
Market Impact Analysis of Potential Changes to the ENERGY STAR[®] Criteria for Clothes Washers

Background

The ENERGY STAR criteria for residential clothes washers changed on January 1, 2007, paralleling a change in the Federal standard. The 2007 criteria are a minimum Modified Energy Factor (MEF) of 1.72 and a maximum Water Factor (WF) of 8.0. The MEF calculates the annual energy usage including machine energy use, water heating energy use, and dryer energy use as a function of tub volume. The higher the MEF is, the more efficient the clothes washer. WF is the gallons of water used per cycle per cubic foot and so the lower the WF, the more water efficient the clothes washer. The MEF criteria level is 36.5% above the minimum Federal standard of 1.26 and there is currently no Federal standard or requirement limiting water consumption. Pursuant to Section 131 of the Energy Policy Act of 2005 (EPAAct 2005) as amended by the Energy Independence and Security Act of 2007, the Secretary of Energy “shall establish new qualifying levels not later than January 1, 2008, for clothes washers, effective beginning July 1, 2009.”

Market Overview

The current market share for ENERGY STAR qualified clothes washers is not publicly available as retailer sales data for the first year under the new criteria has not yet been received. For the fourth quarter of 2006, the ENERGY STAR qualified market share rose dramatically to 51% from 39% in the third quarter and 32% in the second quarter. However, a large proportion of these models are top-load models with MEFs between 1.42 and 1.72 and therefore, do not meet the 2007 criteria. Limited data for the first quarter of 2007 showed a market share comparable to the beginning of 2006. The Department of Energy (DOE) is currently attempting to acquire more data and confirm the data received.

Table 1 shows the number and percentage of total available standard clothes washer models at each efficiency range coincident with the tiers developed by the Consortium for Energy Efficiency (CEE).

Table 1: Available Clothes Washer Models (as of January 4, 2008)

Efficiency Level	Number of Available Models	Percentage of Available Models
Current Federal Standard (Minimum MEF of 1.26)	502	100%
Current ENERGY STAR Criteria (Minimum MEF of 1.72 and Maximum WF of 8.0)	280	55.8%
CEE Tier 1 (Minimum MEF of 1.80 and Maximum WF of 7.5)	256	51.0%
CEE Tier 2 (Minimum MEF of 2.00 and Maximum WF of 6.0)	167	33.3%
CEE Tier 3 (Minimum MEF of 2.20 and Maximum WF of 4.5)	78	15.5%

Another method for estimating market availability is to examine the proportion of clothes washers available at each retailer. Table 2 shows the number of ENERGY STAR qualified and total models available at the four top national appliance retailers and one of the two largest buying groups (model information for Nationwide is not available).

Table 2: Available Clothes Washer Models –Retailers

Retailer	Number of Available Models	Number of Available ENERGY STAR Qualified Models	Percentage of Available Models Qualified
Best Buy	69	39	56.5%
Brand Source	103	35	34.0%
Home Depot	61	36	59.0%
Lowe's	43	94	45.7%
Sears	43	94	45.7%

These high percentages of available ENERGY STAR qualified products are probably misleading since the market data is model-weighted, not shipment-weighted, and thus does not represent actual consumer purchases of qualified machines.

Potential ENERGY STAR Criteria Performance Levels

DOE can choose to either adopt a modest change based on the fact that the current ENERGY STAR criteria were just adopted and already result in substantial savings or DOE can set a higher criteria based on the significant number of products available at higher tiers. Currently CEE has three tiers as listed in Table 1. Tier 1 is just above the current ENERGY STAR criteria while Tier 2 is a significant increase in both energy and water efficiency.

Engineering Considerations

The criteria change that took effect January 1, 2007, was a significant increase in clothes washer efficiency and a significant shift in the ENERGY STAR program for clothes washers. Nearly all top-load models with agitators were excluded from the program and ENERGY STAR qualified washers must, at a minimum, utilize a high-efficiency rinse cycle to meet the water factor criteria. Raising the ENERGY STAR criteria to a minimum MEF of 2.0 and a maximum water factor of 6.0 would disqualify every ENERGY STAR qualified top-load model now on the market and effectively force any consumer who desired an ENERGY STAR qualified washer to purchase a front-load unit.

The ENERGY STAR criteria for clothes washers have changed three times in the last six years, more than any other appliance criteria. The Federal standard for clothes washers has also changed twice in the last three years and the current Federal standard is equivalent to the 2001 ENERGY Star criteria. However, with the mandate in EPAct 2005 to again revise the criteria, DOE decided to take a wide view of possible changes to improve energy efficiency in this product category for the consumer.

Potential Energy Savings

Table 3 shows the national aggregate energy savings, assuming electric water heating and an electric dryer, of changing the criteria to both the CEE Tier 1 level and the CEE Tier 2 level. A 20% market share is assumed as the baseline, purely for comparative purposes.

Table 3: Energy and Water Savings at a 20% Market Share

ENERGY STAR Shipments (20% Penetration)	Energy Savings					Water Savings				
	ENERGY STAR Criteria (MEF)	Federal Minimum (kWh/year)	ENERGY STAR Minimum (kWh/year)	Savings per Unit (kWh/year)	National Aggregate Savings (kWh/year)	ENERGY STAR Criteria (WF)	Non-Qualified Usage (gallons/yr)	Maximum ENERGY STAR Qualified Usage (gallons/yr)	Savings per Unit (gallons/yr)	National Aggregate Savings (gallons/yr)
1,900,000	1.8	921	638	283	538 million	7.5	12,764	8,614	4,150	7.9 billion
1,900,000	2.0	921	574	347	659 million	6.0	12,764	6,891	5,873	11.2 billion

Assumptions:

Combined washer and dryer energy.

Average volume of 2.96 cubic feet for a non-qualified washer and 2.93 cubic feet for a qualified washer based on average size of existing models.

Minimum MEF of 1.26 for a product just meeting the Federal standard.

Volume based on 2006 annual shipments of 9.5 million (Appliance Magazine, March 2007).

Non-qualified water factor of 11.0 based on average water factor of existing non-qualified models.

Recommended New ENERGY STAR Criteria

DOE proposes a two-step phased criteria revision. The Energy Independence and Security Act of 2007 amended EAct 2005 to change the effective date of the new ENERGY STAR criteria from January 1, 2010 to July 1, 2009. Based on this mandate and due to the number of models available at the current CEE Tier 1 level, DOE will raise the minimum MEF to 1.8 and lower the maximum water factor to 7.5, inline with the current CEE Tier 1 level, effective July 1, 2009. This criteria change will apply to both residential and residential-style commercial clothes washers. The change in criteria level, although modest, will be the fourth new criteria since 2001. The effective date gives manufacturers 17 months to prepare for the criteria change. The annual program savings for ENERGY STAR qualified clothes washers will be 538 million kWh/year and 7.9 billion gallons of water. DOE will also raise the minimum MEF to 2.0 and lower the maximum water factor to 6.0 effective January 1, 2011. Again, this criteria change will apply to both residential and residential-style commercial clothes washers and be in line with the current CEE Tier 2. Half of all currently available products meet the proposed 2009 level and one-third of all currently available products meet the proposed 2011 level. DOE feels setting a second, more aggressive set of criteria, provides the consumer an expectation the program will deliver energy and water savings commensurate with already available technology or potential technological improvements in the product category. Establishing the 2011 criteria today provides manufacturers three years to prepare for the new criteria. Although mandated to finalize new criteria for ENERGY STAR qualified clothes washers by January 1, 2008, DOE feels with the phased criteria and need for stakeholder comment on this approach, while not meeting the EAct date by a month it will not miss the intent of the legislation.

The ENERGY STAR program for clothes washers has already assisted in transforming the clothes washer market by working with stakeholders to promote next generation clothes washers. Every clothes washer now sold in the United States would have been ENERGY STAR in 2001 and is more efficient than 99% of models sold in 1997. Manufacturers have invested millions of dollars in next generation clothes washers. For these reasons, the Department proposes modest criteria effective in 2009, and higher, more aggressive, criteria levels in 2011, thus allowing time for manufacturers to prepare to bring these savings to consumers. If partners or stakeholders would like to submit comments or suggestions, please submit them to Richard Karney at Richard.Karney@EE.DOE.GOV by January 23, 2008.