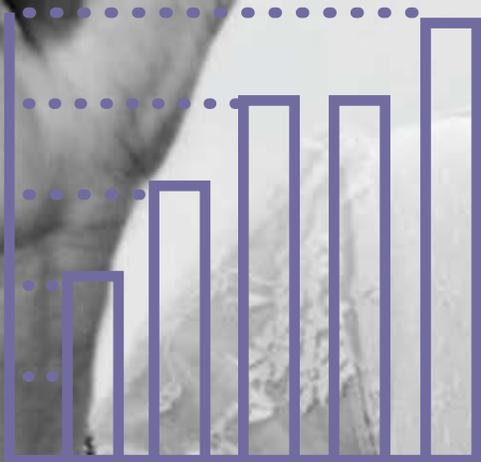
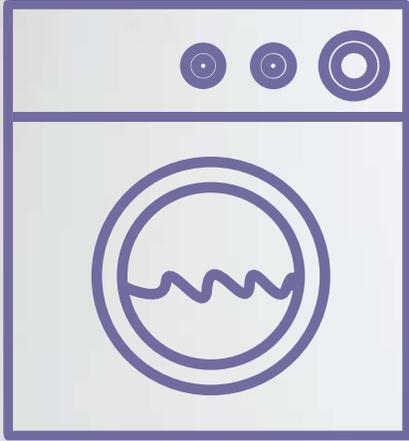




# CLOTHES WASHER PRODUCT SNAPSHOT

May 2008

Prepared by D&R International, Ltd.  
On behalf of the  
U.S. Department Energy



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# ENERGY STAR® QUALIFIED CLOTHES WASHERS: *A Great Opportunity to Save Energy and Water*

When it comes to saving energy and water, ENERGY STAR qualified clothes washers are the power-hitters of home appliances, using an average of 31 percent less energy and 55 percent less water than standard clothes washers. Many Energy Efficiency Program Sponsors (EEPS) promote them because they deliver cost effective energy savings. Water utilities also promote them because they are a direct and cost-effective way to achieve water savings. They appeal to consumers because they are gentler on clothes and save hundreds of dollars in water and energy costs.

This document presents key market facts that program sponsors will find helpful in developing clothes washer programs. A brief summary is presented below; details follow in the body of this *Snapshot*.

- **An increasing proportion of consumers are choosing to purchase ENERGY STAR qualified clothes washers.** Every year a greater proportion of units sold are qualified. In 2006, 38 percent of all washers sold were ENERGY STAR, up from 27 percent in 2004, when new criteria took effect.
  - **More than half of all clothes washer models available for sale in the United States are ENERGY STAR qualified.**<sup>1</sup> All ENERGY STAR qualified clothes washers are now either front-loaders or advanced high-efficiency top-loaders. Only these two types of machines are able to meet current ENERGY STAR criteria.
  - **ENERGY STAR clothes washers appeal to consumers for many reasons.** Utility cost savings are compelling: an ENERGY STAR qualified clothes washer will save the average consumer \$50 annually and \$550 over the lifetime of the machine.<sup>2</sup> Many ENERGY STAR models also have other features that consumers find attractive, including larger capacities, sleek styling, more cycle options, and less wear and tear on clothes.
  - **First cost (sticker price) and unfamiliarity remain the greatest barriers to even more rapid growth in ENERGY STAR qualified clothes washer sales.** Purchase price is still the principal barrier to accelerating that growth. Traditional top-loading washers sell for hundreds of dollars less, yet their lifetime costs are higher. Some consumers are also deterred by the unfamiliar configuration and operation of front-loading and advanced top-loading washers.
  - **New, more stringent ENERGY STAR criteria will take effect in two phases over the next three years.** The first phase, which increases energy and water efficiency by five percent, will take effect in July 2009. The second phase, which increases energy and water efficiency another ten percent, will take effect in January 2011. With the new criteria, ENERGY STAR clothes washers will continue to offer substantial energy and water savings for years to come.
  - **The market potential for ENERGY STAR qualified clothes washers remains large.** Although 79 percent of U.S. households have a clothes washer,<sup>3</sup> only 11 percent of those units are ENERGY STAR qualified.<sup>4</sup> If all conventional units were replaced with ENERGY STAR qualified models, U.S. consumers could save approximately 11 billion kilowatt hours (kWh) of electricity, 290 million therms of natural gas, 550 billion gallons of water, and \$4 billion annually.
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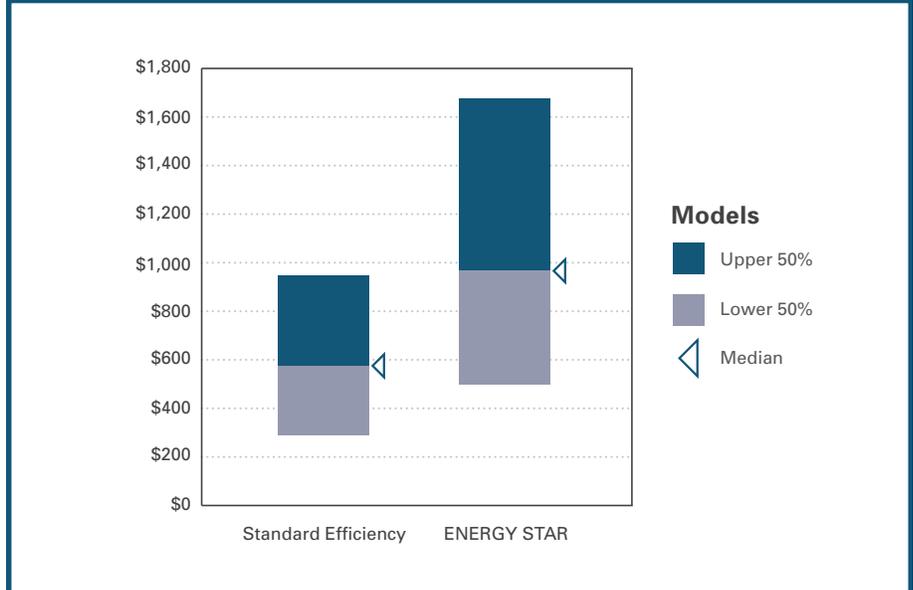
## PRODUCT FEATURES AND BENEFITS

Price and features are the key factors consumers consider in choosing a particular appliance model. Consumers increasingly demand appliances with premium features, and clothes washers are no exception to this trend. Consumers are attracted to touch-pad controls, programmable settings, higher spin speeds, steam cleaning, greater capacity, more cycle options, and stainless steel tubs. Some of these premium features—most prominently higher spin speeds and greater capacity—are directly linked to improved efficiency. As a result, nearly all premium washers qualify for the ENERGY STAR.

Washers with higher spin speeds extract more water from clothes, meaning less time and energy spent in the dryer. Washers without a turning agitator are gentler on clothes and leave more space in the tub for laundry, meaning fewer loads of laundry each week.

ENERGY STAR qualified clothes washers are generally more expensive than standard washers. They incorporate advanced technologies that are more expensive to build or buy than are conventional washer technologies. For example, to accommodate higher spin speeds, manufacturers often must use more expensive suspensions. Partly as a result of increased manufacturing costs, many high-efficiency washers are positioned as premium products and are loaded with many of the other features listed above. Manufacturers give them appealing names and make them available in an assortment of colors to attract consumers' attention. Manufacturers and retailers find these products highly profitable and are eager to partner with EEPS to promote them.

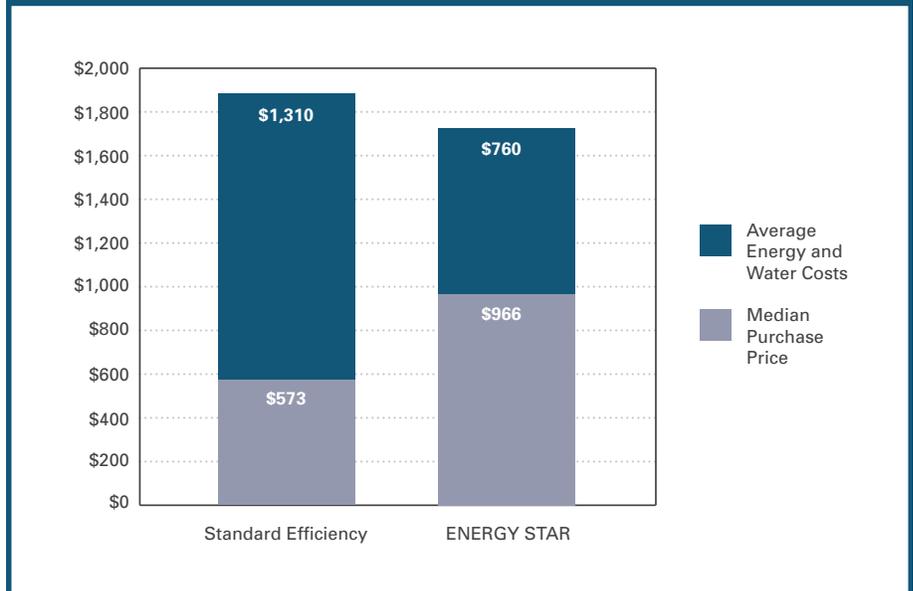
**Figure 1: Purchase Price Range for Clothes Washers**



**Note:** Price data are not sales weighted.

**Source:** D&R International Ltd.; based on data provided by ENERGY STAR retail partners.

**Figure 2: Lifetime Cost for Clothes Washers Standard Efficiency vs. ENERGY STAR**



**Source:** D&R International Ltd.; 2007 product database.

Nevertheless, there are a number of ENERGY STAR models that are less expensive than the more expensive standard-efficiency washers (Figure 1). Manufacturers have recently introduced these less expensive ENERGY STAR models to make energy-efficient washers affordable to more consumers.

When you consider both the purchase price and the lifetime operating costs, ENERGY STAR qualified washers compare favorably to standard-efficiency models because ENERGY STAR qualified models cost substantially less to operate (Figure 2). For example, the sticker price on the least expensive standard model is about \$200 less than the least expensive ENERGY STAR qualified model. However, when lifetime operating costs are considered together with purchase price, that same standard model will cost the owner about \$340 more over its lifetime than the ENERGY STAR qualified model. On average, an ENERGY STAR qualified clothes washer will pay for the increased purchase price within five years, well before its average life of 11 years.

Despite the many benefits of ENERGY STAR models, new technology and a changing market present challenges for increasing sales of ENERGY STAR qualified clothes washers, including a need to educate consumers and change consumer behavior. The key challenges facing those who are promoting ENERGY STAR qualified washers are as follows:

- **Price and familiarity still favor traditional top-loaders.** First cost strongly influences nearly all purchasing decisions, and traditional top-loading products typically cost less than ENERGY STAR qualified alternatives. In addition, all clothes washers that meet ENERGY STAR criteria are either front-loaders or advanced top-loaders. These product designs are unfamiliar to many consumers, which can create an obstacle to sales.
- **Front-loading models operate best with special detergent.** ENERGY STAR clothes washers work best with special low-sudsing detergents formulated for lower water volumes and temperatures. Regular detergents may produce extra suds that remain in the clothes; cause units to overflow; or, if the machine can sense residual detergent, cause the unit to use additional water, thus reducing energy and water savings. The specially formulated detergents are usually marked with an “h•e” symbol (pictured at right).
- **Front-loading models require additional care.** With front loaders, users are typically advised to run a bleach cycle occasionally and leave the door open when not in use to avoid mold. Consumers unfamiliar with this additional care may be upset by unexpected mold or mildew, which can stain clothing.



## Problems With Non-ENERGY STAR Models.

*Consumer Reports* magazine reported in June 2007 that “several manufacturers are meeting the new federal minimum clothes washer standard by lowering wash water temperatures,”<sup>6</sup> which can result in poor cleaning performance and unhappy consumers. The problem is associated only with non-ENERGY STAR top-loading products. Its effect on the collective consumer psyche is not known, but program managers may need to address the misconception that increased energy efficiency is associated with poor cleaning performance.

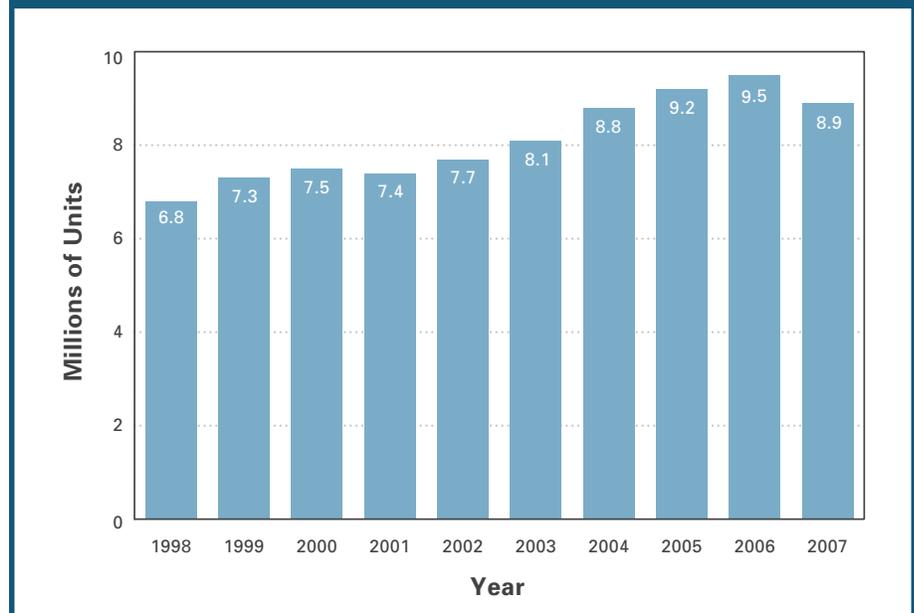
## HOUSEHOLD PENETRATION AND MARKET SIZE

An estimated 87 million households, or 79 percent of U.S. households, have a clothes washer.<sup>7</sup> Of those, only 11 percent have an ENERGY STAR qualified model, so there remain significant energy and water savings opportunities from increasing the household penetration of ENERGY STAR qualified clothes washers. After a decade of steady growth, total clothes washer sales declined in 2007, falling to 8.9 million units (Figure 3). This was due to the dramatic decrease in new housing starts. Industry sources estimate that 7.3 million of those units replaced existing units, with the remaining 1.6 million units going into new homes.<sup>8</sup>

While individual households buy most clothes washers, there is also a large market for residential-style commercial clothes washers. Some 3.5 million units are used in laundry rooms in multifamily housing, on college campuses, or at independent do-it-yourself laundromats.<sup>9</sup> These machines are standard residential machines modified to withstand more frequent use and to require payment. Typically, they are owned by route operators who place them in service in laundry facilities in return for a share of the vend revenues.

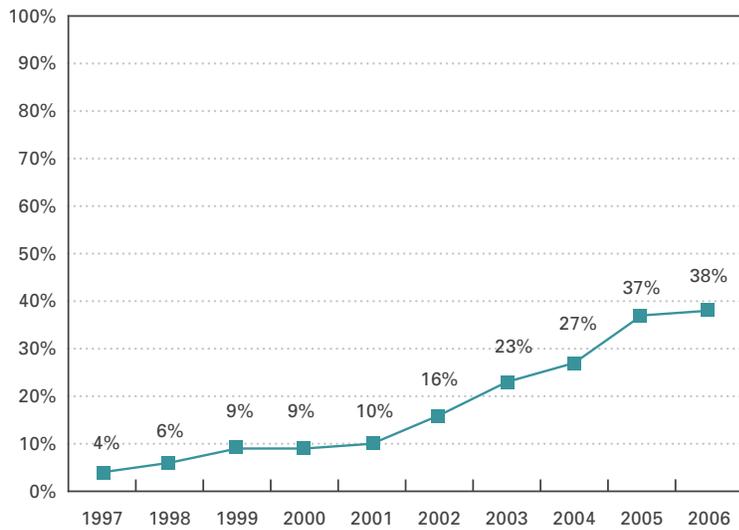
Although these commercial units represent just three percent of the total installed base, they are used three times more frequently and so account for nearly 10 percent of U.S. clothes washer energy and water consumption. These commercial units are replaced more frequently than residential units; therefore, investments in replacing older, less-efficient units with newer, more-efficient units will pay off more quickly in commercial settings.<sup>10</sup>

**Figure 3: Residential Clothes Washer Shipments by Year**



**Sources:** 1998-2006 data from Annual Statistical Review, *Appliance Magazine* May 2007. 2007 data from D&R International, Ltd.; based on data provided by ENERGY STAR retail partners.

**Figure 4: ENERGY STAR Qualified Clothes Washer Market Share**



Source: D&R International, Ltd.; based on data provided by ENERGY STAR retail partners.

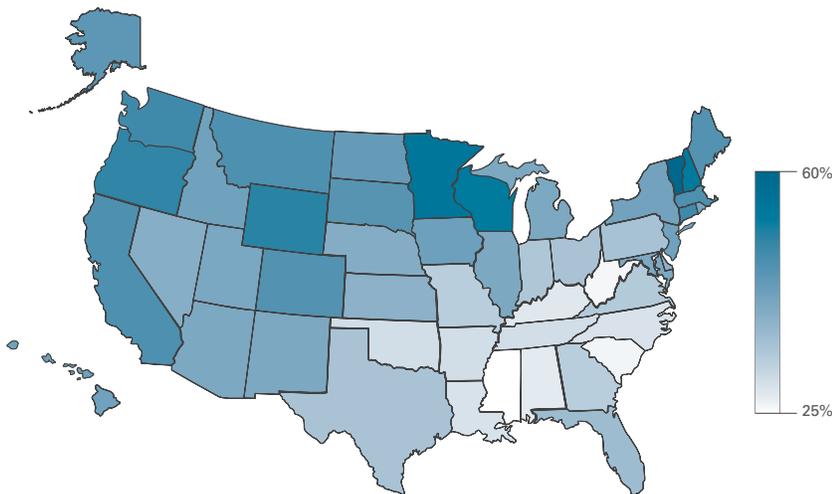
## ENERGY STAR MARKET SHARE

Sales of ENERGY STAR qualified clothes washers have grown faster than sales of clothes washers as a whole. ENERGY STAR market share rose from four percent in 1997 to 38 percent in 2006 (Figure 4). While final data are not yet available, preliminary estimates suggest that ENERGY STAR market share declined in 2007 due to implementation of new ENERGY STAR criteria, which increased clothes washer efficiency requirements by 21 percent and added a new water efficiency requirement. Under the new criteria, many previously qualified models, particularly traditional top loaders, no longer qualified.

On March 7, 2008, the U.S. Department of Energy (DOE) released updated criteria, effective July 1, 2009, with additional criteria effective January 1, 2011 (Table 1). The 2009 criteria increase efficiency by five percent over current levels; the 2011 criteria then improve efficiency by an additional ten percent over 2009 levels. These new criteria are expected to bring immediate drops in ENERGY STAR market share, followed by increases as manufacturers introduce new, more efficient models.

Market share of qualified units varies by state (Figure 5). Sales are highest in California, New England, and the Northwest, regions where EEPS' programs are established and active. Market share is lowest in the lower Midwest and South, where energy efficiency has only recently received attention and investment.<sup>11</sup>

**Figure 5: ENERGY STAR Market Share by State 2006**



Source: D&R International Ltd.; based on data provided by ENERGY STAR retail partners.

**Table 1: Timeline of ENERGY STAR Criteria and Federal Standards for Clothes Washers** (*Residential and Residential-Style Commercial*)

Criteria	1997	Jan. 1, 2001	Jan. 1, 2004	Jan. 1, 2007	July 1, 2009	Jan. 1, 2011
ENERGY STAR	EF ≥ 2.5	MEF ≥ 1.26	MEF ≥ 1.42	MEF ≥ 1.72 WF ≤ 8.0	MEF ≥ 1.8 WF ≤ 7.5	MEF ≥ 2.0 WF ≤ 6.0
Federal Standard: Residential	EF ≥ 1.18		MEF ≥ 1.04	MEF ≥ 1.26		MEF ≥ 1.26 WF ≤ 9.5
Federal Standard: Residential-Style Commercial	None			MEF ≥ 1.26 WF ≤ 9.5		

**Note:** Current criteria and standards are in shaded boxes. Modified Energy Factor (MEF), the current measure of clothes washer efficiency, is the ratio of the capacity of the washer to the energy used in one cycle. MEF includes energy used to operate the machine, to heat the water used for washing, and to dry clothes after the wash. The higher the MEF, the more efficient the product. The previous metric, Energy Factor (EF), excluded drying energy. Water Factor (WF) measures the ratio of the quantity of water used in one cycle to the capacity of the washer. The lower the WF, the more efficient the product.

**Source:** DOE.

### What Happened to Those Tax Credits?

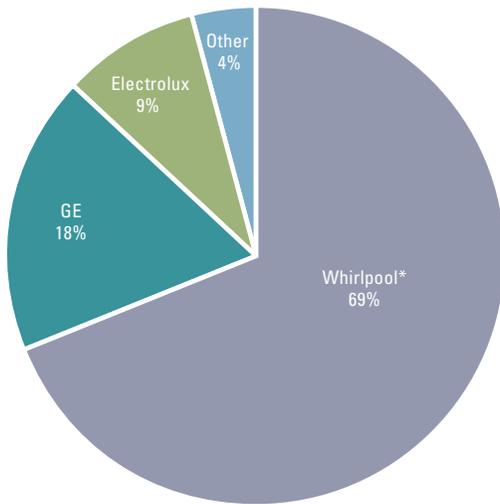
The Energy Policy Act of 2005 established a \$100 tax credit for manufacturers for every clothes washer produced in the United States in 2006 and 2007 that met the 2007 ENERGY STAR criteria levels. Some manufacturers report using the credits to continue to invest in ENERGY STAR and raise the efficiency of future clothes washer platforms. Although Congress did not extend the tax credit in 2007, it may be revisited in 2008.

## MANUFACTURERS

Three manufacturers currently dominate the U.S. clothes washer market (Figure 6). Whirlpool is the largest clothes washer manufacturer, controlling 69 percent of the market after its 2006 acquisition of Maytag. The market shares of the two other leading manufacturers, GE and Electrolux, have held relatively steady for the last five years, at 18 percent and 9 percent in 2006, respectively. Foreign players, such as Bosch, LG, Samsung, and Fisher & Paykel, are beginning to gain traction in the U.S. market, expanding floor space with national appliance retailers. The combined market share of manufacturers other than the big three rose from less than one percent in 2002 to four percent in 2006.

ENERGY STAR qualified clothes washers are available throughout the United States, and all major manufacturers offer qualified models (Figure 7). Today, 40 percent of all clothes washer models available for purchase in the United States are ENERGY STAR qualified.<sup>12</sup> To meet existing criteria and in anticipation of upcoming criteria, manufacturers have taken different approaches with respect to their ENERGY STAR product offerings. Fisher & Paykel only offers top-loading models. LG, Bosch, Electrolux, and Samsung offer only front-loading models. GE, Whirlpool, and Kenmore offer both types.

**Figure 6: Manufacturer Market Share and Total Shipments, 2006**



Manufacturer	Total Shipments (in millions)
Whirlpool	6.6
GE	1.7
Electrolux (Frigidaire)	0.9
Others	0.4
All	9.5

\*Includes most Kenmore products.

**Note:** Figures do not sum to total due to rounding.

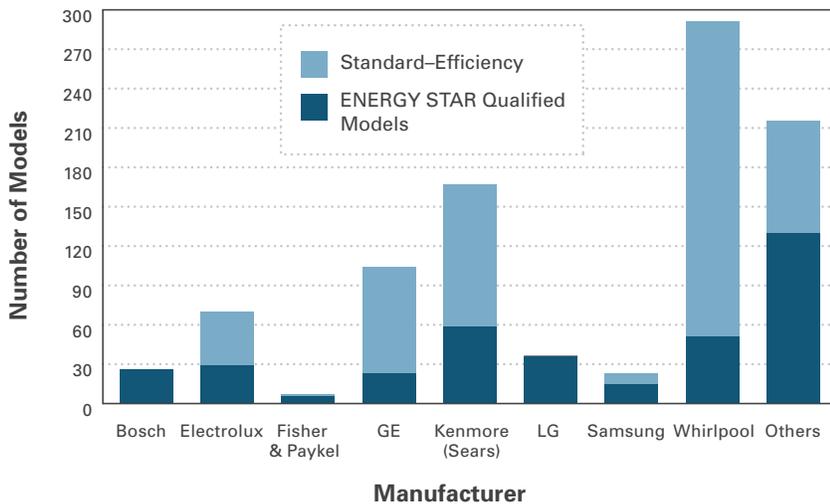
**Source:** "30<sup>th</sup> Annual Portrait of the U.S. Appliance Industry," *Appliance Magazine*, September 2007, p. 43.

**Who Makes What Brand?**

The table below lists the brand names used by the eight largest clothes washer manufacturers in the United States. Three of these manufacturers offer ENERGY STAR qualified clothes washers under two or more brand names.

Manufacturer	Brands of ENERGY STAR Qualified Products
Bosch	Bosch Siemens
Electrolux	Frigidaire
Fisher & Paykel	Fisher & Paykel
GE	GE GE Profile
Kenmore (Sears)	Kenmore (Sears)
LG	LG
Samsung	Samsung
Whirlpool	Amana KitchenAid Maytag Whirlpool

**Figure 7: Clothes Washer Models by Manufacturer, 2007**



**Source:** D&R International, Ltd.; 2007 product database.

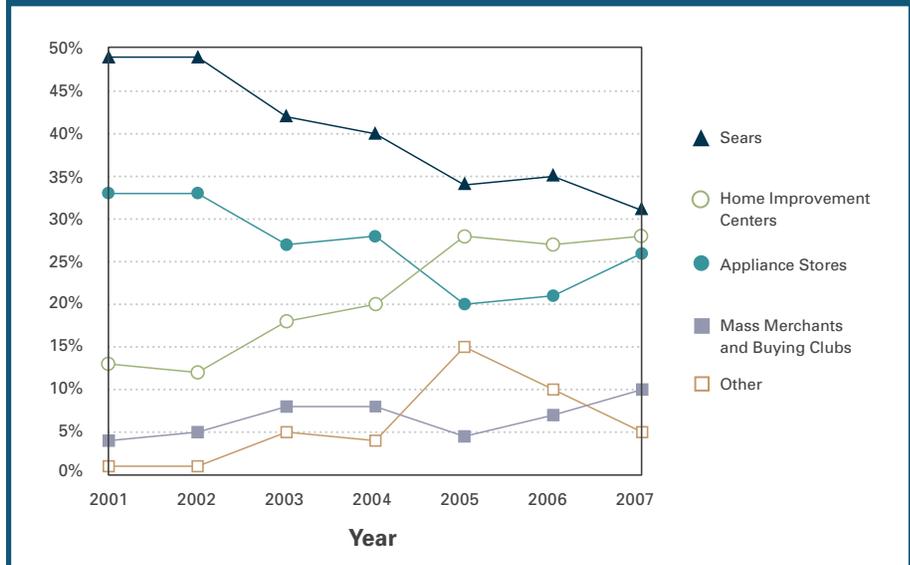
## RETAILERS

All of the largest appliance retailers in the United States—Sears, Lowe’s, The Home Depot, and Best Buy—offer large selections of ENERGY STAR qualified clothes washers.<sup>13</sup> For many years, Sears and appliance stores sold the lion’s share of laundry equipment. In recent years, these retailers have lost market share to home improvement centers such as Lowe’s and The Home Depot (Figure 8). However in the past two years, home improvement centers’ market share seems to have leveled off, with appliance stores recapturing a modest amount of share. Additionally, mass merchants and warehouse clubs only accounted for four percent of the market in 2001, but they have since more than doubled their share to 10 percent in 2007.

One reason that independent appliance stores can effectively compete with giants like Sears, Best Buy, The Home Depot, and Lowe’s is that they coordinate their activities through national buying groups. These umbrella organizations, notably Nationwide Marketing Group, Brand Source, and the NATM Buying Corporation, enable independent retailers to pool their purchasing power and obtain competitive prices from manufacturers. The buying groups also serve as points of contact so that EEPS can include independent stores in coordinated promotions and campaigns in the same way they do larger retail chains.

Each retailer offers a different selection of products. Table 2 shows which manufacturers’ products each leading retailer or buying group carries.

**Figure 8: Laundry Appliance Market Share by Retailer Type**



**Note:** Includes both clothes washers and clothes dryers.

**Sources:** Data for 2001-2006 from “State of the Industry Annual Report,” published annually from 2002 to 2007 as the last issue in February of the weekly publication *Home Furnishing News*. Data for 2007 from personal communication with the editor of *Home Furnishing News*, February 2008.

**Table 2: Leading Retail Distribution Channels by Manufacturer**

	Sears	Lowe’s	The Home Depot	Best Buy	P.C. Richard & Son	H.H. Gregg	Menards	Nationwide Marketing Group	AVB BrandSource
Bosch	✓	✓		✓	✓	✓		✓	✓
Electrolux	✓	✓		✓	✓	✓	✓	✓	
Fisher & Paykel		✓			✓			✓	✓
GE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kenmore (Sears)	✓								
LG	✓		✓	✓	✓			✓	
Samsung	✓	✓		✓	✓				
Whirlpool	✓	✓	✓	✓	✓	✓	✓	✓	✓

**Source:** Retailer Web sites.

## ENERGY SAVINGS OPPORTUNITIES

New ENERGY STAR qualified clothes washers use an average of 31 percent less energy and 55 percent less water than new standard clothes washers. Much of the cost savings come from the significant reduction in water used for cleaning, which can reach 7,000 gallons and \$31.60 per household per year, a 60 percent cost savings, on average. An ENERGY STAR qualified clothes washer also saves households a modest amount of energy directly—16 kWh and \$1.66 per year, on average.

Energy savings also come from two additional sources: the reduction in hot water use that occurs because of lower overall water consumption, and the shorter drying times needed because high spin speeds leave less water in the clothes. As a result, energy savings vary depending on the type of energy used for drying and water heating. Tables 3 and 4 provide average savings for each scenario, and weighted-average cost savings.

**Table 3: Estimated Water and Energy Savings**

Fuel Type		Annual Savings					
Water Heating Fuel	Clothes Drying Fuel	Water	Water Heater	Clothes Washer	Clothes Dryer	Total Energy Savings	
						Therms	kWh
Gas	Gas	6,977 gallons	5 therms	16 kWh	4 therms	9	16
	Electric				100 kWh	5	116
	None				-	5	16
Electric	Gas	6,977 gallons	142 kWh	16 kWh	4 therms	4	158
	Electric				100 kWh	-	258
	None				-	-	158

Source: D&R International, Ltd. product database.

**Table 4: Estimated Cost Savings**

Fuel Type			Annual Savings					Lifetime Savings*
Water Heating Fuel	Clothes Drying Fuel	Percent of U.S. Households	Water	Water Heater	Clothes Washer	Clothes Dryer	Total*	
Gas	Gas	21%	\$32	\$7	\$2	\$5	\$45	\$500
	Electric	29%				\$11	\$50	\$555
	None	9%				-	\$40	\$440
Electric	Gas	1%	\$32	\$15	\$2	\$5	\$54	\$591
	Electric	33%				\$11	\$59	\$646
	None	7%				-	\$48	\$530
Weighted Average		100%	\$32	\$10	\$2	\$8	\$51	\$562

\* Estimates may not sum to total annual or lifetime savings due to rounding.

Note: Lifetime savings assume a product lifetime of 11 years.

Source: Fuel type splits from Energy Information Administration, *Residential Energy Consumption Survey, 2001*.  
 Energy prices from Energy Information Administration, 2008.  
 Water price from "Water and Wastewater Rate Survey," Raftelis Consulting, 2006.

Converting sales of standard clothes washers into sales of ENERGY STAR qualified models would result in significant energy and water savings for the country:

- Converting 1,000 standard clothes washer sales to sales of ENERGY STAR models would save 136,000 kWh of electricity, 7 million gallons of water, and 4,000 therms of natural gas every year.
- Shifting all sales of standard models to ENERGY STAR qualified models (5.5 million units) would save 750 million kWh of electricity, 39 billion gallons of water, and 20 million therms of natural gas every year, saving those consumers \$275 million in energy bills annually.
- By replacing the entire country's installed base of standard clothes washers (78 million units) with new ENERGY STAR qualified models, the United States could save 11 billion kWh of electricity, 550 billion gallons of water, and 290 million therms of natural gas every year.

## **ENERGY STAR STRATEGY**

DOE's overall objective is to increase market share of ENERGY STAR qualified clothes washers. To do this, it works closely with EEPS, retailers, and manufacturer partners to promote ENERGY STAR qualified clothes washers by highlighting their cost savings, environmental friendliness, and performance benefits. In addition, DOE aims to keep the ENERGY STAR label relevant in the market by periodically reviewing and updating the ENERGY STAR criteria as warranted.

In the coming year, DOE is collaborating with partners to develop promotional strategies and materials to take advantage of new ENERGY STAR criteria. The criteria that took effect in 2007 include a new water efficiency requirement, which is helping water utilities substantiate claims about the water savings associated with ENERGY STAR models. The momentum created by the new criteria provides a great opportunity for DOE to reach out to new and somewhat "un-tapped" ENERGY STAR stakeholders such as water utilities and commercial laundry route operators.

On March 7, 2008, DOE released updated criteria that will take effect on July 1, 2009, with additional criteria effective January 1, 2011. DOE is working with ENERGY STAR partners to develop water savings and other messaging for use in outreach materials.

DOE helps partners develop marketing materials and educational outreach activities. In addition, DOE publishes periodic market intelligence reports such as this one for partners to use in their program planning. On request, DOE can provide partners with customized "fun facts" to use in promoting ENERGY STAR products.

DOE's ENERGY STAR Appliance Partner Meeting, held every September, provides a forum in which partners can share promotional plans and coordinate their efforts with one another. These meetings also provide partners with an excellent opportunity to share best practices and network.

## EEPS PROMOTIONS

Clothes washers have been a flagship product in EEPS' program portfolios because they bring substantial and cost-effective energy savings. ENERGY STAR serves as a valuable resource to EEPS, helping them realize their goals of

- Increasing market saturation of energy-efficient clothes washers;
- Encouraging energy conservation;
- Increasing consumer awareness of the ENERGY STAR brand and energy efficiency in general; and
- Reducing electricity demand, including during peak hours.

EEPS have successfully used a number of strategies to reach those goals, including consumer rebates, in-store signage and materials, advertising, and community outreach.

EEPS rebate programs have helped the national market share of ENERGY STAR qualified clothes washers quadruple from nine percent in 2000 to 38 percent in 2006.

Most EEPS with long-standing energy-efficiency programs tie rebates to efficiency tiers beyond ENERGY STAR levels, using tiers set by the Consortium for Energy Efficiency. Promoting a more efficient subset of ENERGY STAR qualified models provides these EEPS greater per-unit energy and water savings.

Many EEPS regularly involve manufacturers and retailers in rebate programs, coordinating activities at the ENERGY STAR Appliance Partner Meeting or sending requests for proposals to solicit their participation. EEPS typically assemble a varied group of interested parties to increase program visibility and effectiveness, and to avoid the impression that they are endorsing specific manufacturers or retailers.

## ENDNOTES

<sup>1</sup> D&R International, Ltd. product database, 2007.

<sup>2</sup> "30<sup>th</sup> Annual Portrait of the U.S. Appliance Industry," *Appliance Magazine*, September 2007. Based on 11-year average life expectancy.

<sup>3</sup> U.S. Census Bureau, American Housing Survey 2005.

<sup>4</sup> D&R International, Ltd. Retail sales data, 2007.

<sup>5</sup> "Do Green Appliances Live Up to Their Billing," *The Wall Street Journal*, August 2, 2007.

<sup>6</sup> "Washers & Dryers: Dirty Laundry," *Consumer Reports*, June 2007.

<sup>7</sup> Based on 2005 saturation rate, from U.S. Census Bureau, American Housing Survey 2005. Estimate of number of U.S. households from U.S. Census Bureau, American Community Survey 2006.

<sup>8</sup> D&R International, Ltd. 2007, based on personal communications with major manufacturers and retailers.

<sup>9</sup> Multifamily Laundry Association, 2002.

<sup>10</sup> Ibid.

<sup>11</sup> D&R International, Ltd. retail sales data, 2007.

<sup>12</sup> D&R International, Ltd. product database, 2007.

<sup>13</sup> *Major Appliance Retailers Report*, June 2006.



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