

California Residential Efficiency Market Share Tracking

Appliances 2000

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TURNING DATA INTO INFORMATION

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Introduction

This report examines the efficiency shares and average efficiencies of clothes washers, dishwashers, refrigerators, and room air conditioners purchased in California's residential sector. Includes is a review of the data sources for analysis of appliance efficiencies, model availability with respect to energy efficiency ratings, energy efficiency standards, the estimated percentage of units sold that qualify for the ENERGY STAR[®] label, and analysis by market channel (national chains and independently owned retailers).

The data presented in this report cover the 1998 through 2000 period. Subsequent reports will be made available on a semi-annual base, with the next report (Volume 1, 2001) covering up through the first half of 2001.

Data for this report were collected from a panel of independently owned retailers and combined with the national chain sales data provided by D&R International. The results were used to estimate the market share of ENERGY STAR qualifying appliances sold in California. Data sources and the applicability of the results to support California's statewide appliance program are the reasons for basing this analysis on the share of ENERGY STAR qualifying units sold. California depends on ENERGY STAR as the criterion as well as the marketing tool for these programs.

This report is an integral part of the ongoing Residential Market Share Tracking Study (RMST).¹ The RMST, now in its second-year produces four separate semi-annual reports: Residential New Construction,² Lighting,³ Appliances, and HVAC/Water Heaters. The objective of each RMST report is to estimate the market share of energy efficient products, over time, within the California residential market. Each study is accompanied by a four to eight page high-level summary.

¹ RER, Inc. *California Residential Efficiency Market Share Tracking: First-Year Interim Report*. Prepared for Southern California Edison. October 2000.

² RER, Inc. *Residential New Construction Study*. Prepared for Pacific Gas & Electric Company. September 2001.

³ RER, Inc. *Residential Market Share Tracking: Lamps*. Prepared for Southern California Edison. January 2001.

The remainder of this report presents a discussion of the data collection, including identifying data sources, describing data analysis techniques and summarizing geographical coverage of the collected data. Individual sections describing findings for clothes washers, dishwashers, refrigerators, and room air conditioners follow. The final report section discusses the work effort for the third year of the project.

2

Data Collection and Analysis

2.1 Overview

Sales data were collected from two major sources: D&R International (who provides data from certain national ENERGY STAR partners)⁴ and independent retailers (including regional appliance chains). RER is responsible for the recruitment, collection, and maintenance of the independent retail sample.

This section summarizes the number of California retail outlets and describes the data collection and analysis for the national and independent appliance retailer sales data.

2.2 California Retail Outlets

Insofar as the analysis of appliance sales relies on collecting data from retail appliance dealers, it is useful to understand the number of retail storefronts in California. Table 2-1 presents a summary of the number of retailer entities and individual storefronts by national chain and independents. Independents include single storefronts as well as regional chains. As depicted in Table 2-1, approximately 51% of storefronts are ENERGY STAR partners and the remaining 49% are independents and regional chains.

Presently, data are being collected from 42 storefronts (5% of all storefronts) for tracking energy efficient appliances.

Table 2-1: California Appliance Retailer Entities and Storefronts - 2000

	National Chains	Independent Regional Chains	Independent Individual Stores	All Retailers
Companies/Retail Entities	4	30	291	325
CA Retail Storefronts	414	107	291	812
ENERGY STAR Partners	4	2	0	6

⁴ It is important to note that not all national ENERGY STAR partners share appliance sales data with D&R International.

2.3 National Appliance Retailer Sales Data

D&R International (D&R) provided RER with sales data from national retail chains for each of the appliances covered by the RMST project. D&R collects sales data from national retailers under a contract to support and evaluate the EPA/DOE ENERGY STAR Appliance Program and to track the sales of ENERGY STAR labeled products on a national level. California sales data were made available to RER to support the California RMST project. The national chain ENERGY STAR partners in the 2000 data include two retailers. The data includes the total number of all units sold by zip code and the total number of ENERGY STAR qualifying units sold by ZIP code. Due to confidentiality agreements with national partners, D&R was unable to provide more detailed information about the efficiency of units sold. It is worth noting that there has been a significant change in the participants in D&R's database. In particular, two major national chains no longer provide data to D&R. In one case, the national chain has gone out of business and in the other the national chain has discontinued offering a line of appliances.

2.4 Independent and Regional Chain Appliance Retailer Sales Data

This section discusses the collection of the independent and regional chain appliance retail sales data. In addition, a brief discussion on the differences in market shares of ENERGY STAR qualifying units sold by the national as compared to those sold by independents is presented.

ENERGY STAR Sales by Independent Retailers

In California, independent retailers have established a firm niche within the overall appliance market. In the past, little has been known about appliance sales through the independent retail appliance market channel. There has been some anecdotal evidence that the sales share of ENERGY STAR labeled products is slightly higher in this market than the national chain retail market. This study continues to show that this impression has its basis in fact. Industry professionals revealed their rationale for higher ENERGY STAR qualified sales by independents than by national chains.⁵ The difference could be attributable to several factors, including lower employee turnover and therefore higher awareness, willingness to special order appliances, and overall different marketing strategies. The reality is that while national chains do have a good overall selection, their selection is limited by corporate decisions. Independents offer flexibility to consumers that national chains inherently cannot. Customers at independent appliance retailers usually realize that the item they want may not be available in the retailers' inventory. Moreover, independent stores do not try to compete

⁵ RER, Inc. *California Residential Efficiency Market Share Tracking: First-Year Interim Report*. Prepared for Southern California Edison. October 2000.

with the price points that national chain stores can offer on some models. Instead, they focus on service, knowledge, and helping find the best fit for the needs of a customer. Many times customers of independent retailers are looking for planned appliance replacements. This stands in contrast to some customers who may seek out a national chain because they require an emergency appliance replacement purchase. There is a perception that national chains have the best selection of appliances that are immediately available. The reality is that while national chains do have a good overall selection, their selection is limited by corporate decisions.

Sample Frame and Sample Design

RER utilized the same basic sample frame of independent retailers provided by the Electric and Gas Industries Association (EGIA) and the Associated Volume Buyers (AVB) roster.⁶ Table 2-2 illustrates the breakdown of storefronts by utility area.

Table 2-2: Independent Appliance Retailer Sample Frame

	Utility Service Area				All
	PG&E	SCE	SDG&E	Other*	
All Areas					
Storefronts	194	98	34	72	398
Percent of Total	49%	25%	8%	18%	100%
PG&E, SCE, and SDG&E Only					
Storefronts	194	98	34		326
Percent of Total	60%	30%	10%		100%

*“Other” includes municipal utilities such as LADWP, LMUD, PP&L, SMUD, and many others.

Although RER has not yet met the initial goal of recruiting 20% of the independent appliance retailers in California’s electric utility service areas for the RMST, RER did significantly increase participation. Table 2-3 provides the sampling targets for each utility service area.

Table 2-3: Independent Appliance Retailer Long-Term Sample Targets

	Utility Service Area			All
	PG&E	SCE	SDG&E	
Storefronts	39	19	7	65
Percent of Total	60%	30%	10%	100%

⁶ The sample obtained from the EGIA under-represents the SDG&E service area, according to EGIA staff. Augmenting the EGIA sample with AVB members helped to alleviate this problem.

Independent Retailer Panel Recruitment

The collection of 2000 data has benefited from aggressive recruitment as well as improving the ease of participation. The increased visibility of energy issues throughout the state has also helped some retailers to understand the importance of the market share tracking study. For instance, five independent regional chains agreed to share 2000 sales data. This helped improve geographic coverage. The recruiting efforts will continue for the third year of the project. RER hopes to focus on increasing coverage in the SDG&E territory as well as in some of the cities in central and eastern California.

Current Independent Retailer Panel

As shown in Table 2-4, RER obtained appliance sales data from a panel of 13 independent retailers representing 42 individual storefronts. The retailers in the panel provided data in a variety of formats: electronic spreadsheets, hard-copy sales reports, and even handwritten tallies of units sold. Most retailers provide data to RER on a monthly basis. In general, the data includes the appliance type, manufacturer, manufacturer model number, quantity sold, and date of sale. In the First-Year Interim Report,⁷ a subset of the panel provided complete 1999 data. However, others began providing data at different points throughout 1999. All new independent retailers recruited agreed to share their entire Year 2000 sales figures.

Table 2-4: Current Independent Appliance Retailer Panel

	Utility Service Area				All
	PG&E	SCE	SDG&E	Other*	
Storefronts	24	15	1	4	42
Percent of Total	56%	34%	1%	9%	100%

* "Other" includes municipal utilities such as LADWP, LMUD, PP&L, SMUD, and many others.

It is important to comment here about the sample sizes of each year covered by the analysis. As illustrated in Table 2-5, the current analysis database includes sales data from national retail chains for 1998, 1999 and 2000, as well as data from independent retailers for 1999 and 2000.

⁷ RER, Inc. *California Residential Efficiency Market Share Tracking: First-Year Interim Report*. Prepared for Southern California Edison. October 2000.

Table 2-5: Appliance Sales Data Coverage, by Market Channel

Market Channel	1998	1999	2000
National Chain Retailers *	X	X	X
Independent Retailers		X	X

* Two national chains provided 1998 data, four provided 1999 data, and two provided 2000 data.

2.5 Appliance Data Analysis

RER based the analysis of residential appliance efficiencies upon ENERGY STAR qualification. In generic terms, RER estimated the percentage of units sold that qualified for the ENERGY STAR label during each quarter from the first quarter of 1998 through 2000. Estimating statewide average efficiency ratings, or the average percentage above the federal standard is not feasible because of the nature of the national chain sales data provided by D&R. However, it is possible to estimate the average sales by efficiency for the independent/regional chain retailers. This detailed information will be illustrated in the subsequent appliance sections.

Data Processing

A considerable amount of effort is needed to transform the raw data collected for the various sources into a common format that will support the analysis.

National Retail Chain Data. The national chain sales data provided by D&R was converted into the same format as the independent data. Part of this conversion included the addition of a variable that indicates the percent above standard for each appliance model. Since ENERGY STAR specifications are a specific threshold for each appliance, this variable functioned as the mechanism that separated the units between those that were ENERGY STAR qualified and those that were not.

Independent and Regional Chains. The data received from independent and regional chains is first converted to a common electronic format. For example, hard copy data are coded into an electronic database. The required efficiency parameters are then electronically merged to the sales data by the manufacturer model numbers provided in the sales data. The primary sources for efficiency parameters varied by appliance. For clothes washers and dishwashers, RER staff obtained the majority of efficiency data directly from manufacturers. Information was procured from their websites whenever possible. Additionally, telephone calls were made to obtain information for older models or for manufacturers without websites. For refrigerators and room air conditioners, the CEC's Appliance Efficiency Database and AHAM's Directory of Certified Refrigerators and Freezers provided most of

the efficiency data.⁸ In addition to the efficiency or energy factor data, a variable that indicates the percent above efficiency standard for each model for the independent data is created. This is done to identify the various efficiency levels of units sold compared to the federal standard.

Appliance Sales Analysis

The general analysis involved estimating the share of appliances sold that met or exceeded the ENERGY STAR qualification threshold. In particular, RER estimated the percentage of ENERGY STAR compliant units of each appliance sold in California and for each utility service area on an annual and quarterly basis from the first quarter of 1998 through the fourth quarter of 2000.

Two key points are worth noting regarding the appliance sales analysis. First, as noted in Table 2-5, the sample of retailers that provided 1998 is different from the sample that provided 1999 data. Specifically, in 1998 only two national chain retailers provided sales data, whereas four national chains and a panel of independent retailers provided data in 1999. To account for differences between the 1998 and 1999 data, the 1998 data were adjusted based on the ratio of the estimated percent of ENERGY STAR units sold during 1999 to the percent of ENERGY STAR units sold by national chains in 1999. Second, expansion weights were developed according to the sample design for this component of the project. In particular, separate expansion weights were developed for national chain sales and sales by independently owned retailers. This was particularly important because of speculation by industry professionals that retailers in the two market channels behave differently with respect to the product mixes they typically stock and sell.

Expansion Weights. RER developed weights to expand the sample to the total sales of each appliance in California and each utility service area. This required the estimation of 1) total appliance sales in California and each utility service area, and 2) total appliance sales through each market channel.

To estimate the total appliance sales in each utility area, RER developed the ratio of the total number of households in each utility service area to the total number of households in California. This ratio was used to estimate the proportion of total sales of each appliance in each utility service area for each year, based on total appliance shipments to California as published by AHAM.

⁸ California Energy Commission. Appliance Efficiency Database. www.energy.ca.gov/efficiency/appliances. Association of Home Appliance Manufacturers. *AHAM Directory of Certified Refrigerators and Freezers. January and June Editions.* 1997 through 2000.

$$N_{ua} = \frac{P_u}{P_{CA}} \times S_{CAau}$$

where:

- N_{ua} is an estimate of total sales of appliance a for utility u in 2000.
- P_u is the total number of households in each utility's u service area in 2000.
- P_{CA} is the total number of households in California in 2000.
- S_{CAa} is the total shipments of appliance type a to California in 2000.

To estimate total sales for each market channel, RER estimated the total sales of each appliance by national chains by expanding the sales provided in the D&R database (representing two chains) to represent sales by all ENERGY STAR partner national chains. Because total unit sales by individual chains are not known, RER expanded sales by a revenue-multiplier as a proxy for total unit sales:⁹

$$N_{ua}^{nc} = n_{ua}^{nc} \left(\frac{R_{ua}^{nc}}{r^{nc}} \right)$$

where

- N_{ua}^{nc} is the total sales of appliance a by all national chain ENERGY STAR partners (nc) in 2000.
- n_{ua}^{nc} is the sales of appliance a for utility u in 2000.
- R^{nc} is the total revenues from appliance sales by all national chain ENERGY STAR partners in 1999.¹⁰
- r^{nc} is the total revenues from appliance sales by the national chain retailers in the analysis sample in 1999.

Total sales by the independent retail channel is assumed to be the remainder of market, or

$$N_{ua}^{in} = N_{ua} - N_{ua}^{nc}$$

where

- N_{ua}^{in} is the total sales of appliance a by all independent retailers (in) in 2000.

⁹ D&R International provided revenue data to RER for creation of revenue multipliers.

¹⁰ 2000 revenue data was not available to update the revenue-multiplier. Therefore, the proxy used in 1999 was used for 2000.

The expansion weights for each appliance a sold in each utility area u for sales by the national chain ENERGY STAR partners and independent retailers are computed as the ratio of total units sold to the units sold represented in the analysis sample:

$$W_{ua}^{nc} = \frac{N_{ua}^{nc}}{n_{ua}^{nc}}$$

$$W_{ua}^{in} = \frac{N_{ua}^{in}}{n_{ua}^{in}}$$

where:

- W_{ua}^{nc} is the expansion weight applied to all sales by the national chain ENERGY STAR partners in the sample, and
- W_{ua}^{in} is the expansion weight applied to all sales by independently owned retailers in the sample.

Shares of ENERGY STAR qualifying appliances during each quarter were estimated by expanding the sales in the database by the appropriate expansion factor and computing the percent of the expanded sales that qualify for the ENERGY STAR label.¹¹

¹¹ Because the 1998 sales data does not accurately represent California's appliance market, RER developed a rather simplistic approach to estimating the shares of ENERGY STAR appliances representing the entire market. In particular, the share of ENERGY STAR qualified sales of each appliance developed from the 1998 data was multiplied by the ratio of the share of ENERGY STAR sales in 1999 by the national chains in the 1998 sample to the share of ENERGY STAR sales in 1999 by the four national chains in the 1999 sample.

3

Clothes Washers

3.1 Overview

This section discusses total clothes washer unit sales, characteristics of available models, efficiency standards, market share of ENERGY STAR® qualified units, and analysis of ENERGY STAR sales by market channel.

3.2 Total Unit Sales

Table 3-1 presents estimates of annual unit sales of clothes washers used in the development of market shares in this report. The Association of Home Appliance Manufacturers (AHAM) provided the main source of information for these estimates. The data provided by AHAM is based on appliance distributor sales.

Table 3-1: Estimate of Total Clothes Washer Units Sales in California*

Measure	1998	1999	2000
Clothes Washers	702,000	721,100	731,500

*AHAM

3.3 Characteristics of Available Models

Comprehensive data sources to characterize overall available clothes washer models, such as those found for refrigerators, are not available. However, the ENERGY STAR program illustrated some interesting trends in available models. As of April 11, 2001, D&R International made the following observation about clothes washers, “84 qualified models are listed with ENERGY STAR at present; this is about 13% of all models currently available.”¹² In addition, D&R International has studied the market for ENERGY STAR appliances. In November 2000, they found that 567 models of clothes washers (42 brands) met the federal

¹² D&R International, Ltd. Appliance Update: ENERGY STAR Qualified Products in 2001.
www.energystar.gov/opie/library/studiesreports/natmarketstudies/2001applianceupdatespring.pdf.

standard. Of these, 64 models (18 brands) met the higher ENERGY STAR specification.¹³ The increase in available models from November to April was expected because new ENERGY STAR standards did not affect washers in the same manner as other appliances. The new ENERGY STAR specification for clothes washer is basically the same as the former specification. The major shift for clothes washers has been the change from energy factor (EF) to modified energy factor (MEF). The old ENERGY STAR specification of 2.50 EF and the new specification of 1.26 MEF are basically the same. Therefore, the standard did not truly tighten for clothes washers.

3.4 Clothes Washer Efficiency Standards

Clothes washer energy use is expressed in estimated annual energy use (kWh) under “typical conditions” and is based on an average 392 loads of laundry per year. Current clothes washer efficiency ratings are expressed as an energy factor rating (EF), which is a measurement based on ft³/kWh/cycle. However, the new standards are based on a modified energy factor (MEF).¹⁴

Current federal energy use standards for residential clothes washers vary by tub volume and have been in place since May 1994. Compact washers with a tub capacity less than 1.6 cubic feet have a minimum EF requirement of 0.90. Top loading clothes washers with a tub capacity of 1.6 cubic feet or greater must have an EF of 1.18. Front-loading units were required to have an unheated rinse option. Changes to the federal minimum energy efficiency standard have been approved. These changes have been guided, in part, by the Super-Efficient Home Appliance Initiative (SEHA) standards created by the Consortium for Energy Efficiency (CEE). President George W. Bush finalized the new standard, initially started during the Clinton administration, in April 2001. It will take effect on January 1, 2004. The new provision also includes a second increase in the standard, which will commence on January 1, 2007. The new federal standards require units to be 22% more efficient in 2001 and 35% more efficient in 2004 than today’s baseline washer.

¹³ D&R International, Ltd. ENERGY STAR Appliances: 2001 Market Forecast.

www.energystar.gov/opie/library/studiesreports/natmarketstudies/2001applianceforecast.PDF.

¹⁴ The MEF considers the moisture content remaining in clothes after washing. It does so to correlate the effectiveness of the washer to the amount of dryer use required or, in other words, the dryer savings. The MEF concept is similar to the Super Efficient Home Appliance (SEHA) initiative standards created by the Consortium for Energy Efficiency (CEE).

Table 3-2: Comparison of Federal and ENERGY STAR Clothes Washer Energy Standards

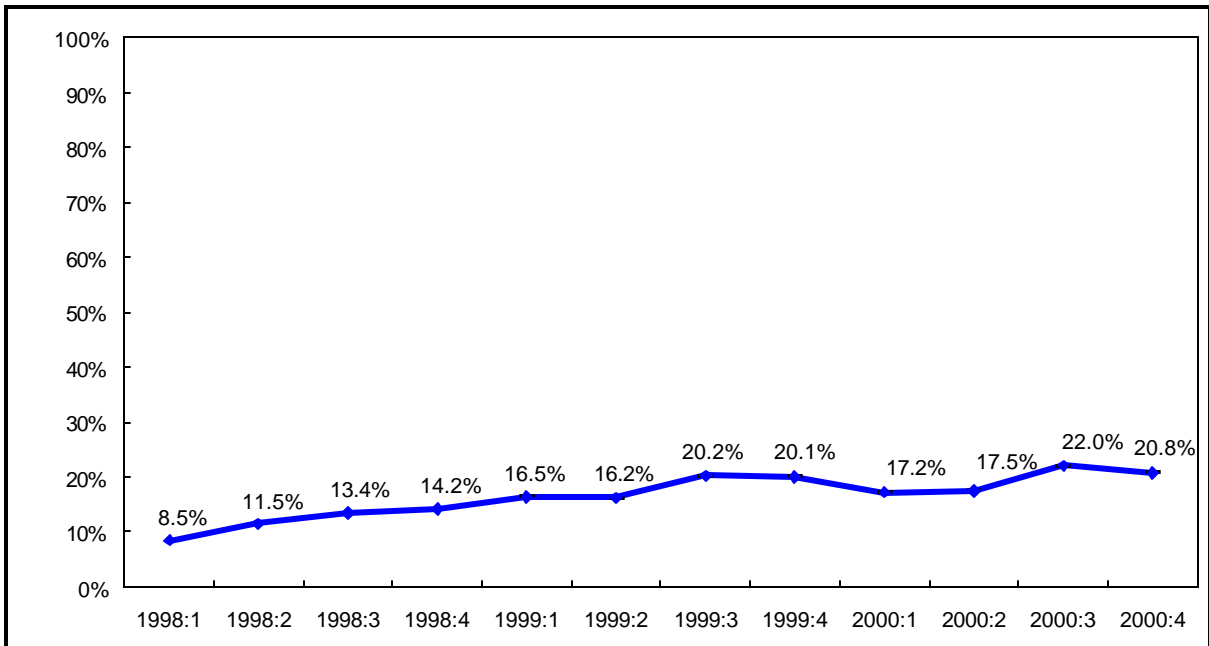
	1994 Standard	January 1, 2001 Standard	January 1, 2004 Standard	January 1, 2007 Standard
NAECA	1.18 EF	1.18 EF	1.04 MEF	1.26 MEF
Percent Improved	n/a	n/a	22% over 2001	35% over 2001
ENERGY STAR	2.50 EF	1.26 MEF (~ 2.50 EF)	1.42 MEF	n/a

3.5 Market Share of ENERGY STAR Qualified Clothes Washers

Figure 3-1 and Table 3-3 present the percentage of ENERGY STAR qualified clothes washers sold in California during the first quarter of 1998 through the fourth quarter of 2000. As shown, the market share of ENERGY STAR qualified clothes washers has steadily increased during the past three years—climbing from over 8% in early 1998 to 20% by the final quarter of 2000.

Table 3-4 reports the percentage of ENERGY STAR compliant clothes washers sold in each utility service area annually and by quarter.

Figure 3-1: Clothes Washer Sales, Percent of ENERGY STAR Qualified Units



Error bands for the 90% confidence interval.
1998 data reflects national chain D&R data only.

Table 3-3: Clothes Washer Sales, Percent of ENERGY STAR Qualified Units (Statewide)

Year	Percent of ENERGY STAR Qualified Clothes Washers				
	Annual	Q1	Q2	Q3	Q4
1998	11.96% (-) n = 180,983	8.52% (-) n = 44,233	11.46% (-) n = 43,366	13.39% (-) n = 44,746	14.22% (-) n = 48,638
1999	18.17% (0.0006) n = 425,528	16.45% (0.0011) n = 115,621	16.23% (0.0011) n = 107,984	20.24% (0.0013) n = 101,691	20.07% (0.0013) n = 100,232
2000	19.26% (.0006) n=414,505	17.20% (.0013) n=113,966	17.48% (.0011) n=114,385	22.01% (.0011) n=88,754	20.79% (.0014) n=97,400

1 Standard errors in parentheses.

2 1998 data reflects national chain D&R data only.

Table 3-4: Clothes Washer Sales, Percent of ENERGY STAR Qualified Units by Utility Service Area

Utility	Year	Percent of ENERGY STAR Qualified Clothes Washers ^{1,2}				
		Annual	Q1	Q2	Q3	Q4
PG&E	1998	12.65% (-) n=83,563	80.63% (-) n = 19,916	13.65% (-) n = 20,751	15.29% (-) n = 20,520	12.87% (-) n = 22,376
	1999	14.68% (0.0008) n=165,144	12.91% (0.0015) n = 47,436	13.67% (0.0017) n = 42,090	15.56% (0.0019) n = 37,916	17.16% (0.0019) n = 37,702
	2000	24.29% (.0011) n=165,405	20.36% (.0019) n=43,959	23.99% (.0020) n=45,042	28.1% (.0023) n=37,038	25.04% (.0022) n=39,366
SCE	1998	8.74% (-) n=47,708	7.55% (-) n = 12,287	7.16% (-) n = 11,357	7.88% (-) n = 11,693	12.19% (-) n = 12,371
	1999	17.38% (0.0010) n=140,863	15.59% (0.0018) n = 36,820	15.41% (0.0019) n = 35,609	19.73% (0.0021) n = 34,829	19.03% (0.0021) n = 33,605
	2000	14.95% (.0009) n=136,046	14.06% (.0018) n=38,696	12.21% (.0017) n=38,212	16.75% (.0022) n=27,790	17.25% (.0021) n=31,348
SDG&E	1998	11.70% (-) n=14,582	10.59% (-) n = 3,491	11.65% (-) n = 3,359	14.19% (-) n = 3,413	10.66% (-) n = 4,319
	1999	18.03% (0.0020) n=38,302	18.67% (0.0039) n = 9,915	14.68% (0.0035) n = 9,943	18.70% (0.0041) n = 9,229	20.18% (0.0042) n = 9,215
	2000	21.29% (.0022) n=35,560	19.91% (.0040) n=9,890	16.25% (.0037) n=9,816	24.36% (.0050) n=7,492	24.72% (.0047) n=8,362
Other	1998	13.37% (-) n = 35,130	7.82 (-) n = 8,539	10.36% (-) n = 7,899	14.39% (-) n = 9,120	19.82% (-) n = 9,57203
	1999	15.71% (0.0013) n=81,219	14.65% (0.0024) n = 21,450	14.91% (0.0025) n = 20,342	17.67% (0.0027) n = 19,717	15.72% (0.0026) n = 19,710
	2000	16.20% (.0013) n=77,494	16.02% (.0025) n=21,421	15.11% (.0025) n=21,315	17.47% (.0030) n=16,434	16.43% (.0027) n=18,324

1 Standard errors in parentheses.

2 "Other" includes municipal utilities such as LADWP, LMUD, PP&L, SMUD, and others.

3 1998 data reflects national chain D&R data only.

3.6 Analysis by Market Channel

Figure 3-2 and Table 3-5 compare the shares of ENERGY STAR qualified clothes washers sold by national chain ENERGY STAR partners to sales by independently owned stores and regional chains. As shown, national chains sell a considerably lower percentage of ENERGY STAR clothes washers than independent retailers. Throughout the three-year period, the share sold by national chain ENERGY STAR partners ranged from 10.4% to 12.5% by the end of 2000, while the share sold by the independent retailers ranged from a low of 27.44% to just over 33% during the same period.

Figure 3-2: Clothes Washer Sales, Percent of ENERGY STAR Qualified Units by Market Channel

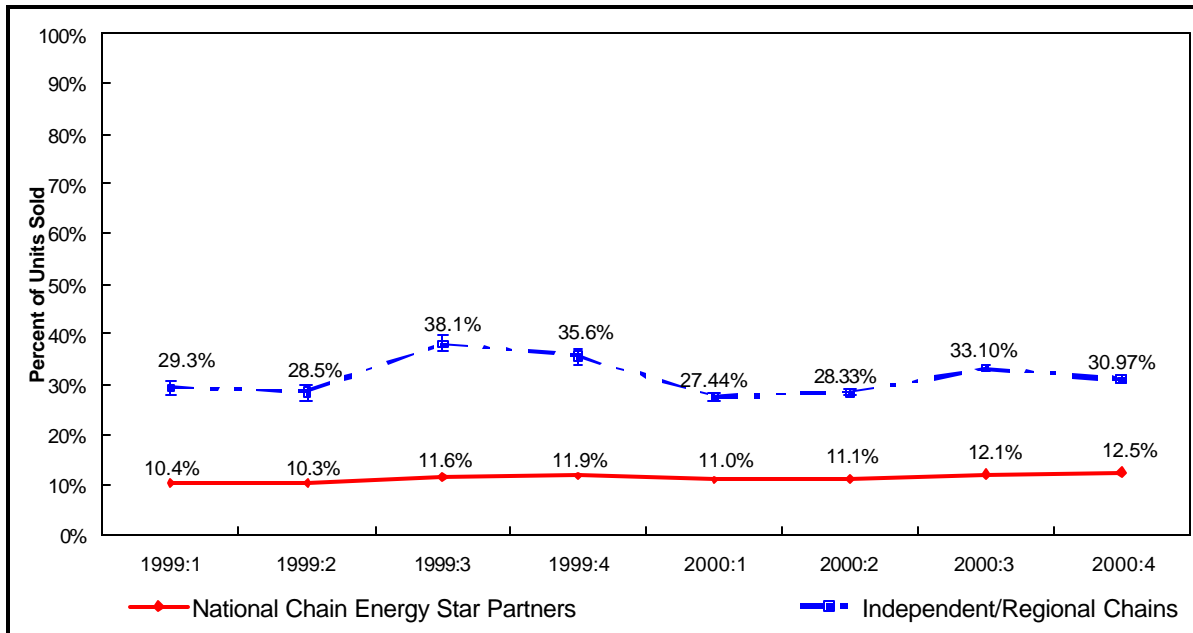


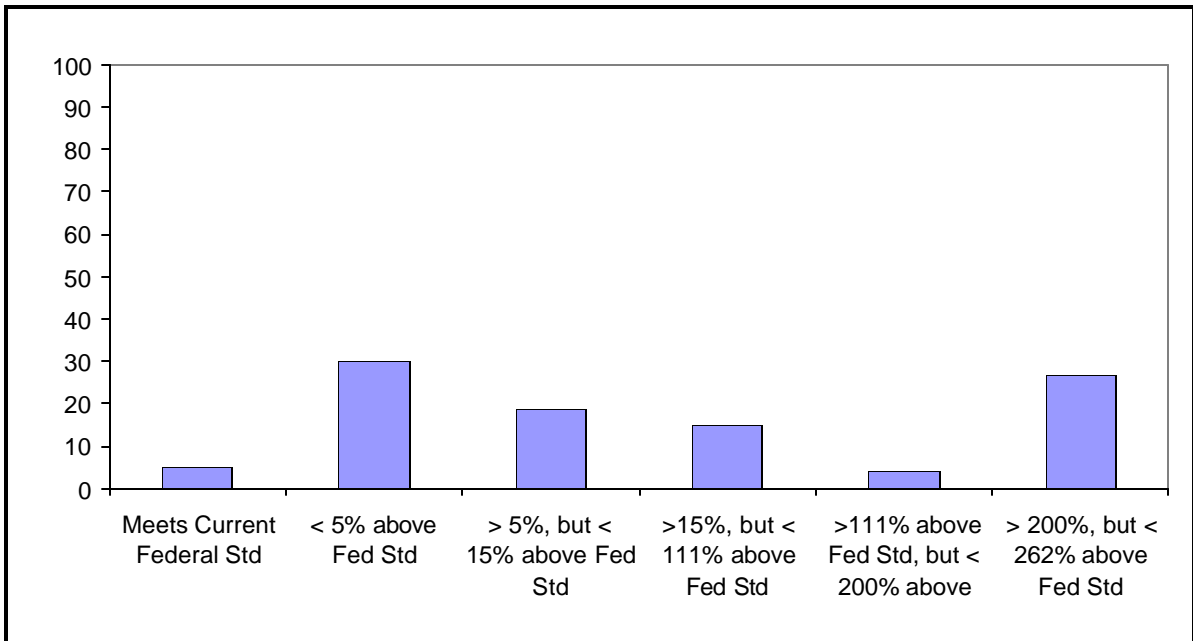
Table 3-5: Clothes Washer Sales, Percent of ENERGY STAR Qualified Units by Market Channel

Market Channel	1999:1	1999:2	1999:3	1999:4	2000:1	2000:2	2000:3	2000:4
National Chain ENERGY STAR Partners	10.36% (0.0009) n =113,050	10.30% (0.0009) n =105,551	11.63% (0.0010) n =99,385	11.88% (0.0010) n =97,766	10.98% (0.0010) n =102,845	11.05% (0.0010) n =103,399	12.12% (0.0012) n =76,422	12.48% (0.0011) n =85,304
Independents and Regional Chains	29.28% (0.0090) n =2,571	28.47% (0.0091) n =2,433	38.10% (0.0101) n =2,306	35.58% (0.0096) n =2,466	27.44% (0.0042) n =11,121	28.33% (0.0043) n =10,986	33.09% (0.0042) n =12,332	30.97% (0.0042) n =12,096

The detailed data shared by independent retailers in 2000 have enabled sales to be examined in groupings of efficiency levels. This is shown in Figure 3-3. Note that the ENERGY STAR threshold is 111% above the federal standard. Also of interest is that only a small percentage

of clothes washers sold by participating independents only just meet the federal standard. This reinforces the idea that independent appliance retailers do not focus on sales of low price point appliance models, which often have low efficiency levels. Subsequently however, one-quarter of independent sales were of models less than 5% above the standard. Generally, two-thirds of independent appliance sales are from non-ENERGY STAR qualified units. Approximately one-third are ENERGY STAR qualified. Beyond that, the ENERGY STAR qualified units sold by independents tend to be toward the high end of the ENERGY STAR qualification range. Many of these units have an EF of 4.01 or higher. European companies manufacture many high efficiency models. Many of these manufacturers do not have significant representation, if they are offered at all, in the national chain retailers. National chains tend to be dominated by U.S.-based appliance manufacturers, formerly known as the Big 5.¹⁵ In the past, the Big 5 have not focused on efficiency as much as their smaller European counterparts. Independent retailers offer their customers a wider selection of appliances, including European models. Figure 3-3 shows that these choices can impact the share of highly efficient clothes washers sold by independent retailers.

Figure 3-3: Percent of 2000 Independent Clothes Washer Sales by Efficiency Level



¹⁵ The Big 5 consists of Amana, Fridgidaire, General Electric, Maytag, and Whirlpool. In 2001, Amana was purchased by Maytag, leaving four major appliance manufacturers.

4

Dishwashers

4.1 Overview

This section discusses total dishwasher unit sales, characteristics of available models, efficiency standards, market share of ENERGY STAR[®] qualified units and analysis of ENERGY STAR sales by market channel.

4.2 Total Unit Sales

Table 4-1 presents estimates of annual unit sales of dishwashers used in the development of market shares in this report. The Association of Home Appliance Manufacturers (AHAM) provided the main source of information for these estimates. Data provided by AHAM are based on appliance distributor sales.

Table 4-1: Estimate of Total Dishwashers Units Sales in California*

Measure	1998	1999	2000
Dishwashers	509,000	566,800	579,100

* AHAM

4.3 Characteristics of Available Models

Comprehensive data sources to characterize available dishwasher models are not available. However, as of April 11, 2001, D&R International made the following observation about dishwashers, “167 qualified models are listed with ENERGY STAR at present; this is over 22% of models currently on the market.”¹⁶ It is important to note that, as of January 1, 2001 when the new ENERGY STAR specification took effect,¹⁷ approximately 100 models fell short of the new qualification level. By August 2001, 262 models of dishwashers, out of over 800, qualified for the new higher ENERGY STAR standard.

¹⁶ D&R International, Ltd. Appliance Update: ENERGY STAR Qualified Products in 2001. www.energystar.gov/opie/library/studiesreports/natmarketstudies/2001applianceupdatespring.pdf.

¹⁷ D&R International, Ltd. ENERGY STAR Appliances: 2001 Market Forecast. www.energystar.gov/opie/library/studiesreports/natmarketstudies/2001appliancemarketforecast.pdf.

4.4 Dishwasher Efficiency Standards

Dishwasher energy use is based on estimated annual energy use (kWh) under “typical conditions” and an average of 322 loads per year. Dishwasher efficiency ratings are expressed as an energy factor rating (EF). The EF for dishwashers is computed as:

$$EF = \frac{322}{\text{Actual Annual Energy Usage (kWh)}}$$

As summarized in Table 4-2, all standard-sized dishwashers must have an energy factor equal to at least 0.46. ENERGY STAR qualified dishwashers must exceed the minimum federal standard by at least 25% as of January 1, 2001. The previous standard for 2000 was 13%. Once again, the new ENERGY STAR specification stems from the SEHA program from the CEE.¹⁸

Table 4-2: Dishwasher Energy Efficiency Standards and Program Requirements

	1994 Efficiency Rating (EF)	January 1, 2001 Standard
NAECA	0.46	0.46
ENERGY STAR	0.52	0.58
Percent Improved	13.0%	25.0%

Does not apply to compact dishwashers.

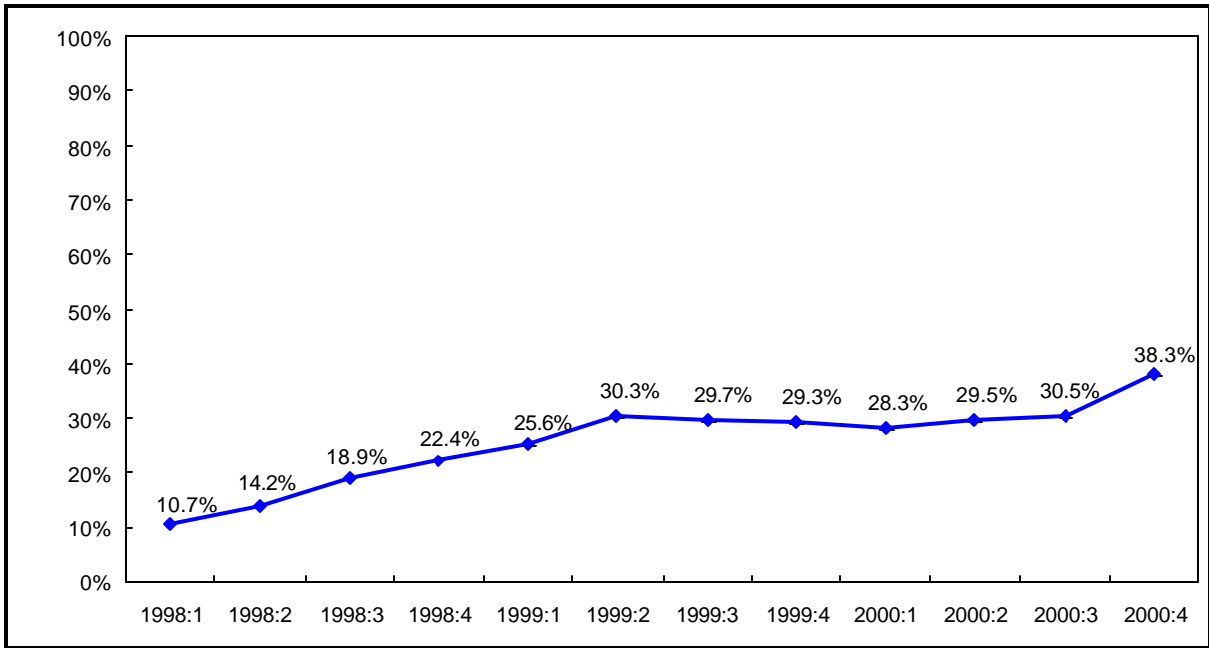
4.5 Market Share of ENERGY STAR Qualified Dishwashers

Figure 4-1 and Table 4-3 present the percentage of ENERGY STAR qualified dishwashers sold in California during the first quarter of 1998 through the fourth quarter of 2000. Shares of ENERGY STAR dishwasher sales in 1999 and 2000 were fairly level. The sharp increase at the end of the year will be explained in the analysis by channel.

Table 4-4 reports the percent of ENERGY STAR compliant dishwashers sold in each utility service area annually and by quarter.

¹⁸ Many parties are hoping that new federal dishwasher efficiency standards will be passed this year. If this comes to fruition, it would likely take effect on January 1, 2005. Consortium for Energy Efficiency. Super Efficient Home Appliance Initiative: Dishwashers. www.ceefornt.org/resid/seha/dishw/dishw-main.php3

Figure 4-1: Dishwasher Sales, Percent of ENERGY STAR Qualified Units



- 1 Error bands for the 90% confidence interval.
- 2 1998 data reflects national chain D&R data only.

Table 4-3: Dishwasher Sales, Percent of ENERGY STAR Qualified Units (Statewide)

Year	Percent of ENERGY STAR Qualified Dishwashers				
	Annual	Q1	Q2	Q3	Q4
1998	16.91% (-) n = 66,161	10.69% (-) n = 15,478	14.23% (-) n = 15,012	18.91% (-) n = 16,775	22.43% (-) n = 18,896
1999	28.76% (0.001) n = 194,979	25.58% (0.0019) n = 47,633	30.34% (0.0021) n = 47,098	29.74% (0.0021) n = 46,689	29.35% (0.002) n = 53,559
2000	31.64% (.0010) n=214,069	28.29% (.0018) n=60,727	29.54% (.0019) n=56,656	30.48% (.0022) n=44,899	38.28% (.0021) n=51,787

- 1 Standard errors in parentheses.
- 2 1998 data reflects national chain D&R data only.

Table 4-4: Dishwasher Sales, Percent of ENERGY STAR Qualified Units by Utility Service Area

Utility	Year	Percent of ENERGY STAR Qualified Dishwashers ^{1,2}				
		Annual	Q1	Q2	Q3	Q4
PG&E	1998	12.00% (-) n=24,900	7.62% (-) n=5,671	10.76% (-) n=5,626	13.54% (-) n=6,522	15.10% (-) n=7,081
	1999	16.19% (0.0014) n=69,128	11.57% (0.0024) n=17,005	13.26% (0.0026) n=16,425	18.09% (0.003) n=16,172	21.11% (0.0029) n=19,526
	2000	30.73% (0.0015) n=94,925	28.26% (0.0028) n=25,748	28.88% (0.0029) n=24,730	31.56% (0.0032) n=20,976	34.35% (0.0031) n=23,471
SCE	1998	20.44% (-) n=20,197	12.01% (-) n=4,893	15.40% (-) n=4,596	22.14% (-) n=4,940	30.15% (-) n=5,768
	1999	29.6% (0.0017) n=68,633	26.23% (0.0034) n=16,560	32.47% (0.0036) n=17,027	30.78% (0.0036) n=16,882	28.9% (0.0034) n=18,164
	2000	32.16% (0.0018) n=65,649	28.45% (0.0032) n=19,451	30.38% (0.0035) n=17,358	29.95% (0.0040) n=13,271	39.90% (0.0039) n=15,669
SDG&E	1998	15.41% (-) n=6,510	12.02% (-) n=1,466	14.29% (-) n=1,487	17.64% (-) n=1,724	17.30% (-) n=1,833
	1999	30.04% (0.0032) n=20,564	29.29% (0.0064) n=4,995	31.18% (0.0066) n=4,868	29.15% (0.0065) n=4,872	30.55% (0.006) n=5,829
	2000	36.28% (0.0035) n=18,996	30.74% (0.0061) n=5,674	32.54% (0.0066) n=5,070	33.42% (0.0076) n=3,831	47.79% (0.0075) n=4,421
Other	1998	12.92% (-) n=14,554	8.18% (-) n=3,448	11.77% (-) n=3,303	14.76% (-) n=3,589	16.15% (-) n=4,214
	1999	27.68% (0.0023) n=36,654	24.10% (0.0045) n=9,073	27.92% (0.0048) n=8,778	28.28% (0.0048) n=8,763	29.35% (0.0045) n=10,040
	2000	29.72% (0.0025) n=34,399	26.47% (0.0044) n=9,854	27.41% (0.0046) n=9,898	27.18% (0.0054) n=6,821	37.80% (0.0053) n=8,226

1 Standard errors in parentheses.

2 "Other" includes municipal utilities such as LADWP, LMUD, PP&L, SMUD, and others.

3 1998 data reflects national chain D&R data only.

4.6 Analysis by Market Channel

Figure 4-2 and Table 4-5 compare the shares of ENERGY STAR qualified dishwashers sold by national chain ENERGY STAR partners to sales by independently owned stores and regional chains. As shown, the share sold by the national chains is considerably lower than the share sold by the independent store throughout the year. The share sold by national chain ENERGY STAR partners showed an overall trend of increasing sales numbers of ENERGY STAR dishwashers through the second quarter of 2000. They ranged from 13.1% at the beginning of 1999 to 20.5% by mid-2000. The significant decrease at the end of 2000 is attributed to partial data from D&R. D&R had partial data from a national retailer who carried an extensive line of dishwashers. This retailer accounted for a high percentage of ENERGY STAR sales. These particular sales data were available for the first two quarters of the year, but not for the last two. Therefore, when looking at Figure 4-2, one sees a sharp decline of ENERGY STAR dishwasher sales for the national chains during the last two quarters of 2000.

The independents showed a slight weakening in their percentage of ENERGY STAR sales until one of the national chains left the market. At that point, the share sold by the independent retailers soared to just above 50% at the end of the year. Figure 4-2 illustrates the increase in independent ENERGY STAR qualified dishwasher sales. A portion of the ENERGY STAR share of sales, which in the past would have gone to the national retailers, appears to have shifted to independent retailers

Figure 4-2: Dishwasher Sales, Percent of ENERGY STAR Qualified Units by Retailer Type

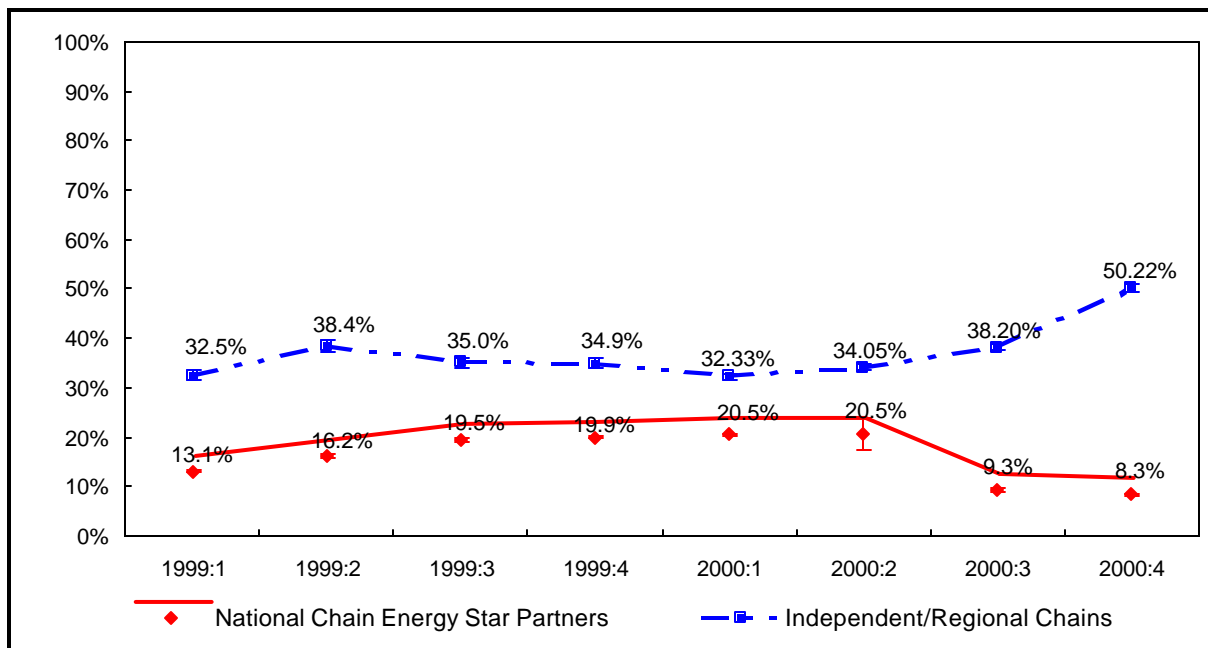


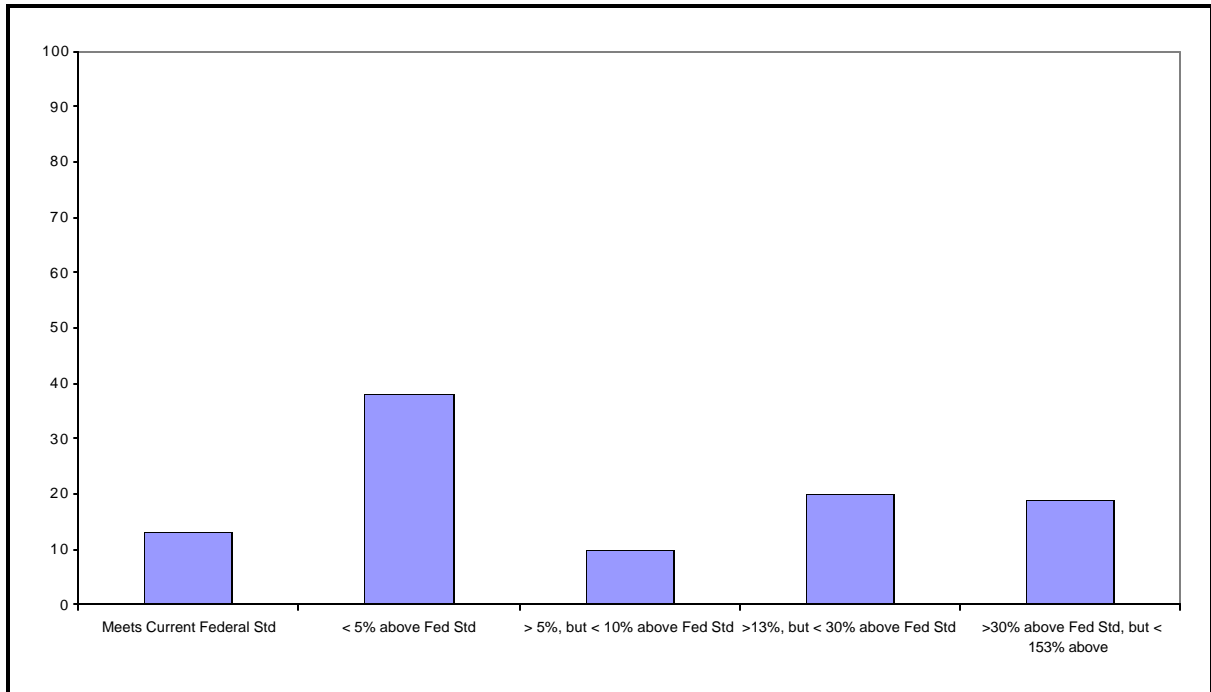
Table 4-5: Dishwasher Sales, Percent of ENERGY STAR Qualified Units by Market Channel

Market Channel	1999:1	1999:2	1999:3	1999:4	2000:1	2000:2	2000:3	2000:4
National Chain ENERGY STAR Partners	13.06% (0.0014) n =69,128	16.17% (0.0018) n =42,227	19.48% (0.0019) n=41,425	19.94% (0.0018) n =48,184	20.45% (0.0019) n =45,309	20.50% (0.0020) n =41,854	9.34% (0.0017) n =30,180	8.34% (0.0015) n =35,928
Independents and Regional Chains	32.5% (0.0066) n =5,067	38.42% (0.0069) n =4,871	35.05% (0.0066) n =5,264	34.88% (0.0065) n =5,375	32.33% (0.0038) n =15,418	34.05% (0.0039) n =14,802	38.20% (0.0040) n =14,719	50.22% (0.0040) n =15,859

The detailed data shared by independent retailers in 2000 has enabled sales to be examined in groupings of efficiency levels. This is shown in Figure 4-3. Note that the ENERGY STAR threshold is 13% above the federal standard. The efficiency buckets above the ENERGY STAR threshold indicate the wide array of independent sales in these high efficiency areas. Almost half of the dishwashers sold by independents in 2000 were ENERGY STAR qualified. Beyond that, the ENERGY STAR qualified units sold by independents tend to be the high end of ENERGY STAR. Many are more than 30% above the federal standard. These units have an EF of .60 or higher. As with clothes washers, foreign-based companies manufacture many high efficiency models. Many of these manufacturers do not have significant representation, if they are offered at all, in the national chain retailers. National chains tend to be dominated by U.S.-based appliance manufacturers, formerly known as the Big 5.¹⁹ In the past, the Big 5 have not focused on efficiency as much as their smaller foreign counterparts. Independent retailers offer their customers a wider selection of appliances, including European models. Figure 4-3 shows that these choices can impact the share of highly efficient dishwashers sold by independent retailers.

¹⁹ The Big 5 consists of Amana, Fridgidaire, General Electric, Maytag, and Whirlpool. In 2001, Amana was purchased by Maytag, leaving four major appliance manufacturers.

Figure 4-3: Percent of 2000 Independent Dishwasher Sales by Efficiency Level



5

Refrigerators

5.1 Overview

This section discusses total refrigerator unit sales, characteristics of available models, efficiency standards, market share of ENERGY STAR qualified units, and analysis of ENERGY STAR sales by market channel.

5.2 Total Unit Sales

Table 5-1 presents estimates of annual unit sales of refrigerators used in the development of market shares in this report. The Association of Home Appliance Manufacturers (AHAM) provided the main source of information for these estimates. Data provided by AHAM are based on appliance distributor sales.

Table 5-1: Estimate of Total Refrigerator Units Sales in California*

Measure	1998	1999	2000
Refrigerators	949,400	975,700	1,025,300

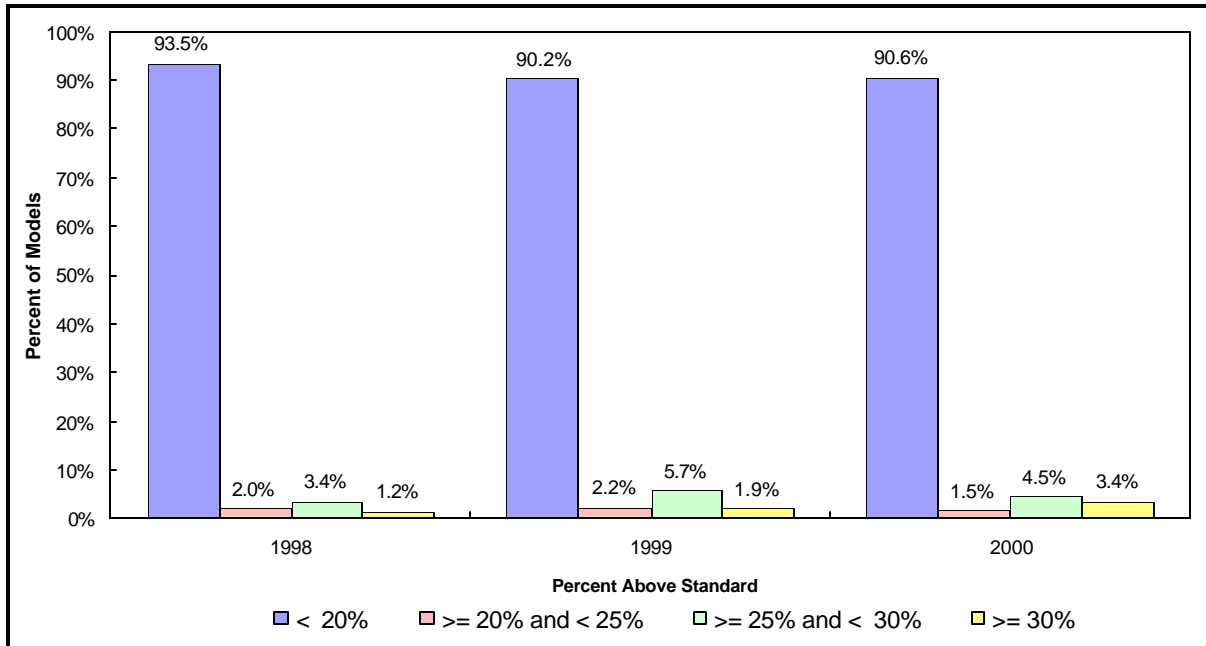
*AHAM.

5.3 Characteristics of Available Models

The AHAM Directory of Certified Refrigerators and Freezers was used to examine energy use attributes of available refrigerator models. Figure 5-1 and Figure 5-2 characterize refrigerators available in the marketplace in terms of their energy use characteristics. As shown in Figure 5-1, almost 94% of models available in 1998 used 20% less energy than the maximum requirement. This percentage decreased slightly to 90% in 1999 and 2000.

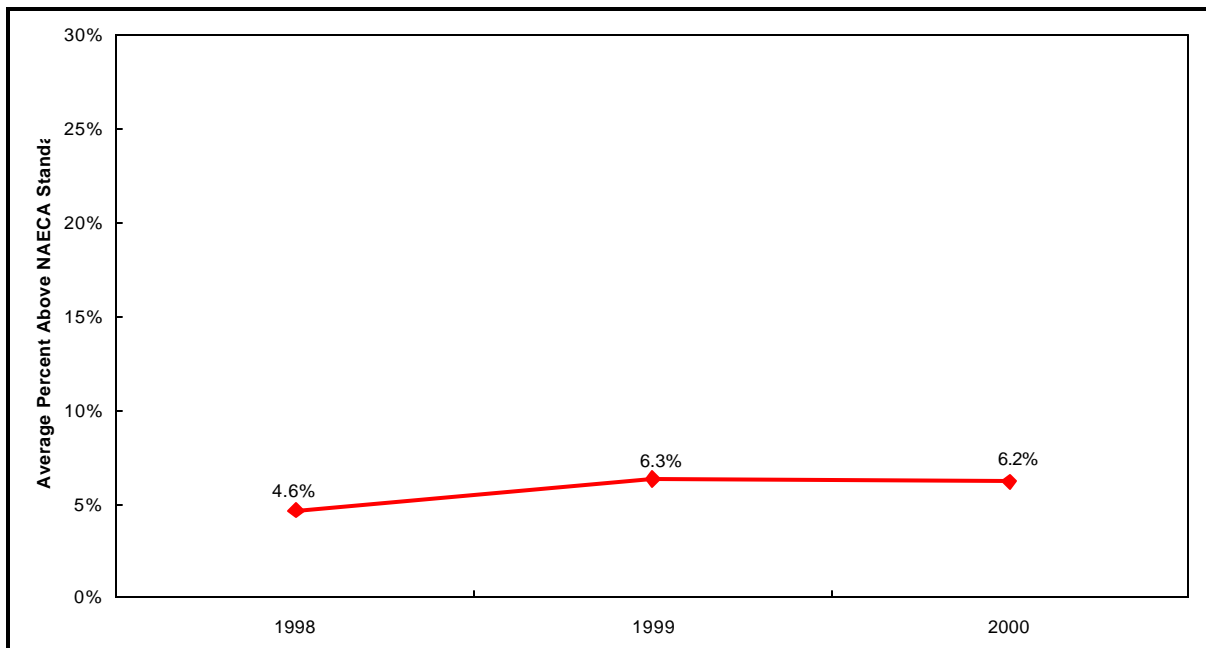
Figure 5-2 provides a time trend of the average percent above standard across all available refrigerator models. The average number of units greater than 20% above average has increased from 6.5% to 9.4% in 1999 and 2000, respectively.

Figure 5-1: Refrigerator Model Availability by Percent Above Standard



Source: AHAM

Figure 5-2: Available Refrigerator Models, Average Percent Above Standard



Source: AHAM

5.4 Refrigerator Efficiency Standards

Refrigerator energy use ratings are expressed in terms of expected annual energy use (kWh) under “typical conditions.” Federal energy use standards vary by refrigerator configuration and are a function of the unit’s adjusted volume (AV). Table 5-2 includes formulas for computing the federally mandated maximum energy use requirements for each refrigerator configuration type. This table also shows the energy reductions required for a refrigerator to qualify for the ENERGY STAR label (at least 20% less kWh) and the Super Efficient Home Appliance (SEHA) initiative.

New refrigerator energy use standards became effective on July 1, 2001.²⁰ The new formulas for computing maximum energy usage are included in the final column of Table 5-2. The required energy use reductions from the current standard to the new 2001 standard vary by configuration, ranging between 27% and 32%. In January 2001, AHAM’s Directory of Certified Refrigerators and Freezers contained 1,217 refrigerator/freezer models with automatic defrost. Only 25 of these met the new standard. All of the aforementioned models will decrease their energy consumption, on average, 25% annually under the new National Appliance Energy Consumption Act (NAECA). Additionally, the new 2001 ENERGY STAR qualification is that refrigerators use 10% less energy than the new federal standard. AHAM’s Directory of Certified Refrigerators and Freezers for July 2001 showed that 515 of the 1094 refrigerator/freezer models with automatic defrost complied with the new federal standard.

²⁰ The new 2001 federal standard for refrigerators can be found in the following: Energy Conservation Program for Consumer Products: Energy Conservation Standards for Refrigerators, Refrigerator-Freezers and Freezers. *Federal Register*. Vol. 62, No. 81. April 28, 1997.

Table 5-2: Refrigerator Energy Use Standards and Program Requirements

	Current Standard (Max. kWh)	2001 Standard (July 1, 2001)
Federal Standard		
Manual defrost	13.5*AV+299	8.82*AV+248.4
Partial defrost	10.4*AV+398	8.82*AV+248.4
Automatic defrost, top mount without TTD	16.0*AV+355	9.80*AV+276.0
Automatic defrost, side mount without TTD	11.8*AV+501	4.91*AV+507.5
Automatic defrost, bottom mount without TTD	16.5*AV+367	4.40*AV+459.0
Automatic defrost, top mount with TTD	17.6*AV+391	10.2*AV+356.0
Automatic defrost, side mount with TTD	16.3*AV+527	10.1*AV+406.0
ENERGY STAR Qualification	20% less kWh	10% less kWh (as of Jan. 1, 2001)
SEHA Tier 1 Qualification	30% less kWh	n/a
SEHA Tier 2 Qualification	37% less kWh	n/a

TTD = through-the-door ice dispenser.

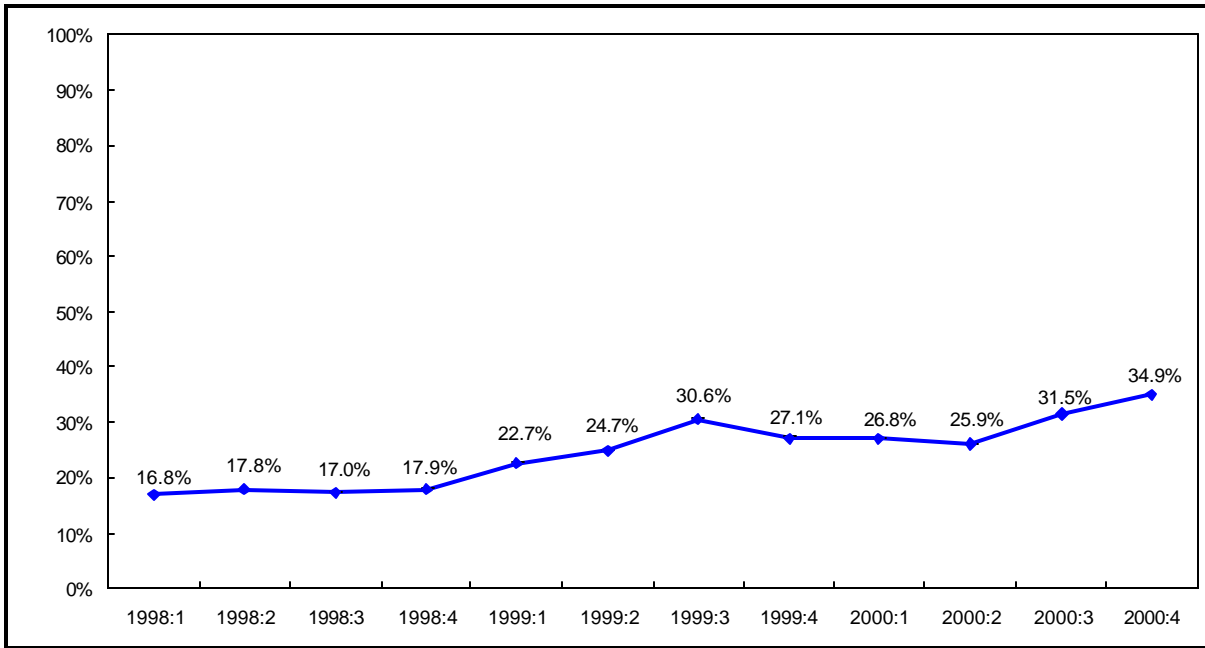
AV = Adjusted Volume = Fresh Volume + (1.63*Freezer Volume).

5.5 Market Share of ENERGY STAR Qualified Refrigerators

Figure 5-2 and Table 5-3 present the percentage of ENERGY STAR qualified refrigerators sold in California during the first quarter of 1998 through the fourth quarter of 2000. As shown, the percent of ENERGY STAR refrigerators remained relatively steady. Most fluctuations occur within a 5% range from the second quarter of 1999 through the second quarter of 2000. Then, in late 2000, ENERGY STAR refrigerators appear to have steady gains in market share.

Table 5-4 reports the percentage of ENERGY STAR compliant refrigerators sold in each utility service area annually and by quarter.

Figure 5-3: Refrigerator Sales, Percent of ENERGY STAR Qualified Units



- 1 Error bands for the 90% confidence interval.
- 2 1998 data reflects national chain D&R data only.

Table 5-3: Refrigerator Sales, Percent of ENERGY STAR Qualified Units, Statewide

Year	Percent of ENERGY STAR Qualified Refrigerators				
	Annual	Q1	Q2	Q3	Q4
1998	17.35% (-) n = 230,171	16.81% (-) n = 46,004	17.77% (-) n = 55,309	17.03% (-) n = 76,525	17.93% (-) n = 52,333
1999	26.49% (0.0006) n = 473,882	22.65% (0.0013) n = 110,181	24.66% (0.0012) n = 121,250	30.55% (0.0013) n = 130,514	27.09% (0.0013) n = 111,937
2000	29.78% (0.0007) n = 490,296	26.84% (0.0013) n = 115,865	25.93% (0.0012) n = 145,173	31.49% (0.0013) n = 122,865	34.94% (0.0015) n = 106,393

- 1 Standard errors in parentheses.
- 2 1998 data reflects national chain D&R data only.

Table 5-4: Refrigerator Sales, Percent of ENERGY STAR Qualified Units by Utility Service Area

Utility	Year	Percent of ENERGY STAR Qualified Refrigerators ^{1,2}				
		Annual	Q1	Q2	Q3	Q4
PG&E	1998	17.37% (-) n =90,493	17.88% (-) n = 19,547	19.13% (-) n =21,576	16.29% (-) n =28,722	16.53% (-) n =20,648
	1999	28.43% (0.0011) n =157,639	23.36% (0.0021) n =38,313	24.60% (0.0021) n =40,307	31.46% (0.0023) n =41,424	34.38% (0.0025) n =37,595
	2000	34.97% (0.0011) n =179,113	34.30% (0.0023) n =42,475	31.14% (0.0020) n =52,914	34.57% (0.0023) n =43,030	40.57% (0.0024) n =40,694
SCE	1998	16.17% (-) n =69,987	14.16% (-) n =13,179	15.81% (-) n =17,023	16.25% (-) n =24,049	18.13% (-) n =15,736
	1999	25.39% (0.0011) n =168,527	21.47% (0.0021) n =37,392	23.68% (0.0020) n =43,460	30.44% (0.0021) n =48,231	24.62% (0.0022) n =39,444
	2000	24.59% (0.0011) n =165,926	19.99% (0.0020) n =39,486	20.44% (0.0018) n =49,416	27.98% (0.0022) n =42,985	29.14% (0.0024) n =34,039
SDG&E	1998	23.10% (-) n =17,969	25.41% (-) n =2,980	21.12% (-) n =4,484	22.83% (-) n =6,434	24.00% (-) n =4,071
	1999	29.80% (0.0023) n =39,695	28.53% (0.0046) n =9,483	29.01% (0.0045) n =10,237	32.16% (0.0046) n =10,417	28.99% (0.0046) n =9,558
	2000	37.37% (0.0024) n =39,102	29.53% (0.0048) n =9,036	29.99% (0.0044) n =10,749	41.96% (0.0047) n =10,671	44.66% (0.0053) n =8,646
Other	1998	13.90% (-) n =51,722	13.00% (-) n = 10,298	13.94% (-) n =12,226	13.87% (-) n =17,320	14.69% (-) n =11,878
	1999	21.69% (0.0013) n =108,021	18.56% (0.0025) n =24,993	20.11% (0.0024) n =27,246	22.82% (0.0024) n =30,442	24.72% (0.0027) n =25,340
	2000	25.03% (0.0013) n =106,155	22.70% (0.0026) n =24,868	23.19% (0.0024) n =32,094	26.63% (0.0027) n =26,179	27.89% (0.0029) n =23,014

1 Standard errors in parentheses.

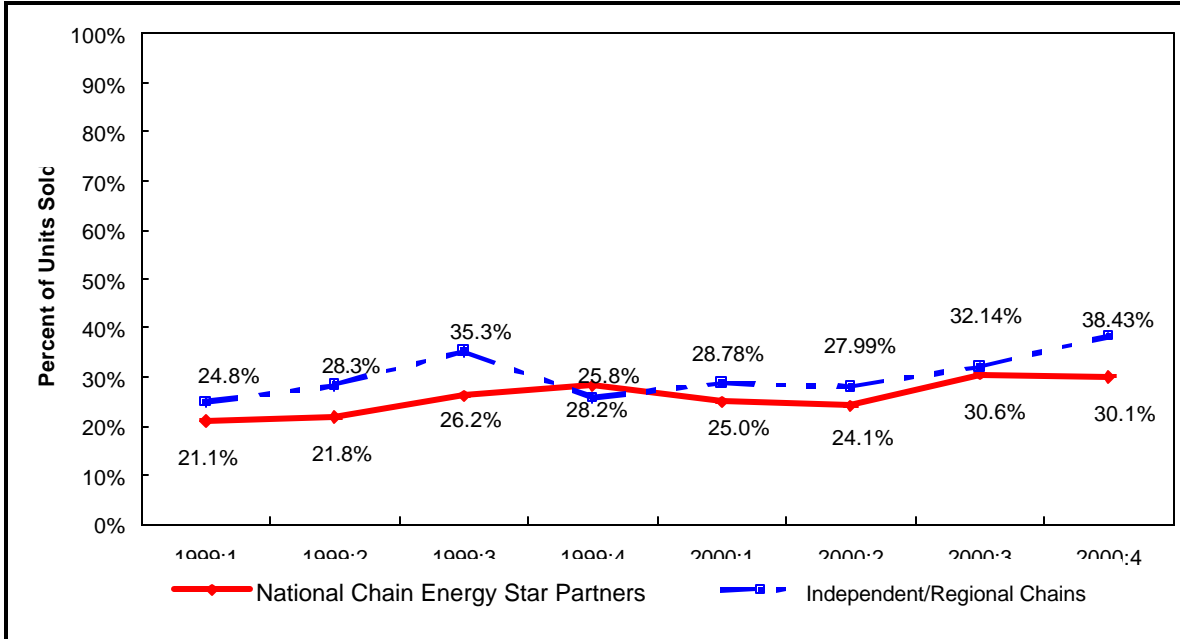
2 "Other" includes municipal utilities, such as LADWP, LMUD, PP&L, SMUD, and others.

3 1998 data reflects national chain D&R data only.

5.6 Analysis by Market Channel

Figure 5-4 and Table 5-5 compare the shares of ENERGY STAR qualified refrigerators sold by national chain ENERGY STAR partners to sales by independently owned stores and regional chains. Generally, the share sold by the national chains is lower than the share sold by the independent stores.

Figure 5-4: Refrigerator Sales, Percent of ENERGY STAR Qualified Units by Market Channel



Error bands for the 90% confidence interval.

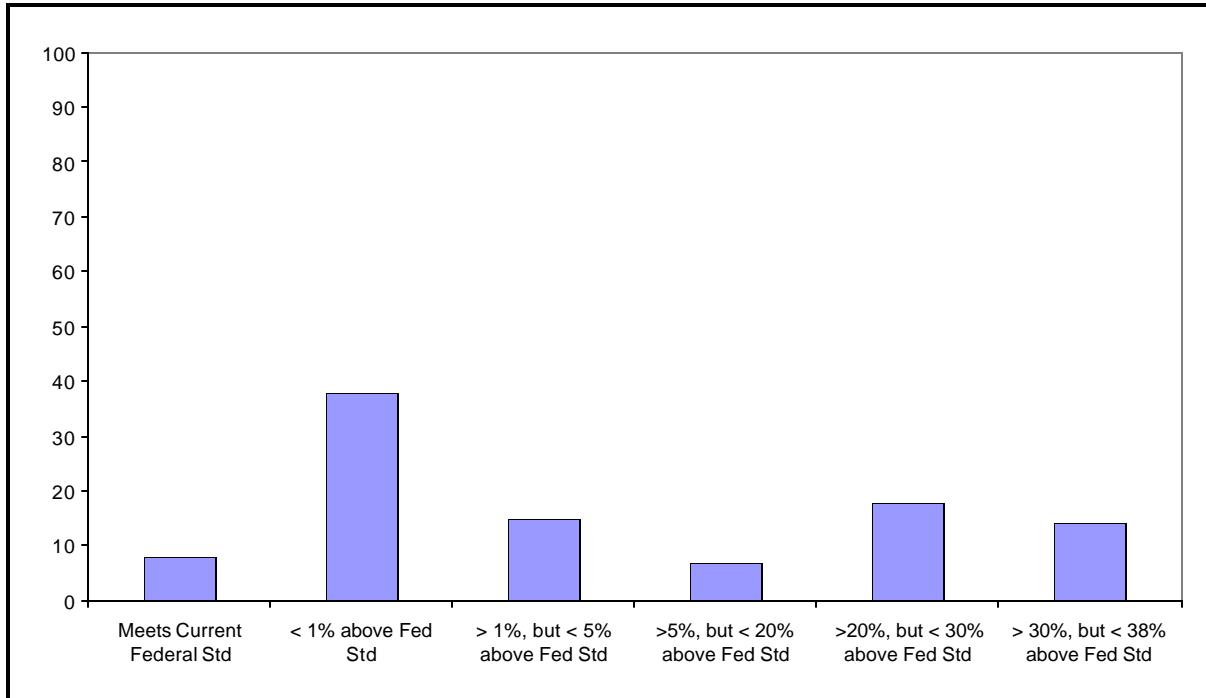
Table 5-5: Refrigerator Sales, Percent of ENERGY STAR Qualified Units by Market Channel

Market Channel	1999:1	1999:2	1999:3	1999:4	2000:1	2000:2	2000:3	2000:4
National Chain ENERGY STAR Partners	21.08% (0.0012) n=106,212	21.79% (0.0012) n=116,872	26.16% (0.0012) n=124,803	28.24% (0.0014) n=107,273	25.03% (0.0014) n=100,864	24.14% (0.0012) n=127,557	30.62% (0.0014) n=101,910	30.08% (0.0015) n=87,641
Independents and Regional Chains	24.83% (0.0069) n=3,969	28.32% (0.0068) n=4,378	35.31% (0.0063) n=5,711	25.81% (0.0064) n=4,664	28.78% (0.0037) n=15,001	27.99% (0.0034) n=17,616	32.14% (0.0032) n=20,955	38.43% (0.0036) n=18,752

The detailed data shared by independent retailers in 2000 has enabled sales to be examined in groupings of efficiency levels. This is shown in Figure 5-5. Note that the ENERGY STAR threshold is 20% above the federal standard. Over 60% of refrigerators sold by participating

independents in 2000 were less than 5% above the federal standard. This may correlate to the 90% of refrigerators available that do not qualify for the ENERGY STAR specification. However, it is interesting to note that one-third of refrigerators sold by independent retailers were ENERGY STAR qualified, despite comprising less than 10% of available models. Also, of the ENERGY STAR qualified units sold by independent appliance retailers, almost half were at least 30% above the federal standard.

Figure 5-5: 2000 Independent Sales by Efficiency Level



6

Room Air Conditioners

6.1 Overview

This section discusses total room air conditioner unit sales, characteristics of available models, efficiency standards, market share of ENERGY STAR qualified units, and analysis of ENERGY STAR sales by market channel.

6.2 Total Unit Sales

Table 6-1 presents estimates of annual unit sales of room air conditioners used in the development of market shares in this report. The Association of Home Appliance Manufacturers (AHAM) provided the main source of information for these estimates. Data provided by AHAM are based on appliance distributor sales.

Table 6-1: Estimate of Total Room Air Conditioner Unit Sales in California*

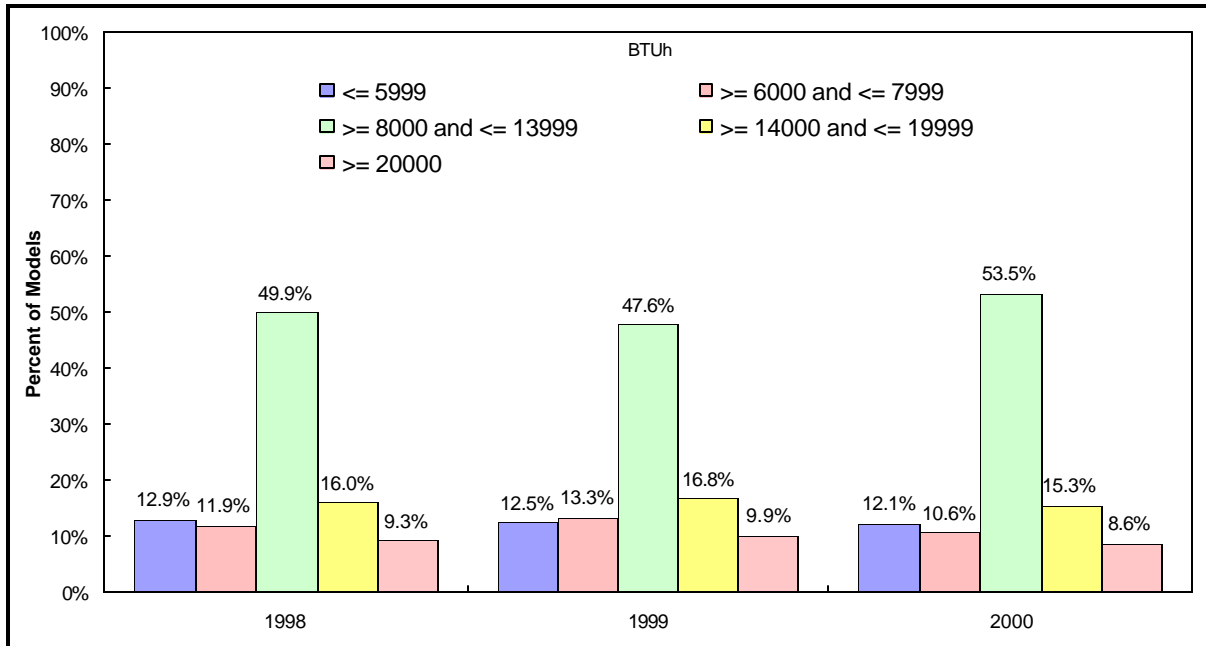
Measure	1998	1999	2000
Room Air Conditioners	231,100	278,600	279,600

* AHAM

6.3 Characteristics of Available Models

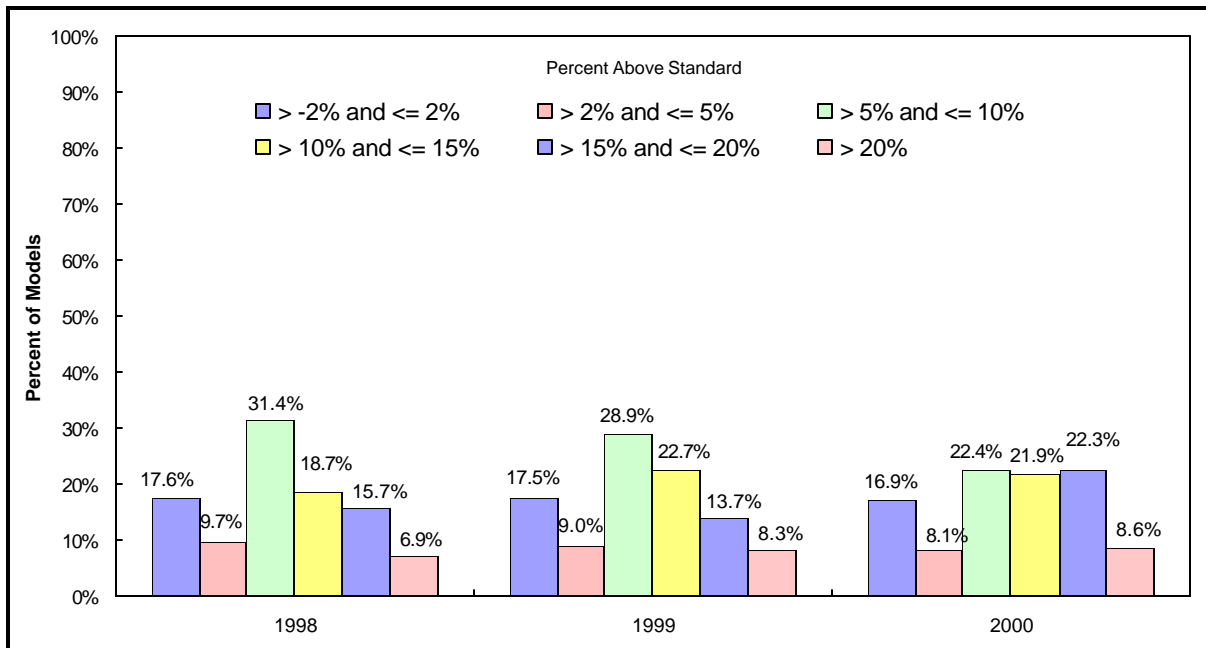
Figure 6-1 and Figure 6-2 characterize currently available room air conditioner models by output capacity and energy efficiency ratings relative to the federal standard. Figure 6-1 illustrates that about half of the room air conditioners available in 1998, 1999, and 2000 have rated output capacities between 8,000 and 14,000 Btuh. Figure 6-2 shows that the percentage of available room air conditioners exceeding the current standard by at least 10% has increased from about 41% to over 50% in 1998 and 2000, respectively.

Figure 6-1: Available Room Air Conditioner Models by Output Capacity (Btuh)



Source: ARI

Figure 6-2: Room Air Conditioner Model Availability by Percent-Above-Standard



Source: ARI

6.4 Room Air Conditioner Efficiency Standards

The energy efficiency of room air conditioners is expressed as an Energy Efficiency Rating (EER), which varies by cooling capacity (Btuh) and configuration. Table 6-2 includes the minimum energy efficiency requirement for each configuration and size. Room air conditioners must exceed the current standard by at least 15% to qualify for the ENERGY STAR label. New energy efficiency standards for room air conditioners became effective on October 1, 2000. These revised EERs are included in the final column in Table 6-2.

Table 6-2: Energy Efficiency Standards for Room Air Conditioners

Btuh	Configuration	Current Standard (EER)	New Standard (EER)
< 6,000	Without reverse cycle and with louvered sides	8.0	9.7
	Without reverse cycle and w/out louvered sides	8.0	9.0
6,000 – 7,999	Without reverse cycle and with louvered sides	8.5	9.7
	Without reverse cycle and w/out louvered sides	8.5	9.0
8,000 - 13,999	Without reverse cycle and with louvered sides	9.0	9.8
	Without reverse cycle and w/out louvered sides	8.5	8.5
14,000 - 19,000	Without reverse cycle and with louvered sides	8.8	9.7
	Without reverse cycle and w/out louvered sides	8.5	8.5
> 20,000	Without reverse cycle and with louvered sides	8.2	8.5
	Without reverse cycle and w/out louvered sides	8.2	8.5
< 14,000	With reverse cycle and w/out louvered sides	8.0	8.5
≥ 14,000	With reverse cycle and w/out louvered sides	8.0	8.0
< 20,000	With reverse cycle and with louvered sides	8.5	9.0
≥ 20,000	With reverse cycle and with louvered sides	8.5	8.5
	Casement only	*	8.7
	Casement slider	*	9.5

Current standards became effective January 1, 1990.
New standards became effective on October 1, 2000.

6.5 Market Share of ENERGY STAR Qualified Room Air Conditioners

Figure 6-3 depicts the estimated share of ENERGY STAR qualified room air conditioners sold in 2000. Table 6-3 presents the percentage of ENERGY STAR qualified room air conditioners sold in California from 1998 through 2000.

Table 6-4 reports the percent of ENERGY STAR compliant room air conditioners sold in each utility service area annually and by quarter.

Figure 6-3: Room Air Conditioner Sales, Percent of ENERGY STAR Qualified Units

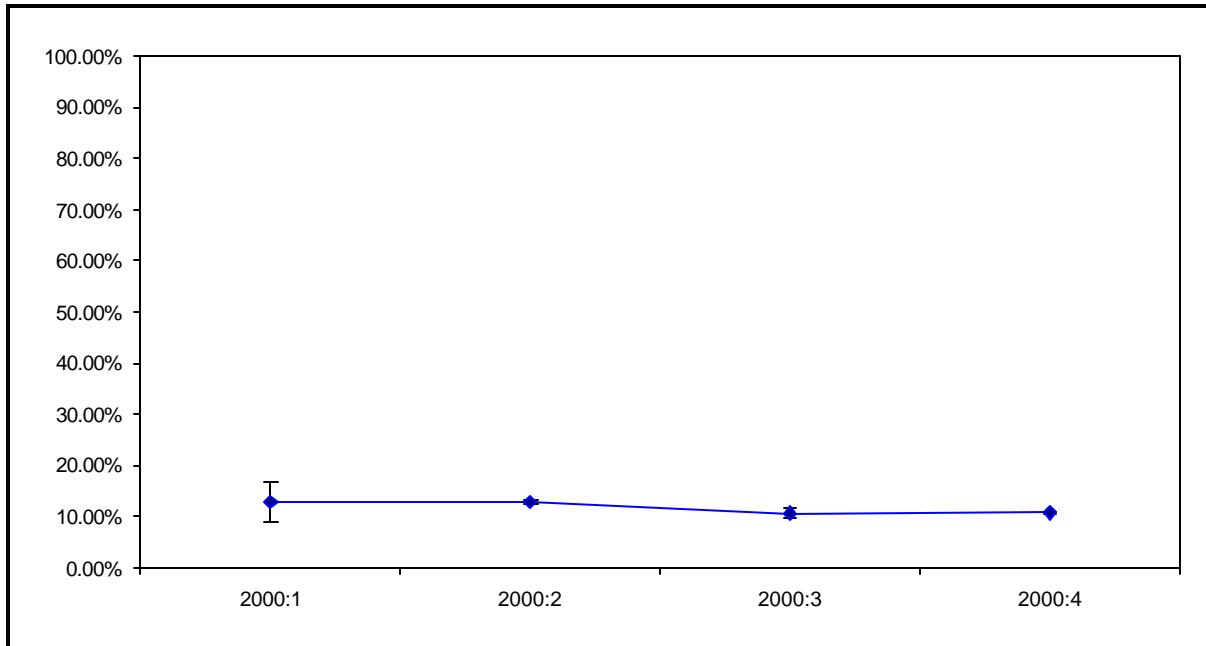


Table 6-3: Room Air Conditioner Sales, Percent of ENERGY STAR Qualified Units, Statewide

Year	Percent of ENERGY STAR Qualified Room Air Conditioners				
	Annual	Q1	Q2	Q3	Q4
1998	6.73% (-) n = 19,087	1.61% (-) n = 186	6.56% (-) n = 3,627	6.86% (-) n = 15,176	4.08% (-) n = 98
1999	20.43% (0.0038) n = 11,176	7.63% (0.0481) n = 118	4.81% (0.0029) n = 5,317	31.15% (0.0063) n = 5,396	0.13% (0.002) n = 345
2000	11.81% (0.0016) n = 42,562	12.76% (0.0027) n = 149	12.87% (0.0022) n = 22,758	10.66% (0.0022) n = 19,526	10.68% (0.0027) n = 129

Standard errors in parentheses.

Table 6-4: Room Air Conditioner Sales, Percent of ENERGY STAR Qualified Units by Utility Service Area

Utility	Year	Percent of ENERGY STAR Qualified Room Air Conditioners ^{1,2}				
		Annual	Q1	Q2	Q3	Q4
PG&E	1998	6.41% (-) n=5,636	3.70% (-) n=54	4.66% (-) n=1,074	6.86% (-) n=4,472	5.56% (-) n=36
	1999	5.99% (0.0073) n=3,217	33.33% (0.1571) n=9	4.40% (0.0051) n=1,638	32.68% (0.0121) n=1,513	.0002% (0.0019) n=57
	2000	33.33% (0.1571) n=9	12.03% (0.0535) n=37	14.02% (0.0037) n=8,907	14.91% (0.0043) n=7,024	15.38% (0.0578) n=39
SCE	1998	5.88% (-) n=6,118	3.33% (-) n=30	7.46% (-) n=1,005	5.64% (-) n=5,038	0.00% (-) n=45
	1999	6.46% (0.0041) n=3,576	5.00% (0.0218) n=100	5.34% (0.0056) n=1,592	7.59% (0.0063) n=1,753	6.11% (0.0209) n=131
	2000	6.11% (0.0209) n=131	13.02% (0.0345) n=95	8.31% (0.0034) n=6,505	8.43% (0.0035) n=6,327	7.78% (0.0282) n=90
SDG&E	1998	4.53% (-) n=728	0.00% (-) n=8	7.46% (-) n=134	3.79% (-) n=580	16.67% (-) n=6
	1999	6.35% (0.0154) n=252	0.00% (0.0000) n=0	8.05% (0.0223) n=149	3.26% (0.0185) n=92	0.00% - n=10
	2000	3.26% (0.0185) n=92	0.00% (0.0000) n=0	15.83% (0.0117) n=979	15.84% (0.0118) n=947	0.00% (0.0000) n=0
Other	1998	8.05% (-) n=6,605	0.00% (-) n=94	7.28% (-) n=1,414	8.42% (-) n=5,086	9.09% (-) n=11
	1999	6.71% (0.0039) n=4,131	0.00% - n=8	4.49% (0.0047) n=1,938	8.10% (0.0060) n=2,038	17.01% (0.0310) n=147
	2000	17.01% (0.0310) n=147	.5% (0.125) n=16	17.89% (0.0048) n=6,367	17.38% (0.0052) n=5,228	0.00% - n=0

1 Standard errors in parentheses.

2 "Other" includes municipal utilities such as LADWP, LMUD, PP&L, SMUD, and others.

6.6 Analysis by Market Channel

Room air conditioners appear to be one category where, on average, the independent appliance retailers do not have as large a share of ENERGY STAR qualified units sales as the national chain stores. There are several reasons for this.

- First, many independent appliance retailers do not sell room air conditioners.
- Second, those that do tend to have a limited selection.
- Third, heating and cooling contractors have increased their inventories and sales of room air conditioners.
- Finally, home improvement and large discount retail channels have significantly increased their market penetration for room air conditioners.

Figure 6-4 and Table 6-5 compare the shares of ENERGY STAR qualified room air conditioners sold in California. The national chain data begin in 1998 and continues through the third quarter of 2000. D&R International did not receive information from the participating national partners regarding room air conditioner sales in the fourth quarter of 2000. Although RER was unable to verify precise reasons for this, the new ENERGY STAR room air conditioner specification that took effect on October 1, 2000 may have played a role in the submission of data.

Figure 6-4 also presents independent retailer data for 2000 only.

Figure 6-4: Room Air Conditioner Sales, Percent of ENERGY STAR Qualified Units by Market Channel

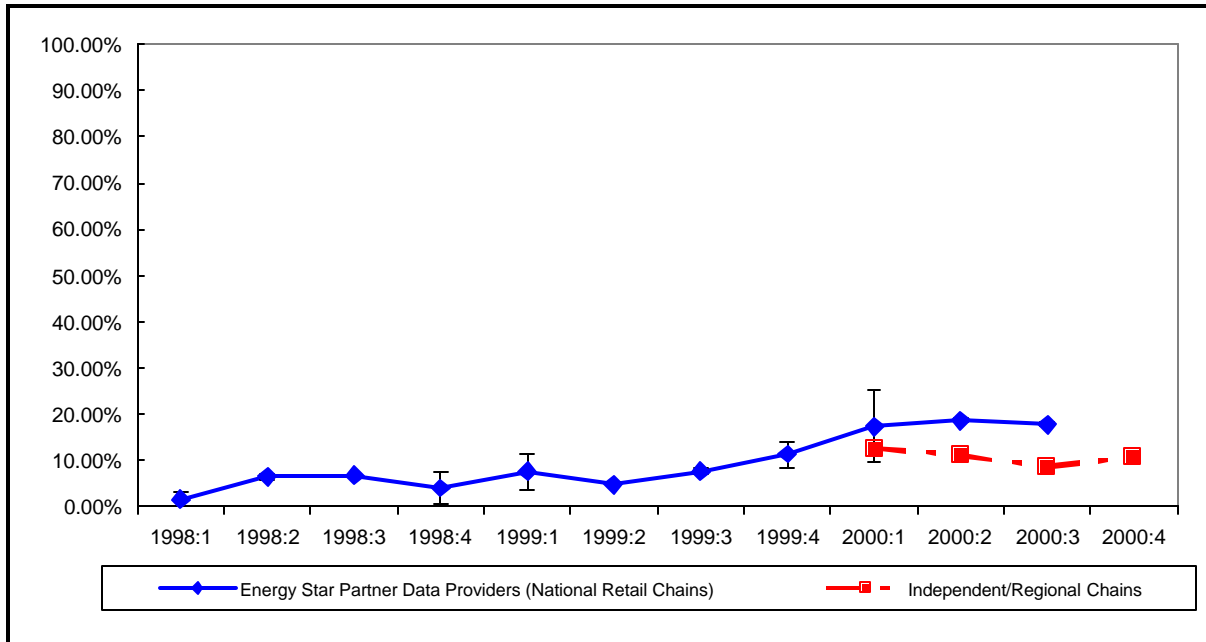


Table 6-5: Room Air Conditioner ENERGY STAR Sales by Market Channel

Market Channel	2000:1	2000:2	2000:3	2000:4
National Chain ENERGY STAR partners	17.46% (0.0478) n =63	18.59% (0.0026) n =21,748	17.79% (0.0028) n =18,437	n/a
Independent and Regional Chains	12.70% (0.0359) n =86	11.19% (0.0099) n =1,010	8.67% (0.0085) n =1,089	10.68% (0.0272) n =129

7

Work in Progress and Third-Year Tracking Activities

In the third year, the project team will continue its recruitment efforts in order to increase the precision of the analysis of the impact of independent retailers on the household appliance market. RER strives to meet the 20% goal for independent sample size, and continues efforts to improve geographic coverage. Due to the success of recruitment for 2000 data, there do not appear to be any significant obstacles to further increasing the sample size for the third year of the study. Within this overall effort to enlarge the sample, special attention will be paid to underrepresented utility areas, such as SDG&E. Additionally, the team looks forward to continuing the positive relationship forged with D&R International. The continuing third-year efforts will also focus on the following:

- Developing individual summaries for participating independent retailers,
- Maintaining the sample retailer base by regular contact/relationship building,
- Continuing recruitment efforts for independent retailers,
- Expanding recruitment efforts for large chains which are not ENERGY STAR partners,
- Assisting D&R International with their efforts to recruit their ENERGY STAR partner home improvement retailers to share appliance sales data, and
- Working with D&R International to obtain data more frequently than annually.

Moreover, the project team plans to move to a semi-annual summary. This update will contain California independent retailer information and estimated national data. RER will continue to monitor changes in federal standards (National Appliance Energy Consumption Act or NAECA). The impact of these changes, such as the new room air conditioner standard and the new refrigerator standard, will be evaluated when the 2001 data are analyzed. Perhaps this standard change will lead to some additional analysis of the independent data. In addition, the ENERGY STAR appliance specification changes will also be taken under careful consideration in the analysis of the 2001 sales data.