for Environment	22		17	
Other	11		19	
Never heard of any others/only one I know of		3		6
Savings on electric bill		0		4
Utility sponsorship of the program		2		3
Recommendation of retailer/dealer		1		2
Recommendation of a friend/relative		1		2
Other		4		2
Don't know/ Refused	5		4	
Total	149		139	
N of the responses	512		454	

* Respondents could provide multiple responses. First and second responses were combined and then divided by the number of respondents.

Changes to the Logistics System

The most dramatic change to the program was the introduction of an advanced logistics tracking system. In the 2004-05 program, the contractors had their own tracking databases. A computer was used to track customers and their appointments. Pick-up orders were printed and the logistics and the tracking of units were done using paper forms. At the end of the day when drivers returned to the warehouse, they were required to submit their paperwork. Drivers were not given a new routing until all paperwork was completed. Data were input from the paper and the rebate was then tracked and paid by the contractor.

An Updated Logistics System

Realizing that the logistics systems and administrative processes could be streamlined and that shorter pick-up times might reduce the cancellation rates, the SCE program manager began looking for alternative logistics systems. Working with an outside contractor, the manager had a new database structure developed, added dynamic routing software much like those used by businesses who provide on-site customer services or package delivery, added two-way communication devices that were capable of inputting, receiving, and displaying data, and were capable of tracking and communicating geographic location.

In the new system routing is optimized the afternoon of the day before the pick-up. The name, address, and telephone numbers are downloaded to a handheld PDA along with the routing. In route, the crews are encouraged to call ahead and inform customers of their arrival time. When the crew arrives to pick up a unit or units, they enter the information (size, type,

style, etc.) for the appliance or appliances that are removed and/or a disposition code into the handheld unit. The disposition code indicates the successful pick-up of a working unit, an ineligible nonworking unit, a cancellation, or some other outcome. This is immediately transmitted and loaded into the central tracking database. Routes can also be adjusted if customers call and cancel while the truck is in route. Because the routing is dynamic, if someone near a route calls requesting a pick-up, the pick-up can be incorporated into the route on the same day if the truck has space.

When appointments are cancelled or they have space on their trucks, drivers can prospect for potential pick-ups from nearby households that are scheduled for future pick-ups that have indicated that they would be willing to have an earlier pick-up if they are home. Because of the geo-positioning capability, the central office knows the exact location of every truck while in route.

Finally, paper forms have been eliminated. Customers sign for the removal on the handheld device. Pictures of the unit(s) and/or pictures associated with any damage that may have occurred in the customer's home can be documented. The driver enters the appropriate data for the units that are retrieved. When the truck arrives at the recycling facility, the units are electronically checked in and their characteristics verified. The data needed for the incentive payment are produced and forwarded for payment.

The Effects of Changing Logistics on Pick-up Times

Table 4 displays the distribution of days between the call and the actual pick-up of the appliance. The four time periods represent four distinct periods of activity: the 2004 and 2005 program years, the period from January 2006 through the end of June 2007, the period from July to December 2007 when the new system was being initiated, and 2008 when the system was fully operational and essentially working as intended

What the data show is a progressive improvement in average pick-up times. In 2004-05 the pick-up time was 15 days, this declined to 10 between January 2006 and June 2007. There was a further decline to an average of seven days between July and December 2007, and finally an average of five days during 2008. In 2008, nearly 40 percent of the units were retrieved within three days and 78 percent within seven days.

The information for 2004 and 2005 and January 2006 to June 2007 is primarily for the same contractor, so the decline is not a function of a difference in contractors. However, the decline could reflect the division of the service territory into two parts, one for each contractor, resulting in a more compact pick-up area. In turn, that could have influenced the number of retrieved units. The average monthly removals were roughly in the same range, about 4,300 to 4,500 units per month so the workload was about the same. Barring other explanations, the changes appear to be entirely logistics related.

Table 4. Distribution of Days from Call to Pick-up for Four Different Time Periods (Percent)

Days from request to pick-up	2004 and 2005	January 2006 to June 2007	July 2007 to December 2007	2008
0 to 3	4.6[1]	4.9	29.1	39.6
4 to 7	9.1	40.3	43.1	38.3
8 to 14	47.3	43.3	19.6	15.4
15 to 21	29.5	7.2	4.2	3.4
22 to 30	7.6	2.4	1.8	1.5
30+	1.9	1.9	2.3	1.7
Total	100.0	100.0	100.0	100.0
N	109,783	90,657	31,228	86,467
Average Days	15	10	7	5

1. This value is probably higher than it should be because missing values were assigned to zero. There is no way to correct the problem. The effect is very small. It would increase the average only slightly and the one percent would be distributed through the remaining categories

Non-Primary Refrigerator Characteristics

A major concern of appliance recycling programs has been the capture of second and third refrigerators in households. Currently about a quarter of the units that are removed are secondary units. The program would like to increase this percentage. The characteristics of households with these units are not well understood. In order to further understand the non-primary refrigerator market SCE's Home Energy and Water Efficiency Survey (HEES) data were analyzed. By participating in HEES, customers obtain information to help them become familiar with ways to control and reduce energy and water usage. This analysis was not completed in the 2004-05 evaluation, but represents important new information for recycling programs on non-primary refrigerators.

For this evaluation, data were obtained for the 2007 and 2008 annual HEES surveys in the SCE territory. The combined total of respondents was 70,462. It is important to remember that these results are for residents who elected to have a home energy survey. Some of these residents participate because they have high bill complaints and are encouraged by the utility. Others are people who may be looking for ways to reduce energy costs or who are predisposed to improving the energy and water efficiency of their homes. Some may be seeking reinforcement that their homes are energy efficient. The point is that these residents are self-selected and may differ from the overall population. Even so, analysis of this data is instructive.

During the two-year period, 66 percent of those surveyed had one refrigerator, 29 percent had two units, and five percent had three or more units.

The HEES Survey contains detailed characteristics for up to three refrigerators in a given household. These characteristics include size and age. This survey is quite informative because it has a broader and a more articulated range of refrigerator size categories than some of the other surveys. It includes a mini category which is two cubic feet or less, a 3 to 10 foot cubic category, and a category for 28 cubic feet and greater.

Table 5 presents the size distribution for the first, second and third refrigerators. As one might expect, there are very few first refrigerators (two percent) that are less than 10 cubic feet. Eighty-nine percent of first units are between 17 and 27 cubic feet. Seventeen percent of second units are 10 cubic feet or less (seven percent are two cubic feet or less. Fifty-four percent of third units are less than 10 cubic feet. Sixty-six percent of third units are sixteen cubic feet or less. In other words, third units are much smaller than second and first units. From the standpoint of ARP, it appears that 17 percent of second units and slightly more than half of third units do not qualify the program.

Table 6 shows the age of refrigerators by first, second or third unit. The primary finding is that the majority of first (79 percent), second (72 percent) and third units (71 percent) are 10 years or less. This table shows that for the most part the percentage of units more than 15 years old ranges from eight to 11 percent. These data suggest that second and third units are much newer than is generally believed. The table also shows that first units are newer than second units but that third units are the newest. This may reflect the high percentage of third units in the mini category.

The previous finding can be confirmed by cross tabulating the second and third units by size and age.

Table 5. HEES Data Results for The Size of Refrigerators

Refrigerator Size (cubic feet)	First Unit	Second Unit	Third Unit
Mini (2 or less)	1	7	21
Very small (3-10)	1	10	33
Small (11-16)	5	12	12
Medium (17-20)	36	39	16
Large (21-27)	53	30	14
Extra large (28 or more)	5	2	4
Total	100	100	100
N	59,132	21,273	3,318

Table 6. HEES Data Results for The Age of Refrigerators

Refrigerator Age	First Unit	Second Unit	Third Unit
New	9	6	11
1-5 years	42	34	46
6-10 years	28	32	24
11-15 years	12	17	12
16-20 years	8	7	5
More than 20 years	2	4	3
Total	100	100	100
N	61,610	21,451	3,350

Figure 3 shows the percentage of second units by age and the size of the units. The percentages of mini, very small, and small units decline with age of the unit. The percentage of medium and large units increases with the age of the unit until they get to 16 years and older. The extra large units are of a fairly consistent small percentage.

Figure 4 is the same graph as above but for third units. Once again, the same pattern exists. The percentage of mini to smaller units decreases with age while the percentage of medium and large units increases with age. The take away from this data is that many households that have second and third units have purchased smaller units in recent years. The high percentage of third units that are relatively young minis suggests that a good percentage of people are purchasing minis for wine or beer storage or perhaps as an outside unit. The minis and the very small units are not eligible for the program.

Figure 3. Percent of Second Units by Size and Age

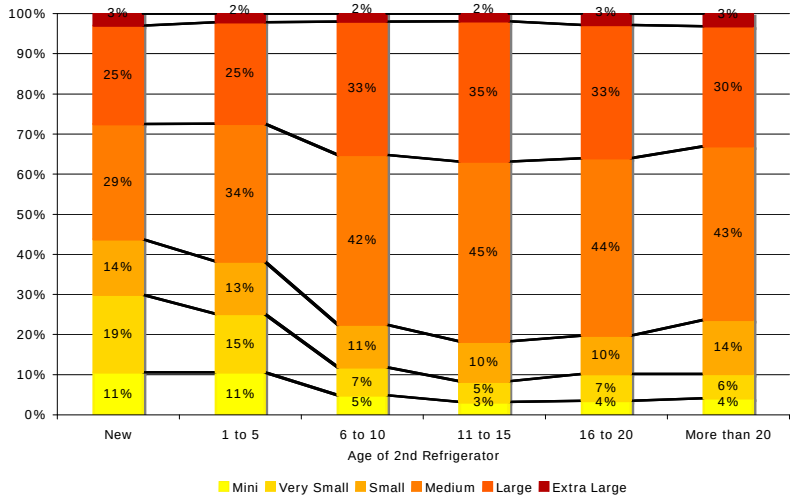
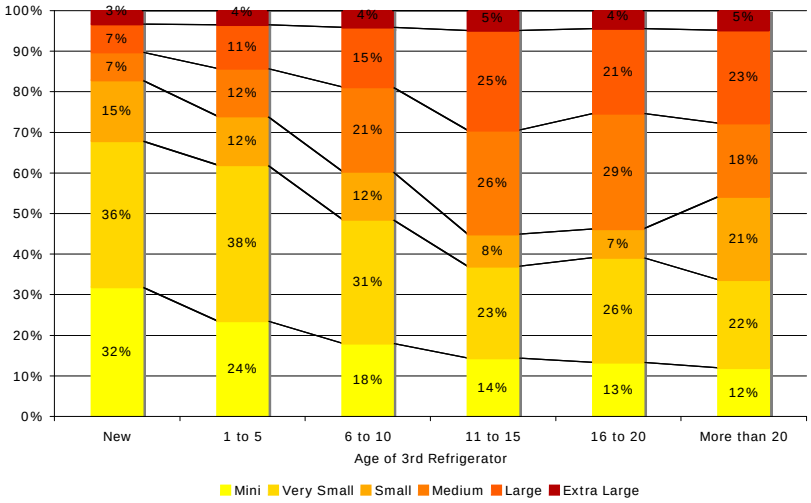


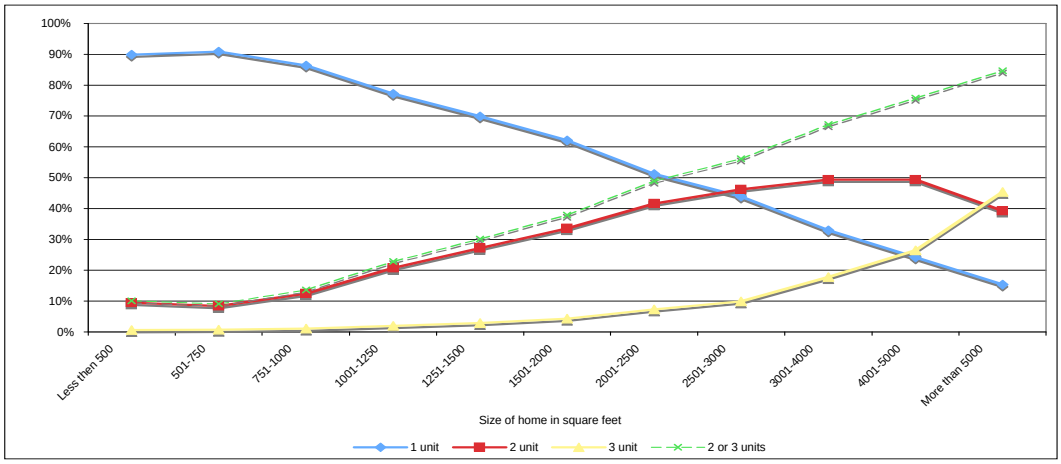
Figure 4. Percent of Third Refrigerators by Size and Age



The number of first, second and third units was also examined by the square footage of the dwelling. As

Figure 5 shows, there is a strong relationship between having second or third unit and the size of the dwelling. More than forty percent of households with a footprint greater than 2,000 square feet have a second unit. When the footprint reaches 3,000 square feet the percentage is nearly 50 percent of households. The green curve combines the second and third units. The result is that at 3,000 square feet more than 60 percent of the households have a second or third unit and for dwellings above 5,000 square feet the percentage if above 80 percent.

Figure 5. Percent of Nth Unit in Household by Square Footage of the Household



What these data seem to suggest is that second and third units are relatively young, that is, less than ten years. Second, and especially third units, are much smaller than first units with the majority of third units being the mini or very small units. The percentage of 2nd and 3rd units in a dwelling rises rapidly from 10 to about 50 percent as the size of the dwelling increases from 1,000 square feet to 2,500 square feet and continues to rise beyond 2500 to more than 5000 square feet although not so rapidly. Twenty-five hundred square feet is the point where the percentage of 2nd and 3rd refrigerators is greater than the percentage of single refrigerator households. Twenty-five hundred square foot households and above might be a good break point for targeting second refrigerators.

Conclusion

The refrigerator and freezer recycling program run by SCE increased the number of units collected by roughly 50 percent in 2008. Increased funding and a highly focused marketing campaign, along with changes to the logistic system are the major reasons why the program picked up nearly 90,000 units. An analysis of used refrigerator transfers found that the market share captured by ARP has almost doubled from 15 percent to 28 percent between the 2004-05 and the 2006-08 study.

The evaluation of found were that the percentage of transfers occurring through dealers increased by about a fifth from 21 percent to 26 percent. The two increases offset significant declines in units being given away and sold – two categories that represent units that go back into service. Awareness among disposers in the general population increased from 58 to 70 percent from 2004 – 2005 to 2006 – 08.

Incentive and convenience were the keys to customer participation. Fifty-five percent of participants mentioned the incentive and 44 percent mentioned convenience. This is the reverse of 2004-05 when 66 percent cited convenience and 46 percent the incentives. It is also noteworthy that the percentage of respondents who said that they would participate without the incentive declined from 81 in 2005 - 05 to 71 percent in 2006 – 08. Three reasons why this may be the case are that the incentive increased by $15, the increased participation in 2008 may have tapped market segments that included more people interested in participating because of the incentive, and that the recession may have made the incentive and the electric savings more attractive.

The major change that SCE made in terms of their program was updating the logistics system. The new system has a number of advantages. It eliminates paper to computer data transfers that should help to improve the quality of data. It makes it easier for people to verify data at each step that should also increase accuracy. It also significantly reduces the time to pick-up. The average pickup time was reduced from 15 days in the 2004-05 program years to 5 days in 2008. Although convenience as a motivator has decreased some, it is still very important and a major reason why customers cancel orders.

Finally, this paper looks at the characteristics of second and third refrigerators. In general, second and third units are relatively young (less than 10 years). Second, and especially third units, are much smaller than first units with the majority of third units being the mini or very small units. The conclusion is that many of these units may not be eligible and/or attractive to recycling programs. Twenty-five hundred square feet is the point where the percentage of 2nd and 3rd refrigerators is greater than the percentage of single refrigerator households. Twenty-five hundred square foot households and above might be a good break point for targeting second refrigerators. There data suggest that some of the second and third units may have been deliberate purchases and therefore will be difficult for the program to capture.

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