Market Progress Evaluation Report

ENERGY STAR® Resource-Efficient Clothes Washers, No. 5

prepared by

Pacific Energy Associates, Inc.

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ENERGY STAR® RESOURCE-EFFICIENT CLOTHES WASHER PROGRAM

MARKET PROGRESS EVALUATION REPORT #5

Final Report

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The views and opinions of the authors expressed herein do not necessarily reflect those of the Northwest Energy Efficiency Alliance, its board, its members, or its staff.

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Executive Summary

The Northwest Energy Efficiency Alliance (the Alliance) is a non-profit group of electric utilities, state governments, public interest groups and industry representatives committed to bringing affordable, energy-efficient products and services to the marketplace. In 1997, the Alliance initiated a market transformation effort in the clothes washer industry. First known as the *WashWise* program, the *ENERGY STAR® Resource-Efficient Clothes Washer* (ES-RECW) *Program* has evolved considerably over the past four years into a nationally known example of effective market transformation.

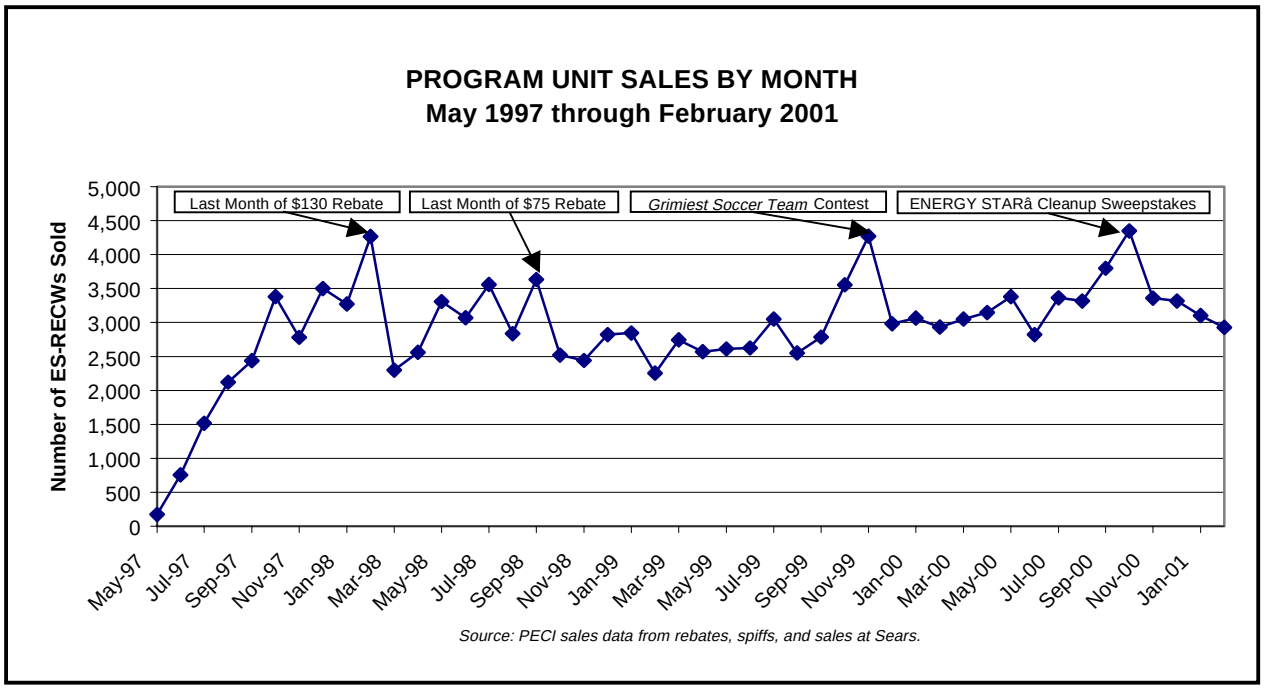
Initially, the program was primarily a consumer rebate-driven effort, with rebates of $130 for the purchase of qualifying products. As it achieved initial success, and the costs grew, consumer rebates were first reduced, and then eliminated. Since November of 1998, the program has relied on consumer marketing and retailer support (including "spiffs") to maintain sales of *ENERGY STAR®* resource-efficient clothes washers. Earlier in 2000, the program expanded to include other *ENERGY STAR®* home appliances. Throughout 2000 and into 2001, the program continued to operate in a low-cost manner in an effort to ensure the market was supported while Federal Standards were being negotiated.

The program has now concluded. This final *Market Progress Evaluation Report* (MPER) documents the history of the initiative, summarizes keys to the program's success, and offers suggestions on how to track the sustainability of the program's impact after the Alliance funding is completed.

A key progress indicator of the ES-RECW program is the impact on sales of ES-RECWs in the Northwest. *Figure ES-1* illustrates sales of ES-RECWs from May of 1997 through February of 2001. The sharp rise in sales rates at the beginning of the program continued unabated until the incentive levels were reduced from $130 to $75 at the end of February 1998, when over 4,000 units were reported sold in one month. After that point, sales were remarkably stable despite later elimination of rebates; monthly sales of ES-RECWs were between 2,500 and 3,500 during most of the program period. The sales peaks in November 1999 and September 2000 were caused by short-term marketing promotions and events, and included the *Grimiest Soccer Team* contest in 1999 and 2000, and the *ENERGY STAR® Cleanup Sweepstakes* (in partnership with Fred Meyer) in 2000. Sales in 2000 seem to reach an even higher plateau, typically

exceeding 3,000 units per month, and accounting for an average market share of 14.2%.

Figure ES - 1



Note: To account for sales made in 1997 that were received in 1998, PEA used a sales-weighted average to allocate 3,564 rebates to May through December 1997.

Table ES-1 shows the program costs over time, grouped into three broad categories for analysis: administration, marketing, and incentives. It clearly illustrates the drop in incentive costs. In 2000, the program costs dropped to $42 per ES-RECW sold, a five-fold decrease from the first full year of the program (1998).

Table ES - 1

ENERGY STAR RECW PROGRAM COSTS (IN DOLLARS)						
Program Cost Category	**1997**	**1998**	**1999**	**2000**	**2001***	**Total**
INCENTIVES	1,927,180	2,995,209	344,515	445,711	106,605	5,819,220
MARKETING	350,625	783,289	672,223	614,027	33,664	2,453,828
ADMINISTRATION	551,909	424,981	372,973	604,780	122,890	2,077,533
TOTAL	**2,829,714**	**4,203,479**	**1,389,711**	**1,664,518**	**263,159**	**10,350,581**

Source: PECI cost data.

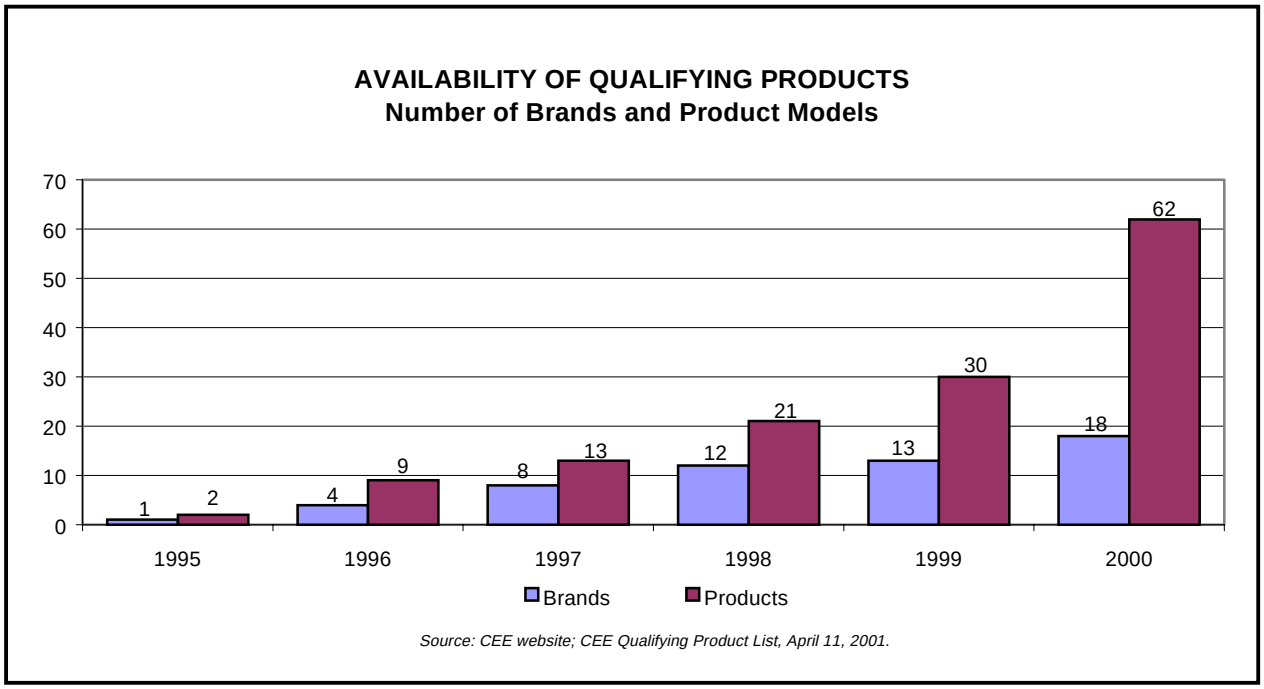
Note: Minor Direct expenses were merged into the Marketing category to improve readability. Administration includes: PECI management and implementation labor, APT subcontract field labor and direct expenses, PECI travel, and other PECI direct expenses. Year 2000 Administration reflected increased costs due to the APT subcontract and program expansion to the eastside of Montana Power Company territory.

* 2001 costs are through February

Another progress indicator is the extent to which manufacturers began to supply more qualifying ES-RECWs. In general, there has been an explosion in both the number of manufacturers making ES-RECWs as well as the number of models. Before 1997, the only products available were European models that were considered small by American standards, as well as expensive. Maytag and Frigidaire both introduced resource-efficient washers in 1997, which changed the market substantially. Now there are 18 different manufacturers and 62 different models available for consumers to choose from (*see Figure ES-2*).

While success in the market was a major element of the program's history, this success also contributed to achievement in another forum. A key objective of the *WashWise/ENERGY STAR® Clothes Washer Program* was to foster the advancement of the high-efficiency clothes washer market in order to influence the development of improved *Federal Appliance Efficiency Standards* ("Standards"). Through the strategic and persistent efforts of the Alliance, its contractors, and others across the country, this progress indicator also has been accomplished. Proving that the market existed for a new generation of clothes washers was a component of achieving agreement with manufacturers on the level and implementation date of the standard.

Figure ES - 2



The Alliance is in a remarkably good position to inexpensively monitor the persistence of some of the key program and market effects to assess the longer-term impacts of the program's accomplishments. The two major accomplishments PEA suggests the Alliance monitor over time are the market share of ES-RECWs and the implementation of the new *Federal Appliance Efficiency Standards* for clothes washers. The necessary information is available from the U.S. Environmental Protection Agency (and its contractors), industry and energy-efficiency advocate news releases, and the *Federal Register*. The Alliance may also want to consider augmenting this information with additional market research into consumer and retailer attitudes, although this information is not critical at this time.

Summary of Accomplishments

The initiative was initially designed to fulfill two broad goals: create a substantial and sustainable market share for resource-efficient clothes washers; and help establish a new *Federal Standard* that would require all

clothes washers to be efficient. Both broad goals have been met and from nearly any perspective, the *ENERGY STAR® Resource-Efficient Clothes Washer Program* has been a major success. Key among the initiative's successes are the following:

- The Alliance-funded effort established the leading resource-efficient clothes washer (RECW) market in the nation, proving that RECWs could be more than a niche product.

- The Alliance played a major role in establishing federal standards for efficiency in clothes washers, a standard that is now secure.

- The Alliance initiative served as a model program for others, most notably in New England, to further national goals in support of RECWs.

- Program decision-making and operation provided an excellent example of "Adaptive Management," reflecting the Alliance's desire to actively manage programs to adjust to market conditions and improved information.

- The program provided cost-effective energy resources to the region. Alliance funding of $11.5 million leveraged over $400 million in efficiency investments in the area, and by 2010, over 100 aMW of electrical energy savings will be realized annually within the region because of this investment.

- The *ENERGY STAR® Resource-Efficient Clothes Washer Program* provided an excellent demonstration of the ability of well-designed, well-managed programs to change markets – a clear indication of how a new generation of market transformation organizations and programs can work.

- PEA believes that the *ENERGY STAR® Resource-Efficient Clothes Washer Program* represents an excellent example of a deliberate, successful energy efficiency market transformation effort, and that the strategies of the Alliance are a model for future market transformation initiatives, particularly for those efforts targeting technology advancement culminating in improved Standards.

1. Introduction and Background

The Northwest Energy Efficiency Alliance (the Alliance) is a non-profit group of electric utilities, state governments, public interest groups and industry representatives committed to bringing affordable, energy-efficient products and services to the marketplace. This final *Market Progress Evaluation Report* (MPER) reviews the status of the Alliance's regional *ENERGY STAR® Resource-Efficient Clothes Washer Program* (ES-RECW Program) and its influence on the market.

The report is divided into six chapters. In this first chapter, Pacific Energy Associates, Inc. (PEA) presents a brief history of the program and its changes, including documentation of key findings and recommendations from previous MPERs. In *Chapter 2*, the status of key program and market indicators is presented, typically with information showing the entire history of the period of program intervention. *Chapter 3* discusses the status of the appliance manufacturing industry regarding *ENERGY STAR® Resource-Efficient Clothes Washers* (ES-RECWs). The status of the *Federal Appliance Standards* is discussed in *Chapter 4*, while *Chapter 5* documents the energy savings and benefits of the ES-RECW Program. Finally, in *Chapter 6*, PEA presents key findings and lessons learned from the operation and evaluation of the ES-RECW Program.

Summary History of the ES-RECW Program

The ES-RECW Program started as the *WashWise Program*[1] in 1997, and has evolved considerably over the past three years. The original *WashWise Program* was comprised of two major elements – incentives and a marketing/promotional campaign. There were two incentive elements to *WashWise.* A direct consumer rebate was available to purchasers in the

[1] As the program and the technology promoted by the program each had two names, the nomenclature can be confusing. Originally the *WashWise Program* supported Resource-Efficient Clothes Washers (RECWs). With the adoption of a national specification for *ENERGY STAR®* Clothes Washers, the program changed both the name of the technology promoted (to *ENERGY STAR® Clothes Washers*, or ES-RECWs) and the program name. Because the national specification for the ES-RECW technology was identical to the regional RECW specification, only the name used changed, not the underlying technology being promoted. Likewise, the ES-RECW Program was a direct extension of the *WashWise Program* – only the name changed.

form of a $130 instant, in-store discount off the retail purchase price of qualifying *WashWise Resource-Efficient Clothes Washers* (RECWs). Additionally, the retailers received $20 per qualifying RECW sold. The *WashWise* marketing and promotional elements primarily focused on: 1) educating consumers regarding the financial and other benefits of RECWs; 2) creating an awareness of the incentive element of the *WashWise Program*; and 3) informing, training, and motivating appliance retailers.

Using a process of Adaptive Management to actively manage its programs, the Alliance was consistently able to adjust to conditions in the marketplace. For example: based on strong consumer response to the original program offering and the realities of budget constraints, the design of the *WashWise Program* and plans for its future were refined in December 1997. Primarily, the refinements focused on reducing the original program incentives from $130 and $20 to the consumer and the retailer, respectively, to $75 to the consumer and $10 to the retailer. March 1, 1998, was set as the changeover date to the new incentives.

Additionally, based on consumer response projections and Alliance budget allocation decisions, plans were made to phase out consumer incentives completely and transition to an *ENERGY STAR®* program and marketing platform in the fall of 1998. In accordance to the plan, consumer rebates were completely eliminated at the end of September 1998. Ten dollar ($10) "spiffs" (rebates to salespeople for each product sold) were implemented to motivate sales personnel to continue to promote RECW products and to provide a mechanism to track product sales data in the absence of rebate-generated information. The program identity was changed from *WashWise* to the *ENERGY STAR® Resource-Efficient Clothes Washer Program,* and the program marketing platform and materials were redesigned and repositioned to emphasize *ENERGY STAR®*. The venture continued with these strategies while expanding the marketing messages and retailer support to include other *ENERGY STAR®* appliances.

Program History as Documented Through Previous MPERs

Key Findings and Recommendations From MPER #1

The first Market Progress Evaluation Report (MPER, E98-003, January 1998) presented an initial look at the market for resource-efficient clothes

washers, the progress and trends in that market, and the influence of the *WashWise Program* to date. In its investigation, PEA surveyed or interviewed recent purchasers of RECWs and people actively shopping for clothes washers, as well as retailers and manufacturers. Program and other industry data were reviewed.

Key findings from the first MPER included the following:

- **The initial task of the *WashWise Program* was to achieve a marketshare of 3%, or 2,785 RECW sales in 1997**. The venture used a consumer incentive of $130 (which was rebated at the time of sale), as well as marketing and promotion strategies. These included consumer education about the benefits of RECWs and the availability of the incentive, and training and assistance to retailers selling RECWs.

- **The size of the regional market for clothes washers was estimated to be 21,400 units sold per month, of which 3% to 4% might be expected to be RECWs**, based on normal market conditions at that time. (Estimates included the introduction of RECWs from two U.S. manufacturers, Frigidaire and Maytag.)

- **Sales of RECWs in the Northwest greatly exceeded program goals and expectations**. For example, sales in October 1997, alone, were 2,684 units – more than 12% of all clothes washer sales for the month, and 96% of the program goal for the year. While market baseline conditions may have been originally underestimated, the *WashWise Program* was also very successful in promoting the sales of RECWs.

- **Purchasers were very satisfied with the performance of their RECWs, and 91% would recommend such a purchase to a friend**. The primary reason consumers purchased a RECW was for energy and water savings, but cleaner clothes and gentleness were also important considerations.

- **Retailers were also enthusiastic about RECWs**. Consumers generally were unaware of RECWs until they entered a retail establishment. However, despite an incremental cost of $300 to $500 for the RECWs, retailers believed that they were worth the money, and that at incremental costs of $100 to $200, one-third to

one-half of all consumers would buy one. They also rated the *WashWise Program* highly for its assistance.

While the *WashWise Program* was enjoying unprecedented success in the market, the first MPER pointed to a number of broader issues that required attention in order to achieve the long-term goals of market transformation. Most importantly, PEA believed it was critical that the Northwest efforts continue to be successful and promoted in various national forums, even while budgets would have to be managed because of the program's unanticipated initial success. As the Northwest provided the country's best example of the potential for RECWs, its success became important in ensuring that all manufacturers developed appropriate products, a key step towards improving RECW market share, achieving incremental price reductions, and working with the Federal Standards process.

PEA also recommended that marketing and educational efforts be increased, even while rebate levels would need to be significantly dropped due to budget constraints. Marketing costs are more controllable than rebates, and increased education was indicated since the vast majority of consumers were unaware of the existence and benefits of RECWs.

PEA noted that sales of RECWs could be expected to continue at an aggressive pace, and could be in the 15% to 20% range for 1998, assuming a substantial ($100+) rebate and an increased marketing effort.

In response to the first MPER and escalating costs, the Alliance cut the rebate nearly in half, to $75 for consumers, and noted that the rebate would be phased out within the next year. Marketing efforts were enhanced. Some key program and evaluation results were written up in *The Duffy Report* – a four-color marketing piece aimed at retailers, manufacturers, and policy makers – that trumpeted the program's success. Information from the purchaser and retailer surveys was used to develop support for improved *Federal Standards* for clothes washers.

Key Findings and Recommendations From MPER #2

There were several key issues that were of particular interest for the second *WashWise Market Progress Evaluation Report* (E98-012, August 1998). First, how did the Northwest market weather the transition to smaller rebates? Second, from a national standards perspective, did customer satisfaction with RECWs continue after the "honeymoon" period

of initial ownership? Third, how informed were general consumers regarding the technology and the program? Fourth, how might the market be impacted when incentives were eliminated in the Northwest?

To help examine these issues, PEA surveyed recent purchasers, general consumers, and shoppers. Interviews were also conducted with representatives from the national chain stores, the largest regional appliance retailers, and all of the major manufacturers.

Findings from the second MPER included the following:

- **PEA found that market activity peaked in the last months of the $130 rebates, with RECWs obtaining over 18% market share**. After the rebate reduction, market share for RECWs still persisted at an average of 12%, and tended to increase.

- **Customer satisfaction continued at very high levels**, even after six months or more of ownership.

- **Of general consumers (those not currently in the market for a clothes washer), more than half were aware that RECWs could be purchased for home use**. Cleaning ability, load capacity, efficiency, and price were all ranked "very important" by the majority of consumers. More than half of those consumers familiar with RECWs reported that they were at least somewhat likely to purchase one, with the likelihood increasing for customers intending to replace their clothes washer soon. However, consumers showed an unwillingness to pay the incremental costs currently associated with RECWs – 40% of consumers said they would not pay any more money for a clothes washer that saved them $50 a year in operating costs. More than 20% had heard of *ENERGY STAR®*, the national brand label, while only 6% had heard of *WashWise*.

- **There were significant signs that the national marketshare of RECWs would increase, even without rebates in the Northwest**. Manufacturers were diversifying and improving their product lines, and sales of RECWs continued to increase nationwide. Half of the major retailers believed that the regional market would fully recover after rebates were eliminated.

Nationally, there was a significant marketing/rebate effort starting in the Northeast, as well as a variety of programs in California.

Based on information from multiple sources, PEA projected that the RECW market could be maintained at the 10% to 12% level in the Northwest without rebates. PEA recommended continuing a regional marketing and educational program for RECWs, focused on supporting retailers. PEA also recommended consideration of the *ENERGY STAR® Home Appliance Program* as a way to sustain the RECW market position and raise the profile of other energy-efficient appliances. Finally, PEA recommended the development and implementation of a detailed plan for supporting and influencing the *Federal Appliance Standards* process.

Key Findings and Recommendations From MPER #3

At the time of MPER #3 (E98-026, April 1999), consumer rebates were eliminated and the program transitioned to the *ENERGY STAR® Resource-Efficient Clothes Washer Program* to more closely identify with national marketing efforts. *MPER #3* provided information on the current program and the market responses over the preceding nine months, including a survey of retailers and a review of the *Federal Standards* process.

Findings from MPER #3 included the following:

- **The *WashWise/ENERGY STAR® Resource-Efficient Clothes Washer* program continued to be very successful in stimulating regional sales of RECWs**. RECW sales for 1998 were 37,100 units, 13% of all clothes washer sales.

- **The positive results in the Northwest were having an impact on manufacturers' plans and the *Federal Appliance Standards* process**.

- **Sales continued at a reasonable pace after the end of the rebate**, dropping only 14% on average, and there were a variety of indicators that sales of RECWs would continue to expand in the Northwest and nationally.

- **While prices of RECWs had moderated slightly, the higher incremental cost of RECWs (an average of over $350 more**

than standard washers with similar features) was still a very substantial barrier to increasing market share.

- **Projects in other areas of the country were enjoying success**. In particular, the *TumbleWash* project in the Northeast had built sales as rapidly as *WashWise* did, being limited in growth primarily by production and distribution capacity.

- **Manufacturers were continuing to improve and diversify their product lines**.

The RECW Program had a very successful introduction and contributed to the acceleration of the market for RECWs; a sustainable market for RECWs had been established. However, in PEA's assessment, there were still substantial barriers to achieving full market transformation. These barriers were related, and at their base were rooted in a lack of full competition among all of the U.S. manufacturers. Given that the market for RECWs and the U.S. product entries into the market were recent events (only about 30 months old), it was be unreasonable to expect that all of the market barriers would be overcome.

These continuing market barriers were:

- **The *Federal Standards* process was uncertain.** Because almost all RECWs sold in the U.S. (97% in the Northwest) were made by two manufacturers, other manufacturers might feel that *Federal Standards* at a high level would put them at a competitive disadvantage, causing them to vigorously oppose such standards.

- **RECWs still had a high incremental cost over standard clothes washers.** The top-selling units had incremental costs of between $250 and $500. Only a small percentage of consumers, certainly less than one-third, were willing to pay incremental costs in this range, even for very substantial benefits. Lower prices were needed to broaden consumer appeal.

- **Competition among the U.S. manufacturers for the RECW market was limited.** Only two U.S. appliance manufacturers were enjoying the benefits of having their RECWs accepted by consumers. Other manufacturers appeared to be unwilling to commit to the RECW market in a substantial way. Until there was

fuller competition, higher prices would remain, and technology innovation might be constrained.

- **Consumers were not aware of the benefits of RECWs**. While at least half of the consumers in the Northwest were aware of RECWs, the remainder was not. Retailers would be able to sell more RECWs if consumers were educated about RECWs prior to the time of purchase.

Given the barriers, PEA made two broad recommendations. First, PEA suggested that the RECW Program be continued at some level, even without any rebates. A specific concern was that a complete shut down of the *WashWise/ENERGY STAR®* program would send a message to manufacturers that, once again, utility support for energy efficiency was fleeting. While manufacturers' product plans do not rely on the existence of utility programs, utility programs clearly can help support the development of a market for new energy-saving products.

While providing additional rebates at this point would be expensive and probably unnecessary, PEA recommended that any of a variety of marketing and market support initiatives be pursued. PEA also recommended that the Alliance continue providing leadership and support for upgrading the *Federal Standards* for clothes washers, where the Northwest had become an important player. PEA argued that, given the effort expended to get the RECW market to its current point, insuring that the remaining barriers to transforming the market continue to be addressed was a prudent investment.

Key Findings and Recommendations From MPER #4

Since November of 1998, the program has relied on consumer marketing and retailer support to maintain sales of *ENERGY STAR®* clothes washers. Earlier in 2000, the program also expanded to include other *ENERGY STAR®* home appliances. For MPER #4 (E98-065, October 2000), the primary emphasis was on reviewing the effectiveness of the marketing efforts over the last eighteen months, as well as generally updating the status of the program and the market. To complete this review, PEA conducted extensive discussions with program staff, reviewed detailed sales data from independent retailers, and interviewed the most active retailers in the Northwest.

In MPER #4, PEA found that the ES-RECW Program had been very effective at maintaining relatively high sales levels of ES-RECW. Throughout the history of the ES-RECW Program to date, the Program had been very effective in moving the market, and had provided leadership and support to the *Federal Appliance Standards* process, thus helping provide success in both forums. Other specific findings included:

- **Despite the elimination of consumer rebates from the program, sales continued at strong levels.** Overall market share in 1999 was 12.9%, effectively the same as 1998, when rebates were available for nearly all of the year.

- **The average retail price of ES-RECWs has been reduced by about $100 since January 1998.** This was caused by market share shifts to less expensive ES-RECWs, price point drops in some models, and the entry of new products.

- **PECI, the program contractor, has done an outstanding job of crafting an effective marketing campaign on a modest budget**. The program contractor demonstrated creativity in their approach to marketing, and, most importantly, maintained an effective line of communication and a solid relationship with retailers.

- **PEA believes that the "spiff" program, supported by the *Great Escape Sweepstakes*, was the most important and successful element of the marketing effort**. The relationship established by this marketing approach kept sales personnel focused on promoting ES-RECWs, and had a direct impact on short-term sales. Related to the success of the spiff effort was the continued support for POP materials, and the ability to support retailers through personal communications and service.

- **Retailers continue to be optimistic about the future of the ES-RECW market**. Retailers expect that ES-RECWs will have half of the market share in five years.

- **Expanding the program to cover all *ENERGY STAR®* appliances has been a useful change**. While the key marketing elements reviewed in this report were almost exclusively targeted to clothes washers, retailers expressed their strong support for the expanded program.

From a market transformation perspective, the biggest news was that appliance manufacturers and environmental/energy-efficiency advocates had agreed to a negotiated settlement regarding future clothes washer standards. The negotiated standard is proposed to begin in 2004, with a second step in 2007 that will require efficiency levels similar to the current ES-RECWs for all clothes washers. The negotiated settlement resolved a potentially problematic political process, and seemed nearly certain to be fully supported in the standard-setting process. The settlement represents a major step in increasing the energy efficiency of clothes washers, and the Alliance played a significant role, both in establishing the early market for resource-efficient clothes washers, and in providing data and policy support to the standards-setting process.

At the time of MPER #4, the program was nearing the end of its contract period, and within that period, PEA did not have any specific recommendations for program changes or enhancements. With the program's success in the market and at the *Federal Standards* level, the original program objectives had been fully achieved.

With the negotiated settlement regarding future clothes washer standards, the Alliance had shown success both in the appliance market and in increasing government standards, the two forums identified as targets for success in the initial program planning. PEA concluded that the Alliance clothes washer program had become a textbook case of how to transform a market effectively, due to the development of a successful overall strategy followed by strong implementation.

2. Program Performance

In this section of the report, some key measures of the success of the ES-RECW Program and the status of the clothes washer market are tracked over time. In most cases, information begins with the initiation of the program in 1997, and data are tracked through the end of 2000, or into the first few months of 2001.

Sales and Market Share of ES-RECWs in the Northwest

A key measure of the success of the ES-RECW program is the impact on sales of ES-RECWs in the Northwest. A key program goal was to: *"Dramatically increase the market share of RECWs* [ES-RECWs] *in the Program area over the next three years."*

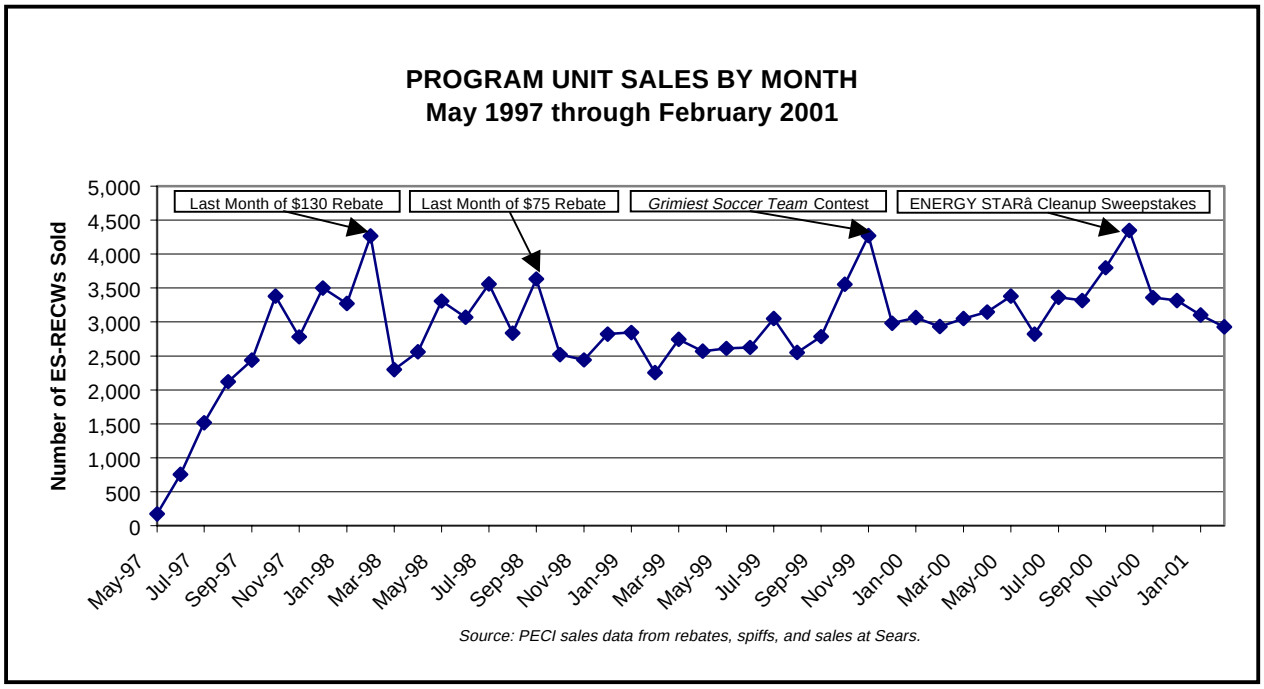
The initial short-term numeric goal of the program was to achieve a market share of 3%, or 2,785 rebated sales of RECWs in 1997. As the figures below show, these short-term goals were substantially exceeded.

Figure 1 illustrates sales of ES-RECWs from May of 1997 through February of 2001. Six months into the project, monthly sales of RECWs were exceeding the expectations for annual sales. The sharp rise in sales rates at the beginning of the program continued unabated until the incentive levels were reduced from $130 to $75 at the end of February 1998, when over 4,000 units were reported sold in one month.

The early sales success of the program required some budget-related adjustments in an attempt to keep sales at a relatively high level while ensuring that program costs did not get out of hand. The basic changes were the previously mentioned drop in rebate amount in February 1998, followed by the elimination of consumer rebates in September 1998. (The program continued to provide a variety of marketing support and a $10 incentive to salespersons and/or retailers through February 2001.)

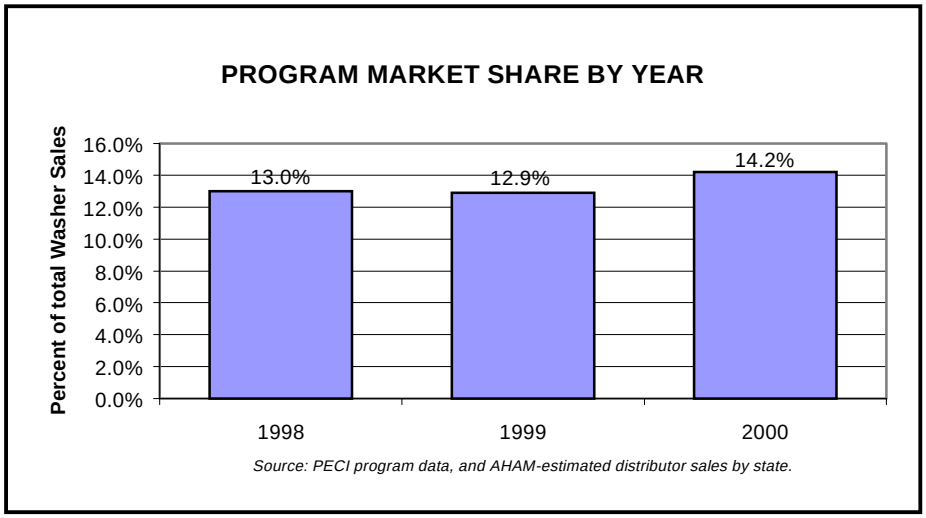
As *Figure 1* shows, sales were remarkably stable despite these major program financial changes; during most of the program monthly sales of ES-RECWs were nearly always between 2,500 and 3,500. The sales peaks in November 1999 and September 2000 were caused by short-term marketing promotions and events. Sales in 2000 seem to reach an even higher plateau, typically exceeding 3,000 units per month.

Figure 1



Note: To account for sales made in 1997 that were received in 1998, PEA used a sales-weighted average to allocate 3,564 rebates to May through December 1997.

Figure 2



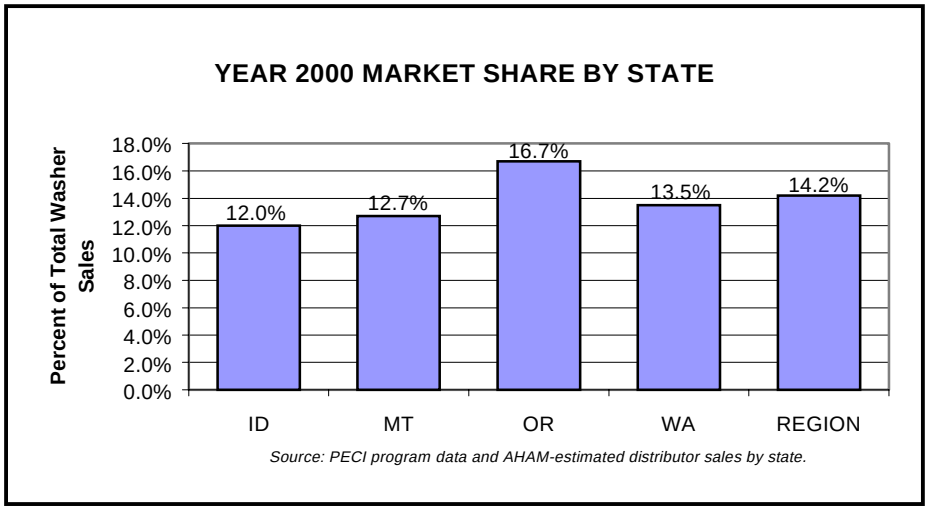
Note: Sales results from independent retailers were adjusted to correct for 10% under-counting of spiff data. AHAM washer sales were also adjusted to correct for the absence of Circuit City sales and spiffs from the program. This adjustment impacted January through October 2000 results. Circuit City exited the laundry market after October 2000.

Figure 2 tells a similar story of steady sales, with an increase in 2000. (As 1997 represents a period of less than a year when the program was first being implemented, it is not included in this graph.)

Sales By State

While the Alliance funding program effort operated across the entire Northwest, some utilities offered additional incentive and/or marketing support for ES-RECWs, and beginning in January 1998, Oregon offered a state income tax credit. *Figure 3* shows the most recent data on performance by state. While all four states experienced substantial increases in sales, Oregon had the highest market share, followed by Washington.

Figure 3



Note: Sales results from independent retailers were adjusted to correct for 10% under-counting of spiff data. AHAM washer sales were also adjusted to correct for the absence of Circuit City sales and spiffs from the program. This adjustment impacted January through October 2000 results. Circuit City exited the laundry market after October 2000.

In Oregon, the state income tax credit is the most likely explanation for the high rate of sales. In a letter of analysis to the Oregon Office of Energy, PEA estimated that the income tax credit increased sales in Oregon by 18% to 38% compared to the rest of the region. That analysis calculated sales of ES-RECWs per 1,000 house-holds, as shown in *Table 1*.

Washington sales of ES-RECWs also track higher than Idaho and Montana, probably due to the presence of strong utility programs as well as higher household income levels.

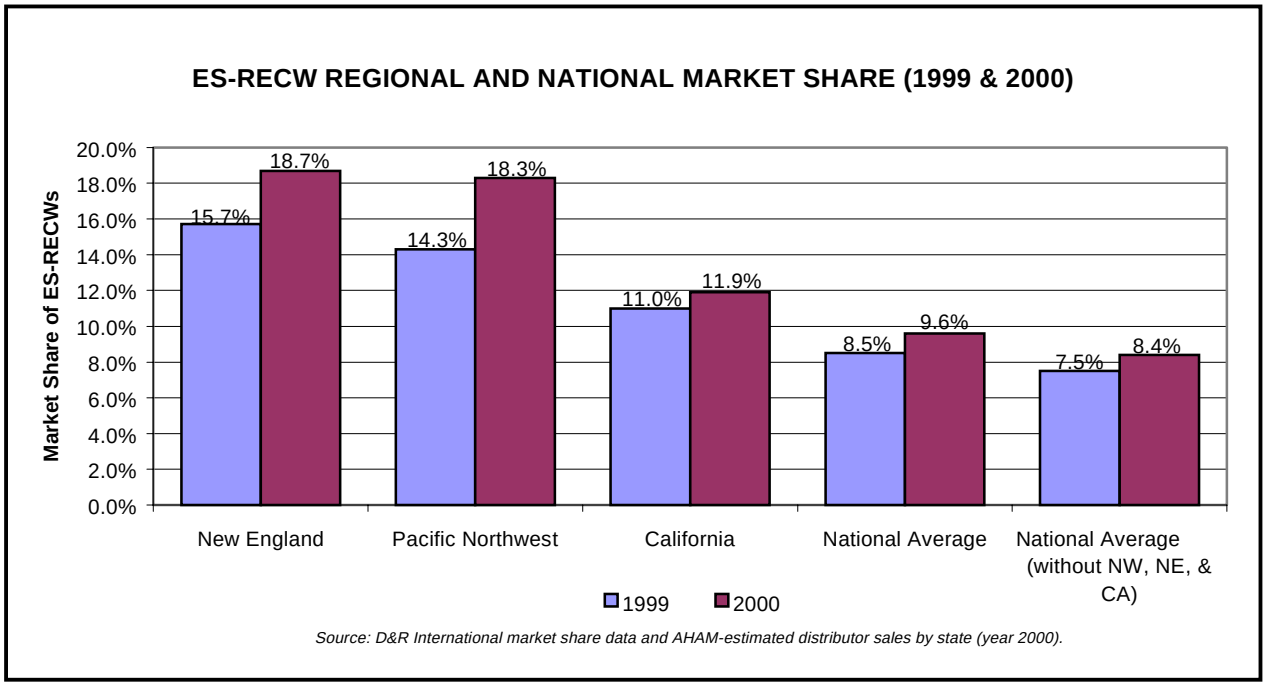
Table 1

ENERGY STAR CLOTHES WASHER SALES BY STATE PER 1,000 HOUSEHOLDS					
MPER and Date	**State**				**Notes**
	Oregon	**Washing-ton**	**Idaho**	**Montana**	
MPER #1 JAN 1998	1.8	1.5	1.2	2.0	Covers sales in the first six months of the Alliance program (5/97-10/97). This was prior to implementation of the tax credit.
MPER #2 AUG 1998	9.1	7.8	5.9	8.6	Covers a 14-month period – the last eight months of 1997 and first six months of 1998.
MPER #3 APR 1999	11.0	8.0	5.9	10.2	Covers a 20-month period. Oregon sales were 40% higher than the average of the other states. Includes sales for all of 1998, as well as the last eight months of 1997. Non-Oregon sales averaged 7.8/ 1,000 households.
MPER #4 OCT 2000	13.8	12.0	9.2	7.3	Covers an 18-month period from January 1999 through June 2000. The Montana number now includes program expansion into the entire state, which reduced the penetration rate. The Non-Oregon region averaged 10.3 sales/1,000 households.

Comparison to Other Regions and National Data

The increase in the sales of ES-RECWs is not just a Northwest experience. Major appliance manufacturers have made commitments to efficient clothes washers, and several other states or regions have run programs similar to the Alliance effort. *Figure 4* shows comparable data from New England, California, and the rest of the country

Figure 4



Note: The data used in this figure are only for national retailers, and so varies from other data included in this report.

The program in New England is operated by the Northeast Energy Efficiency Partnerships (NEEP), a multi-utility, multi-state collaborative effort. The program was modeled after the Alliance program, but started in 1998 rather than 1997. In general, the NEEP program has pursued a more aggressive marketing campaign, including extensive television advertising, and rebates (ranging from $50 to $100) are still being paid to consumers. Despite the higher costs of the NEEP program, as compared to the Alliance's ES-RECW Program, the results are very similar for 2000.

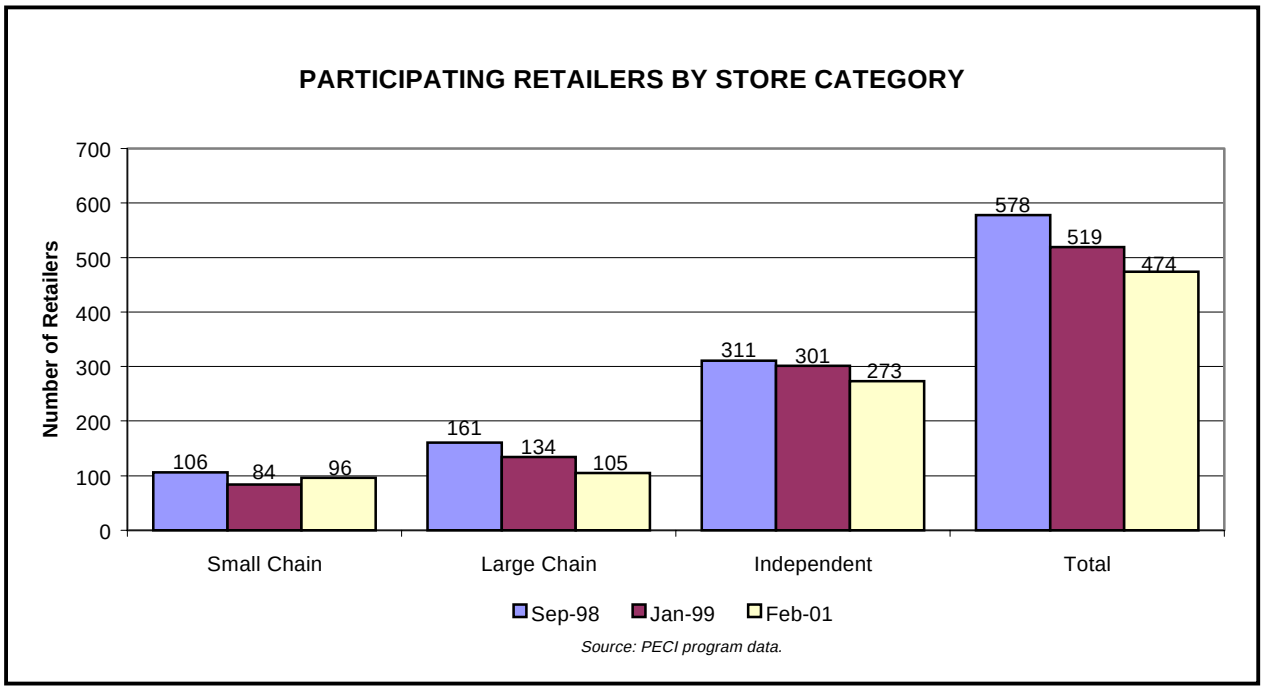
The California program actually was in place before the Alliance effort, but has been hampered by the lack of a consistent, coordinated campaign, and has experienced funding disruptions.

The Alliance program shows a market share roughly twice as high as the national average. When the national average is corrected to compensate for those areas of the country with the most active utility-supported programs, the difference is even greater.

Retailer Participation

The program has always placed a high value on getting as many Northwest retailers to take part as possible. As *Figure 5* indicates, the greatest participation was achieved during the period when consumer rebates were available. The number of participating retailers has declined over time; however, the largest reason for the decline is a reduction in the number of stores selling appliances. Several appliance-retailing chains, both national and regional, have gone out of business, as have some independents, and some independent retailers have grown into small chains. Overall, 90% of appliance retail outlets remained with the program into 2001, and none requested to be dropped.

Figure 5



Program Costs Over Time

Program costs were grouped into three broad categories for analysis: administration, marketing, and incentives. *Table 2* shows the changes in costs over time, primarily showing the drop in incentive costs.

Table 2

ENERGY STAR RECW PROGRAM COSTS (IN DOLLARS)						
Program Cost Category	**1997**	**1998**	**1999**	**2000**	**2001***	**Total**
INCENTIVES	1,927,180	2,995,209	344,515	445,711	106,605	5,819,220
MARKETING	350,625	783,289	672,223	614,027	33,664	2,453,828
ADMINISTRATION	551,909	424,981	372,973	604,780	122,890	2,077,533
TOTAL	**2,829,714**	**4,203,479**	**1,389,711**	**1,664,518**	**263,159**	**10,350,581**

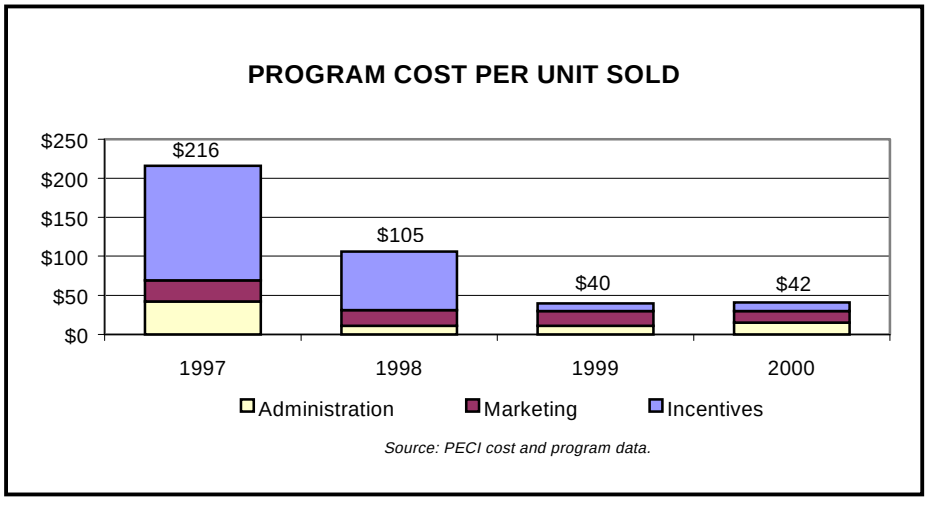
Source: PECI cost data.

Note: Minor Direct expenses were merged into the Marketing category to improve readability. Administration includes: PECI management and implementation labor, APT subcontract field labor and direct expenses, PECI travel, and other PECI direct expenses. Year 2000 Administration reflected increased costs due to the APT subcontract and program expansion to the eastside of Montana Power Company territory.

* 2001 costs are through February

Related to the change in program costs, are the program costs per unit sold, as shown in *Figure 6*. This figure shows a dramatic, fivefold drop in program costs over time; as incentives were reduced and annual sales increased.

Figure 6



2. Program Performance

3. Manufacturer's Update and Perspectives on ES-RECWs

Overview

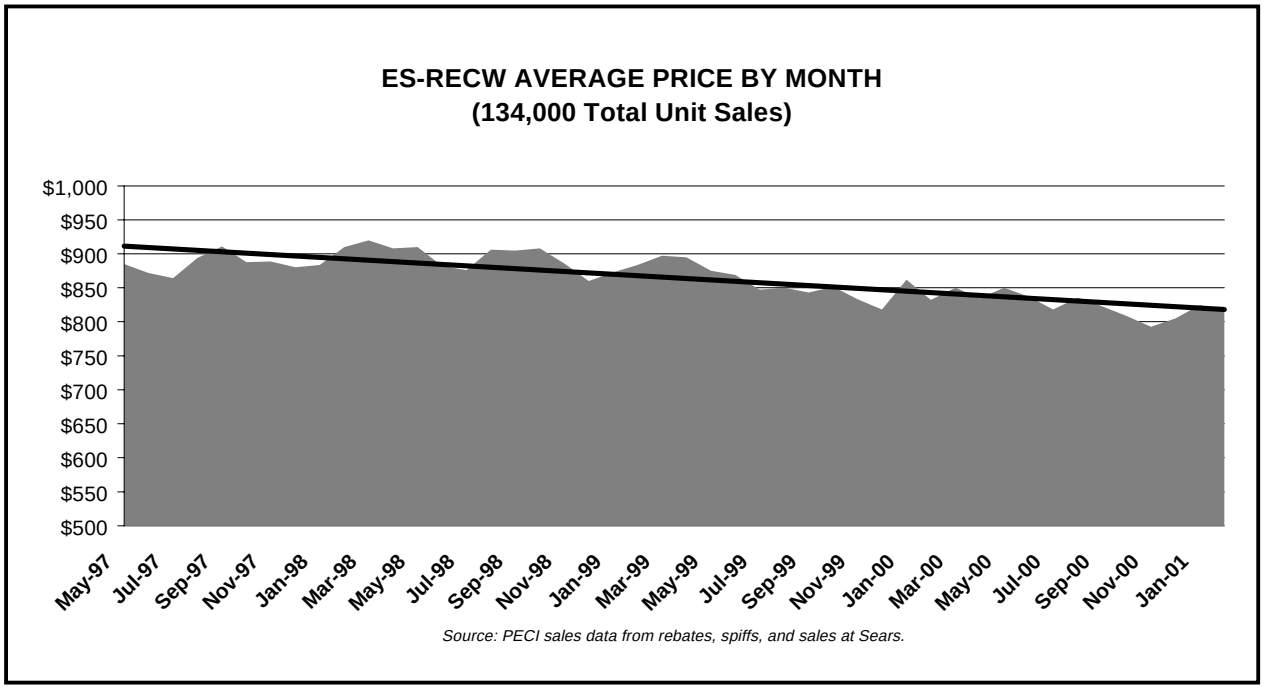
For this final MPER, PEA reviewed program data on sales and costs of ES-RECWs, and interviewed all five U.S.-based manufacturers of clothes washers, and the three major importers, to determine their current status regarding pricing, production, marketing plans, and opinions regarding *ENERGY STAR®* clothes washers.

Changes in ES-RECW Prices and Manufacturer Market Share

ES-RECWs still cost more on average than standard clothes washers. Part of the increase is due to the positioning of ES-RECWs as a premium product by some manufacturers, part is due to recovery of investments in research, marketing, and manufacturing facilities, and part is due to some higher imbedded costs of technologies used in the more resource-efficient products. Retailers in the Northwest believed that a standard washer with similar features (e.g., size, controls, quality) would cost about $500. DOE research indicates that the average standard washer cost is $453, and they expect efficient clothes washers to cost $240 more than that in 2007.

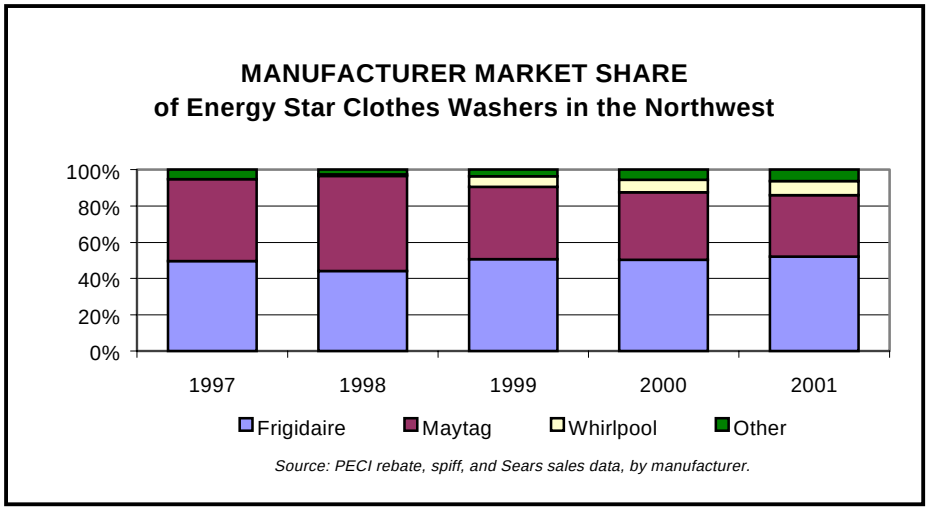
Figure 7 indicates that the average cost of ES-RECWs is on a downward trend. Part of this trend is due to reductions in the retail prices of ES-RECWs, while part is due to the shifting in market share from higher-cost ES-RECWs (from Maytag and European manufacturers) to lower-cost products (primarily from Frigidaire and Whirlpool). Since the inception of the Alliance program, the average cost of ES-RECWs has dropped nearly $100, but is still more than $300 above standard clothes washers with similar features.

Figure 7



Note: May 1997 through December 1997 average prices were adjusted to incorporate sales made in 1997, but recorded later and reported in 1998 results.

Figure 8

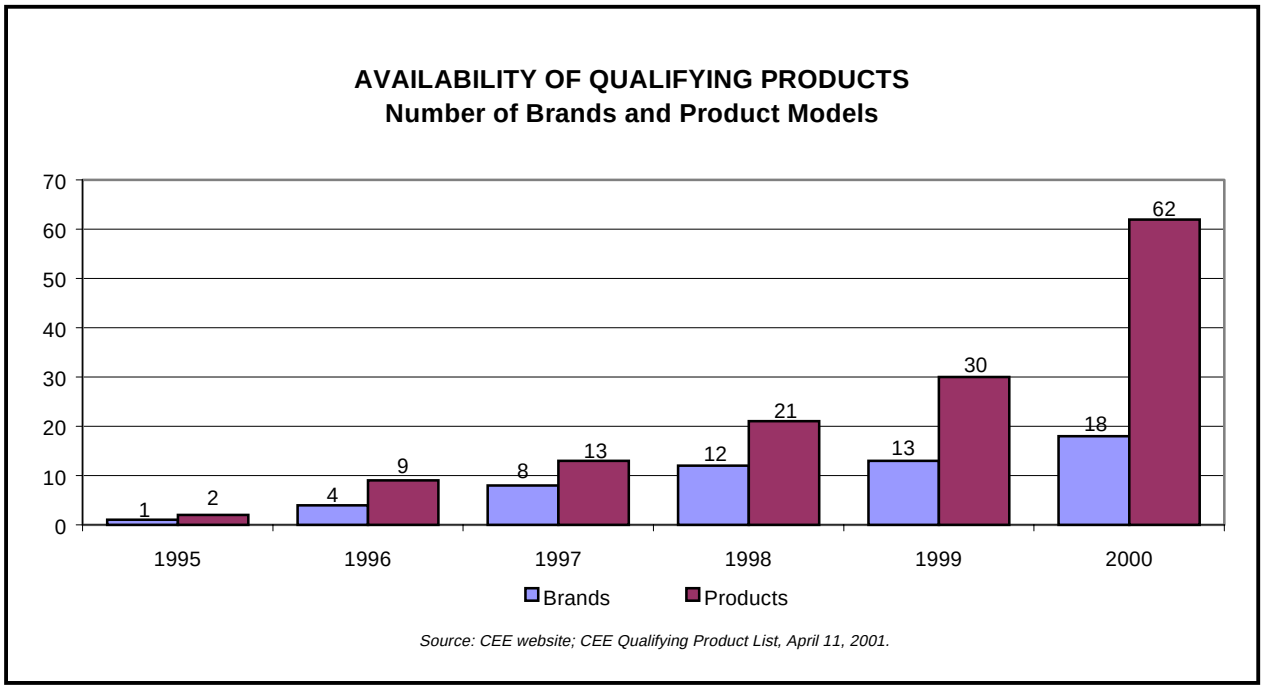


In *Figure 8*, the annual changes in market share by manufacturer are tracked. In the first full program year, 1998, Maytag had a majority of all ES-RECW sales. In 2000 and the early months of 2001, ES-RECWs made by Frigidaire now account for over 50% of the market. Whirlpool is the largest maker of clothes washer by far, but was a late entrant in the resource-efficient market. They are

adding different models to their line-up in 2001, and their market share among ES-RECWs may continue to grow, although from a modest base.

In general, there has been an explosion in both the number of manufacturers making ES-RECWs as well as the number of models. This is perhaps the most compelling evidence, from a market perspective, that ES-RECWs have become a major opportunity to grow market share. Before 1997, the only products available were European models that were considered small by American standards, as well as expensive. Maytag and Frigidaire both introduced resource-efficient washers in 1997, which changed the market substantially. Most recently, there are now 18 different manufacturers, and 62 different models available for consumers to choose from (*see Figure 9*).

Figure 9



Manufacturer Interviews

Table 3, below, presents a summary of the key responses from manufacturer interviews. Some significant details from each of the manufacturer interviews are presented after the table.

Table 3

SUMMARY OF KEY RESPONSES FROM MANUFACTURERS							
Subject	**Frigidaire**	**General Electric**	**Maytag**	**Whirlpool**	**Asko**	**Equator**	**Miele**
NEW PRODUCTS SINCE MPER #3 (SEPT 99)	No	Yes – two front load	Yes – one front load	Yes – one top load	Yes – six front load	No	No
NEW PRODUCTS PLANNED	Yes – front load	Yes – top load	NA	Yes – top load	Yes – front load $599 to $799	No	Yes
PRICE RANGE IN 1999	$649 to $699	$699 to $749	$1,099 to $1,999 (combined w/dryer)	$599	$999 to $1599	$999 (combined w/ dryer)	$1,395 to $1,795
PRICE RANGE IN 2001	$599 to $699	$649 to $999	$1,049 to $1,999	$599 to $1,099	$999 to $1,699	$1,099	$1,399 to $1,799
ES-RECW PERCENT OF PRODUCTION	25% to 30%	15% to 20%	32% to 50%	NA	100%	90%	100%
PLANNED CHANGES TO PRODUCTION	No	No	Yes – adding production line	Yes	Yes – a second shift	No	No
STRONGER SALES W/ UTILITY PROGRAMS	Yes	Yes	Yes – initially	Yes	Yes	Yes	Yes

Continued

SUMMARY OF KEY RESPONSES FROM MANUFACTURERS							
Subject	**Frigidaire**	**General Electric**	**Maytag**	**Whirlpool**	**Asko**	**Equator**	**Miele**
RETAILERS REQUESTING MORE Energy Star® PRODUCTS FOR OTHER APPLIANCES	Yes – but only in areas w/ rebates	Yes	Don't Know	Don't Know	NA	Yes	Yes
HAS Energy Star® WASHER SUCCESS INFLUENCED OTHER PRODUCT PLANS?	Yes – now have an *ENERGY STAR®* refrigerator	No	Yes – it raised expect-ations for marketing	Don't Know	NA – only sell laundry equipment	Yes – brought out an *ENERGY STAR®* dish-washer	Yes
IMPACT OF NORTHWEST PROGRAM	Significant – it drove ES sales	Significant	Influential in NW only	A success in NW	Very Important	Very Important	Important
Energy Star® USE IN MARKETING	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Energy Star® LABELS ON PRODUCTS	Yes	Yes	Yes	Yes	Will begin May 2001	Yes	Yes

Amana

While Amana has no current qualifying models (and is therefore not included in the table above), they continue to monitor the ES-RECW market and plan to remain in the clothes washer business after the new standards take effect. Detailed product plans were not shared.

General Electric

General Electric believes that energy efficiency is no longer a niche, and that the energy-efficient market will continue to grow. The company has

been closely watching the market response to Whirlpool's *Calypso* washer, and indicated it would be introducing its own energy-efficient, top-loading unit within the next two years. Expansions to its front-loading line-up are also planned.

GE noted that its *ENERGY STAR®* product has enabled it to increase sales volume and sales revenue. Sales have been increasing over the past six months, primarily on the East and West Coasts. GE expects demand will continue to increase over the next six months.

The company reported that retailers were requesting more *ENERGY STAR®* products for other appliances, most notably for refrigerators and room air conditioners. The company noted it was not sure how to manage the different state requirements for water-factor that are now appearing in California and Texas.

Frigidaire

Beginning September 2001, Frigidaire will introduce six new *ENERGY STAR®* clothes washers to replace their old line-up. The units will present new styling and graphics, and come in at price points similar to the existing line-up. The company continues to manufacture units for Sears (Kenmore), and General Electric.

ENERGY STAR® washers represent 25% to 30% of overall washer production at Frigidaire. Sales are stronger in areas where there are active utility programs. The Northwest is the biggest market for Frigidaire.

Retailers are generally not requesting more *ENERGY STAR®* products for other appliances, according to Frigidaire. However, in areas where *ENERGY STAR®* is being actively promoted, and rebates are offered, the company indicated that *ENERGY STAR®* sales are increasing.

The success of Frigidaire's *ENERGY STAR®* clothes washer has indirectly influenced "other" product plans, according to the company. For example, due to the awareness of *ENERGY STAR®*, Frigidaire, who had never had a qualifying refrigerator before, will produce *ENERGY STAR®* product.

The Northwest's program was mentioned as the one that helped drive the sales of front-loading clothes washers in the market.

Maytag

Maytag builds three front-loading *ENERGY STAR®* clothes washers, and one top-load unit. While the company would not say what percent of washer production the *ENERGY STAR®* clothes washers represent, they indicated it was less than 50%. A March 2001 press release indicated that 32% of Maytag's products, including washers, refrigerators and dishwashers, are *ENERGY STAR®*-rated, which is double the average for the U.S. appliance industry.

Maytag noted that sales were initially stronger in areas with utility programs, but are now strong everywhere. They noted that retailers are more aware of the program and becoming better at selling *ENERGY STAR®* as a benefit. Maytag credits the Northwest's ES-RECW program as being influential, and believes the rebates were powerful in jump-starting the market.

Whirlpool

At the *2001 Kitchen & Bath Show*, Whirlpool will introduce a new line of energy-efficient products that meet *ENERGY STAR®* levels (a press release indicated a new *Calypso* washer, a dishwasher, and a refrigerator). This May/June introduction will be supported with a full media ad launch.

Whirlpool says it has seen a slight increase in sales volume and revenue from its *ENERGY STAR®* products. The company anticipates the market will continue to grow. Whirlpool reported stronger sales in areas with utility programs, especially when rebates were offered. Whirlpool also reported seeing more *ENERGY STAR®* activity, and interest in it from retailers like Sears and Best Buy. The company does not directly credit the success of their *ENERGY STAR®* washer with influencing other product plans. Rather, Whirlpool credited the market, *ENERGY STAR®* incentives, and consumers' need for energy-efficient products as having a greater influence over product plans.

Whirlpool credited the Northwest's *ENERGY STAR®* program for driving a higher segment of energy-efficient washer sales than the national average.

Asko

Asko will be showing six new, lower price-point models at the annual *Kitchen and Bath Show*. Asko was purchased one year ago by an Italian firm, Antonio Merloni Group, one of the largest OEM manufacturers in the world.

The company continues to grow rapidly, citing both increases in sales volume and revenue, although they would not give any specific data. Over the past six months, sales have been increasing, with activity highest in California and New York. The company sees demand continuing to increase over the next six months as other states, besides California and Oregon, respond to the growing energy crisis and support more energy-efficient and water-saving products.

They indicated the Northwest's *ENERGY STAR®* program has been very important to the success of *ENERGY STAR®* clothes washers in the marketplace.

Equator

Equator's ES-RECW is a condensing (ventless) all-in-one, combination washer and dryer. The company sees the unit as a niche product where space (footprint) is a prime consideration. The strongest sales are in New York City and the San Francisco Bay Area, where living spaces are somewhat constrained, and space-saving appliances are valued. Future marketing plans call for targeting senior citizens in retirement centers.

Sales have been increasing substantially over the past six months and the company expects demand to stay strong over the next six months.

The company noted that the success of Equator's *ENERGY STAR®* clothes washer had influenced other product plans, such as their new *ENERGY STAR®* dishwasher. The company noted that the Northwest's program was very important to the success of *ENERGY STAR®* washers in the marketplace.

Miele

Miele had planned to roll out eight new models in the U.S. this year, under the name *Generation-2000*. However, their U.S. introduction has been pushed back to mid-2002, to allow the company to first establish sales in the European market. The company indicated that distribution has grown by 30% per year over the past five years. Over the past six months, sales have increased, and demand over the next six months is also expected to increase.

All of Miele's clothes washer product line is *ENERGY STAR®*. Seven of eleven dishwashers are also *ENERGY STAR®*. The success of their *ENERGY STAR®* clothes washer has influenced Miele to expand their washer line-up, especially in areas where *ENERGY STAR®* is strong. And, the company expects to expand into refrigerators in less than one year. The company reported that the Northwest's *ENERGY STAR®* program has definitely been important to the success of *ENERGY STAR®* washers in the market, particularly in Oregon and Washington.

Summary

The ES-RECW market has continued to expand since the last interviews with clothes washer manufacturers in September 1999. Most manufacturers have introduced new models, and more are on the way. Pricing continues to hold up well, reflecting strong demand for the product, and the efficient market continues to grow in relation to its share of overall production.

Utility programs continue to drive sales, especially in regions where rebates are offered. The Northwest is the largest market for Frigidaire, and that market has remained strong, even with the elimination of rebates and changes to program identity and marketing. The Northwest program received very high marks from manufacturers concerning its impact on the market. The success of the ES-RECW effort appears to have influenced the product plans of most of the manufacturers.

3. Manufacturer's Update and Perspectives on ES-RECWs

4. Federal Appliance Efficiency Standards Update

A key objective of the *WashWise/ENERGY STAR® Clothes Washer Program* was to foster the advancement of the resource-efficient clothes washer market in order to influence the development of improved *Federal Appliance Efficiency Standards* ("Standards"). Through the efforts of the Alliance, its contractors, and others across the country, this objective has been accomplished. This chapter discusses the final stages of the Standards-setting process and the role of the Alliance in this important development.[2]

The Negotiated Agreement for the New Standard

On May 23, 2000, after a protracted rule-making process marred by concerns with DOE's economic analyses and the equipment-testing procedures, a landmark agreement on revisions to the minimum efficiency standards for clothes washers was announced. The agreement culminated months of negotiations between appliance manufacturers and a broad coalition of public interest advocates. This negotiated agreement included recommendations for: 1) efficiency standard levels and implementation dates; 2) *ENERGY STAR®* program specifications; 3) federal tax credits for manufacturers; and 4) energy and water-use performance disclosure/ reporting.

Standard Levels and Implementation Dates

The agreement proposed increasing the minimum energy efficiency requirements in two stages for clothes washers manufactured in this country. It called for an initial 22.5% improvement over the current standards, effective for clothes washers manufactured on or after January

[2] Most of the information in this section was provided or obtained through interviews with Tom Eckman of the Northwest Power Planning Council and Andrew DeLaski of the Appliance Standards Awareness Project. Additionally, detailed information and documentation was obtained from the *Federal Register* (January 12, 2001) and the websites for US DOE's Office of Building Technology (http://www.eren.doe.gov/buildings/codes_standards/applbrf/) and the Consortium for Energy Efficiency (*http://www.ceeformt.org/*).

1, 2004. The final step in the agreement was a 35% increase in energy efficiency for washers manufactured on or after January 1, 2007.

ENERGY STAR® Specifications

The agreement also called upon DOE to set the minimum efficiency level for clothes washers to qualify for the *ENERGY STAR®* label in 2001 at 35% above the current standard, and raised it to 42.5% above the current standard in 2004. Interestingly, as evidence of the complicated nature of these negotiations, the agreement also included aspects related to *ENERGY STAR®* specifications for refrigerators and freezers.

Federal Tax Credits

Parties to the agreement committed to supporting legislation that would provide federal income tax credits for manufacturers producing clothes washers complying with the new standards prior to its effective date. In addition, manufacturers could receive tax credits for producing *ENERGY STAR®*-compliant refrigerators and freezers.

Performance Disclosure and Reporting

The negotiated standard established the minimum energy efficiency of new clothes washers, but did not propose to regulate the amount of water that can be used by the machines. However, manufacturers agreed to disclose the energy efficiency and water consumption of all clothes washers sold that qualify for the tax credit and *ENERGY STAR®* designation beginning in 2001. The Association of Home Appliance Manufacturers (AHAM) will also report the sales-weighted average energy efficiency and water consumption of all machines sold, beginning in 2002, and each machine's water factor beginning in 2007.

From Negotiated Agreement To Federal Standards

With the negotiated agreement between the key participants in the Standards rule-making in hand, the Clinton Administration issued the new standards for clothes washers (as well as for other appliances, including air conditioners) just before leaving office in January 2001. A copy of the

Federal Register Final Rule for this subject is located in *Appendix A***.** However, as part of a 60-day review period that these new *Federal Standards* are under, the Bush Administration quickly ordered the review of the Standards and the proceedings, indicating that over-turning the Clinton administration decision was a real possibility.

Lawyers for DOE (under Bush) directed the DOE to examine whether former President Clinton's appointees exaggerated the benefits or played down the costs of the energy-efficiency standards. Petitions to overturn the Clinton actions on Standards were filed on behalf of consumers. A *Joint Resolution (H.J RES.44)* from the U.S. House of Representatives was issued to nullify the Standards.

In the end, the new Standards for clothes washers survived this opposition, and became effective as of April 13, 2001. Other appliance Standards being reviewed were not as resilient. The proposed Standards for air conditioner efficiency, for example, ended up being "rolled back" from requiring new units to use 30% less energy than the current Standards to requiring a more modest 20% reduction in consumption.

It appears that there were several key factors that enabled the clothes washer standard to survive this review intact, while the air conditioner standard was rolled back. Key among these factors was that the appliance manufacturing industry supported the new standard. The industry, through its association (Association of Home Appliance Manufacturers, or AHAM), weighed in heavily during the 60-day review process, responding directly to the petitions of consumer and other groups trying to reopen the Standards rulemaking process. A copy of an AHAM letter to the Secretary of Energy is located in *Appendix B.* This letter indicates the strong support of the industry for the Standards.

All documentation reviewed by PEA, and all of the interviews conducted for this report, indicated that the single biggest reason the Standard for clothes washers went through was the appliance manufacturers' support for the new Standard as outlined in the negotiated agreement. The Standards were negotiated, rather than imposed on the industry, and the manufacturers supported the agreement to the end. Several process observers noted that, *"The manufactures will make a lot more money selling these new machines than the old ones."* PEA assumes that the industry support is profit-motivated, but nevertheless, it appears to be the industry support that ultimately delivered the new clothes washer Standard

in the face of significant opposition. Their support came from the fact that the market for energy-efficient clothes washers had been demonstrated to exist, and manufacture of this new generation of clothes washers held benefits to the manufacturers (in the form of increased revenues), as well as benefits for consumers. The Alliance program played a strong role in demonstrating the potential market for these new appliances.

By contrast, the Standards for air conditioners were not supported by the HVAC manufacturing industry, leading to sufficient pressure from those opposed to the new Standards to cause the Bush Administration to "roll-back" those Standards.

The Role of the Alliance

The contributions of the Alliance to the Standards setting process are several.

Strategic Program Design and Implementation

As was noted earlier, from the beginning, the Alliance established program objectives targeting the Federal Standards. Additionally, the program design and implementation strategies that either directly or indirectly provided support for improved Standards included:

- Consumer rebates to create early consumer demand and retailer interest, stimulate product sales, and encourage product development and introduction by the manufacturers;
- Retailer support and training, and consumer marketing to produce a knowledgeable sales force and increased consumer awareness;
- High quality program and market activity tracking and reporting; and
- Gradual reduction and elimination of consumer rebates (while continuing marketing and other retailer support program elements) to demonstrate unsubsidized market viability (i.e., that the market share of clothes washers was not "bought").

Program Evaluation and Market Research

Through a series of *Market Progress Evaluation Reports*, each with a somewhat different focus and emphasis, the Alliance provided several key pieces of information to program designers, market actors, and the Standards setting process. Areas addressed included:

- Consumer awareness, satisfaction, and behavior market research results;
- Reliable market share estimates and projections; and
- Identification of program design evolution opportunities and short-term feedback on program changes. (This process not only proved invaluable to the Alliance Program designers and implementers, but also to program designers around the country, most specifically New England utilities, who developed a "sister" program patterned after the Alliance program.)

Direct Participation in the Standards Setting Process

In MPER #2, PEA recommended that the Alliance "develop and implement a detailed plan for supporting and influencing the Federal Appliance Standards setting process." PEA recommended continuing support for the Standards setting process in MPER #3. The Alliance responded by funding the development of an aggressive plan and a small team of consultant/contractors to represent the Northwest region and to participate in the U.S. DOE's Standards setting process for clothes washers. Over the course of more than two years, the team, led by Tom Eckman, provided the process:

- Support from a organization that was neither primarily an environmental advocacy group, nor an "inside-the-beltway" political player;
- Analytical support, primarily in the areas of market data and non-energy benefits, developed through program, evaluation, or other means;
- Consumer market research results designed to refute specific consumer barriers (developed through the evaluations); and

- Support for the standards from utilities and government entities.

While DOE needed to replicate much of the Northwest's market research to provide a national perspective and to represent industry perspectives, the Northwest's lead in the marketplace and the quality of the market data generated set the standard for additional research. The Alliance-funded participation also added outside perspectives, which changed the dynamics of the negotiations.

Summary

The successful Northwest clothes washer program and participation of the Alliance in the national Standards process were at least partially responsible for the development of a new Standard for clothes washers that already has withstood a major political test. The Standard is virtually certain of going into effect as planned.

The support of the appliance manufacturing industry was critical in developing negotiated standards, and the role of the Northwest in demonstrating that a market existing for ES-RECWs was critical to assuaging the fears of the manufacturers regarding consumer acceptance of this new technology. The political and technical support provided to the standards process by the Alliance also substantially assisted the development of the new Standards.

PEA believes that the *ENERGY STAR® Resource-Efficient Clothes Washer Program* represents an excellent example of a deliberate, successful energy efficiency market transformation effort, and that the strategies of the Alliance are a model for future market transformation initiatives, particularly for those efforts targeting technology advancement culminating in improved Standards.

5. ES-RECW Program Cost and Savings Analysis Update

This section contains a brief background discussion and the results of the most recent Alliance analysis of energy and resource savings for the *WashWise/ENERGY STAR® Resource-Efficient Clothes Washer Program.* The current analysis is based on the Northwest's regional market characteristics and efficiency levels, and changes to the market that will be required by the new federal appliance efficiency standards.

Program Cost and Savings Analysis (1999-2000)

As part of an Alliance project to standardize and formalize the analysis of program effects and cost-effectiveness, Alliance staff developed a program cost-and-savings analysis for the *WashWise/ENERGY STAR® Resource-Efficient Clothes Washer Program.* To support the analysis, Alliance staff reviewed all available program planning and market research documentation, as well as PEA's previous evaluation work products and recommendations pertaining to the analysis. The staff also interviewed and discussed the available information and the analysis with selected program, industry, and evaluation personnel to confirm or revise the list of assumptions used for the analysis. The analysis was completed in the spring of 2000.

In the fall of 2000, as part of developing *Market Progress Evaluation Report #4*, PEA reviewed the Alliances' program cost and savings analysis in detail. Based on PEA's understanding of the characteristics of the negotiated industry agreement for proposed new *Federal Appliance Efficiency Standards* for clothes washers, PEA recommended that the Alliance staff modify several key assumptions that drive the cost-effectiveness analysis for the program. In general, PEA recommended that the analysis be changed to reflect the latest information regarding the efficiency levels and timing of the proposed federal appliance standards for clothes washers. The negotiated industry agreement for the Standard included three levels of efficiency: the current standard, a change in the standard in 2004, and a final change in 2007. Specifically, PEA recommended:

1. Expanding the analysis from its former approach of having only "standard" and "qualifying" clothes washers, to having three

categories of products: those meeting the current minimum appliance efficiency; those meeting the first stage of the new standard; and those meeting the final stage of the new standard.

2. Examining and documenting any assumed effects of using the *Modified Energy Factor* (MEF) as the efficiency performance scale. Primarily, this would include integration of *Remaining Moisture Content* (RMC) with the previous Energy Factor, which may have an assumed effect on the dryer savings estimate. PEA also suggested that the Alliance consider modifying (slightly reducing) the water savings assumptions to reflect the uncertainties regarding this resource, due to the election of the parties to the negotiated agreement to not include a Water Factor component of the standards.

PEA also worked with Alliance staff to develop market share projections for the staged implementation of the new clothes washer standards in an attempt to characterize projected manufacturing ramp-up and consumer market acceptance of the various levels of product efficiency. These market share curves were presented in MPER #4.

Current Status of Program Cost and Savings Analysis

In February of 2001, the Alliance staff updated the program cost and savings analysis for the *WashWise/ENERGY STAR® Resource-Efficient Clothes Washer Program* as part of the Alliance's annual reporting process. The current analysis incorporates the timing and efficiency levels of the new *Federal Efficiency Standard* for clothes washers and the market share projections developed for MPER #4.

The Alliance's updated *Cost-Effectiveness Summary for ENERGY STAR® Resource-Efficient Clothes Washers* is presented in *Appendix C*. The key results of the analysis included the following:

- $11.5 million in Alliance funding leveraged over $400 million in efficiency investments in the region.
- By 2010, over 100 aMW of electrical energy savings will be realized annually within the region because of these investments.

- Over multiple analytical perspectives and timeframes, the program/venture is very cost-effective.

Summary

The Alliance staff has done a very good job of assembling and documenting planning assumptions. Likewise, the staff has developed a high quality analysis approach with results presented in a very readable format (see *Appendix C*). PEA has no further recommendations for the *Program Savings Analysis* effort.

5. ES-RECW Program Cost and Savings Analysis Update

6. Lessons Learned

By virtually any measure, the Alliance's ES-RECW program has been a success. It has achieved both of its primary goals (developing a sustainable market share and passage of a *Federal Appliance Standard*), and has had many other accomplishments and successes through its history. In this chapter, PEA attempts to extract lessons learned that may have value for similar programs, similar attempts to influence national standards, and similar evaluation efforts. These key lessons are broken into component areas for discussion, although many of the lessons learned cut across the categories.

Program Operations

Key lessons learned include:

- **Early use of rebates stimulated interest and sales.** Rebates succeeded in driving early sales; however, greater-than-expected sales exceeded budget projections. The Alliance Board decided to increase program funding in the short run, but scaled back rebates in two stages, keeping some stimulus in the market while reducing program costs substantially.

- **The program was able to transition from rebates to marketing only, and sales rebounded even without rebates**. Sales dropped slightly after the rebates were reduced, and finally eliminated, but sales later rebounded to higher levels.

- **Because of rebates, and later "spiffs," the program had excellent access to data that enabled easy monitoring of trends.** The program contractor recognized the importance of good data to monitoring and adjusting program strategies. Data sources and analysis were strong components of the overall approach.

- **Communication and relationship-building with retailers was a key component of the initiative's success.** Communications enabled the program to change strategies with minimal damage to retailer relationships.

- **Low cost marketing strategies were successful in maintaining relationships and building market share.** The program never

had a budget large enough to support major media buys, such as television advertising, but still was successful in raising consumer awareness and supporting sales by retailers.

- **The program contractor, PECI, did an excellent job of both general administration of the program, as well as the development of relatively low-cost marketing and relationship building strategies**. PECI showed excellent creativity in marketing the program, as well as strong administrative control in managing the program.

Market and Program Strategy

Key lessons learned include:

- **The positioning of the first RECWs/ES-RECWs as premium products by the manufacturers eventually paid dividends**. While the higher prices of RECWs were viewed as an issue by the program, the other side of the higher prices was that manufacturers (and retailers) were able to increase revenues and (likely) profits. Premium products appeal to early adopters. Because the initial U.S. manufacturers could easily recover the costs of R&D and manufacturing changes, while adding market share, other manufacturers had to pay attention or lose sales. Eventually, the ability of manufacturers to increase revenues led to solid support for national standards.

- **The inception of the program coincided with the availability of qualifying products from two major U.S. appliance manufacturers.** Having well designed products from major U.S. appliance manufacturers substantially contributed to the success of the program, and the success of the ES-RECWs across the country.

- **The RECWs had other benefits, in addition to energy savings, that helped secure a place in the market.** The program could sell water savings as well as the ability to handle larger loads, better cleaning power, etc. to expand the reach to more consumers.

Standard Setting Process

Key lessons learned include:

- **The early success of the Alliance's initiative demonstrated the market potential of ES-RECWs to the industry**. Key industry players did not believe that RECWs could be successful beyond a niche product. The rapid increase in sales, and the ability of RECWs to sell well without rebates, proved the merit of the product in the marketplace.

- **Market research conducted by the program influenced the Federal Standards process.** Alliance-funded research on retailers, general consumers, and early purchasers all aided the perception that ES-RECWs could be more than a niche product, which was the early position of several manufacturers. While much of the research was replicated nationally to directly influence the standard-setting process, the Northwest research helped set the direction of later national work.

- **Direct participation in the Standards-setting process by program representatives was valuable**. The representatives from the Northwest changed the dynamics of the Standard-setting process, adding representation from interested groups that were either not consistently represented, or that were not represented at all.

- **The negotiated standards process was instrumental in securing the support of the industry**. Once the industry decided that a substantial Standard was inevitable, they negotiated in good faith. Their support for RECWs later led to the Standard, withstanding a major political challenge.

Evaluation

Key lessons learned include:

- **Overall, the Alliance's process of "Adaptive Management" proved very successful.** Staff, contractors, and the Alliance Board responded to issues raised and recommendations made by the evaluations, which contributed to a successful program. Several

substantial changes were made to the program over time, with positive results.

- **Broad coverage of the market (consumers, retailers, manufacturers) helped extract useful information for adjusting program goals, and enabled the Alliance Board to keep a broad perspective.** Seeing the broader market picture aided the process of making balanced program decisions.

- **Each of the MPERs had a distinct focus of attention, which increased their value.** Going deeper in certain issues at critical times added to the value of the evaluations. For example, the second MPER was focused on collecting data that might influence the national standards process, and the fourth MPER examined the value of the marketing effort.

7. Tracking Market Transformation After the Program

The Alliance is in a remarkably good position to inexpensively monitor the persistence of some of the key program and market effects to assess the longer-term impacts of the program's accomplishments. The two major accomplishments PEA suggests the Alliance monitor over time are the market share of ES-RECWs and the implementation of the new *Federal Appliance Efficiency Standard* for clothes washers.

Thanks to the data collection efforts of the U.S. Environmental Protection Agency (and its contractors), the market share of *ENERGY STAR®* appliances sold through the national chain partners are available on a quarterly and annual basis. The national chain partners represent approximately 50% of all ES-RECW sales nationally. Although these data only indicate the sales from the national partners and do not include the sales from independent retailers, PEA has examined these data in the past and believes the national partner market share to be a reasonable proxy for the entire market share of ES-RECWs.

The actual implementation of the recently adopted federal appliance efficiency standards for clothes washers can be easily monitored over the next few years through any number of channels. These channels include reviewing industry and energy efficiency advocate new releases and the *Federal Register*. An ongoing review of the number and efficiency levels of the *ENERGY STAR®*-qualified products list may also provide some insight to the actions of manufacturers in anticipation of, or in response to, the changing standards.

Additional information regarding the longer-term impacts of the program accomplishments would be available through additional market research. EPA has conducted and may repeat consumer awareness studies from which the Alliance could access results. In the past, EPA allowed interested partners to over-sample a particular geographic area (for modest cost) to allow a better state- or region-specific understanding of the results. The Alliance may want to consider this in the future. Additional Alliance-funded market research of consumer and retailer attitudes may also be useful in assessing the persistence of various program and market effects. At this time, PEA does not consider this additional information critical.

7. Tracking Market Transformation After the Program

Appendices

Appendix A: ***Federal Register, Friday, January 12, 2001, Energy Conservation Program for Consumer Products: Clothes Washer Energy Conservation Standards; Final Rule***

Appendix B: **Letter to The Honorable Spencer Abraham, Secretary of Energy from Charles A. Samuels, Government Relations Counsel, Association of Home Appliance Manufacturers**

Appendix C: **Cost-Effectiveness Summary for Energy Star® Resource-Efficient Clothes Washer**

Appendices

Appendix A

Federal Register, Friday, January 12, 2001, Energy Conservation Program for Consumer Products: Clothes Washer Energy Conservation Standards; Final Rule

Appendix A

Federal Register

Friday,
January 12, 2001

Part IX

Department of Energy

Office of Energy Efficiency and Renewable Energy

10 CFR Part 430
Energy Conservation Program for Consumer Products: Clothes Washer Energy Conservation Standards; Final Rule

Finding of No Significant Impact; Energy Conservation Program for Consumer Products; Notice

DEPARTMENT OF ENERGY

Office of Energy Efficiency and Renewable Energy

10 CFR Part 430

[Docket No. EE–RM–94–403]

RIN 1904–AA67

Energy Conservation Program for Consumer Products: Clothes Washer Energy Conservation Standards

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Final rule.

SUMMARY: The Department of Energy (DOE or Department) has determined that revised energy conservation standards for clothes washers will result in significant conservation of energy, are technologically feasible, and are economically justified. On this basis, the Department today amends the existing energy conservation standards for standard-size clothes washers as proposed and as recommended by stakeholders. The Department also amends the standards for compact clothes washers as well as making minor amendments to the test procedure for measuring the energy efficiency of clothes washers.

DATES: The effective date of this rule is January 1, 2004, except that the effective date of the amendments to appendix J to subpart B of part 430 is February 12, 2001.

The Director of the Federal Register approved the incorporation by reference as of January 1, 2004, of certain publications listed in this rule.

ADDRESSES: A copy of the Technical Support Document (TSD) may be read at the DOE Freedom of Information Reading Room, U.S. Department of Energy, Forrestal Building, Room 1E–190, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586–3142, between the hours of 9:00 a.m. and 4:00 p.m., Monday through Friday, except Federal holidays. Copies of the TSD can be obtained from the Codes and Standards Internet site at: http://www.eren.doe.gov/buildings/codes_standards/applbrf/clwasher.html or from the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Forrestal Building, Mail Station EE–41, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586–9127.

FOR FURTHER INFORMATION CONTACT: Bryan Berringer, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Forrestal Building, Mail Station EE–41, 1000 Independence Avenue, SW., Washington, DC 20585–0121, (202) 586–0371, E-mail: Bryan.Berringer@ee.doe.gov, or Eugene Margolis, Deputy Assistant General Counsel, U.S. Department of Energy, Office of General Counsel, Forrestal Building, Mail Station GC–72, 1000 Independence Avenue, SW., Washington, DC 20585–0103, (202) 586–9526, E-mail: Eugene.Margolis@hq.doe.gov.

SUPPLEMENTARY INFORMATION: The Department of Energy (DOE or Department) is incorporating by reference, test procedures from the American Association of Textile Chemists and Colorists (AATCC). These test procedures are set forth in the standards publications listed below:

1. American Association of Textile Chemists and Colorists Test Method 118—1997, *Oil Repellency: Hydrocarbon Resistance Test* (reaffirmed 1997).

2. American Association of Textile Chemists and Colorists Test Method 79—2000, *Absorbency of Bleached Textiles* (reaffirmed 2000).

Copies of these standards publications may be viewed at the Freedom of Information Reading Room, U.S. Department of Energy, Forrestal Building, Room 1E–190, 1000 Independence Avenue, SW., Washington, DC 20585–0101, telephone (202) 586–3142, between the hours of 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays.

Copies of the above standards incorporated by reference can be obtained from the American Association of Textile Chemists and Colorists, P.O. Box 1215, Research Triangle Park, NC 27709, telephone (919) 549–8141, telefax (919) 549–8933, or electronic mail: *orders@aatcc.org*.

I. Introduction

A. Consumer Overview

1. Background

The Department of Energy (DOE or Department) is directed by the Energy Policy and Conservation Act, as amended, to consider establishing minimum efficiency standards for various consumer products, including clothes washers. Today's standards are consistent with these requirements of the law. DOE is amending almost ten-year-old minimum efficiency standards for new standard-sized residential clothes washers. These amended standards take into account a decade of technological advancements and will save consumers and the nation money, significant amounts of energy and water,

and have substantial environmental and economic benefits.

Interested parties involved in this rulemaking, including manufacturers and energy efficiency advocates, jointly proposed these clothes washer efficiency standards to the Department. The parties believe these to be the highest standards which are technologically feasible and economically justified as required by law. The standards, as proposed by the parties, consist of two stages. The first stage begins on January 1, 2004, and requires that all new residential clothes washers manufactured after that date be 22 percent more efficient than today's minimally compliant clothes washer. The second stage begins on January 1, 2007, and requires that all new residential clothes washers manufactured after that date be 35 percent more efficient than today's minimally compliant clothes washer. Delaying the standard implementation date for the higher efficiency level gives manufacturers more time to research and develop lower-cost solutions to achieve higher standards.

The Department has reviewed the Joint Proposal and agrees the recommended standard is the highest efficiency level that is technologically feasible and economically justified as required by law. The Department therefore is amending the energy conservation standard for the standard-size residential clothes washers as recommended in the Joint Proposal.

2. Clothes Washer Features

The amended efficiency levels can be met by either top- or front-loading designs. In fact, there are vertical-axis top-loading and horizontal-axis front-loading washers on the market today that already meet the higher 2007 standard. Thus, consumers will have the same range of clothes washers as they have today. Furthermore, the clothes washer energy efficiency standard will not impact clothes washer features valued by consumers such as door placement, capacity, water temperature and adjustable load sizes. The Department does not expect the cleaning ability or the reliability and repair costs of washing machines to be changed by the design changes anticipated under the clothes washer amended standards and repair parts will continue to be available for today's washers.

The energy and water savings result primarily from a variety of innovative designs such as more efficient use of hot and cold water by using more accurate sensors that can detect the clothing load and use only as much water for washing as is necessary. The new washers also use higher spin speeds to remove more water from the clothes so less time and energy is needed to dry the clothes.

3. Consumer Benefits

Table 1 summarizes the "vital statistics" of today's typical clothes washer. Table 2 presents the implications for the average consumer of the 2004 and 2007 clothes washer standards.

TABLE 1.—VITAL STATISTICS OF TODAY'S TYPICAL CLOTHES WASHERS

Average price	$421.
Number of washes per year	392.
Annual utility bill	$115.
Life expectance	14.1 years.
Energy consumption	3.23 kWh per wash (1266 kWh per year).
Water consumption	39.2 gallons per wash (15,366 gallons per year).

TABLE 2.—IMPLICATIONS OF NEW STANDARDS FOR THE AVERAGE CONSUMER

Year standard comes into effect	2004 (Stage 1)	2007 (Stage 2).
New clothes washer price	$474	$670.
Estimated price increase	$53	$249.
Annual utility bill savings	$15	$48.
Median payback period	3.5 years	5.0 years.
Average net savings over appliance life	$103	$260.
Energy savings per wash	0.612 kWh	1.361 kWh.
Energy savings per year	239 kWh	533 kWh.
Water savings per wash	4.0 gallons	18.1 gallons.
Water savings per year	1568 gallons	7,095 gallons.

Currently, the typical clothes washer has a price of $421 and costs $115 a year in energy and water bills. In order to meet the 2004 standard, the Department estimates that the price of a washer will be $474, an increase of $53. This price increase will be offset by an annual savings of about $15 on the utility bills. In order to meet the 2007 standard, the Department estimates that the price of a washer will be $670, an increase of $249. This price increase will be offset by an annual savings of about $48. It should be noted that DOE based its estimate of the incremental retail cost for the 2007 standards on manufacturer cost estimates for horizontal-axis machines submitted to the Department in 1997. New cost information derived from vertical-axis washers now in the market that meet the 2007 standards indicate that the incremental prices could be substantially less. Based on the Department's analysis, the incremental price of these high-efficiency vertical-axis washers would be approximately $150.[1]

The Department recognizes that few consumers are actually typical in the energy and water prices that they pay and the number of wash loads that they do per year. Consequently, the Department has investigated the effects of the different energy and water prices across the nation and different clothes washer usage patterns. The Department estimates that about 90 percent and 81 percent of all consumers purchasing a new washer will save money as a result of the 2004 and 2007 standards, respectively.

The Department also investigated how these standards might affect low income consumers and senior households. The Department estimates that about 90 percent and 81 percent of all low income consumers purchasing a new washer will save money as a result of the 2004 and 2007 standards,

[1] Assumes a $75 incremental manufacturer cost and a total mark-up of 1.99 (TSD Chapter 5 section 5.4.1 and Chapter 6 section 6.1).

respectively. For senior households, these values are 84 and 72 percent.

4. National Benefits

The standards will provide large benefits to the nation. DOE estimates the standards will save 5.52 quads of energy over 27 years (2004 to 2030). This is equivalent to the total energy consumption of all U.S. homes over a period of approximately 3.3 months. By 2020, the standards will avoid the construction of four 400 megawatt coal-fired plants and eleven 400 megawatt gas-fired plants. These energy savings will result in cumulative greenhouse gas emission reductions of 95.1 million metric tons (Mt) of carbon dioxide (CO_2) equivalent, or an amount equal to that produced by three million cars in a year. Additionally, air pollution will have cumulative reduction by the elimination of 253.5 thousand metric tons of nitrous oxides (NO_X) and 28.1 thousand metric tons of sulfur dioxide (SO_2) from 2004 to 2030. The cumulative water savings are estimated at 11 trillion gallons, enough water to supply the needs of 6.6 million households for 25 years, meaning less water will be pumped from America's aquifers and rivers, and less strain will be placed on many of the nation's water and sewer systems. In total, we estimate the net economic benefit to the nation of this standard will be $15.3 billion from 2004 to 2030.

Please note that you can find additional information about clothes washers on the DOE web-site at: *www.eren.doe.gov/buildings/codes_standards/applbrf/clwasher.html*.

B. Authority

Part B of Title III of the Energy Policy and Conservation Act, Pub. L. 94–163, as amended by the National Energy Conservation Policy Act, Pub. L. 95–619, by the National Appliance Energy Conservation Act (NAECA), Pub. L. 100–12, by the National Appliance Energy Conservation Amendments of 1988, Pub. L. 100–357, and the Energy Policy Act of 1992, Pub. L. 102–486 [2] (the Act or EPCA) created the Energy Conservation Program for Consumer Products other than Automobiles. The consumer products subject to this program (often referred to hereafter as "covered products") include clothes washers.

Under the Act, the program consists essentially of three parts: Testing, labeling, and Federal energy conservation standards. The Department, in consultation with the National Institute of Standards and Technology, amends or establishes new test procedures for each of the covered products. Section 323 of EPCA, 42 U.S.C. 6293. Test procedures appear at 10 CFR part 430, subpart B.

The Federal Trade Commission (FTC) prescribes rules governing the labeling of covered products after DOE publishes test procedures. Section 324(a) of EPCA, 42 U.S.C. 6294(a). At the present time, there are Federal Trade Commission rules requiring labels for clothes washers.

Any new or amended standard must be designed so as to achieve the maximum improvement in energy efficiency that is technologically feasible and economically justified. Section 325(o)(2)(A) of EPCA, 42 U.S.C. 6295(o)(2)(A).

Section 325(o)(2)(B)(i) of EPCA, 42 U.S.C. 6295(o)(2)(B)(i), provides that before DOE determines whether a standard is economically justified, it must first solicit comments on a proposed standard. After reviewing comments on the proposal, DOE must then determine that the benefits of the standard exceed its burdens, based, to the greatest extent practicable, on a weighing of the following seven factors:

"(I) The economic impact of the standard on the manufacturers and on the consumers of the products subject to such standard;

(II) The savings in operating costs throughout the estimated average life of the covered product in the type (or class) compared to any increase in the price of, or in the initial charges for, or maintenance expenses of, the covered products which are likely to result from the imposition of the standard;

(III) The total projected amount of energy savings likely to result directly from the imposition of the standard;

(IV) Any lessening of the utility or the performance of the covered products likely to result from the imposition of the standard;

(V) The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the imposition of the standard;

(VI) The need for national energy conservation; and

(VII) Other factors the Secretary considers relevant."

C. Background

1. Current Standards

The existing clothes washer efficiency standards have been in effect since 1994. Energy efficiency for a clothes washer is measured in terms of an energy factor (EF), which measures overall clothes washer efficiency, in terms of cubic feet per kilowatt-hour per cycle, and is determined by the DOE test procedure. 10 CFR Part 430, Subpart B, Appendix J. The current clothes washer efficiency standards are as follows:

- top-loading, compact (less than 1.6 cubic feet capacity), EF = 0.90
- top-loading, standard (1.6 cubic feet or greater capacity), EF = 1.18
- top-loading, semi-automatic, must have an unheated rinse option
- front-loading, must have an unheated rinse option
- suds-saving, must have an unheated rinse option

2. History of Previous Rulemakings

On November 14, 1994, DOE published an Advance Notice of Proposed Rulemaking (ANOPR). 59 FR 56423. On November 19, 1998, DOE published a Supplemental ANOPR. (Hereafter referred to as the 1998 Supplemental ANOPR.) 63 FR 64344. In the 1998 Supplemental ANOPR, DOE provided interested persons an opportunity to comment on:

(1) The product classes that we propose to analyze;

(2) The analytical framework, models (*e.g.*, the Government Regulatory Impact Model (GRIM)), and tools (*e.g.*, a Monte Carlo sampling methodology, and life-cycle-cost (LCC) and national energy savings (NES) spreadsheets) we used to perform analyses of the impacts of standards; and

(3) The results of preliminary analyses for LCC, payback and national energy savings contained in the Preliminary Technical Support Document: Energy Efficiency Standards for Consumer Products: Clothes Washers (TSD) dated October 1998 and summarized in the 1998 Supplemental ANOPR.

On October 5, 2000, DOE published a Notice of Proposed Rulemaking (NOPR or proposed rule) for energy efficiency standards. 65 FR 59550. For the NOPR, we analyzed the energy savings, benefits and burdens of amended energy conservation standards for clothes washers and shared the results of these analyses with all stakeholders. Based on these analyses, several of the major stakeholders, including clothes washer manufacturers and energy efficiency advocates, submitted to the Department a joint proposal for the highest standard level which they believed to be technologically feasible and economically justified (hereafter referred as the Joint Comment). (Joint Comment, No. 204). Based on our review of the Joint Comment, we found the proposed standards technologically

[2] Part B of Title III of the Energy Policy and Conservation Act, as amended by the National Energy Conservation Policy Act, the National Appliance Energy Conservation Act, the National Appliance Energy Conservation Amendments of 1988, and the Energy Policy Act of 1992, is referred to in this rule as the "Act." Part B of Title III is codified at 42 U.S.C. 6291 *et seq.* Part B of Title III of the Energy Policy and Conservation Act, as amended by the National Energy Conservation Policy Act only, is referred to in this rule as the National Energy Conservation Policy Act.

feasible and economically justified. Therefore, we proposed to amend the energy conservation standard for clothes washers for residential applications as recommended in the Joint Comment and announced a public hearing, which was held on November 15, 2000.

Included in the NOPR for energy efficiency standards were revisions to the clothes washer test procedure. The test procedure revisions we made were necessary due to discrepancies uncovered in the measurement of remaining moisture content (RMC). The discrepancies were found to be caused by variations in the properties of the energy test cloth. The situation has been addressed in the test procedure revisions by adding provisions for cloth certification based on the results of extractor testing and the derivation of a cloth-specific correction factor. In addition, we incorporated minor editorial changes to help clarify both Appendices J and J1 of the test procedure based on the joint proposal by stakeholders. These changes, as proposed in the NOPR, are included in this final rule.

3. Process Improvement

A moratorium was placed on publication of proposed or final rules for appliance efficiency standards as part of the FY 1996 appropriations legislation. Pub. L. 104–134. That moratorium expired on September 30, 1996.

On July 15, 1996, the Department published a Process Improvement Rule establishing procedures, interpretations and policies to guide the Department in the consideration of new or revised appliance efficiency standards (Procedures for Consideration of New or Revised Energy Conservation Standards for Consumer Products, 61 FR 36974, July 15, 1996). DOE has followed the Process Improvement Rule, to the extent possible, in developing the clothes washer standard.

We developed an analytical framework for the clothes washer standards rulemaking for our stakeholders. The analytical framework described the different analyses (*e.g.,* LCC, payback and manufacturing impact analyses (MIA)) to be conducted, the method for conducting them, the use of new LCC and national energy savings (NES) spreadsheets, and the relationship between the various analyses. We have conducted several meetings, workshops and discussions regarding energy efficiency standards for clothes washers. These workshops included discussions on proposed design options and a preliminary engineering analysis on November 15, 1996; development of an analytical framework for appliance standards rulemaking on July 23, 1997; and development of two new spreadsheet tools for LCC and NES on March 11, 1998. We conducted public hearings on December 15, 1998, to receive additional comments on the 1998 Supplemental ANOPR and on July 22, 1999, to discuss the process, analytical tools and uncertainties with the test procedures. We conducted a public hearing on November 15, 2000, to receive comment on proposed efficiency standards addressed in the NOPR published on October 5, 2000.

In the NOPR, we also incorporated the recommendations made by the Advisory Committee on Appliance Energy Efficiency Standards on April 21, 1998. (Advisory Committee, No. 96). These recommendations relate to using the full range of consumer marginal energy prices (CMEP) in the LCC analysis (replacing the use of national average energy prices), defining a range of energy price futures for each fuel used in the economic analyses and defining a range of primary energy conversion factors and associated emission reductions, based on the generation displaced by energy efficiency standards for each rulemaking. Marginal energy prices are used in the LCC, payback and the NPV portion of the NES analyses. Because the NES results are inputs to the analyses for utility, emissions and employment; these analyses are also impacted by using marginal rates.

4. Test Procedures

Federal test procedures for clothes washers were first established in 1977. Simultaneous with the NOPR for clothes washer standards, the Department was also in the process of revising the clothes washer test procedure. The Department needed to address a number of innovative technologies for which there were no test procedures. A number of proposals were published, including one on December 22, 1993, (58 FR 67710) and another on March 23, 1995, (60 FR 15330). In its comments to the March 1995 proposed rule, the Association of Home Appliance Manufacturers (AHAM) requested that DOE adopt an additional new test procedure, that captures current consumer habits that affect energy use, which would be used in considering the revision of the clothes washer energy conservation standards, and would go into effect upon issuance of standards.

On April 22, 1996, the Department issued a supplemental Notice of Proposed Rulemaking proposing such a new test procedure, Appendix J1, as well as certain additional revisions to the currently applicable test procedure in appendix J to subpart B of 10 CFR part 430. 61 FR 17589. The supplemental notice was published to seek comments on whether DOE should adopt the AHAM recommended test procedure with certain changes. The final rule, published on August 27, 1997, adopted this recommendation. 62 FR 45484. Appendix J is the current applicable test procedure, and it will expire on December 31, 2003. Appendix J1 is informational and will not become mandatory until the energy conservation standards of this rule become effective on January 1, 2004. The appendix J test procedure specifies an energy efficiency descriptor called the energy factor (EF). The appendix J1 test procedure specifies an energy efficiency descriptor called the modified energy factor (MEF) which replaces the EF. Contrasting with the previous EF descriptor, the MEF descriptor incorporates clothes dryer energy by consideration of the remaining moisture content (RMC) of clothes leaving the clothes washer. Other substantive differences between the test procedures include using different water temperatures for testing and using cloth loads in J1 but not in J. The issuance of the test procedure final rule was a major step in accelerating the development of clothes washer standards. The test procedure final rule provided the basis upon which the energy and water consumption calculations could be determined.

During this standards rulemaking, it was discovered that the test cloth to be used for determining the RMC was giving inconsistent results. The Department investigated possible causes for the inconsistent test results, and results are summarized in the DOE report, "Development of a Standardized Energy Test Cloth for Measuring Remaining Moisture Content in a Residential Clothes Washer," May 2000. (DOE, No. 200). As part of our investigation into the cause of these discrepancies, we found that various lots of test cloth will yield inconsistent RMC results. To understand the effects of operating variables and cloth specifications, it was necessary to conduct laboratory tests to determine RMC. To insure that test results would not be influenced or biased by any manufacturer's product (clothes washer), we used an extractor to remove moisture content. An extractor is a centrifuge—basically a rotating basket that has a controllable speed to produce a variety of centrifugal forces. The speed was varied to impose different centripetal accelerations on the test load. These accelerations are reported in

terms of gravitational acceleration (g). We also soaked the cloth in a tub at controlled temperature rather than use the agitated soak cycle provided by a typical washer. The RMC tests closely resemble those specified in the clothes washer test procedure.

An extractor-based test has been established to examine RMC values at different gravitational forces (g-forces). A correction factor is derived by which the deviation between a new production batch of test cloth and a standard reference test cloth is measured. This deviation is measured as the root mean square between the set of measured RMC values and the set of standard RMC values. If this absolute deviation is below 2 percent, then no correction factors are needed in MEF tests using that batch of cloth. If the absolute root-mean-square (RMS) difference between the cloth RMC values and standard RMC values is above 2 percent, then correction factors must be applied when using the cloth to test the MEF of a clothes washer.

As part of this rulemaking, we included revisions to the test procedure based on our proposed language addressed in the May 2000 report dealing with the energy test cloth, RMC, extractor testing and the correction factor and Joint Stakeholders Comment. (Joint Comment, No. 204). In addition, we incorporated AHAM's comments and Joint Stakeholders Comment requesting minor editorial changes to help clarify both appendices J and J1. (AHAM, Nos. 197 and 199, and Joint Comment, No. 204). These changes have been included in their entirety in this rulemaking pertaining to the test procedure.

II. General Discussion

A. Test Procedures

As addressed in the NOPR for energy efficiency standards, we included revisions to the test procedure dealing with the energy test cloth, RMC, extractor testing and the correction factor based on our May 2000 report, which can be found in appendix C of the TSD. We also incorporated changes suggested in AHAM's comments and in the Joint Comment requesting minor editorial changes to help clarify both appendices J and J1 of the test procedure. (AHAM, Nos. 197 and 199, and Joint Comment, No. 204). In addition, during the public hearing held on November 15, 2000, and in a written statement, AHAM requested that the test procedure be further clarified and enhanced by incorporating additional changes. These changes have been included in their entirety in this final rule. A more complete discussion of these comments is found in section IV of this rule.

B. Technological Feasibility

1. General

There are top- and front-loading clothes washers in the market at all of the efficiency levels prescribed in today's final rule. The Department, therefore, believes all of the efficiency levels contained in today's final rule for both top- and front-loading clothes washers are technologically feasible as required by 325(o)(2)(A) of EPCA, as amended.

2. Maximum Technologically Feasible Levels

The Act requires the Department, in considering any new or amended standards, to consider those that "shall be designed to achieve the maximum improvement in energy efficiency * * * which the Secretary determines is technologically feasible and economically justified." (Section 325(o)(2)(A)). Accordingly, for each class of product considered in this rulemaking, a maximum technologically feasible (max tech) design option was identified and considered as discussed in the NOPR. 65 FR 59550, 59555–56 (October 5, 2000). See section V. Analytical Results and Conclusions for details of the levels analyzed for this rulemaking.

The Department considers design options technologically feasible if they are already in use by the respective industry or research has progressed to the development of a working prototype. The Process Improvement Rule sets forth a definition of technological feasibility as follows: "Technologies incorporated in commercially available products or in working prototypes will be considered technologically feasible." 10 CFR 430, subpart C, appendix A(4)(a)(4)(I).

In consultation with interested parties, the Department developed a list of design options on all possible energy saving designs for consideration. The Department gathered design option information from previous clothes washer analyses, trade publications, industry research organizations, product brochures from domestic and foreign manufacturers, and appliance conferences, including the International Appliance Technical Conference (IATC). The "Draft Report on Design Options for Clothes Washers" and "Draft Report on the Preliminary Engineering Analysis for Clothes Washers" provide details on the potential technologies. The following designs were considered: Improved fill control, tighter tub tolerance, added insulation, increased motor efficiency, thermostatically controlled mixing values, improved water extraction, horizontal-axis, horizontal-axis with recirculation, advanced control/sensor, suds-saving, direct drive motor, automatic fill control, reduced thermal mass, electrolytic disassociation of water, ultrasonic washing, bubble action, and ozonated laundering. (Clothes Washer Public Workshop, No. 55B and 55C). Based on this information the Department determined that a 50 percent reduction in the energy use of the baseline model (corresponding to an MEF of 1.634) is the maximum technologically feasible level for both the Top-Loading, Standard (1.6 ft.^{3} or greater capacity) and Front-Loading classes.

Additionally, under the guidelines in the Process Improvement Rule, DOE conducted a screening analysis to eliminate from consideration, early in the process, any design option which is not practicable to manufacture, install, or service, will eliminate product utility features, or for which there are safety concerns that can not be resolved. In order to conduct the screening analysis, the Department gathered information regarding all current technology options and prototype designs. In consultation with interested parties, the Department developed a list of design options for consideration in the rulemaking. All technologically feasible design options were considered in the screening analysis, and none were rejected.

C. Energy Savings

1. Determination of Savings

The Department forecasted energy savings through the use of a national energy savings (NES) spreadsheet as discussed in the NOPR. 65 FR 59550, 59556, 59563–68 (October 5, 2000).

2. Significance of Savings

Under section 325(o)(3)(B) of the Act, the Department is prohibited from adopting a standard for a product if that standard would not result in "significant" energy savings. While the term "significant" has never been defined in the Act, the U.S. Court of Appeals, *in Natural Resources Defense Council* v. *Herrington,* 768 F.2d 1355, 1373 (D.C. Cir. 1985), concluded that Congressional intent in using the word "significant" was to mean "non-trivial." The savings to the nation are 5.52 quads of energy over 27 years (2004 to 2030) which is equivalent to the total energy consumption of all U.S. homes over a period of approximately 3.3 months. We

consider this to be non-trivial and therefore determine it to be significant.

D. Economic Justification

As noted earlier, Section 325(o)(2)(B)(i) of the Act provides seven factors to be evaluated in determining whether a conservation standard is economically justified.

1. Economic Impact on Manufacturers and on Consumers

We considered the economic impact on manufacturers and on consumers as discussed in the NOPR. 65 FR 59550, 59556 (October 5, 2000). The clothes washer industry would experience a cumulative NPV loss of between $421.1–528.4 million representing between 29.2 and 36.7 percent of base case industry value. The Department estimates that about 89 percent and 81 percent of all consumers purchasing a new washer will save money as a result of the 2004 and 2007 standards, respectively. In total, we estimate the benefit to the nation of this standard will be $15.3 billion from 2004 to 2030.

2. Life-Cycle-Costs

We considered life-cycle-costs as discussed in the NOPR. 65 FR 59550, 59556–57 (October 5, 2000). At the 1.04 MEF level, consumers would experience a savings in LCC of $103, while they would experience a LCC savings of $260 at the 1.26 MEF level that would go into effect in 2007. The payback for the 1.04 MEF level is 3.5 years, and 5.0 years for the 1.26 MEF.

3. Energy Savings

While significant conservation of energy is a separate statutory requirement for imposing an energy conservation standard, the Act requires DOE, in determining the economic justification of a standard, to consider the total projected energy savings that are expected to result directly from revised standards. The Department used the NES spreadsheet results, discussed earlier, in its consideration of total projected savings. The savings to the nation are 5.52 quads of energy over 27 years (2004 to 2030).

4. Lessening of Utility or Performance of Products

This factor cannot be quantified. In establishing classes of products, the Department tries to eliminate any degradation of utility or performance in the products under consideration in this rulemaking.

An issue of utility that was considered in this rule concerns the consumer utility of vertical-axis (V-axis) and horizontal-axis (H-axis) machines. We conducted consumer focus groups and a conjoint analysis study to address this issue. A conjoint analysis is a quantitative method to estimate the value consumers place on the clothes washer attributes. The focus group and conjoint results indicate that price is the most important attribute when consumers are purchasing a new clothes washer, although in each case another attribute is virtually tied with price in terms of importance. In the focus groups, 83 percent of the respondents included price in their top ten list of important clothes washer attributes, while 81 percent included wash tub capacity in that same list. In the conjoint analysis, price had the highest relative importance score (26 percent), followed closely by the availability of a wash load size option on the control panel (25 percent). Of the six attributes included in the conjoint analysis survey, door placement was the fifth most important attribute with a relative importance score of 11 percent (for further information, see Chapter 8 and appendix G of the TSD).

5. Impact of Lessening of Competition

This factor seeks the views of the Attorney General to determine the potential impacts on competition resulting from the imposition of the proposed energy efficiency standard.

In order to assist the Attorney General in making such a determination, the Department provided the Attorney General with copies of the NOPR and the Technical Support Document for review. In a letter responding to the NOPR, the Attorney General concluded "that the proposed clothes washer standard would not adversely affect competition." (Department of Justice, No. 233 at 2). The letter is printed at the end of today's rule.

6. Need of the Nation To Conserve Energy

We reported the environmental effects from today's final rule in the NOPR. 65 FR 59550, 59557, 59578–79 (October 5, 2000). The energy savings this final rule will result in cumulative greenhouse gas emission reductions of 95.1 million metric tons (Mt) of carbon dioxide (CO_2) equivalent, or an amount equal to that produced by three million cars every year. Additionally, air pollution will be reduced by the elimination of 253.5 thousand metric tons of nitrous oxides (NO_X) and 28.1 thousand metric tons of sulfur dioxide (SO_2) from 2004 to 2030.

7. Other Factors

This provision allows the Secretary of Energy, in determining whether a standard is economically justified, to consider any other factors that the Secretary deems to be relevant. Section 325(o)(2)(B)(i)(VI) of EPCA, 42 U.S.C. 6295(o)(2)(B)(i)(VI).

Under this provision, we considered the water savings from each standard level. The Department received numerous comments asking for the inclusion of a water factor standard in addition to the MEF standard. (City of Austin, Nos. 105 at 1 and 187 at 2; City of Bellingham, Washington, Department of Public Works, No. 106 at 1; Lower Colorado River Authority (LRCA), No. 109 at 1; Amy Vicker and Associates, Inc., No. 110 at 1; City of San Diego, No. 123 at 1; City of Santa Barbara, Public Works Department, No. 125 at 1; City of Seattle, No. 126 at 2; Santa Clara valley Water District, No. 127 at 1; American Water Works Association, No. 149 at 1; City of Redmond, Office of the Mayor, No. 153 at 1; Massachusetts Water Resources Authority, No. 152 at 4; State of New Mexico, Office of the State Engineer, No. 158 at 1). As stated previously, the Department considered water savings as a factor in determining the economic justification of the clothes washer standard level. The water savings are estimated at 11 trillion gallons, enough water to supply the needs of 6.6 million households for 25 years, meaning less water will be pumped from America's aquifers and rivers, and less strain will be placed on many of the nation's water and sewer systems. However, the Department does not have the authority to prescribe a minimum water factor standard.

The Secretary has also strongly considered the Joint Comment. This proposal adopts a two stage implementation process oriented toward mitigating financial impacts on manufacturers and ensuring no loss of product utility for consumers. Thus, we are adopting the Joint Comment proposal.

E. Standards Incorporated by Reference

Section 325(o)(2)(A) of EPCA specifies that any new or amended energy conservation standard the Department prescribes shall be designed to "achieve the maximum improvement in energy efficiency * * * which the Secretary determines is technologically feasible and economically justified." Consistent with the EPCA directive that the standard achieve maximum improvement in the energy efficiency, it follows that the test procedure to measure efficiency be both valid and repeatable, in other words, provide consistent results. During this standards rulemaking process it was discovered that the test cloth used for determining remaining moisture content (RMC) was

giving inconsistent results. The effect of RMC on modified energy factor and hence energy efficiency can be substantial. This is discussed in the proposed rule under section III.A. *Test Procedure,* 65 FR 59555 (October 5, 2000). After investigating possible causes for the inconsistent test results, we found that various lots of test cloth had been treated with a stain or water repellant finish that would affect RMC. Consequently, the American Association of Textile Chemists and Colorists (AATCC) Test Method 118–1997, *Oil Repellency: Hydrocarbon Resistence Test* (reaffirmed 1997), and Test Method 79–2000, *Absorbency of Bleached Textiles* (reaffirmed 2000), were added to the proposed rule, under appendix J1 to subpart B of part 430, to determine whether such a finish was present in a test cloth. Also, a procedure was added to "wash out" that finish, so that any test cloth would be equivalent to any other test cloth and therefore produce consistent results. Both of the above procedures were accepted by the stakeholders under the Joint Comment recommendation submitted to the Department by clothes washer manufacturers and energy conservation advocates (Joint Comment, No. 204), and are incorporated by reference in today's final rule.

III. Methodology

As discussed in the NOPR, the Department developed new analytical tools for this rulemaking. The first tool was a spreadsheet that calculates LCC and payback period. The second calculates national energy savings and national net present value (NPV). The Department also completely revised the methodology used in assessing manufacturer impacts including the adoption of the Government Regulatory Impact Model (GRIM). Additionally, DOE developed a new approach using the National Energy Modeling System (NEMS) to estimate impacts of clothes washers energy efficiency standards on electric utilities and the environment. 65 FR 59550, 59557–71 (October 5, 2000).

In general, when information is based on periodic forecasts and surveys such as the Annual Energy Outlook (AEO) forecasts of energy prices and the Residential Energy Consumption Survey (RECS), both from the Energy Information Administration (EIA), we try to use the latest available information. The analysis in support of the NOPR was performed using RECS1993 and AEO1999 data. Just prior to publication of the NOPR both RECS1997 and AEO2000 data became available. Although we did not expect a significant difference in results by updating to RECS1997 and AEO2000, we stated our intent to use this updated information for the final rule. We have updated the analysis for Trial Standard Level 3 using RECS1997 and AEO2000 and have included it in appendix R of the TSD.

IV. Discussion of Comments

A. Test Procedure

During the public hearing held on November 15, 2000 and in a written statement, AHAM requested that the test procedure be further clarified and enhanced by incorporating the following additional changes:

(1) Specify that the test cloth can be used for up to 60 runs in appendix J, as proposed for J1.

(2) Specify that appendix J1 (currently informational) is the test procedure to be used to determine which models meet Energy Star requirements prior to implementation of the January 1, 2004 standard requirement.

(3) Require that a permanent marking be applied to future test cloth lots.

(4) Implement a process to publish the correction factors on future test cloth lots (*i.e.*, publish in **Federal Register**, on web-site, or by letter). (AHAM, No. 211)

These changes to the test procedure are proposed by AHAM for clarification and consistency purposes only. No objections were raised at the public hearing or in written comments to this proposal, and the Department believes they would clarify the test procedure without changing any test results. Therefore, Item #1 will be included in the final rule for consistency in Appendices J and J1. Item #2 will be addressed by letter from DOE to the stakeholders specifying that Appendix J1 along with the revisions in this final rule will be used to determine which models meet Energy Star requirements starting January 1, 2001. Item #3 will be included in the final rule by adding a statement to require that the test cloth have a permanent marking identifying the lot. Item #4 will be addressed by DOE notifying stakeholders via the Internet site at: http://www.eren.doe.gov/buildings/codes_standards/applbrf/clwasher.html with the lot number and correction factors along with the accepted laboratories and mills to be used.

B. Standard

Since we started work on this rulemaking following the 1991 standard final rule, we have had eight public hearings/workshops and three public solicitations for comment. As noted above, DOE published an ANOPR on November 14, 1994. 59 FR 56423. On November 19, 1998, DOE published a Supplemental ANOPR. 63 FR 64344. On October 5, 2000, DOE published a Notice of Proposed Rulemaking (NOPR). 65 FR 59550. In preparation of the NOPR, we conducted several analyses regarding the energy savings, benefits, and burdens of amended energy conservation standards for clothes washers and have shared the results of these analyses with all stakeholders. Based on these analyses, several of the major stakeholders, including clothes washer manufacturers and energy efficiency advocates, submitted to the Department a joint proposal for the highest standard level which they believed to be technologically feasible and economically justified. As a result, based on the aforementioned, we proposed to amend the energy conservation standard for clothes washers for residential applications as recommended in the joint proposal. We announced a public hearing, which was held on November 15, 2000.

Today's final rule standards are based on the joint proposal submitted to the Department by clothes washer manufacturers and energy conservation advocates. (Joint Comment, No. 204). The joint stakeholders consist of the following: Alliance Laundry Systems LLC; Amana Appliances; Asko Incorporated; Frigidaire Home Products; General Electric Appliances (GEA); Maytag Corporation; Miele, Inc.; Fisher & Paykel Ltd; Whirlpool Corporation; Alliance to Save Energy; American Council for an Energy Efficient Economy (ACEEE); Appliance Standards Awareness Project; California Energy Commission (CEC); City of Austin, Texas; Natural Resources Defense Council (NRDC); Northwest Power Planning Council; and Pacific Gas and Electric (PG&E). The proposal as submitted in the Joint Comment consists of four parts as follows:

Clothes Washer Energy Standard. The clothes washer energy standards for standard class clothes washers shall be 1.04 modified energy factor (MEF) in 1/1/2004 and 1.26 MEF in 1/1/2007. The energy test procedure will be revised to ensure that variability between test cloths will not significantly affect remaining moisture content (RMC) results. Additional clarifications will also be made to test procedure.

Energy Star Labeling Program. Energy Star levels shall be set as follows: Standard Class Clothes Washers—1.26 MEF in 2001; 1.42 MEF in 2004; Refrigerator/Freezers—10% better than the 2001 standard in 2001; change to 15% better than the 2001 in 2004.

Tax Credit for the Production of Energy Efficient Clothes Washers and Refrigerator-Freezers. The credit shall provide for two energy efficiency tiers, each with separately designated funds. There is $30 million in each designated fund per company per efficiency tier. Cap of $60 million per company for the two funds or yearly cap with carry forward. Annual total tax credit cannot exceed in any taxable year 2% of corporate gross revenues as determined by average of 3 prior years.

Standard Class Clothes Washers: Two tiers coterminous 2001–2006; $50 per unit for products manufactured with a 1.26 MEF and $100 per unit for products manufactured with a 1.42 MEF, increasing to 1.5 MEF in 2004. Includes residential-style "coin-operated" washers.

Refrigerators: First tier effective in 2001. $50 per unit for products manufactured 10% above 2001 minimum efficiency standard. Credit runs through 2004. Second tier also effective in 2001 and runs through 2006. It is $100 for products manufactured 15% above the 2001 minimum efficiency standard. Credits apply to automatic defrost refrigerator-freezers only, at 16.5 cubic feet internal volume and above.

Voluntary Industry Water Program. Water factor reporting shall be part of a voluntary industry sponsored program. AHAM members agree to publicly disclose through AHAM, water factors for each model that meets Energy Star/ Tax Credit MEF levels, starting sometime in calendar year 2001. In calendar year 2002 and each year thereafter, industry-wide shipment weighted average water factors for units shipped in the previous year shall be reported by AHAM. Water factor calculations will use appendix J water factor through 2003 and will use Appendix J1 thereafter. Starting in 2007, AHAM members agree to report water factor for all models. AHAM will sponsor water conference." (Joint Comment, No. 204).

This rulemaking only addresses the clothes washer energy standards of this proposal. The above standard, based on this proposal would go into effect in stages, with the first stage going into effect on January 1, 2004, and the second stage going into effect on January 1, 2007 (hereafter referred to as the 2004 standard and 2007 standard, respectively). The initial standard is a 22 percent reduction in energy consumption over the current standard (or a MEF of 1.04). The later, more stringent standard, is a 35 percent reduction in energy consumption over the current standard (or a MEF of 1.26). Both top-loading vertical-axis and front-loading horizontal-axis design clothes washers are currently available in retail appliance stores at these levels.

In response to the NOPR, we received additional comments supporting the proposed energy conservation standard announced from AHAM (representing Alliance Laundry Systems LLC; Asko Incorporated; Amana Appliances; AB Electrolux (Frigidaire Home Products); GEA, Fisher & Paykel Ltd; Maytag Corporation; Miele, Inc.; and Whirlpool Corporation), manufacturers, energy efficiency advocates, utilities and consumers. (AHAM, No. 212 at 1; Amana, No. 223 at 1; Whirlpool, No. 236 at 2; Maytag, No. 230 at 2; ACEEE, Nos. 214 & 227; NRDC, No. 225 at 2; AWWA, No. 234; Comment No. 218). However, Oregon Office of Energy (OOE) request a standard level at a 40 percent improvement over the baseline washer or a MEF of 1.36. (OOE, No. 219 at 2).

We also received three comments from Congress. Representative Ralph Regula (R–OH) supports this rulemaking and believes it should be approved without delay. (Comment No. 220) Representatives Joe Knollenberg (R–MI) and Wally Herger (R–CA) are asking for 120- and 90-day extensions of the comment period, respectively. (Docket No. EE–RM/STD–98–440, Comment No. 73 at 68 and Comment No. 239). This rulemaking process for clothes washers began on November 14, 1994, almost 6 years ago with the publication of the Advanced Notice of Proposed Rulemaking. 59 FR 56423. Subsequently, there were eight public hearings/workshops and three public solicitations for comment. Thus, DOE is adopting the proposed rule and does not plan to extend the comment period.

C. Two Standards in One Rulemaking

The Competitive Enterprise Institute (CEI) and Consumer Alert (CA) commented that the statute does not specifically allow for the creation of two standards in one rulemaking. (CEI & CA, No. 207 at 2; CEI, No. 228 at 3). More specifically, these comments contended that the 2007 standard, coming only 3 years after the 2004 standard, violates the requirement in section 325 of the Act that an amended standard for these products "shall apply to products manufactured after a date which is 5 years after * * * the effective date of the previous amendment * * * " 42 U.S.C. 6395(m).

DOE disagrees with this comment. In this rulemaking, DOE is complying with the mandate in section 325(g)(4)(B) of the Act to determine whether to amend the standards in effect for clothes washers. Consistent with section 325(m), section 325(g)(4)(C) of the Act provides that a second and any subsequent amendments shall apply to products manufactured five years after the effective date of the previous amendment, except that in no case may the amended standard apply to products manufactured within 3 years after publication of the standard. Today's amended final rule will have been published 6½ years after the effective date of the previous final rule, in conformity with the statute, and applies to products manufactured 3 years or more after its publication date.

Nothing in the Act precludes DOE, in carrying out its duty to determine whether to amend the existing standards, from promulgating amendments that take effect in two stages. In this rulemaking, DOE has determined that an interim 2004 standard is technologically feasible and economically justified. This less stringent interim standard gives industry sufficient lead time to depreciate their current assets and plan a more orderly transition of their production facilities. Delaying the implementation date for the higher efficiency level gives manufacturers more time to research and develop lower cost solutions to achieve higher standards. Under the provisions in the Act, DOE may not apply subsequent amendments of these standards to products manufactured within 5 years after the effective date of the second or final stage of this rule (*i.e.,* until 2012).

AHAM and the NRDC both support DOE's position that there is nothing in the statute which prohibits rule amendments that consist of initial or interim standards and more stringent or final standards. (Mr. Samuels of AHAM, No. 216CC at 23; Mr. Goldstein of NRDC, No. 216CC at 56).

Thus, DOE is adopting the rule, as proposed.

D. Consumer Information Statement

The Consumer Federation of America (CFA) commented that it believes that the Consumer Overview section could be improved to include the following information: Impact on the "first cost" or purchase price, impact on LCC (*i.e.* energy costs and water savings), payback period, impact of a rule on affordability of product for the average consumer and especially the low and moderate income population, and environmental implications/benefits of a rulemaking. (CFA, Nos. 210 & 232 at 2). In addition, as it was recommended by the Appliance Standards Advisory Committee at its October 24, 2000, meeting, the consumer information

statement (Consumer Overview) should be in simplified language so that it is understandable to the consumer. (Advisory Committee Meeting Transcripts dated October 24, 2000, at 43). These changes have been made to the Consumer Overview section of this final rule.

E. Consumer Input

CEI and CA commented that they believe there was inadequate consumer input into the rulemaking process. (CEI & CA, No. 209). General Electric (GE) commented that DOE has given adequate time for consumer input by holding numerous comment periods and hearings. (Mr. Jones of GE, No. 216CC at 74). Since we started work on this rulemaking in 1991 we have had eight public hearings/workshops and three public solicitations for comment. DOE published an ANOPR on November 14, 1994 with a 75 day comment period. 59 FR 56423. On November 19, 1998, DOE published a Supplemental ANOPR and held a public hearing on December 15, 1998 with a 75 day comment period. 63 FR 64344. All of the technical information pertaining to the Supplemental ANOPR and a copy of the Supplemental ANOPR were made available immediately thereafter on our Internet site. On October 5, 2000 DOE published a NOPR and held a public hearing on November 15, 2000 with a 60 day comment period. 65 FR 59550. All of the technical information pertaining to the NOPR and a copy of the NOPR were made available immediately thereafter on our Internet site.

Since February 1999, the Department received 10 letters from consumers opposing the proposed energy efficiency standards and about 200 comments opposing a ban on top-loading vertical-axis clothes washers. (Comment No. 217). In addition, we responded to about 200 e-mails and phone calls by sending in return a fact-sheet and a copy of the rule. On the other hand, the Department received over 600 letters from consumers supporting the energy conservation standards at a 40 percent improvement in efficiency (today's requirement is for a 35 percent improvement by 2007). (Comment Nos. 191, 192, 193, 196, & 201). We have also received comments from consumer advocate groups such as the Arizona Consumers Council, Center for Environmental Citizenship, Coalition for Consumer Rights, Residential Providers Association of Oregon, and others supporting the energy conservation standards at a 40 percent improvement in efficiency. (Comment No. 191). In addition, in selecting today's standards, we considered the results of the consumer focus groups and a conjoint analysis study we performed to address the consumer utility issue pertaining to top-loading vertical-axis and front-loading horizontal-axis machines. Based on the above, DOE concludes that many consumers are concerned that a new standard would ban, or have the unintended effect of banning, top-loading vertical-axis clothes washers. The Department notes that the standard adopted today mandates a minimum level of energy efficiency and that at least three clothes washer manufacturers currently have top-loading clothes washers which meet the 2007 standards.

In conclusion, we believe there has been ample time and opportunity for public comment and that consumer input has been received and consumer interests represented and considered.

F. Energy and Economic Analyses

The Department received several comments with respect to various elements of the energy and economic analyses. This section addresses product classes, incremental retail costs, water savings, detergent savings, LCC and payback, and cost effectiveness.

G. Product Classes

Currently, DOE divides clothes washers into classes based on size and features, such as suds-saving. For the existing standards, DOE defines residential clothes washers in the following classes:

- Top-loading, compact (less than 1.6 cubic feet capacity);
- Top-loading, standard (1.6 cubic feet or greater capacity);
- Top-loading, semi-automatic;
- Front-loading; and
- Suds-saving.

In the NOPR, the Department indicated it would maintain the current product classes.

The Department received several comments on its proposal to maintain separate product classes for top-loading and front-loading washers and to establish the same efficiency requirement for both. OOE commented that DOE should follow the lead of the Federal Trade Commission and establish only two classes of automatic clothes washers—standard and compact—as there is no basis for doing otherwise and to avoid consumer confusion. (OOE, No. 219 at 8). NRDC commented that it made more sense to collapse the V-axis and H-axis classes into a single class. (Mr. Goldstein of NRDC, No. 216CC at 57). Whirlpool commented that it fully supports the consolidation of the top- and front-loading standard capacity classes. (Whirlpool, No. 236). Maytag commented that it fully agrees with the Department's conclusion that a single efficiency standard for standard class top-and front-loading washers is clearly justified. (Maytag, No. 230 at 2). Amana commented that it supports the Department's proposal to have the same energy-efficiency standard for V-axis and H-axis washers while maintaining separate classes for these products on the basis of differences in technology, cost and utility/performance. It believes, however, that the Department should correct the designations from top- and front-loading to V-axis and H-axis. (Amana, No. 223 at 5).

The Department agrees that currently both V-axis and H-axis washers can achieve the same range of efficiency and that different efficiency standards are not warranted based on axis of rotation or orientation of loading. For this reason, the Department proposed a single minimum efficiency for the existing "standard" size top-loading and front-loading washers. However DOE is concerned that in the future these classes may have a different potential for efficiency improvement. Therefore, in today's final rule, the Department is maintaining both the Standard Top-Loading and Front-Loading product classes but is requiring a single efficiency standard level for both the Standard Top-Loading and Front-Loading classes of washers.

Additionally, Amana requested that the Department segregate the standard size washer class into subclasses on the basis of capacity in cubic feet to eliminate the potential of confusion and prevent consumers from being misled in comparing washers of different sizes and mistakenly purchasing a smaller one that consumes more energy. (Amana, No. 223 at 4). The Department understands that the FTC labeling could lead to confusion for the consumer. We do not believe, however, that this issue can be addressed by defining additional efficiency subclasses. The Department will take up this matter with FTC to study this issue.

The Department received several comments on the issue of increasing the volume definition of the compact class from 1.6 cubic feet to 2.0 cubic feet. Maytag commented that it agreed with the Department's proposal to maintain the existing 1.6 cubic feet definition of the compact product class since it believes increasing the compact class to 2.0 cubic feet could place manufacturers who have complied with more stringent efficiency standards at a competitive disadvantage. (Maytag, No. 230 at 2). The OOE commented it was generally

indifferent to the Department's decision to keep the definition of the compact class at less than 1.6 cubic foot capacity. However, OOE deplores that the Department has not examined the potential to improve the energy efficiency of these products. (OOE, No. 219 at 7). Whirlpool commented that it disagrees with the Department's proposal to maintain the current less than 1.6 cubic feet definition for compact washers and recommends that the Department redefine the "compact" class to instead be either "top-loading units less than 2.0 cubic feet in capacity with external width not to be in excess of 22.5 inches *OR* top-loading units that are less than 1.6 cubic feet in capacity and not more than 24 inches in width." (Whirlpool, No. 236 at 3).

The Department appreciates Whirlpool's suggested language to redefine the compact class. However, given that this proposed change in definition is new and was not subject to public notice and comment, the implications are not fully understood. Thus, the Department is maintaining the current classification for the compact class.

Whirlpool commented that it disagrees with the MEF value of 0.65 for the compact class and suggested that, based on its testing, an MEF of 0.57 more accurately reflects the current EF standard of 0.9. (Whirlpool, No. 236 at 3). Since the compact class was not analyzed, it is the Department's intention that current clothes washers for this class qualify under the new MEF minimum energy efficiency requirement. The Department has conducted sample calculations and testing on both a 1.46 cubic feet washer and a 1.93 cubic feet washer. Based on the findings, the Department is maintaining the 0.65 MEF value.

H. Incremental Retail Costs

The American Council for an Energy Efficient Economy (ACEEE) commented that DOE based its estimate of incremental retail cost for the proposed standards on manufacturer cost estimates for horizontal-axis machines. ACEEE adds that manufacturers stated at the NOPR hearing that incremental costs may well be less than estimated. ACEEE further remarks that this observation is supported by the Department's own reverse engineering analysis, which found mid-point incremental manufacturer costs for V-axis machines that meet or exceed the 2007 standard to be approximately $75. Applying the mark-ups used in the DOE analysis, ACEEE calculates a $140 incremental retail price which is lower than the $249 incremental retail price used by the Department in its analysis. Based on its analysis of past rulemakings, ACEEE believes that the incremental price will be around $50. To capture the full range of possible future prices, ACEEE recommends that DOE state that the incremental price will be in the range of $50–$239. ACEEE does not believe DOE should revise its analysis using this range since the proposed standards clearly meet the NAECA criteria at $239 and would certainly meet these criteria if the costs were lower. (ACEEE, No. 227 at 1).

The Oregon Office of Energy (OOE) also commented that the engineering analysis for washers meeting the proposed standard (MEF=1.26) overstates the manufacturing costs of this level. OOE states that DOE based its analysis on the assumption that the standard would only be met with H-axis clothes washer designs. OOE commented that in recent months it has become clear to the Oregon Energy Office that manufacturers will meet the proposed new standard with fairly traditional top-loading, vertical-axis designs that incorporate programmable electronic controls. (OOE, No. 219 at 3).

As commented by ACEEE and OOE, the engineering cost and performance data used in the DOE analysis for the proposed standard level is based on H-axis technology. The decision to base the engineering analysis on H-axis technology was made in response to AHAM comments in 1996 (AHAM, No. 67 at 1) and 1998 (AHAM, No. 84 and 86) that manufacturers could not achieve levels of efficiency improvement beyond 25 percent with traditional V-axis clothes washers. More recently, two manufacturers introduced high-efficiency V-axis clothes washers into the U.S. market that meet or exceed the performance requirements of the 2007 standard. The Department had efficiency testing performed on three commercially available high-efficiency washers and one prototype V-axis washer. Additionally, the Department had these washers disassembled and analyzed to estimate their manufacturing costs. As commented by ACEEE, these washers had a lower estimated cost range then their H-axis counterparts. Thus, the Department agrees with ACEEE that the price estimates used by the Department in its analysis may be at the high end of what may be expected and that lower prices for the proposed efficiency would only improve the justification of the standards. The Department notes that in this period of rapid technological advances and new product introductions, assessing the future cost and performance of clothes washers is an uncertain exercise. As with any forecast, there is a range of uncertainty in the forecasted results.

Additionally, ACEEE reasoned that given the downward trend in the Producer Price Index, it was likely that clothes washer manufacturers would achieve future productivity gains and design improvements that would allow them to have lower costs than submitted in 1997. (ACEEE, No. 227 at 1). The Department agrees that the recent introduction of high efficiency V-axis designs and the reverse-engineering results on these designs indicates that the price impact of the standard on consumers may be lower than expected. Consideration of a PPI deflator however appears to the Department as very speculative. In order to comply with NAECA and assure that the standards that are adopted are economically justifiable, the Department adopts price and cost estimates that can be made with a fairly high degree of certainty. While historic price data as indicated in the Consumer Price Index (CPI) and Producer Price Index (PPI) may indicate trends or tendency towards real price decreases, the reasons behind these trends are unclear. While it is fairly certain that real prices for appliances will not increase given the same quality and type of product, the possibility of a continuing decrease is far from certain. The Department therefore utilizes an analysis that assumes constant real prices for the same quality and type of clothes washer.

I. Water Savings

OOE commented that the 35 percent level of energy reduction can be achieved by a V-axis design which may have programmable electronic controls and, therefore, the assumed water savings may be less than the level stated in the analysis. (OOE, No. 219 at 2, 3 & 4).

The Department believes that while an H-axis washer typically is a design approach that results in water savings, there is no guarantee of water savings with any design approach, at any level of energy efficiency. Water use may be increased by, for example, adding more cold rinses without impacting a minimum MEF level. The Department has relied on manufacturer data based on what manufacturers would build at each standard level. The water use data presented by manufacturers estimates the same water savings at both the 35 percent and 40 percent levels using horizontal-axis technology and only a slightly higher water usage level at the 25 percent level using vertical-axis technology. As we can now observe in the marketplace, similar V-axis washer

technology may be used to achieve a 35 percent level or even a 40 percent level.

J. Detergent Savings

OOE commented that DOE should include detergent savings that owners of H-axis machines (and any others that reliably deliver equivalent water savings) will experience at the 40 percent improvement and above (MEF standard levels of 1.36 and above). (OOE, No. 219 at 6 & 7). Unilever HPC commented that it is erroneous and arbitrary to state that you can save detergent using high efficiency washers because the amount of detergent used is a purely discretionary consumer decision. It further commented that to include detergent savings is to imply a cleaning performance standard which the proposed standard does not actually address. (Mr. Linard of Unilever, No. 216CC at 84).

The Department believes that while some consumers may use less detergent even at MEF levels of 1.26 as estimated by the OOE in the Pacific Northwest, others may use currently more expensive detergents specially manufactured for H-axis washers. OOE also states that there is every reason to expect that detergent manufacturers will have a difficult time significantly increasing the price of these detergents to compensate for reductions in use. No evidence is provided to support that statement. There is no conclusive proof of what price consumers will pay for detergent in 2007 when the standard takes effect at levels equivalent to that achieved by H-axis washers.

K. Life-Cycle-Costs and Payback

The Regulatory Studies Program at the Mercatus Center at George Mason University (Center) commented that the Department used different savings estimates at different places in the NOPR and the TSD. (Center, No. 224 at 5). The NOPR presented values based both on point estimates and also more detailed estimates based on distributions of input values. The primary results used in the analysis of Payback Periods and life-cycle-costs are based on a distribution of inputs used to create a distribution of LCC and Payback Periods. This methodology allows consideration of ranges of inputs (*e.g.* numbers of loads per year, energy price) rather than just using typical or average values. Table 3 presents the results of a simplified point value analysis that uses average input values for each variable and calculates a single output value. Tables 4 and 5 present the results of a more detailed simulation of 10,000 households which has input distributions for each variable and output distributions for each result.

We calculated the distributed results using 10,000 individual payback periods and found their average, rather than dividing the average retail price increase by the average annual savings. These two methods of determining the average payback period are not mathematically equivalent. The average retail price increase and the average operating cost savings shown are also determined from distributions to account for the differences in fuel prices, how often households do the wash, etc. (see Chapter 7 of the TSD for details). To avoid confusion, for this final rule, the Department has modified the Consumer Overview to reflect the more detailed distribution-derived values for price and operating cost.

TABLE 3.—SINGLE POINT VALUES

MEF level/year	Single point values (for U.S. mix of fuel types)			
	Payback period (Years)	Delta retail price on most likely based incremental manufacturer costs	Operating cost savings, (Avg. Inputs used)	Mean LCC savings
1.04/2004	3.2	$53	$16	$105
1.26/2007	4.7	240	51	262

TABLE 4.—DISTRIBUTION-DERIVED VALUES

MEF level/year	Distributions					
	Payback (years)		Delta retail price		Annual operating cost savings	
	Mean	Median	Mean	Median	Mean	Median
1.04/2004	4.6	3.5	$53	$47	$15	$13
1.26/2007	6.8	5.0	249	177	48	43

TABLE 5.—DISTRIBUTION-BASED LCC SAVINGS

MEF level/year	Distributions	
	LCC savings	
	Mean	Median
1.04/2004	$103	$81
1.26/2007	260	208

L. Cost Effectiveness

The Edison Electric Institute (EEI) states that at least 90 percent of consumers should have lower life-cycle-costs under any new standard. EEI then argues that the proposed clothes washer standards are not economically justified since only 80–81 percent of consumers will have lower life-cycle-costs, and only 72 percent of senior citizens will have lower-life-cycle costs. Additionally, EEI believes that a

payback period of 7 years is too long. (EEI, No. 209 at 1). The Department disagrees. First of all, EEI states no reason why 90 percent should be an acceptable level. Secondly, EPCA requires the Department to consider LCC as just one of the factors in determining economic justification of a standard level. In determining economic justification, EPCA directs the Secretary to determine whether the benefits of a standard exceed the burdens. Consumer LCC and payback, the resulting energy savings, the need for national energy conservation and the economic impacts on manufacturers and consumers are just a few of the factors that the Secretary must consider. There is no mathematical formula given or used for weighing the benefits and burdens of the various factors.

Furthermore, because of wide variations in usage rates and energy prices across the country, no national standard can be designed to minimize, or even reduce, life-cycle-costs for all consumers. The Department analyzes the expected impacts of proposed standards on consumers taking these differences into account. However, there will always be some consumers who will have higher life-cycle-costs under any national standard. In making its determination regarding the overall benefits and burdens of any standard, the Department considers both the magnitude of any adverse effects that are expected on consumers, as well as the total number or any groupings of consumers that might be adversely affected. However, the Department does not recognize any arbitrary mathematical threshold for LCC benefits as suggested by EEI, and the ratio of consumers with LCC savings versus those with LCC increases will vary from rulemaking to rulemaking depending on the various benefits and burdens of each unique rulemaking.

The Mercatus Center stated that the proposed clothes washer standards are not economically justified. (Center, No. 224 at 17). The Center claimed that the standard will harm the majority of consumers and will take away consumer choice by eliminating top-loading, vertical-axis clothes washers. The Center recommended that the Department not go forward with the proposed standard and stated that since the Department believes that consumers pass up energy efficient washers because they are misinformed about operating costs, that the Department should construct a program to correct this deficiency. The Center further stated that consumers do not need to be coerced into saving money.

Much of the Center's comment is a philosophical argument against the use of Federal energy efficiency standards as a means of modifying consumer product choices or behavior. In its comment, the Center grades the Department on issues such as whether the Department has identified a significant market failure, has identified an appropriate Federal role, has examined alternative approaches, has maximized net benefits and has understood individual choice and property impacts. Most of these issues had been resolved by the Congress when they enacted the statutory requirements which guide and limit the Department's decision-making process. Furthermore, when tested in the court in *Natural Resources Defense Council* v. *Herrington*, 768 F. 2d 1355, 1406–07 (D.C. Cir. 1985), the court stated that "the entire point of a mandatory program was to change consumer behavior." As is stated under section I.*B. Authority* at the beginning of this final rulemaking, the Act requires the Department to "establish standards designed to achieve the maximum improvement in energy efficiency that is technologically feasible and economically justified." This emphasis on maximizing energy savings may or may not lead to standards that also maximize economic benefits—although in this case the proposed clothes washer standards would produce National and consumer benefits that are very close the maximum of the standard levels analyzed.

Most of the analysis presented by the Center assumes that the standards would eliminate top-loading, vertical-axis clothes washers. As is discussed in the Energy and Economic Analyses comments, while the original manufacturer data submitted assumed that all clothes washers at and above a 35 percent improvement would be horizontal-axis machines, manufacturers have already begun offering top-loading, vertical-axis clothes washers that would meet the 2007 standard. Thus, a key assumption made by the Center is incorrect.

In another part of its analysis, the Center speculated that if consumers used their clothes washers less than average, they would experience lower benefits. This is true, and as discussed in the response to the EEI comment above, and the LCC and Payback discussion, the Department analyzed the expected impacts of the proposed standards on consumers taking usage and other differences into account. As reported in the Conclusion section of today's rule, the Department found that 20 percent of consumers would experience higher life-cycle-costs under the 2007 standard, and that the impact was considered in the decision for today's rule.

V. Analytical Results and Conclusion

A. Analytical Results

We examined six trial standard levels. Table 6 presents the baseline and trial standard levels, the associated MEF values and the percentage reduction in energy use from the baseline achieved at the trial standard level. Trial Standard Level 3 contains two stages of standards which were proposed in the Joint Comment. (Joint Comment, No. 204).

TABLE 6.—TRIAL STANDARD LEVELS FOR CLOTHES WASHERS

Trial standard level	MEF	Percent reduction in energy use
Baseline	0.817	0.
1	1.021	20.
2	1.089	25.
3	1.04 in 2004	~22 in 2004
	1.26 in 2007	~35 in 2007.
4	1.257	35.
5	1.362	40.
6	1.634	50.

The Department presented the results of its analytical analysis in the NOPR which are unchanged for today's final rule. 65 FR 59550, 59571–81 (October 5, 2000).

We also added, for comparative evaluation purposes, the results of Trial Standard Level 3 using the RECS97 and AEO2000 data. These results have been included as an Appendix R of the TSD. The rulemaking process is such that months to years can take place between the time an analysis is completed and a final rule is issued. During that time span, conditions or data are likely to change and the Department attempts to insure that any such changes will not compromise the robustness of the analysis or lead to a different conclusion. For example, the NOPR used the AEO1999 forecast of electricity prices and electricity generation mix to determine energy savings and net present value. Since the analysis was completed, the AEO2000 forecast became available. The Department examined the impact of the AEO2000 forecast on energy savings and net present value. The energy savings reported in the NOPR ranged from 2.12 to 7.53 Quads. Using the data from AEO2000 shows the energy saving which ranged from 2.09 to 7.44 Quads. The net present values reported in the NOPR ranged from 3.66 to 16.88 billion dollars. Using the data from AEO2000 shows the NPV which ranged from 3.76 to 16.89 billion dollars. The Department does not consider these changes to be meaningful or a reason to revise the analysis. Additionally, it would be incorrect to select only one portion of the analysis for revision, such as the electric price, without also examining other related inputs, such as equipment prices, which also might have slightly changed. While the Department acknowledges that the analysis performed for the NOPR does not fully reflect some of the changes in the industry and energy markets that have occurred more recently, the Department believes that the analysis is still a valid basis for today's final rule.

B. Conclusion

The Act specifies that any new or amended energy conservation standard for any type (or class) of covered product shall be designed to achieve the maximum improvement in energy efficiency which the Secretary determines is technologically feasible and economically justified. Section 325(o)(2)(A), 42 U.S.C. 6295(o)(2)(A). In determining whether a standard is economically justified, the Secretary must determine whether the benefits of the standard exceed its burdens. Section 325(o)(2)(B)(i), 42 U.S.C. 6295(o)(2)(B)(i). The amended standard must result in significant conservation of energy. Section 325(o)(3)(B), 42 U.S.C. 6295(o)(3)(B).

We considered the impacts of standards beginning with the most efficient level. We have included a summary of the analysis results in Table 7 to aid the reader in the discussion of the benefits and burdens for the different trial standard levels.

TABLE 7.—SUMMARY ANALYSIS RESULTS

Trial Standard Level	6	5	4	3	2	1
MEF	1.63	1.36	1.26	1.04 in 2004, 1.26 in 2007	1.09	1.02
Total Energy Saved (Quads)	7.53	6.03	5.99	5.52	4.04	2.12
Water Savings (trillion gallons)	10.85	12.94	12.94	11.59	9.09	0.53
NPV (Billion $)	10.79	16.73	16.88	15.3	14.29	3.66
Emissions:						
Carbon Equivalent (Mt)	134.6	107.3	106.2	95.1	70.9	38.1
Discounted Carbon Equivalent (Mt) [1]	35.6	28.6	28.3	24.1	19.0	10.2
NO_X (kt)	364	283.1	280.6	253.5	193.6	115.6
Discounted NO_X (kt) [1]	108.3	85.2	84.0	70.8	58.3	33.8
SO_2 (kt) [2]	31.41	30.31	30.31	28.11	30.31	31.41
Discounted SO_2 (kt) [1]	8.3	8.0	8.1	7.3	8.0	8.3
Manufacturer Impacts:						
Cumulative Loss in Industry NPV ($ Million) [3]	474.5–648.9	453.1–524.9	510.1–612.5	421.1–528.4	409.9–566.2	19.2–90.1
% Change in Industry NPV	(33.0)–(45.2)	(31.7)–(36.5)	(35.4)–(42.5)	(29.2)–(36.7)	(28.5)–(39.3)	(1.3)–(6.3)
Standard Deviation % NPV	27.7	27.7	17.7	15.8	11.4	11.5
Life-Cycle-Cost ($):						
Mean Savings ($)	176	243	242	103/260	211	61
Percent Households LCC Less than Baseline	69	80	79	81/90	87	84
Median Payback (years)	7.0	5.1	5.1	3.5/5.0	4.0	0.6

[1] The Department makes no effort to monetize the benefits of the emission reductions, but there may be time related differences in the perceived value of the emissions depending on when they occur, as with monetized benefits that accumulate over time. Emission reductions that occur sooner are often more desirable than equivalent reductions that occur later. Like monetary benefits, the health, recreational and ecosystem benefits that result from emission reductions are often perceived to have a greater value if they occur sooner, rather than later. To the extent that the different trial standard levels have slightly different shipment distributions over time, some trial standard levels might have a slightly higher proportion of earlier emission reductions than another trial standard level. To show the possible effect of the different timing patterns of the emissions, the Department is also presenting discounted emissions. These calculations were done using the same seven percent discount rate as was used for discounting monetized benefits.

[2] Results only include household SO_2 emissions reductions because SO_2 emissions from power plants are capped by clean air legislation. Thus, SO_2 emissions will only be negligibly affected by possible water heater standards.

[3] Includes impacts on dryer and repair business.

1. Trial Standard Level 6—MEF 1.63

First, we considered the most efficient level (max tech), MEF 1.63, which saves a total of 7.53 quads of energy through 2030. This is a significant amount of energy. The cumulative water savings through 2030 would be 10.85 trillion gallons. The emissions reductions through 2030 would total 134.6 Mt of carbon equivalent, 364 kt of NO_X, and 31.41 kt of SO_2. At this level, consumers experience a mean savings in LCC of $176, with a median payback of 7.0 years.

At Trial Standard Level 6, the clothes washer industry would experience a cumulative NPV loss of between $474.5—648.9 million which represents between 33.0 and 45.2 percent of the clothes washer industry value absent standards ($1,439.1 million—base case). This impact is not evenly distributed among the six major manufacturers.[3] The large variability of impacts is attributed to the presence of existing product for some manufacturers at this efficiency level which means that some firms may gain a competitive advantage. This variability is measured by the standard deviation of individual companies' changes in NPV.[4] At this level, the standard deviation in individual companies' percentage change in NPV is 27.7 percent. Given the high industry impacts and the uneven burden on individual firms, there exists a significant risk of industry consolidation.

At this trial standard level a small company with an assumed market share of 2.1 percent would lose 90.7 to 102.8 percent of its value. A small company with an assumed market share of 4.2 percent would lose 166 to 178.1 percent of its value. Based on the major loss in company value associated with meeting this standard level, it is likely that one or both of the two smaller manufacturers[5] would cease to produce clothes washers covered by the standard and might also cease to market commercial clothes washers. These values can be found in Chapter 11 in Table 11.39 of the TSD.

The Department concludes that the burdens of Trial Standard Level 6 outweigh the benefits. Consequently, the Department concludes Trial Standard Level 6 is not economically justified.

2. Trial Standard Level 5—MEF 1.36

Next, we considered a 1.36 MEF, which saves a total of 6.03 quads of energy through 2030, also a significant amount. The cumulative water savings through 2030 for this trial standard level would be 12.94 trillion gallons. The emissions reductions through 2030 would total 107.3 Mt of carbon equivalent, 283.1 kt of NO_X, and 30.31 kt of SO_2. At this level, consumers experience a mean savings in LCC of $243, with a median 5.1 year payback.

The clothes washer industry would experience a cumulative NPV loss of between $453.1–524.9 million. This represents between 31.7 and 36.5 percent of industry value absent standards ($1,439.1 million—base case). For the same reason in Trial Standard Level 6, this impact is not evenly distributed among the six major manufacturers. At this level the standard deviation in individual companies' percentage change in NPV is 27.7 percent. (Refer to Chapter 11 of the TSD for a description of the calculation method for standard deviation.) Given the high industry impacts and the uneven burden on individual firms, there exists a significant risk of industry consolidation.

At this trial standard level a small company with an assumed market share of 2.1 percent would lose 87.7 to 92.7 percent of its value. A small company with an assumed market share of 4.2 percent would lose 160.3 to 165.3 percent of its value. Based on the major loss in company value associated with meeting this standard level, it is likely that one or both of the two smaller manufacturers[6] would cease to produce clothes washers covered by the standard and might also cease to market commercial clothes washers. These values can be found in Chapter 11 in Table 11.39 of the TSD.

The Department concludes that the burdens of Trial Standard Level 5 outweigh the benefits. Consequently, the Department concludes Trial Standard Level 5 is not economically justified.

3. Trial Standard Level 4—MEF 1.26

Next, we considered a 1.26 MEF, which saves a total of 5.99 quads of energy through 2030, a significant amount. Just as in the case of the 1.36 MEF, the cumulative water savings through 2030 would equal 12.94 trillion gallons. The cumulative emissions reductions through 2030, however, are slightly lower for the 1.26 MEF because the cumulative energy savings is lower for this standard level than the 1.36 MEF. The 1.26 MEF level would save 106.2 Mt of carbon equivalent, 280.6 kt of NO_X, and 30.31 kt of SO_2. At this level, consumers experience a mean savings in LCC of $242 with a median payback of 5.1 years.

Under a 1.26 MEF standard, the clothes washer industry would experience a cumulative NPV loss of between $510.1–612.5 million. This represents between 35.4 and 42.5 percent of industry value absent standards ($1,439.1 million—base case). Compared to Trial Standard Levels 5 and 6, this impact is more evenly distributed amongst the six major manufacturers as represented by a standard deviation in individual companies' NPV of 17.7 percent, and thus there exists less risk of industry consolidation. Refer to Chapter 11 of the TSD for a description of the calculation method for standard deviation. This lower standard deviation reflects the greater diversity of designs, approaches and engineering flexibility to meet this efficiency level compared to Trial Standard Levels 5 and 6. However, given the high level of investment required to meet this efficiency level and an inability to spread fixed costs over large volumes, small manufacturers are particularly vulnerable. At this trial standard level a small company with an assumed market share of 2.1 percent would lose 91.8 to 98.9 percent of its value. A small company with an assumed market share of 4.2 percent would lose 164.4 to 171.6 percent of its value. Based on the major loss in company value associated with meeting this standard level, it is likely that one or both of the two smaller manufacturers[7] would cease to produce clothes washers covered by the standard and might also cease to market commercial clothes washers. These values can be found in Chapter 11 in Table 11.39 of the TSD.

The Department concludes that the burdens of Trial Standard Level 4 outweigh the benefits. Consequently, the Department concludes Trial Standard Level 4 is not economically justified.

4. Trial Standard Level 3—MEF 1.04/1.26

Next, we considered the two step 1.04/1.26 MEF efficiency level, which was proposed in the Joint Comment. (Joint Comment, No. 204). This trial standard level, Trial Standard Level 3, has energy savings of 5.52 quads through 2030, a significant amount. The cumulative water savings through 2030 would equal 11.59 trillion gallons. The emissions reductions through 2030 would total 95.1 Mt of carbon equivalent, 253.5 kt of NO_X, and 28.11 kt of SO_2.[8] At the 1.04 MEF level, consumers would experience a savings in LCC of $103, while they would

[3] Alliance Laundry Systems LLC, Amana Appliances, Frigidaire Home Products, General Electric Appliances (GEA), Maytag Corporation, and Whirlpool Corporation.

[4] The standard deviation is a measure of how widely individual companies' percentage NPV changes are dispersed from the industry percentage change in value. Refer to Chapter 11 of the TSD for a description of the calculation method.

[5] Alliance Laundry Systems LLC and Amana Appliances.

[6] Alliance Laundry Systems LLC and Amana Appliances.

[7] Alliance Laundry Systems LLC and Amana Appliances.

[8] The Department recognizes that the Environmental Protection Agency is considering regulations which could affect the amount of sulfur in home heating oil.

experience a mean LCC savings of $260 at the 1.26 MEF level that would go into effect in 2007. The median payback for the 1.04 MEF level is 3.5 years, and 5.0 years for the 1.26 MEF. The clothes washer industry would experience a cumulative NPV loss of between $421.1–528.4 million representing between 29.2 and 36.7 percent of base case industry value.

Compared to a single step standard level of a 1.26 MEF implemented in 2004, the Joint Comment proposal reduces the impacts of the standards on manufacturers by delaying the effective date three years for the 1.26 MEF level. This allows clothes washer manufacturers more time to depreciate their current assets and plan a more orderly transition of their production facilities. Delaying the standard implementation date for the higher efficiency level gives manufacturers more time to research and develop lower-cost solutions to achieve higher standards.

Since the MIA shows that small manufacturers suffer the greatest impact, the Department takes into consideration that the consensus proposal was developed in consultation with, and supported by small manufacturers.

Furthermore, we consider that the Joint Comment specifically states that the proposal is not expected to eliminate any competitors. (Joint Comment, No. 204).

Based on the manufacturers' statement in the Joint Comment, we believe that these impacts from the proposal are mitigated and conclude that, given the benefits, the standards submitted in the Joint Comment are economically justified. (Joint Comment, No. 204).

The Energy Policy and Conservation Act, as amended, directs the Department to consider the impact of any lessening of competition that is likely to result from the standards, as determined by the Attorney General. In a letter responding to the NOPR, the Attorney General concluded "that the proposed clothes washer standard would not adversely affect competition." (Department of Justice, No. 233 at 2). See Department of Justice letter, dated December 4, 2000, which is printed as the appendix to this rule.

After carefully considering the analysis and comments, the Department amends the energy conservation standards for clothes washers as proposed by the Joint Comment. (Joint Comment, No. 204). The Department concludes this standard saves a significant amount of energy and is technologically feasible and economically justified. In determining economic justification, the Department finds that the benefits of energy and water savings, consumer LCC savings, national net present value increase, job creation and emission reductions resulting from the standard outweigh the burdens of the loss of manufacturer net present value, and consumer LCC increases for some users of clothes washers covered by today's notice. Therefore, the Department today is amending the energy conservation standards for clothes washers at Trial Standard Level 3. The clothes washer energy efficiency standards for Top-Loading, Standard (1.6 ft.^{3} or greater capacity) and Front-Loading class clothes washers shall be 1.04 MEF on January 1, 2004 and 1.26 MEF on January 1, 2007.

VI. Procedural Issues and Regulatory Review

A. Review Under the National Environmental Policy Act

The Department prepared an Environmental Assessment (EA) (DOE/EA–1344) which is available from: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Forrestal Building, Mail Station EE–41, 1000 Independence Avenue, SW, Washington, DC 20585–0121, (202) 586–0371. We found the environmental effects associated with various standard efficiency levels for clothes washers to be not significant, and therefore we are publishing, elsewhere in this issue of the **Federal Register**, a Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321 *et seq.*, the regulations of the Council on Environmental Quality (40 CFR Parts 1500–1508), and the Department's regulations for compliance with NEPA (10 CFR Part 1021).

B. Review Under Executive Order 12866, "Regulatory Planning and Review"

Today's regulatory action has been determined to be an "economically significant regulatory action" under Executive Order 12866, "Regulatory Planning and Review." (58 FR 51735, October 4, 1993). Accordingly, today's action was subject to review under the Executive Order by the Office of Information and Regulatory Affairs (OIRA) of the Office of Management and Budget.

The draft submitted to OIRA and other documents submitted to OIRA for review have been made a part of the rulemaking record and are available for public review in the Department's Freedom of Information Reading Room, 1000 Independence Avenue, SW, Washington, DC 20585, between the hours of 9 a.m. and 4 p.m., Monday through Friday, telephone (202) 586–3142.

The proposed rule contained a summary of the Regulatory Impact Analysis which focused on the major alternatives considered in arriving at the approach to improving the energy efficiency of consumer products (65 FR 59582–83). The reader is referred to the complete "Regulatory Impact Analysis," which is contained in the TSD, available as indicated at the beginning of this rulemaking. It consists of: (1) A statement of the problem addressed by this regulation, and the mandate for government action; (2) a description and analysis of the feasible policy alternatives to this regulation; (3) a quantitative comparison of the impacts of the alternatives; and (4) the national economic impacts of the proposed standard.

C. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.*, requires an assessment of the impact of regulations on small businesses. Small businesses are defined as those firms within an industry that are privately owned and less dominant in the market.

To be categorized as a "small" clothes washer manufacturer, a firm must employ no more than 1,000 employees. The clothes washer industry is characterized by six firms accounting for nearly 99 percent of sales. By the above definition none of the six major U.S. manufacturers of clothes washers are considered "small." The Department is aware of one small domestic manufacturer of clothes washer, Staber Industries, that produces a top-loading horizontal-axis clothes washer. The energy efficiency of this product already exceeds the 2007 standard level.

The Department prepared a manufacturing impact analysis which was made public and available to all the clothes washer manufacturers. This analysis considered the effects on small manufacturers with a minimum annual production of 165,000 units (representing a 2.1 percent market share for Alliance Laundry Systems LLC). The Department did not receive any information or comments indicating that even smaller manufacturers of clothes washers would be impacted differentially from those included in the small manufacturer analysis performed. Furthermore, the small manufacturer is a signer of the Joint Comment.

In view of the foregoing, the Department has determined and hereby

certifies pursuant to section 605(b) of the Regulatory Flexibility Act that, for this particular industry, the standard levels in today's final rule will not "have a significant economic impact on a substantial number of small entities," and it is not necessary to prepare a regulatory flexibility analysis.

D. Review Under the Paperwork Reduction Act

No new information or record keeping requirements are imposed by this rulemaking. Accordingly, no Office of Management and Budget clearance is required under the Paperwork Reduction Act. 44 U.S.C. 3501 *et seq.*

E. Review Under Executive Order 12988, "Civil Justice Reform"

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, "Civil Justice Reform," 61 FR 4729 (February 7, 1996), imposes on Executive agencies the general duty to adhere to the following requirements: (1) Eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; and (3) provide a clear legal standard for affected conduct rather than a general standard and promote simplification and burden reduction. With regard to the review required by sections 3(a) and 3(b) of Executive Order 12988, it specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE reviewed today's final rule under the standards of section 3 of the Executive Order and determined that, to the extent permitted by law, the final regulations meet the relevant standards.

F. Review Under Executive Order 12630, "Takings" Assessment Review

DOE has determined pursuant to Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 52 FR 8859 (March 18, 1988), that this regulation would not result in any takings that might require compensation under the Fifth Amendment to the United States Constitution.

G. Review Under Executive Order 13132, "Federalism"

Executive Order 13132 (64 FR 43255, August 4, 1999) imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. Agencies are required to examine the constitutional and statutory authority supporting any action that would limit the policy making discretion of the States and carefully assess the necessity for such actions. Agencies also must have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. DOE published its intergovernmental consultation policy on March 14, 2000. (65 FR 13735). DOE has examined today's final rule and has determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. State regulations that may have existed on the products that are the subject of today's final rule were preempted by the Federal standards established in the NAECA Amendments of 1987. States can petition the Department for exemption from such preemption based on criteria set forth in EPCA, as amended.

H. Review Under the Unfunded Mandates Reform Act

With respect to a proposed regulatory action that may result in the expenditure by State, local and tribal governments, in the aggregate, or by the private sector of $100 million or more (adjusted annually for inflation), section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA) requires a Federal agency to publish estimates of the resulting costs, benefits and other effects on the national economy. 2 U.S.C. 1532(a), (b). UMRA also requires each Federal agency to develop an effective process to permit timely input by state, local, and tribal governments on a proposed significant intergovernmental mandate. The Department's consultation process is described in a notice published in the **Federal Register** on March 18, 1997 (62 FR 12820). Today's final rule may impose expenditures of $100 million or more on the private sector. It does not contain a Federal intergovernmental mandate.

Section 202 of UMRA authorizes an agency to respond to the content requirements of UMRA in any other statement or analysis that accompanies the proposed rule. 2 U.S.C. 1532(c). The content requirements of section 202(b) of UMRA relevant to a private sector mandate substantially overlap the economic analysis requirements that apply under section 325(o) of EPCA and Executive Order 12866. The **SUPPLEMENTARY INFORMATION** section of the Notice of Final Rulemaking and "Regulatory Impact Analysis" section of the TSD for this final rule responds to those requirements.

Under section 205 of UMRA, the Department is obligated to identify and consider a reasonable number of regulatory alternatives before promulgating a rule for which a written statement under section 202 is required. DOE is required to select from those alternatives the most cost-effective and least burdensome alternative that achieves the objectives of the rule unless DOE publishes an explanation for doing otherwise or the selection of such an alternative is inconsistent with law. As required by section 325(o) of the Energy Policy and Conservation Act (42 U.S.C. 6295(o)), today's final rule establishes energy conservation standards for clothes washers that are designed to achieve the maximum improvement in energy efficiency that DOE has determined to be both technologically feasible and economically justified. A full discussion of the alternatives considered by DOE is presented in the "Regulatory Impact Analysis" section of the TSD for today's final rule.

I. Review Under the Treasury and General Government Appropriations Act of 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. No. 105–277) requires Federal agencies to issue a Family Policymaking Assessment for any proposed rule or policy that may affect family well-being. Today's final rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

J. Review Under the Plain Language Directives

Section 1(b)(12) of Executive Order 12866 requires that each agency draft its regulations to be simple and easy to understand, with the goal of minimizing

the potential for uncertainty and litigation arising from such uncertainty. Similarly, the Presidential memorandum of June 1, 1998 (63 FR 31883) directs the heads of executive departments and agencies to use plain language in all proposed and final rulemaking documents published in the **Federal Register**.

Today's rule uses the following general techniques to abide by Section 1(b)(12) of Executive Order 12866 and the Presidential memorandum of June 1, 1998:

- Organization of the material to serve the needs of the readers (stakeholders).
- Use of common, everyday words in short sentences.
- Shorter sentences and sections.

K. Congressional Notification

As required by 5 U.S.C. 801, DOE will submit to Congress a report regarding the issuance of today's final rule prior to the effective date set forth at the outset of this notice. DOE also will submit the supporting analyses to the Comptroller General (GAO) and make them available to each House of Congress. The report will state that it has been determined that the rule is a "major rule" as defined by 5 U.S.C. 804(2).

L. Review Under Section 32 of the Federal Energy Administration Act

The test procedure amendments finalized today incorporate the American Association of Textile Chemists and Colorists (AATCC) Test Methods 118—1997, "Oil Repellency: Hydrocarbon Resistance Test" (reaffirmed 1997), and 79—2000, "Absorbency of Bleached Textiles" (reaffirmed 2000), to determine whether a stain resistant or water repellent finish is present in a test cloth used to measure remaining moisture content and therefore the energy consumption of a clothes washer.

The findings required of DOE by section 32 of the Federal Energy Administration Act serve to alert the public and DOE regarding the use and background of commercial standards in the rulemaking process. DOE has evaluated the promulgation of AATCC Test Methods 118–1997 (reaffirmed 1997), and 79–2000 (reaffirmed 2000), in light of the public participation criteria of section 32(b). The Department is unable to conclude whether development of these standards fully complied with section 32(b) regarding the manner of public participation.

As required by section 32(c), DOE has consulted with the Attorney General and the Chairman of the Federal Trade Commission concerning the impact of these standards on competition, prior to prescribing final test procedures.

List of Subjects in 10 CFR Part 430

Administrative practice and procedure, Energy conservation, Household appliances, Incorporation by Reference.

Issued in Washington, D.C., on January 3, 2001.

Dan W. Reicher,

Assistant Secretary, Energy Efficiency and Renewable Energy.

For the reasons set forth in the preamble, part 430 of chapter II of title 10, Code of Federal Regulations is amended, as set forth below.

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

1. The authority citation for part 430 continues to read as follows:

Authority: 42 U.S.C. 6291–6309; 28 U.S.C. 2461 note.

Appendix J [Amended]

2. Appendix J to subpart B of part 430 is amended:

a. By adding a new sentence at the beginning of the introductory paragraph of this appendix.

b. In section 2, by adding paragraphs 2.3.1 and 2.3.2, and by revising paragraphs 2.6.1.3, 2.6.2, 2.10, 2.11, and 2.11.1.

c. In section 3, by revising paragraph 3.3.1.

d. By adding a new section 8.

The additions and revisions read as follows:

Appendix J to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Automatic and Semi-Automatic Clothes Washers

The provisions of this appendix J shall apply to products manufactured after February 12, 2001. * * *

* * * * *

2. * * *

2.3. * * *

2.3.1 *Supply water requirements for water and energy consumption testing.* For nonwater-heating clothes washers not equipped with thermostatically controlled water valves, the temperature of the hot and cold water supply shall be maintained at 100°±10°F (37.8°C±5.5°C). For nonwater-heating clothes washers equipped with thermostatically controlled water valves, the temperature of the hot water supply shall be maintained at 140°F±5°F (60.0°C±2.8 °C) and the cold water supply shall be maintained at 60°F±5F° (15.6°C±2.8°C). For water-heating clothes washers, the temperature of the hot water supply shall be maintained at 140°F±5°F (60.0°C±2.8°C) and the cold water supply shall not exceed 60°F (15.6°C). Water meters shall be installed in both the hot and cold water lines to measure water consumption.

2.3.2 *Supply water requirements for remaining moisture content testing.* For nonwater-heating clothes washers not equipped with thermostatically controlled water valves, the temperature of the hot water supply shall be maintained at 140°F ± 5°F and the cold water supply shall be maintained at 60°F±5°F. All other clothes washers shall be connected to water supply temperatures as stated in 2.3.1 of this appendix.

* * * * *

2.6.1.3 The number of test runs on the same energy test cloth shall not exceed 60 test runs. All energy test cloth must be permanently marked identifying the lot number of the material. Mixed lots of material shall not be used for testing the clothes washers.

2.6.2 *Energy Stuffer Cloth.* The energy stuffer cloths shall be made from energy test cloth material and shall consist of pieces of material that are 12 inches by 12 inches (30.5 cm by 30.5 cm) and have been hemmed to 10 inches by 10 inches (25.4 cm by 25.4 cm) before washing. The maximum shrinkage after five washes shall not be more than four percent on the length and width. The number of test runs on the same energy suffer cloth shall not exceed 60 test runs. All energy stuffer cloth must be permanently marked identifying the lot number of the material. Mixed lots of material shall not be used for testing the clothes washers.

* * * * *

2.10 *Wash time (period of agitation or tumble) setting.* If the maximum available wash time in the normal cycle is greater than 9.75 minutes, the wash time shall be not less than 9.75 minutes. If the maximum available wash time in the normal cycle is less than 9.75 minutes, the wash time shall be the maximum available wash time.

2.11 *Agitation speed and spin speed settings.* Where controls are provided for agitation speed and spin speed selections, set them as follows:

2.11.1 For energy and water consumption tests, set at the normal cycle settings. If settings at the normal cycle are not offered, set the control settings to the maximum speed permitted on the clothes washer.

3. * * *

3.3. * * *

3.3.1 The wash temperature shall be the same as the rinse temperature for all testing. Cold rinse is the coldest rinse temperature available on the machine. Warm rinse is the hottest rinse temperature available on the machine.

* * * * *

8. Sunset

The provisions of this appendix J expire on December 31, 2003.

Appendix J1 [Amended]

3. Appendix J1 to subpart B of part 430 is amended:

a. By removing the Note after the heading and adding a new paragraph.

b. In section 1, by adding paragraphs 1.22 and 1.23.

c. In section 2, by revising paragraphs 2.6.1 and 2.6.2, and adding paragraphs 2.6.3 through 2.6.7.2.

d. In section 4, by revising the definition of "ER_x, ER_a, and ER_n" in paragraph 4.1.5.

The additions and revisions read as follows:

Appendix J1 to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Automatic and Semi-Automatic Clothes Washers

The provisions of this appendix J1 shall apply to products manufactured beginning January 1, 2004.

1. * * *

1.22 *Cold rinse* means the coldest rinse temperature available on the machine (and should be the same rinse temperature selection tested in 3.7 of this appendix).

1.23 *Warm rinse* means the hottest rinse temperature available on the machine (and should be the same rinse temperature selection tested in 3.7 of this appendix).

2. * * *

2.6. * * *

2.6.1 *Energy Test Cloth.* The energy test cloth shall be made from energy test cloth material, as specified in 2.6.4, that is 24 inches by 36 inches (61.0 cm by 91.4 cm) and has been hemmed to 22 inches by 34 inches (55.9 cm by 86.4 cm) before washing. The energy test cloth shall be clean and shall not be used for more than 60 test runs (after preconditioning as specified in 2.6.3 of this appendix). All energy test cloth must be permanently marked identifying the lot number of the material. Mixed lots of material shall not be used for testing the clothes washers.

* * * * *

2.6.2 *Energy Stuffer Cloth.* The energy stuffer cloth shall be made from energy test cloth material, as specified in 2.6.4, and shall consist of pieces of material that are 12 inches by 12 inches (30.5 cm by 30.5 cm) and have been hemmed to 10 inches by 10 inches (25.4 cm by 25.4 cm) before washing. The energy stuffer cloth shall be clean and shall not be used for more than 60 test runs (after preconditioning as specified in 2.6.3 of this appendix). All energy stuffer cloth must be permanently marked identifying the lot number of the material. Mixed lots of material shall not be used for testing the clothes washers.

2.6.3 *Preconditioning of Test Cloths.* The new test cloths, including energy test cloths and energy stuffer cloths, shall be pre-conditioned in a clothes washer in the following manner:

2.6.3.1 Perform 5 complete normal wash-rinse-spin cycles, the first two with AHAM Standard detergent 2A and the last three without detergent. Place the test cloth in a clothes washer set at the maximum water level. Wash the load for ten minutes in soft water (17 ppm hardness or less) using 6.0 grams per gallon of water of AHAM Standard detergent 2A. The wash temperature is to be controlled to 135°F ± 5°F (57.2°C ± 2.8°C) and the rinse temperature is to be controlled to 60°F ± 5°F (15.6°C ± 2.8°C). Repeat the cycle with detergent and then repeat the cycle three additional times without detergent, bone drying the load between cycles (total of five wash and rinse cycles).

2.6.4 *Energy test cloth material.* The energy test cloths and energy stuffer cloths shall be made from fabric meeting the following specifications. The material should come from a roll of material with a width of approximately 63 inches and approximately 500 yards per roll, however, other sizes maybe used if they fall within the specifications.

2.6.4.1 *Nominal fabric type.* Pure finished bleached cloth, made with a momie or granite weave, which is nominally 50 percent cotton and 50 percent polyester.

2.6.4.2 The fabric weight shall be 5.60 ounces per square yard (190.0 g/m^2), ±5 percent.

2.6.4.3 The thread count shall be 61 × 54 per inch (warp × fill), ±2 percent.

2.6.4.4 The warp yarn and filling yarn shall each have fiber content of 50 percent ±4 percent cotton, with the balance being polyester, and be open end spun, 15/1 ±5 percent cotton count blended yarn.

2.6.4.5 Water repellent finishes, such as fluoropolymer stain resistant finishes shall not be applied to the test cloth. The absence of such finishes shall be verified by:

2.6.4.5.1 American Association of Textile Chemists and Colorists (AATCC) Test Method 118—1997, *Oil Repellency: Hydrocarbon Resistance Test* (reaffirmed 1997), of each new lot of test cloth (when purchased from the mill) to confirm the absence of Scotchguard™ or other water repellent finish (required scores of "D" across the board).

2.6.4.5.2 American Association of Textile Chemists and Colorists (AATCC) Test Method 79–2000, *Absorbency of Bleached Textiles* (reaffirmed 2000), of each new lot of test cloth (when purchased from the mill) to confirm the absence of Scotchguard™ or other water repellent finish (time to absorb one drop should be on the order of 1 second).

2.6.4.5.3 The standards listed in 2.6.4.5.1 and 2.6.4.5.2 of this appendix which are not otherwise set forth in this part 430 are incorporated by reference. The material listed in this paragraph has been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Any subsequent amendment to a standard by the standard-setting organization will not affect the DOE test procedures unless and until amended by DOE. Material is incorporated as it exists on the date of the approval and notice of any change in the material will be published in the **Federal Register**. The standards incorporated by reference are the American Association of Textile Chemists and Colorists Test Method 118–1997, *Oil Repellency: Hydrocarbon Resistance Test* (reaffirmed 1997) and Test Method 79–2000, *Absorbency of Bleached Textiles* (reaffirmed 2000).

(a) The above standards incorporated by reference are available for inspection at:

(i) Office of the Federal Register, Information Center, 800 North Capitol Street, NW, Suite 700, Washington, DC;

(ii) U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Hearings and Dockets, "Energy Conservation Program for Consumer Products: Clothes Washer Energy Conservation Standards," Docket No. EE—RM–94–403, Forrestal Building, 1000 Independence Avenue, SW, Washington, DC.

(b) Copies of the above standards incorporated by reference can be obtained from the American Association of Textile Chemists and Colorists, P.O. Box 1215, Research Triangle Park, NC 27709, telephone (919) 549–8141, telefax (919) 549–8933, or electronic mail: *orders@aatcc.org*

2.6.4.6 The moisture absorption and retention shall be evaluated for each new lot of test cloth by the Standard Extractor Remaining Moisture Content (RMC) Test specified in 2.6.5 of this appendix.

2.6.4.6.1 Repeat the Standard Extractor RMC Test in 2.6.5 of this appendix three times.

2.6.4.6.2 An RMC correction curve shall be calculated as specified in 2.6.6 of this appendix.

2.6.5 *Standard Extractor RMC Test Procedure.* The following procedure is used to evaluate the moisture absorption and retention characteristics of a lot of test cloth by measuring the RMC in a standard extractor at a specified set of conditions. Table 2.6.5 of this appendix is the matrix of test conditions. The 500g requirement will only be used if a clothes washer design can achieve spin speeds in the 500g range. When this matrix is repeated 3 times, a total of 48 extractor RMC test runs are required. For the purpose of the extractor RMC test, the test cloths may be used for up to 60 test runs (after preconditioning as specified in 2.6.3 of this appendix).

TABLE 2.6.5.—MATRIX OF EXTRACTOR RMC TEST CONDITIONS

"g" Force	Warm soak		Cold soak	
	15 min. spin	4 min. spin	15 min. spin	14 min. spin
50				
200				
350				

TABLE 2.6.5.—MATRIX OF EXTRACTOR RMC TEST CONDITIONS—Continued

"g" Force	Warm soak		Cold soak	
	15 min. spin	4 min. spin	15 min. spin	14 min. spin
500				

2.6.5.1 The standard extractor RMC tests shall be run in a Bock Model 215 extractor (having a basket diameter of 19.5 inches, length of 12 inches, and volume of 2.1 ft³), with a variable speed drive (Bock Engineered Products, P.O. Box 5127, Toledo, OH 43611) or an equivalent extractor with same basket design (*i.e.* diameter, length, volume, and hole configuration) and variable speed drive.

2.6.5.2 *Test Load.* Test cloths shall be preconditioned in accordance with 2.6.3 of this appendix. The load size shall be 8.4 lbs., consistent with 3.8.1 of this appendix.

2.6.5.3 *Procedure.*

2.6.5.3.1 Record the "bone-dry" weight of the test load (WI).

2.6.5.3.2 Soak the test load for 20 minutes in 10 gallons of soft (<17 ppm) water. The entire test load shall be submerged. The water temperature shall be 100°F ± 5°F.

2.6.5.3.3 Remove the test load and allow water to gravity drain off of the test cloths. Then manually place the test cloths in the basket of the extractor, distributing them evenly by eye. Spin the load at a fixed speed corresponding to the intended centripetal acceleration level (measured in units of the acceleration of gravity, g) ±1 g for the intended time period ±5 seconds.

2.6.5.3.4 Record the weight of the test load immediately after the completion of the extractor spin cycle (WC).

2.6.5.3.5 Calculate the RMC as (WC–WI)/WI.

2.6.5.3.6 The RMC of the test load shall be measured at three (3) g levels: 50g; 200g; and 350g, using two different spin times at each g level: 4 minutes; and 15 minutes. If a clothes washer design can achieve spin speeds in the 500g range than the RMC of the test load shall be measured at four (4) g levels: 50g; 200g; 350g; and 500g, using two different spin times at each g level: 4 minutes; and 15 minutes.

2.6.5.4 Repeat 2.6.5.3 of this appendix using soft (<17 ppm) water at 60°F ± 5°F.

2.6.6 *Calculation of RMC correction curve.*

2.6.6.1 Average the values of 3 test runs and fill in table 2.6.5 of this appendix. Perform a linear least-squares fit to relate the standard RMC ($RMC_{standard}$) values (shown in table 2.6.6.1 of this appendix) to the values measured in 2.6.5 of this appendix:

(RMC_{cloth}): $RMC_{standard} \sim A * RMC_{cloth} + B$

Where A and B are coefficients of the linear least-squares fit.

TABLE 2.6.6.1.—STANDARD RMC VALUES ($RMC_{standard}$)

G	RMC percent	Warm soak		Cold soak
		15 min. spin	4 min. spin	15 min. spin
50	50.4	55.7	52.8	59.0
200	35.6	40.4	37.9	43.1
350	29.6	33.1	30.6	35.8
500	24.2	28.7	25.5	30.0

2.6.6.2 Check accuracy of linear least-squares fit using the following method:

The root mean square value of

$$\left(\sum_{i=1}^{12} \frac{\left(RMC_{standard\_i} - RMC_{corr\_i} \right)^2}{10} \right)^{1/2}$$

shall be less than 2 percent, where a sum is taken over all of the different tests, where $RMC_{standard—i}$ is the RMC standard value measured for the I-th test, and $RMC_{corr—i}$ is the corrected RMC value for the I-th cloth test. This equation is valid only for the use with three (3) g force values therefore when using the 500g requirement; replace the 500g value instead of the 350g value.

2.6.7 *Application of RMC correction curve.*

2.6.7.1 Using the coefficients A and B calculated in 2.6.6.1 of this appendix:

$RMC_{corr} = A * RMC + B$

2.6.7.2 Substitute RMC_{corr} values in calculations in 3.8 of this appendix.

* * * * *

4. * * *

4. 1 * * *

4.1.5 * * *

ER_x, ER_a, ER_n, are reported electrical energy consumption values, in kilowatt-hours per cycle, at maximum, average, and minimum test loads, respectively, for the warm rinse cycle per definitions in 3.7.2 of this appendix.

* * * * *

§ 430.32 [Amended]

4. Section 430.32 is amended by revising paragraph (g) to read as follows:

§ 430.32 Energy and water conservation standards and effective dates.

* * * * *

(g) *Clothes washers.*

(1) Clothes washers manufactured before January 1, 2004, shall have an energy factor no less than:

Product Class	Energy factor (cu.ft./kWh/cycle)
i. Top-Loading, Compact (less than 1.6 ft.³ capacity).	0.9.
ii. Top-Loading, Standard (1.6 ft.³ or greater capacity).	1.18.
iii. Top-Loading, Semi-Automatic.	[1] Not Applicable.
iv. Front-Loading	[1] Not Applicable.
v. Suds-saving	[1] Not Applicable.

[1] Must have an unheated rinse water option.

(2) Clothes washers manufactured on or after January 1, 2004, and before January 1, 2007, shall have a modified energy factor no less than:

Product Class	Modified energy factor (cu.ft./kWh/cycle)
i. Top-Loading, Compact (less than 1.6 ft.^{3} capacity).	0.65.
ii. Top-Loading, Standard (1.6 ft.^{3} or greater capacity).	1.04.
iii. Top-Loading, Semi-Automatic.	[1] Not Applicable.
iv. Front-Loading	1.04.
v. Suds-saving	[1] Not Applicable.

[1] Must have an unheated rinse water option.

(3) Clothes washers manufactured on or after January 1, 2007, shall have a modified energy factor no less than:

Product Class	Modified energy factor (cu.ft./kWh/cycle)
i. Top-Loading, Compact (less than 1.6 ft.^{3} capacity).	0.65.
ii. Top-Loading, Standard (1.6 ft.^{3} or greater capacity).	1.26.
iii. Top-Loading, Semi-Automatic.	[1] Not Applicable.
iv. Front-Loading	1.26.
v. Suds-saving	[1] Not Applicable.

[1] Must have an unheated rinse water option.

* * * * *

Appendix

[The following letter from the Department of Justice will not appear in the Code of Federal Regulations.]

DEPARTMENT OF JUSTICE

Antitrust Division

Main Justice Building, 950 Pennsylvania Avenue, NW., Washington, DC 20530–0001, (202)514–2401/(202) 696–2645 (i), *Antitrust@justic.usdoj.gov* internet, *Http://www.usdoj.gov* (World Wide Web).

December 4, 2000.

Mary Anne Sullivan, General Counsel, Department of Energy, Washington, DC 20585.

Dear General Counsel Sullivan: I am responding to your October 16, 2000 letter seeking the views of the Attorney General about the potential impact on competition of two proposed energy efficiency standards: one for clothes washers and the other for residential central air conditioners and heat pumps. Your request was submitted pursuant to Section 325 (o)(2)(B)(i) of the Energy Policy and Conservation Act, 42 U.S.C. 6291 ("EPCA"), which requires the Attorney General to make a determination of the impact of any lessening of competition that is likely to result from the imposition of proposed energy efficiency standards. The Attorney General's responsibility for responding to requests from other departments about the effect of a program on competition has been delegated to the Assistant Attorney General for the Antitrust Division in 28 CFR 0.40 (g).

We have reviewed the proposed standards and the supplementary information published in the **Federal Register** notices and submitted to the Attorney General, which include information provided to the Department of Energy by manufacturers. We have additionally conducted interviews with members of the industries.

We have concluded that the proposed clothes washer standard would not adversely affect competition. In reaching this conclusion, we note that the proposed standard is based on a joint recommendation submitted to the Department of Energy by manufacturers and energy conservation advocates. That recommendation states that virtually all manufacturers of clothes washers who sell in the United States participated in arriving at the recommendation through their trade association, that the recommendation was developed in consultation with small manufacturers, and that the manufacturers believe the new standard would not likely reduce competition. We note further that, as the industry recommended, the proposed standard will be phased in over six years, which will allow companies that do not already have products that meet the proposed standard sufficient time to redesign their product lines.

* * * * *

Sincerely,

A. Douglas Melamed,

Acting Assistant Attorney General.

[FR Doc. 01–611 Filed 1–11–01; 8:45 am]

BILLING CODE 6450–01–P

Appendix B

Letter to The Honorable Spencer Abraham, Secretary of Energy from Charles A. Samuels, Government Relations Counsel, Association of Home Appliance Manufacturers

Appendix B

AHAM
association of home
appliance manufacturers

1111 19th street, nw ▲ suite 402 ▲ washington, dc 20036
tel 202 • 872 • 5955 ▲ fax 202 • 872 • 9354 e-mail ▲ aham@aham.org

April 4, 2001

The Honorable Spencer Abraham
Secretary of Energy
United States Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Room 7A-257
Washington, D.C. 20585

RE: **AHAM Response To Petition By CEI, et al To Reconsider Clothes Washer Energy Conservation Standard**

Dear Mr. Secretary:

The Association of Home Appliance Manufacturers files these comments in response to the March 13, 2001 Petition by CEI and other groups to reopen the clothes washer rulemaking. We are opposed to the petition and reopening a legally-completed, seven-year rulemaking.

The petition erroneously claims that the clothes washer regulations, issued on January 12, 2001, will force consumers to pay high prices for unsuitable and unattractive "front loading" clothes washers. This assertion is unsupported. In fact, as discussed below, the standard was carefully designed by DOE -- with input from a number of interested parties, from manufacturers to consumer groups to environmental and efficiency groups -- to ensure that future clothes washers will be energy efficient and water-conserving, while maintaining the diversity of designs and features which American consumers now enjoy.

AHAM respectfully requests that the petition be denied. No new information is provided and all assertions in the petition have been thoroughly reviewed by DOE previously. AHAM will not address every issue raised in the petition, but will provide background and perspective on the rulemaking process and substantive rule.

I. Introduction and Background - The History of the Federal Appliance Standards Program and the Clothes Washer Rule.

A. NAECA

DOE has had authority to issue standards since legislation was requested by President Ford in the 1970's. In the case of clothes washers, we are now on the third round of such standards (previous standards were implemented by federal law in 1990 and then by DOE rulemaking effective 1994.) The U.S. appliance industry has not been enthusiastic about federal standards which supplant, to some extent, the marketplace, but the legislation is 30 years old (in relevant part most recently updated in the Reagan Administration). It has been necessary to have federal regulations in order to preempt state and local requirements which would eviscerate the marketplace and undermine national economies of scale to the great harm of consumers and industry.

B. Industry Opposed Clothes Washer Standards Which Restrict Consumer Choice

In the first half of the Clinton Administration, there were indications that the Department of Energy would promulgate radical efficiency standards and effective dates for clothes washers which would produce exactly the harms that the critics are now proclaiming -- forced design changes so only horizontal axis products (similar to that used in Europe and much of the rest of the world) could be sold at high costs which might translate into unacceptable price increases for consumers. Because of these proposals, some AHAM companies joined other industries in supporting a one-year appropriations moratorium to prohibit the DOE from issuing any new appliance standards.

During this one-year "time out," the Republican appropriations committees encouraged DOE and stakeholders to meet to improve the transparency, fairness, and balance of the DOE regulatory process. This so-called "process improvement" effort resulted in a procedural rule which was published for comment several times and placed in the *Federal Register*. New DOE procedures rely less on "black box" analyses by consultants and the usual "over the transom" notice and comment rulemaking and instead emphasize workshops and communications which allow all interested parties to participate and learn about the rulemaking. Congress also encouraged consensus "reg-neg" negotiations.

C. Industry Supported a Balanced, Reasonable Clothes Washer Standard

Subsequent to the process improvement rule, DOE held at least a half dozen workshops and solicited comments at least 12 times about a variety of aspects of the clothes washer analysis, including the engineering, consumer and manufacturers impact analyses. In addition, there were an equal number of public participation opportunities for the development of the process improvement rule. A number of groups and individuals participated in these workshops, including some of the self-appointed consumer critics who now complain about the lack of openness of the process. Arguably, the clothes washer rule was the most open rulemaking

process in the federal government. Almost no stone was unturned to make sure consumers and manufacturers would be unharmed while energy and water would be conserved.

It should be noted that the National Appliance Energy Conservation Act of 1987 contain a number of consumer protections to limit DOE's discretion. These include provisions which prohibit DOE from eliminating product types and designs which create significant consumer utility. NAECA contrasts with the Clean Air Act, for example, which contains relatively little limit to discretion or agency authority. The United States Supreme Court recently held that CAA standards can be set without any consideration of economics.

Last year, after the rulemaking had been pending for six years, the appliance industry discussed possible standards with state and local governments, several utilities, water districts, and advocacy groups interested in energy efficiency and water conservation. The result was a proposal to DOE for an energy efficiency standard. (Notably, these same groups also developed proposals for a tax credit for high-energy efficiency appliances although the tax credit and the regulation are not dependent on each other.) As a result, the DOE issued a proposed rule which was the subject of notice and comment and was then finalized in January.

Unlike other rules issued by the Clinton Administration, which were rushed to finalization, the clothes washer rule is a result of six-years of analysis and discussion. There are no elements in it that are surprising. The rule is fully justified procedurally and substantively under the law. The rule places a new standard in effect in 2004 which will eliminate the most inefficient models from the marketplace and then puts in place a stringent standard in 2007. However, by allowing manufacturers six years to develop models which comply with the most stringent standards, there is a high level of confidence that this can be done while maintaining the features, designs and variety of price points which retailers and consumers desire. No design is mandated by this standard.

In contrast, in California and Texas there are proposals to accelerate the effective dates of the DOE rule and to add stringent water factors. These proposals would undermine national manufacturing and distribution, radically limit consumer choice and impose large costs on consumers and manufacturers.

II. The Clothes Washer Standard Was Promulgated Properly and Fairly Under the Law, Will Benefit the Vast Majority of Consumers, and Conserve Vital Energy and Water.

A. The Benefits of the Rule

The benefits of the standards can be quantified in consumer energy and water savings as well as environmental impact. The 2007 standard benefits greatly the vast majority of consumers. Consumers on average will save around $260 over the product life in reduced energy costs. With respect to water savings, about 7,095 gallons of water per washer will be conserved over the life of the washer.

The law is written in a manner which does not mandate that every single purchaser of a product benefit from the regulation. However, even consumers who rarely use their washer will benefit by helping alleviate regional water and energy problems and related pollution from energy generation.

Recent DOE and industry data agree that 1997 estimates of new product cost probably were overstated. As a consequence, better than 90% of consumers will benefit directly from the standard. When water and pollution abatement benefits are considered, all Americans will benefit. Cumulatively, the standards will save 11.59 trillion gallons of water, equivalent to the water use of 6.6 million households for 25 years. The cumulative energy savings is 5.5 quads over approximately 30 years which is equivalent to over three months of total U.S. residential energy use. The standards will avoid the construction of 15 additional power plants. The net present value of the energy savings is $15.3 billion which assumes relatively high costs of products and relatively low cost of energy.

B. The DOE Rulemaking Process Was Reasonable

The petitioners state that the DOE rulemaking process is complex and relies on invalid analyses and data. The process is fairly complex, but that is only because so many protections have been set in the law to restrain DOE's authority to set unrealistic standards which would adversely impact consumers and manufacturers. DOE is required to undertake complex engineering and economic analyses in order to make sure that any standards are based on feasible technology and full consideration of economic implications.

Since the standards are set in the future and will last for many years, it is necessary to make forecasts of future events which by their nature are speculative. It is difficult, however, to posit the alternative to this process. A simplified, streamlined rulemaking could result in poorly constructed standards which could force consumers to buy products which do not have all the features and utilities which they seek. Even though analyses of impacts on consumers, manufacturers, employment, and energy are far from perfect under the process improvement rule, they reasonably analyze relevant criteria and are open and available to all persons.

The petitioners claim that DOE has made no arrangements to secure views from organizations representing the interests of "real consumers." This presumably means only consumers the petitioners choose because Consumers Federation of America and AARP, among others, participated in this rulemaking and DOE's Appliance Standards Advisory Committee. In fact, conservative interest groups, whether they represent many real consumers or not, have been encouraged to fully participate in all these processes and have had their views considered. The fact that some of their unsubstantiated views have not been accepted by DOE does not mean they have not been considered.

Further, DOE, at the request of industry and other parties, set up focus groups to attain consumer views. These groups and procedures were carefully selected and peer reviewed. As

far as we know, the Mercatus survey, which was a self-selected sample, did not benefit from this scrutiny.

C. DOE Adequately Justified The New Clothes Washer Standards.

1. Life Cycle Cost

As noted above, the standards are estimated to save most consumers on a life-cycle cost basis $260 on energy alone. Due to industry protestations, DOE analyzed life-cycle costs not only on an average consumer basis, but for low-income consumers, consumers in high and relatively low energy cost states and other types of consumers, in order to provide an overall picture/sensitivity of the impact of the regulations. The petitioners use only the worst case scenarios, not acknowledging the positive results of most of the cases analyzed. Since the initial product cost has a major effect on overall LCC, DOE was reasonable to rely on more contemporary manufacturer submissions indicating cost impacts might be less than originally estimated. Therefore, the older analysis likely overstates the number of consumers adversely affected by the rule.

2. Availability of Product and Price of New Products

The petition claims that virtually only expensive front-loading washers will be available. Again, petitioner relies on older data and not the information submitted in 2000. In fact, conventional vertical axis washers at a variety of price points already are available six years in advance of the rule. There are at least three manufacturers with vertical axis and over a half a dozen models. Many new models will be made available soon.

With respect to horizontal axis, a number of models at various price ranges already are available. Most of these products have been "Americanized" and will be subject to additional improvements in the years leading up to 2007.

The pricing mechanism may be the most complex aspect of our economy. There can be no guarantee as to what any future price may be. (Manufacturers cannot even discuss it collectively.) The historical record that shows that appliance prices have increased well below the CPI and PPI. Historically, the appliance industry has not been able to pass through costs regulatorily-induced cost increases to the public. In fact, the PPI and CPI show clothes washer prices have remained relatively stable for the last 18 years even with two sets of standards. Analyses conducted by Lawrence Berkeley Laboratory and in the record show that costs due to the DOE standards have not been passed through to consumers.

The reason these costs have not been passed through is not, of course, because of the charitable nature of manufacturers. Rather, price stability has been due to fierce competition in the marketplace, the existence of mass retailers who will not accept increases and the tremendous productivity of U.S. national manufacturers who have been able to design ever-increasingly

useful and long-lasting products which are much more energy efficient and water-conserving, but at a reasonable cost.

The models in the marketplace today which meet the 2007 standard are the horizontal axis or front-loading products made by both United States and foreign manufacturers and several new vertical axis models. These products range in price from roughly $500 to over $1,000 as compared to the current average price of a clothes washer which is $300-400. However, the very purpose of setting the effective date in 2007 was to provide a transition period for manufacturers to develop new models meeting consumers needs and expectations which can comply with the standard. If the standard were in effect today, then the kinds of price increases and disutilities which the critics raise would be highly likely. Thus, our opposition to the Texas and California proposals. But, it was reasonable for the Department of Energy to rely on analyses and data collected from manufacturers and others to determine that 2007 is a sufficient lead time to avoid these possible negative consequences.

III. DOE Properly Balanced the Standards-Setting Criteria in NAECA.

NAECA requires the Secretary to set a standard which conserves the maximum amount of energy and which is technically feasible and economically justified. In addition, a standard cannot violate the so-called "safe harbor" provision which protects consumer choice and features.

Based on available products, the standard is indisputably technically feasible. The 2007 date ensures that conventional vertical axis designs will be preserved.

The economic justification factors require a careful balancing of relevant considerations. DOE adequately undertook this task in the proposed and final rules. No one criterion is conclusive but all must be considered. A review of the preambles to the proposed and final rules show how this was done thoroughly and rationally.

Finally, consumer preferences, choices and utilities have been preserved. Vertical axis products meeting the 2007 standard already exist. DOE was justified in concluding that a full range of products will be available by 2007. Not only will vertical "access" be available but there are already products available which do not require special detergent or extra wash time. Second, the Soap and Detergent Association has stated that even new detergent formulations are widely-available and many are not priced above conventional formulations.

The appliance industry has an excellent track record in meeting reasonable standards without detriment to consumers. Our refrigerators use only one-third the energy of 1980 models but are just as well built, larger and more feature-laden. There is no record of industry supporting a standard which harms the value or utility to consumers of our products. Our products are highly-rated by satisfied consumers. We do not intend to impair that trust.

* * *

For the reasons stated above, AHAM requests that the petition be denied. Reopening the rule in any respect would create uncertainty and litigation which would impair the smooth transition to next generation products.

Respectfully submitted,

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Appendix C

Cost-Effectiveness Summary for Energy Star® Resource-Efficient Clothes Washer

Appendix C

Cost Effectiveness Summary
for
ES Clotheswasher (0$ Extension)

Creation Date	June 8, 2000
ProCost Ver.	4.10
Run Date	February 21, 2001
Analyst	Ken Anderson

Project Number:	C97-005
Sector:	Residential
Stage:	MPER4 AAA2000

Key Assumptions

Duration:	Venture Period: 5 years	Analysis Unit:	Wtd Appliance
	Ann Non-Electric Benefits: $55.05	Project Start:	1997
		Ann. Net O&M Cost:	$0.00 Per Unit

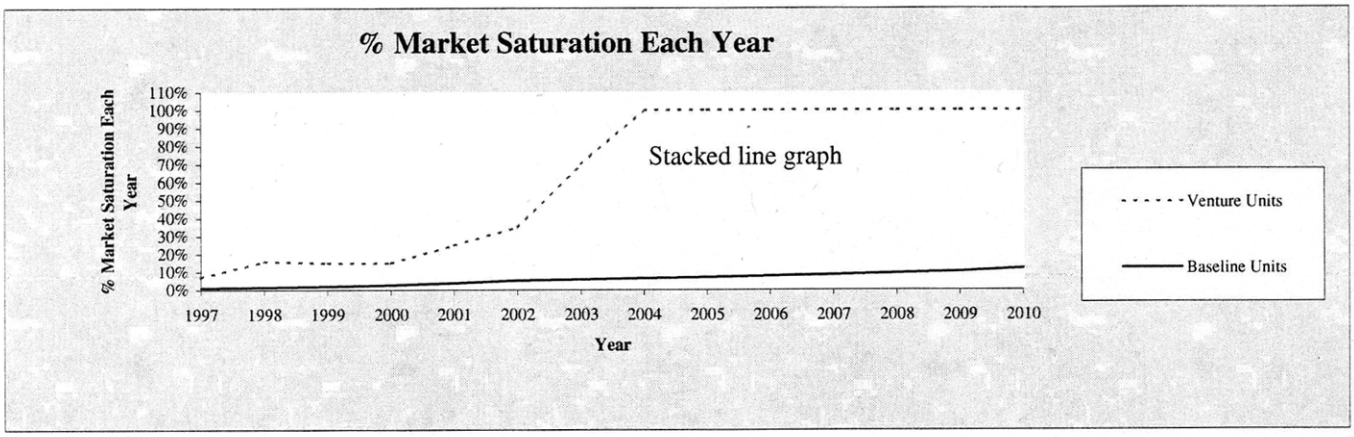
Venture Cost Summary	Period	Venture Costs	Consumer Costs	Other Costs	Total Costs
1997	Venture	$3,518,353	$6,458,500	$2,151,500	$12,128,353
1998	Venture	$4,692,313	$13,154,266	$3,713,660	$21,560,239
1999	Venture	$1,277,687	$13,272,474	$0	$14,550,161
2000	Venture	$1,702,200	$10,772,665	$0	$12,474,865
2001	Post-venture	$400,820	$18,713,205	$0	$19,114,025
2002	Post-venture	$0	$26,374,726	$0	$26,374,726
2003	Post-venture	$0	$57,298,910	$0	$57,298,910
2004	Post-venture	$0	$84,056,821	$0	$84,056,821
2005	Post-venture	$0	$83,985,214	$0	$83,985,214
2006	Post-venture	$0	$83,851,782	$0	$83,851,782
2007	Post-venture	$0	$0	$0	$0
2008	Post-venture	$0	$0	$0	$0
2009	Post-venture	$0	$0	$0	$0
2010	Post-venture	$0	$0	$0	$0
	Totals	$11,591,373	$397,938,563	$5,865,160	$415,395,096

Assumptions:

Energy Star clothes washer savings which are from Wash Wise.
TWO TIER STANDARD 2004 AND 2007. Assumes higher penetration rates, updated per MPER4 Table 5, Pg 35.
The analysis assumes 12 combinations of water heaters (gas or electric), dryers (gas or electric) and home types (single family, multifamily and manufactured home). Incremental cost of ES-washer was $500-1997 dropping steadily to $300 in 2000 where it remains until 2007 when new standard eliminates incremental cost. Alliance cost includes $80,000 for Admin, $2.7 million contract, $135,000 for evaluation, $5.865 million consumer incentives, and $350,000 distributor incentives. Two tier standard MEF=1.04 2004 and MEF-1.26 in 2007. Base MEF=0.817. The Alliance claims all regional savings above the baseline to 2007 only. Savings are based on 350 loads of clothes per year. Electric savings include 59 kWh/year for the washer motor, 340 kWh/year for electric DHW, and 160 kWh/year for electric dryer. Gas savings are 14 therms/year for gas DHW and 7.38 therms/year for gas dryer where gas is valued at $0.30 per therm and included in Non-electric benefit. Water savings is 5,100 gals/year. Washer life and replacement rate is based on 14 years. New homes and washers add 1.5% for a total of 285,000 eligible washers in 1997 growing to 346,000 in 2010. (Note--While not included in the analysis, water savings from 73,000 ES-washers will prevent the construction of a one-million gallon per day sewage plant at an avoided cost of $7 million dollars to the region, this is $96 savings in first cost and $0.54 per year in operating cost for each ES-washer installed.) (2004 and beyond all units are either Tier 1 or Tier 2, combined they are 100%)

Non-electric Benefits and Net O&M Cost Assumptions:

No net O&M costs Non-electric benefits based on RTF includes detergent savings for clothes washers of $18, sewer and water charge reduction of $35 for clothes washers and natural gas savins of $2.05 for clothes washers. Averaged over all units.



Year 2010 Market Size (Units): 310,210 **Tons of CO2 Saved by 2010:** 308,426

Estimated Cumulative Electrical Energy Savings from Venture Units

Year	Market Units	Baseline Units	Venture Contract Units	Venture Market Effects Units	Venture Cum. aMW Savings
1997	287,000	2,870	-	17,220	0.8
1998	288,722	4,026	-	42,170	2.8
1999	290,454	5,647	-	37,921	4.6
2000	292,197	7,921	-	35,909	6.3
2001	293,950	11,110	-	62,377	8.8
2002	295,714	15,584	-	87,916	12.0
2003	297,488	17,245	-	190,996	18.7
2004	299,273	19,084	-	280,189	29.1
2005	301,069	21,118	-	279,951	39.7
2006	302,875	23,369	-	279,506	50.6
2007	304,692	25,860	-	278,832	63.7
2008	306,521	28,617	-	277,903	76.9
2009	308,360	31,668	-	276,692	90.0
2010	310,210	37,225	-	272,985	102.9
Totals	4,178,526	251,345	-	2,420,568	

Total Resource Perspective	**Unit First Cost**	**Annual Unit Savings (kWh)**	**Levelized Cost (Cents/kWh)**	**CE Index* (Benefit/Cost Ratio)**
Venture + Post-Venture Period	$171.47	372.2	-9.78	**3.9**
Venture Period Only	$453.11	372.2	-2.78	1.5
Alliance Perspective	**Unit First Cost**	**Annual Unit Savings (kWh)**	**Levelized Cost (Cents/kWh)**	**CE Index* (Benefit/Cost Ratio)**
Venture + Post-Venture Period	$4.79	372.2	-0.16	22.3
Venture Period Only	$84.00	372.2	1.81	1.3

*** If CE Index for Total Resource Perspective and Venture + Post-venture Period is greater than 1.0, then project is deemed cost effective.**

Consumer Perspective

Scenario	Electric Savings	First Cost	Ann. O&M cost & Non-electric Benf	**Simple Payback in Years** @ 5.0 cents/kWh	@ 3.0 cents/kWh
Savings and Benefits	372	$174.03	$0.00	$19	$11
Payback (Yrs) Electricity plus Non-electric Benefits less O&M Costs			$55.05	2.363	2.628
Simple Payback (Yrs) Electricity Savings Only				**9.351**	**15.584**

Key Changes

Used new two tier standard, adopted the higher MPER4 penetration rates, used new electricity prices, used new T&D benefit $5 to $20. Corrected ratio of gas vs electric dryers, electric water heaters, and SF/MF/MH homes types, zero incremental consumer cost after 2006 since full standard is in place in 2007. Continued savings to 2010, the Alliance's normal planning horizon. Added $1.63 million in contract for 2000 and $395,820 contract in 2001. Added $20,000 for Admin in 2000 and $5,000 (3 months) in 2001. Added $52,200 for Evaluation in 2000 but none in 2001. Used the new format and charts.

Breakeven:

Maximum Added Alliance Dollars	$ 260,000,000		0.0560416 January Peak demand reduction, kWp/unit
Minimum Number of Units	603,700	27%	
Proposed units	2,240,000		

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02/21/2001

Energy Star Clothes Washer	Table 1			ECM 1	ECM 2
Unit Definition is Clothes Washer				**MEF=1.04**	**MEF=1.26**
Non-Alliance First costs - Design, Test, Certify and				per Unit	per Unit
Capital upgrades ($/year) (No incremental cost in 2007 since there are no cheaper alternatives)					
	1997	$0	$0	$ 500	$ 500
	1998	$0	$0	$ 400	$ 400
	1999	$0	$0	$ 350	$ 350
	2000	$0	$0	$ 300	$ 300
	2001	$0	$0	$ 300	$ 300
	2002	$0	$0	$ 300	$ 300
	2003	$0	$0	$ 300	$ 300
	2004	$0	$0	$ 300	$ 300
	2005	$0	$0	$ 300	$ 300
	2006	$0	$0	$ 300	$ 300
	2007	$0	$0	$ -	$ -
	2008	$0	$0	$ -	$ -
	2009	$0	$0	$ -	$ -
	2010	$0	$0	$ -	$ -
Life (years)				14	14
Non-Electricity Benefit ($)		-	$ -	$ 55.05	$ 55.05
Percent purchase savings Non-electricity			0%		
Savings (kWh/Year-Unit)				276.10	414.10
Ann. O&M Costs				$0.00	$0.00
Periodic Q&M Cost ($)				$0.00	$0.00
Regional Market Size in 2000 (MT)		292,197			
Market Size in 2010 (Existing plus new)		310,210			
ECM penetration Profile					
		Market Units/Year MEF=0.817	Baseline Units/Yr MEF=1.26		
	1997	287,000	1.0%	0.0%	7.0%
	1998	288,722	1.4%	0.0%	16.0%
	1999	290,454	1.9%	0.0%	15.0%
	2000	292,197	2.7%	0.0%	15.0%
	2001	293,950	3.8%	10.0%	15.0%
	2002	295,714	5.3%	20.0%	15.0%
	2003	297,488	5.8%	50.0%	20.0%
	2004	299,273	6.4%	60.0%	40.0%
	2005	301,069	7.0%	55.0%	45.0%
	2006	302,875	7.7%	50.0%	50.0%
	2007	304,692	8.5%	0.0%	100.0%
	2008	306,521	9.3%	0.0%	100.0%
	2009	308,360	10.3%	0.0%	100.0%
	2010	310,210	12.0%	0.0%	100.0%
Weighted Savings per unit (kWh/Year-MT)		372.24	From Non-standard Calcs		
Weighted Consumer Cost per unit ($/MT)	$	166.82			
Weighted Non-electric benefit per unit ($/Year)	$	55.05			
Weighted Annual O&M cost per unit ($/Year)	$	-			
Weighted Life per unit (Years)		14			