

MERCATUS CENTER
REGULATORY STUDIES PROGRAM

**Public Interest Comment on
DOE's Proposed Clothes Washer Efficiency Standards¹**

Docket No. EE-RM-94-403

The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of regulations and their impacts on society. As part of its mission, RSP produces careful and independent analyses of agency rulemaking proposals from the perspective of the public interest. Thus, the program's comments on the Department of Energy's (DOE's) proposed efficiency standards for clothes washers do not represent the views of any particular affected party or special interest group, but are designed to protect the interests of American citizens.

Section I summarizes the proposed standards and places them in historical context. Section II discusses whether DOE has established the economic justification for the proposed standards. Section III discusses whether DOE has adequately considered less coercive policy options. Section IV summarizes the conclusions reached by these comments and offers recommendations for a better policy approach.

I. DOE Proposes to Tighten the Energy Efficiency Standards for Clothes Washers

The proposed rule contains two separate, but related, parts. First, it would require standard clothes washers to be more energy efficient. Second, the proposed rule would change DOE's method for measuring energy use by clothes washers.

The proposed rule would change current efficiency standards for standard class clothes washers in two stages. By January 1, 2004, new clothes washers would be required to meet a 1.04 modified energy factor (MEF).² By January 1, 2007, new washing machines would have to meet a 1.26 MEF. The MEF measures the water and energy usage of the machine and differs from the existing energy factor (EF) in that it takes into account the remaining moisture content (RMC) of clothes leaving the clothes washer and the energy needed by clothes dryers to remove the moisture. According to DOE, the 1.04 MEF and

¹ Prepared by Garrett Vaughn, Ph.D. The views expressed herein do not reflect an official position of George Mason University.

² The modified energy factor (MEF) replaces the current energy factor (EF) that defines the current energy efficiency standard for clothes washers. EF measures overall 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 MEF descriptor incorporates clothes dryer energy use by consideration of the remaining moisture content (RMC) of clothes leaving the clothes washer. The greater the RMC, the more energy the consumer is likely to use drying the clothes. The EF descriptor does not consider the RMC.

1.26 MEF standards represent a 22 percent reduction and a 35 percent reduction, respectively, in energy consumption by a standard clothes washer³ over the current standard.⁴

A. Legal basis under the Energy Policy and Conservation Act (EPCA)

The Energy Policy and Conservation Act (EPCA), as amended, prescribes energy conservation standards for clothes washers and several other major appliances. The Act requires DOE to administer an energy conservation program for these products. According to DOE, “EPCA, as amended, specifies that any new or amended energy standard 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).”⁵

Under the statute, DOE can determine “economic justification” for a proposed standard in either of two ways.

Section 325(o)(2)(B)(i) provides that – after soliciting and reviewing comments – “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:

1. The economic impact of the standard on the manufacturers and on the consumers;
2. 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, initial charges, or maintenance expenses;
3. The total projected amount of energy, or as applicable, water, savings likely to result from the standard;
4. Any lessening of the utility or the performance of the covered products likely to result from the standard;
5. The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the standard;
6. The need for national energy and water conservation; and
7. Other factors the Secretary considers relevant.⁶

³ Department of Energy, Office of Energy Efficiency and Renewable Energy, “Energy Conservation Program for Consumer Products: Clothes Washer Energy Conservation Standards,” notice of proposed rulemaking and public hearing, *Federal Register*, October 5, 2000, p. 59551. Subsequent references to this source identify it as: DOE, *Federal Register*.

⁴ The current efficiency standard for clothes washers is 0.9 EF. According to DOE, “Since no mathematical translation [of EF into MEF] is possible, we have estimated this value using engineering calculations and assumptions which are detailed in the TSD [Technical Support Document]. This value is estimated to be an MEF of 0.65.” See: DOE, *Federal Register*, p. 59558. Words in brackets are added.

⁵ DOE, *Federal Register*, p. 59551.

⁶ DOE, *Federal Register*, p. 59553.

Alternatively, DOE can establish a “rebuttable presumption of economic justification” by showing that “the additional cost to the consumer of purchasing a product complying with an energy conservation standard level will be less than three times the value of the energy, and as applicable, water, savings during the first year that the consumer will receive as a result of the standard, as calculated under the applicable test procedure.”⁷ Section 323(o)(2)(B)(iii), 42 U.S.C. 6295(o)(2)(b)(iii).⁷

DOE points to Section 323 of EPCA to justify its revision of the test procedure for measuring energy use by clothes washers. According to DOE, “a test procedure promulgated under Section 323 of the Act must be reasonably designed to produce test results which measure energy efficiency, energy use, water use (in the case of shower heads, faucets, water closets and urinals), or estimated annual operating cost of a covered period of use, and must not be unduly burdensome to conduct.”⁸

B. Current and proposed washer standards

The existing clothes washer efficiency standards have been in effect since 1994 and apply to five classes of clothes washers as follows:

1. Top loading, compact (less than 1.6 cubic feet capacity), EF⁹ = 0.90
2. Top loading, standard (1.6 cubic feet or greater capacity), EF = 1.18.
3. Top loading, semi-automatic, no current energy efficiency standard but must have an unheated rinse option.
4. Front loading, no current energy efficiency standard but must have an unheated rinse option.
5. Suds saving, no current energy efficiency standard but must have an unheated rinse option.¹⁰

In the proposed rulemaking, DOE would maintain the current definitions of the five classes and not impose efficiency standards on classes 3 (top loading, semi-automatic) and 5 (suds saving) (but still require these two classes to have an unheated rinse water option).¹¹ The new, more stringent efficiency standards proposed by DOE would apply to classes 1, 2 and 4: top loading, compact; top loading, standard; and front loading.

⁷ DOE, *Federal Register*, p. 59553. According to DOE, “The rebuttable presumption test is an alternative path to establishing economic justification. (p. 59553).

⁸ DOE, *Federal Register*, p. 59553.

⁹ Energy factor (EF) 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.

¹⁰ DOE, *Federal Register*, p. 59554.

¹¹ DOE justifies this by stating, “These classes were not subject to minimum energy conservation standards because they represented a small portion of the market, and due to a lack of adequate information to analyze them.” DOE, *Federal Register*, p. 59556.

II. Has DOE adequately established the economic justification for the proposed standards?

DOE does not show that the benefits of the proposed standard will exceed its burdens. Contrary to the claims by DOE that the proposed standard “will yield big savings for consumers,”¹² consumers will be made worse off. DOE’s own methodology indicates that many consumers would be harmed. In addition, DOE’s own analytical results show that the increase in washer price (expected from imposition of the new standards) will be more than three times the reduction in the first year’s operating costs provided by the new standards. Hence, DOE does not establish “economic justification” for the proposed standards under either criterion specified under EPCA.

Furthermore, the DOE's procedure for writing the proposed standards made it difficult for individual consumers to participate effectively. The proposed standards are “based on a ‘Joint Stakeholders Comment recommendation submitted to the Department by clothes washer manufacturers and energy conservation advocates.’”¹³ None of the “stakeholders” have the same interests as consumers.

In an August 31, 2000 letter to DOE Secretary Bill Richardson, the Advisory Committee on Appliance Energy Efficiency Standards wrote that DOE’s rulemakings on appliance standards are too ponderous to be useful to the lay consumer even when written to meet the requirement that rulemakings be in “plain language.” The Committee recommended that DOE make rulemakings more “consumer friendly.” DOE responded to the Committee:

“The Department is experimenting with a Consumer Overview section in the Notice of Proposed Rulemaking...Unfortunately, legal counsel has instructed that this overview may not appear at the beginning or end of the document, but must be relegated to the summary section, well-buried in the middle of the notice.”¹⁴

¹² DOE, “Washing Machines to Become More Energy Efficient: Agreement Will Yield Big Savings for Consumers and the Environment,” May 23, 2000.

¹³ DOE, *Federal Register*, p. 59551. DOE added: “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).

¹⁴ A copy of DOE’s response to the Advisory Committee (which paraphrases many of the Committee’s recommendations in the Committee’s August 31, 2000 letter) can be found in the docket for DOE’s proposed energy efficiency standards for central air conditioners and heat pumps [Docket Number EE-RM-97-500] RIN: 1904-AA77. DOE responded to this recommendation: “The Department is experimenting with a Consumer Overview section in the Notice of Proposed Rulemaking...Unfortunately, legal counsel has instructed that this overview may not appear at the beginning or end of the document, but must be relegated to the summary section, well-buried in the middle of the notice. We regret the rigidity of the Federal Register format requirements. But there are other actions we intend to take to compensate for this...” Unfortunately for consumers of clothes washers, whatever these “other actions” may be, they will come too late to better inform them on this proposed rulemaking.

A. Consumers will have fewer choices and face price increases exceeding 50 percent

The proposed standard will not expand consumer choice. As DOE notes, efficient clothes washers are already offered for sale in the marketplace.¹⁵ However, these more energy efficient machines have captured only about 5 percent to 6 percent of the market.¹⁶ Those consumers that have already bought—or would buy—more efficient clothes washers already receive the benefits of lower operating costs. According to DOE, in the absence of the proposed rule, the market share of more efficient washers would slowly increase to approximately 15 percent and level off.¹⁷ Therefore, these consumers neither will benefit nor be harmed by the proposed rule.

The 85 percent of consumers who would otherwise buy less energy efficient clothes washers are the ones who stand to either gain or lose from the proposed rule. DOE suggests that such consumers make poor purchase decisions because they “are unaware of how much water costs contribute to operating expense.”¹⁸ (Water costs include both the water and the energy needed to heat the water.) DOE estimates that the more stringent efficiency standard to take effect on January 1, 2007 would increase average clothes washer prices by \$239 from a base of \$421,¹⁹ an increase of 57 percent. DOE claims that the operating savings will exceed the \$239 price increase and, therefore, “consumers will save \$260, on average, compared to today’s baseline clothes washing machines.”²⁰

Yet, if consumers really are “unaware” of operating costs for clothes washers, then it would appear that energy labeling or an education program informing consumers about these costs could yield appreciable energy and water savings. This approach would avoid an obvious, serious flaw of the proposed efficiency standards. By eliminating less costly

¹⁵ According to DOE: “There are or have been clothes washers in the market at all of the efficiency levels analyzed in today’s notice. Therefore, the Department believes all of the efficiency levels discussed in today’s notice are technologically feasible.” DOE, *Federal Register*, p. 59555.

¹⁶ DOE, *Federal Register*, p. 59568.

¹⁷ DOE states that “without a standard, we’d expect a leveling off at around 15% saturation.” DOE, *Federal Register*, p. 59567.

¹⁸ DOE, *Federal Register*, p. 59567.

¹⁹ DOE, *Technical Support Document*, “Chapter 7: Life-Cycle Costs and Payback Period,” p. 7-4. At another point in the TSD, DOE mentions slightly different numbers. For instance, in Appendix J, DOE states. “The purchase scenarios were run assuming a standard efficiency machine as the base case and comparing that with a medium efficiency machine and a high efficiency machine. The standard efficiency option assumes a price of \$400, no energy and water savings, and a top-loading machine. The medium efficiency washer has a price of \$450 and energy and water savings of \$10 annually, and is a top loading machine. This is consistent with an approximately 20 percent improvement in efficiency. The high efficiency equipment options have a price of \$650, annual savings of \$50, and are either front loading machines with hot water wash capability or top loading machines with no hot water capability. These high efficiency options were designed to coincide with an approximately 40 percent improvement in efficiency.” P. J-3. [Recall that, according to DOE, the intermediate efficiency standard to take effect on January 1, 2004 will reduce energy consumption by 22 percent and the final standard to take effect on January 1, 2007 will reduce energy consumption by 35 percent.]

²⁰ DOE, “Consumer Overview,” October 5, 2000, p. 2.

machines from the marketplace, the standards will harm all consumers who do not operate their clothes washers often enough to recover the higher purchase price in lower operating costs.²¹ However, DOE dismisses an “Enhanced Public Education and Information” alternative based on its estimates of relatively tiny savings of energy and water,²² which in turn are based on the expectation that most consumers will continue to purchase inefficient clothes washers even when fully informed. However, DOE offers no credible explanation why it believes that informed consumers would continue to make poor decisions when buying clothes washers.

B. Many consumers may prefer the options offered by “less efficient” clothes washers.

Those consumers who appear to DOE to be passing up substantial savings by stubbornly insisting on purchasing less energy efficient washing machines, may actually be making quite rational decisions based on other attributes offered by these machines.

Many attributes important to consumers depend on whether washing machines possess a vertical-axis (V-axis) or horizontal-axis (H-axis) design. In general, V-axis machines are both less expensive to purchase but also less energy efficient than H-axis washing machines. However, purchase price and energy efficiency are only two of the attributes important to consumers.

Most clothes washers bought by consumers are V-axis, top-loading machines. The majority of H-axis washers are front loading. Many consumers prefer the top-loading option because they find it requires less bending or kneeling to enter and remove clothes. Furthermore, many consumers believe that a top-loading machine carries less risk of a catastrophic leak during operation (as could occur if water leaked around the door on a front-loading machine).

DOE argues that the proposed standard will not restrict consumer choice on door placement because top-loading, H-axis clothes washers are offered in the marketplace. However, V-axis machines offer the top-loading option at a substantially lower cost and, hence, consumers who desire this option would be harmed by an energy efficiency standard that would make a top-loading clothes washer more expensive.

DOE’s analysis assumes that a high efficiency (H-axis) washer that offers top loading would cost an additional \$250 but lack hot water wash. Consumers wanting hot water wash for the additional \$250 could not get the top-loading feature. In other words, consumers buying the more efficient H-axis washer would have to sacrifice both \$250 *and* hot water wash to get the top-loading feature.²³

²¹ As is discussed later, DOE’s analysis assumes that the average consumer operates a washing machine 392 times a year—more than once a day, on average. Even if such an estimate is accurate for average usage, many households certainly operate their washing machines far less often. The less often a household operates its clothes washer, the fewer savings in operating costs a proposed standard can deliver.

²² DOE, *Federal Register*, p. 59582.

²³ DOE, TSD, Appendix J, p. J-3.

A July 1991 report by Arthur D. Little for washing machine manufacturers found that “many consumers significantly desire the features of V-axis, top-loading washing machines” and “washing machine price is the major determinant of consumer utility or satisfaction.”²⁴

DOE sponsored research into consumer preferences about clothes washers using focus groups and conjoint analysis. According to DOE, the key conclusions reached from this research echoed those of the Arthur D. Little study, and showed that *price is the most important clothes washer attribute* [emphasis in original].²⁵ A proposed standard that would increase the average price of a clothes washer by more than half would appear to run counter to consumer preferences.

Besides price, the proposed standard would affect several other attributes important to consumers, according to the focus groups referenced by DOE. DOE stated:

“Of the most important attributes from the focus groups, the ones that are most likely to be affected by an efficiency standard are price, energy and water costs, door placement, capacity, and water temperatures...These five attributes placed in the top seven attributes in terms of importance in the focus groups.”²⁶

However, some of the focus group results do not appear to rank energy and water savings among “the very most important attributes.” For instance, one of the major focus group studies referenced by DOE found that participants “rarely mentioned energy and water efficiency as key buying criteria.” This same study also reported that participants “viewed top-loading H-axis washers as a confusing hybrid. They also had concerns about specific features (e.g., double door entry; the hatch always rotating to the top.)”²⁷ As already noted, top-loading H-axis washers may lack other attributes important to many consumers; e.g., hot water wash.

Another focus group study considered the reactions of participants to a front-loading and a top-loading H-axis washer. Responses to the front-loading H-axis washer included concerns about “bending to load and unload, fear of leaks, accessibility of controls to children, and dispenser spills.” After being shown the H-axis top-loading washer, participants “said they preferred the top-loading H-axis washer in theory but preferred the front-loading H-axis washer because they felt the overall design was more logical, more familiar from laundromat experiences and more user-friendly.” Yet, “the majority of respondents who said they preferred a top loader said they would never buy Washer B [the top-loading H-axis washer].”²⁸

²⁴ DOE, TSD, Appendix I, p. I-19.

²⁵ DOE, TSD, Appendix J, “Clothes Washer Consumer Analysis,” p. J-3.

²⁶ DOE, TSD, Appendix J, “Clothes Washer Consumer Analysis,” p. J-19.

²⁷ DOE, TSD, Appendix I, p. I-4.

²⁸ DOE, TSD, Appendix I, p. I-6. Words in brackets are added.

C. DOE's analysis ignores factors important to consumers

Despite the considerable evidence showing consumers value a variety of attributes in addition to (and perhaps *more than*) operating costs, DOE's analysis presumes that only these costs along with purchase price matter to consumers. In addressing "lessening of utility or performance of products," (the fourth of the seven factors EPCA specifies for establishing "economic justification") DOE asserts, "this factor cannot be quantified."²⁹ DOE goes on to assure U.S. citizens that "in establishing classes of products, the Department tries to eliminate any degradation of utility or performance in the products under consideration in this rulemaking."³⁰ DOE states that it "addressed" the issue of "consumer utility of V-axis and H-axis machines" through "focus groups and a conjoint analysis."³¹ Yet, DOE ignores the findings of that very same consumer research: price and operating costs are *not* the only attributes that matter to consumers purchasing clothes washers. (By ignoring such findings, DOE is able to "justify" proposing standards that it predicts will *eliminate* V-axis washers from the market even though DOE's own projections show that—absent the standards—90 percent of consumers would prefer to buy V-axis washers in 2007. This point is discussed in detail below.)

Had DOE seriously entertained the hypothesis that consumers are rational—rather than misinformed—decision-makers, then it would have arrived at much different conclusions from its own consumer research. DOE states:

"The results of the Clothes Washer Consumer Analysis (in Appendix J of the TSD) indicate that when consumers have complete information, the effective market discount rate for the purchase of a higher efficiency washer is 20%. This means that consumers are willing to accept a 20% return on additional purchase expenses when they trade off purchase price and operating savings, or for each dollar in annual savings consumers might be willing to pay up to five dollars in increased purchase price."³²

By claiming that consumers apply a 20 percent discount rate to operating savings, DOE implies that consumers are less than rational. DOE estimated life cycle costs of clothes washers based on "a distribution of discount rates averaging 6.1%."³³ In effect, DOE presumes that the average consumer would choose to invest his or her last \$100 in (say) a CD offering a return of \$6.10 a year instead of a new washing machine that could offer as much as a \$19.99 return on that marginal \$100. The consumer assumed by DOE would choose to lose nearly \$14 instead of making the "rational" choice.

DOE could have interpreted its research findings much differently had it seriously considered the possibility that attributes important to consumers are *correlated* with operating costs. For instance, if lower operating costs are correlated with less utility from

²⁹ DOE, *Federal Register*, p. 59957.

³⁰ DOE, *Federal Register*, p. 59957.

³¹ DOE, *Federal Register*, p. 59957.

³² DOE, "Regulatory Impact Analysis," October 5, 2000, p. RIA-3.

³³ DOE, *Federal Register*, p. 59556.

door placement or (and) greater risk of water leakage, then an appreciable portion of the alleged 20% discount rate applies to those other attributes. It may be that a savings of \$20 on operating costs comes at the (unseen by DOE) loss of \$7 worth of door placement and \$6 greater risk of leaks. After adjusting for the loss of utility from these other factors, the reduction in operating costs offers the same approximate return of \$6 per \$100 that consumers apply to all other things.

Despite its own research results that indicate price and operating costs are not the only attributes important to consumers, DOE proposes efficiency standards that it expects will *eliminate* V-axis machines from the marketplace. According to DOE estimates, V-axis machines now have a 93 percent market share, with H-axis machines having the remaining 7 percent. Without the standard, DOE predicts that V-axis machines will have a 90 percent market share in 2007 (the year when the second stage of the proposed standards would become effective). With the standard, DOE estimates that the sales of V-axis machines will drop to zero and H-axis machines will capture 100 percent of the market.³⁴

In short, DOE expects that the proposed standard will literally force 90 percent of all consumers to buy H-axis washing machines (and the attributes offered by such machines) when these consumers would otherwise have chosen V-axis machines (and the attributes offered by those machines).

DOE's claims of "substantial savings" from its proposed standards are based on the proposition that most consumers are misinformed about the energy and water savings offered by H-axis machines. Yet, even when consumers become fully informed in focus group settings, the evidence gathered by DOE shows that most consumers continue to prefer V-axis machines. Such evidence—coupled with the preference for V-axis machines by more than 90 percent of consumers who actually part with their money (as the participants of focus groups do not)—clearly suggests that consumers value attributes other than energy and water savings. Even if manufacturers can engineer H-axis machines to offer all of the attributes that consumers value in V-axis machines, such H-axis machines will cost hundreds of dollars more to purchase.³⁵ Hence, the proposed standards will harm the vast majority of consumers.

³⁴ DOE, TSD, Table 11.12, pp. 11-18, 11-19. These forecasts are for the "medium price/medium income elasticity shipment scenario." Other scenarios considered by DOE—"high price elasticity shipment scenario" and "medium price elasticity shipment scenario"—also show the elimination of V-axis machines from the marketplace by 2007.

³⁵ For instance, DOE states in Appendix J ("Clothes Washer Consumer Analysis") of the TSD: "The high efficiency equipment options [assumed in the purchase scenarios] have a price of \$560, annual savings of \$50, and are either front loading machines with hot water wash capability or top loading machines with no hot water capability. These high efficiency options were designed to coincide with an approximately 40 percent improvement in efficiency." DOE, RIA, p. J-3. Presumably, if a consumer desires *both* top loading *and* "hot water wash capability" in an H-axis machine, that consumer will have to pay more than \$650. Such a consumer would probably not be pleased with an energy efficiency standard that eliminates a \$400 V-axis machine that offers both of those attributes.

D. DOE’s own “payback” analysis indicates that many consumers will be harmed

By considering only purchase price and operating costs—and effectively ignoring other attributes—DOE biases its analysis toward arriving at a finding of “economic justification” for the proposed standards. Even so, DOE’s analysis indicates that many consumers would be harmed by the proposed standards.

1. Life cycle costs require subjective forecasts about energy prices and consumer rates of time preference.

DOE defines “life cycle costs” (LCC) to be the sum of the change in purchase price (usually positive in direction) and the (net present value of the) change in operating costs (usually negative in direction) expected from the proposed standard. A net change of zero indicates that operating savings equal (in absolute value) the increase in purchase price. Under the logic of LCC analysis, a result of zero leaves the consumers unaffected (even if it causes the consumer to buy an H-axis washer instead of a V-axis washer). The burden of a higher purchase price is exactly offset by the benefit of lower operating costs. A positive value for LCC indicates that the proposed standard would harm consumers because the reduction in operating costs do not fully offset the increase in purchase price. A negative value for LCC indicates that the proposed standard would benefit consumers by returning more in operating cost savings than subtracted from the consumer’s wallet by the increase in purchase price.

To begin with, estimating LCC’s is more art than science. To do so, DOE had to forecast numerous prices—for natural gas, electricity and water—that are difficult to predict accurately over long periods. Since washing machines have an average useful life of approximately 14 to 15 years³⁶ and the more stringent standard would take effect on January 1, 2007, DOE must forecast prices more than two decades beyond 2000. Energy prices are notoriously difficult to predict more than a year or so into the future. In addition, because LCC estimates express future operating costs in terms of net present value, a discount rate must be selected. As DOE notes, consumers face a variety of interest rates depending on their economic circumstances. For instance, a homeowner may be able—through a home equity line of credit—to finance the purchase of a new washing machine at a substantially lower (after tax) interest rate than can a renter. One discount rate can reflect the best interest rate available to one—but not both—of these consumers.

2. The “test cloth” used to measure energy efficiency cannot reflect performance with all fabrics.

DOE introduces another uncertainty into the estimation of LCCs with its proposed change in the test procedure used to measure energy efficiency. According to DOE, during the standards rulemaking “it was discovered that the test cloth to be used for

³⁶ DOE assumes that the lifetime of clothes washers averages 14.1 years. DOE, TSD, p. 7-4.

determining the RMC [remaining moisture content] was giving inconsistent results.”³⁷ The inconsistent results can have a substantial lowering effect on the measured MEF (modified energy factor), “particularly for washers which are more efficient with respect to electrical consumption and use of hot water.”³⁸ RMC affects energy consumption by influencing the amount of energy that consumers will use in their clothes dryers.

However, finding a “test cloth” that gives “consistent results” in a DOE laboratory may have little resemblance to the mix of clothes a consumer puts into a washing machine and then into a clothes dryer. DOE states, “A wide variety of articles and fabrics are machine washed by consumers, including: cotton knit goods, denim, towels; cotton/polyester blends in shirts, sheets, tablecloths; various synthetics in a wide variety of articles.” However, “it is clear” that all of these fabrics “could not be evaluated in the revised procedures that include moisture content.” DOE found, The relationship that can be discerned between measurable, specifiable properties of the cloth and the resulting moisture absorption/retention specifiable characteristics—fiber content, weight, etc. to RMC characteristics is compounded by the wide tolerances to allow for the variability of cotton and synthetic fibers, as well as process control variability. Based on discussions with textile industry marketing and manufacturing managers, special manufacture to tighter specifications is probably not available; based on the laboratory testing to date, tight specifications alone will not necessarily lead to a comparably consistent RMC characteristic.³⁹

Despite these difficulties, DOE arrived at a test procedure to determine RMC using a test cloth based on a “single type of fabric that is produced frequently by one mill to a consistent set of specifications.”⁴⁰ Consumers that possess clothes than on average absorb less moisture than DOE’s approved “test cloth” (synthetics absorb less moisture than cotton, for instance) will tend to use less energy drying their clothes than predicted by DOE; and, hence, will tend to receive fewer benefits from being forced to buy more energy-efficient washers.

It should also be noted that consumers may receive less—rather than more—information about the energy needed to wash and dry the particular types of clothing they use, once the test procedure becomes final. DOE states:

“One hundred and eighty days after a test procedure for a product is adopted, no manufacturer may make representations with respect to energy use, efficiency or water use of such product, or the cost of energy consumed by such product,

³⁷ DOE, *Federal Register*, p. 59555.

³⁸ DOE, *Federal Register*, p. 59555. “The following scenario illustrates: for a high efficiency horizontal axis washer, an 18% increase in RMC (54.5% - 64.5%) will result in a 13% decrease in MEF (1.52—1.33). For a lower efficiency washer, a 17% increase in RMC (57.7% - 67.7%) will result in only a 6% decrease in MEF (0.82 - 0.77).”

³⁹ DOE, TSD, Appendix C, p. 5-1.

⁴⁰ DOE, TSD, Appendix C, p. 5-1.

except as reflected in tests conducted according to the DOE procedure. EPCA, Section 323(c)(2).”⁴¹

Hence, it would appear that manufacturers could not inform those consumers who prefer synthetics that their operating savings are likely to be less than advertised.

3. Consumer benefits depend on assumptions about how frequently washing is done.

In general, the more often that consumers are presumed to operate their washing machines—and the higher the rates for energy and water—the higher will be the estimates of operating cost savings for a consumer (and a more negative—beneficial—LCC) under the proposed standard. By the same token, the lower the discount rate selected for the analysis, the greater will be the net present value of future operating cost savings.

DOE estimates that a household will operate its washer 392 times a year⁴² and receive an annual savings in operating costs of about \$30⁴³—or about 7.7 cents a wash. The Mercatus Center used these figures (\$30 annual savings, 392 washes a year and a 6.1 percent discount rate) and found that net present value of the reduction in operating costs over 14.5 years⁴⁴ amounts to approximately \$300, leaving consumers with a net gain of about \$70 after paying the additional \$239 for the more efficient washer.

⁴¹ DOE, *Federal Register*, p. 59553.

⁴² DOE bases this estimate on a survey of washing habits by Proctor & Gamble and RECS data. DOE, *Federal Register*, p. 59561. However, DOE itself suggests that this estimate may not be firmly grounded. In the TSD DOE states: “The DOE test procedure assumes 392 cycles per year. In actuality, the number of loads of laundry per household per year depends on the number of persons in the household, and probably on other factors.” DOE, TSD, p. 10-6. DOE does not attempt to discern either what these “other factors” may be or the magnitude of their influence on the number of washes per year per household.

⁴³ DOE, “Consumer Overview,” p. 2. However, DOE uses different saving estimates at various points. In the graph entitled “Price vs. Savings” on p. 9-28 of the TSD, an annual savings of nearly \$50 appears associated with a washer price that exceeds \$650 [the grid lines on the graph do not permit precise numerical readings.] Yet, on p. J-3 of the TSD, DOE mentions a \$650 high efficiency machine offering 40 percent improvement in safety and annual savings of \$50. Since the proposed standard for January 1, 2007 would increase efficiency by 35 percent, or less than 40 percent, the annual savings would also appear to be less; i.e., less than \$50. DOE’s payback period analysis offers another way to infer the annual savings. That analysis uses a discount rate of zero percent; i.e., DOE simply divides the price increase through by the annual savings to solve for the number of years needed to “payback” the higher purchase price. According to page 7-4 of the TSD, the 35 percent more efficient washer will cost an additional \$239. The mean payback period is 6.8 years (TSD, p. 7-36), which would indicate an annual savings of \$35.15 ($\$35.15 \times 6.8 = \239). The payback period for the 50th percentile of households is 5.0; i.e., the 50th percentile of households has a payback period of 5.0 or less. Using the 5.0 figure indicates annual savings of \$47.80 ($\$47.80 \times 5.0 = \239).

⁴⁴ DOE, TSD, pp. 9-36. “An extra repair extends the life a 14 year old machine by at most six years. At trial standard level 6 less than 10% of machines receive extra repairs that extend the machine life [according to the analysis]. This implies that the lifetime of washers is increased by at most one half year by the imposition of a standard.” Words in brackets are added. Note that the proposed standard to take effect on January 1, 2007 is at trial standard level three (less stringent than trial standard level six). Elsewhere, DOE assumes an average life of 14.1 years (DOE, TSD, p. 7-4). Mercatus used 14.5 years since that was more conservative; i.e., produces a higher value for operating savings.

DOE's estimate that consumers would receive a net gain of \$260 appears to be taken from Table 7.6 on p. 7-30 of the TSD where \$260 is the mean net gain.⁴⁵ Annual savings of about \$50.55—far more than \$30—would be needed to produce a net gain of \$260. DOE's payback analysis indicates that the mean annual savings could be as high as \$47.80, but not \$50.55 (see the discussion in footnote 43).

Furthermore, DOE's analysis indicates that fewer than half of all households would receive a net gain as large as \$260. Table 7.6 also shows that the net gain for the 50th percentile of all households to be \$208; i.e., 50 percent of all households receive net savings greater than \$208 while the other 50 percent receive savings less than \$208. Furthermore, approximately 20 percent of all households appear to *lose* money under the proposed standard, according to Table 7.6. The maximum loss would be \$126.

Using DOE's methodology, Mercatus found with annual savings of \$30 that, a household must operate its washer about 300 times a year—or about five or six washes a week—to recover the higher purchase of a new washer under the standard. Any household operating its washer less frequently—up to five loads per week—would clearly lose under the proposed standard, according to DOE's own methodology. If annual savings are as high \$50.55, then households would have to do more than 180 loads of laundry a year to recover the higher purchase price. In that case, any household averaging fewer than 3.5 loads of wash per week would lose money under the standard.

Mercatus also found that the “break-even” level for annual operating savings is \$24; i.e., any consumer running 392 loads of laundry per year who saves less than \$24 annually in operating costs will be unable to recover the higher purchase price. This consumer, therefore, would be clearly harmed by the proposed standard.

4. Other assumptions used in the benefit cost analysis may not represent conditions faced by all consumers.

Approximately half of all consumers finance their purchases of clothes washers using either a retail loan or a credit card with a mean finance charge of 10.5 percent, according to DOE.⁴⁶ Using a discount rate of 10.5 percent—instead of the 6.1 percent used by DOE – reduces the net present value of operating savings (at \$30 annually) to about \$242, only a few dollars more than the price increase of \$239. Consumers who must pay more than 10.5 percent to finance the purchase of major appliances would lose money under the proposed standards, according to DOE's methodology.

Rural residents are less likely to pay water costs, since water from groundwater wells is essentially free. Thus the one-size-fits all standard may harm them disproportionately.

⁴⁵ “When these [\$30 a year] savings are summed over the lifetime of the high efficiency machine, consumers will save \$260, on average, compared to today's baseline clothes washing machines.” DOE, “Consumer Overview,” p. 2.

⁴⁶ DOE, TSD, p. 7-22.

5. DOE's results do not pass the three-times payback test set by statute.

Obviously, annual savings of \$30 require more than seven years to pay back a higher purchase price of \$239 after discounting. Hence, the proposed standard would appear not to meet the "less than three times" criterion for "economic justification."

However, the payback periods that consumers can expect may not have much in common with the DOE's calculation of "rebuttable payback" periods (PBP). RPBs are a special case of payback periods and, as with DOE's more conventional payback analysis, "a discount rate is not required" for the calculation of PBPs.⁴⁷ Furthermore, the estimate of energy use is "based on the DOE clothes washer test procedure assumptions."⁴⁸ The test procedure selects an amount of energy use that need not bear much relationship to the amounts of energy consumers actually use. For instance, the PBPs estimated by DOE for its proposed efficiency standards for air conditioners and heat pumps presume annual energy use that "is significantly greater than what is indicated by RECS [DOE's Residential Energy Consumption Survey]."⁴⁹ Dispensing with a discount rate and assuming energy use that significantly exceeds actual use reduce the payback estimates. Even so, the PBP for the proposed standard to take effect on January 1, 2007 fails the "less than three times" test by a considerable margin.⁵⁰

6. DOE has inaccurately characterized the impact on low-income families.

A particularly bizarre feature of DOE's analysis is its finding that low income families will benefit more from the proposed standards than the average household, even though the higher purchase price will make it less likely that a low income family can afford a new washing machine in the first place. According to DOE, low-income households would derive greater benefit because they operate their washers more intensively (410 times a year versus 392 times for the general population) and, so, receive a greater reduction in operating savings.⁵¹ (DOE estimates cycle frequency based on family size; and low-income families have more members, on average, than the general population.) However, to receive these "greater benefits," a family must actually purchase a new machine. Yet, DOE also found that, "At a price of \$650 [the approximate price of a new washer made on or after January 1, 2007 under the standard], most (70 percent) of lower income respondents choose to fix the old machine, 12 percent would purchase the new machine. At this price, 9 percent state they would choose to do laundry someplace else."⁵² Without the standards, DOE estimates that 54.5 percent of lower income households would buy a new machine.⁵³ Hence, even though DOE claims that low-

⁴⁷ DOE, TSD, p. 7-40.

⁴⁸ DOE, *Federal Register*, p. 59572.

⁴⁹ DOE, "Energy Conservation Program for Consumer Products, Central Air Conditioners and Heat Pumps Energy Conservation Standards," *op. cit.*, p. 59603.

⁵⁰ DOE, *Federal Register*, Table 9, p. 59573.

⁵¹ DOE, *Federal Register*, p. 59573.

⁵² DOE, TSD, Appendix J, p. j-27. Words in brackets are added.

⁵³ DOE, TSD, Appendix J, p. j-27.

income families stand to gain more from the proposed standards than the general population, DOE also predicts that the standards will lead to a sharp drop in the percentage of low-income families who buy new machines, and thus take advantage of those same benefits. Since only one low income household in eight would buy a new machine under the proposed standard, seven out of eight such households would view themselves as either harmed or—at best—no worse off.

DOE's analysis implies that the Department views low-income people as somewhat more misinformed or (and) irrational than the general population. Even though the standard raises the purchase price by \$239, the operating costs fall by more than \$300 for the relatively few low-income families who would buy new machines—a literal windfall of more than \$70 (after paying the higher purchase price) according to those who conducted DOE's analysis. (If annual savings average \$50.50 for the general population, rather than \$30.00, the windfall ignored by low-income people exceeds \$260.) By implication, the seven out of eight low-income households who fail to accept this substantial windfall must be misinformed or irrational (or both)—just as only a misinformed or irrational person would fail to pick up the proverbial \$5 bill lying on the sidewalk, free for the taking. (The misinformed person, perhaps walking along lost in thought, does not spot the \$5 bill on the sidewalk and, so, is unaware of its existence.)

However, DOE's analytical results can be interpreted without implying that most households of any income level are either misinformed or irrational: most low income people – like most (but not all) of the general population—prefer the collection of attributes offered by V-axis machines to the \$70 savings offered by H-axis machines.

Under this interpretation, the proposed standards will harm 90 percent of all households—encompassing all income levels—by forcing them to accept operating savings that will be worth less to them than the attributes offered by (the soon-to-be extinct) V-axis machines. The remaining 10 percent of all households will not gain from the proposed standards because they would buy H-axis machines anyway.

III. Has DOE Given Adequate Consideration to Policy Alternatives?

DOE considered 10 alternatives to the proposed standards, including an alternative it describes as “Enhanced Public Education & Information.”⁵⁴ Since DOE claims that consumers are largely unaware of energy and water costs when purchasing clothes washers, one might expect that this policy alternative would offer promising results. However, DOE estimates that this alternative would save but one-half of one percent as much energy and water as the proposed standards.⁵⁵

⁵⁴ The other nine policy alternatives are: Consumer Tax Credits, Consumers Rebates High Efficiency, Low Income and Seniors Subsidy, Manufacturer Tax Credits, Voluntary Efficiency Target (5 year delay), Voluntary Efficiency Target (10 year delay), Mass Government Purchases, Early Replacement Program (w/Current Eff.), and Early Replacement Program (w/H-axis). See: DOE, *Federal Register*, Table 23, p. 59582.

⁵⁵ DOE, *Federal Register*, Table 23, p. 59582.

DOE arrives at such meager results by assuming that even most well informed consumers refuse to purchase more efficient washers. DOE states that “to model this possibility, we assumed that the effective market discount rates change from 75% to 47% for purchases of clothes washers.”⁵⁶ DOE bases the 75% estimate on a study conducted by the Northwest Energy Efficiency Alliance.⁵⁷ The 75% estimate means that a consumer requires a 75-cent reduction in operating costs for every additional dollar spent on a new clothes washer; i.e., the consumer insists on a “payback” period of less than two years. DOE then simply *assumes* that the typical consumer—after being exposed to “enhanced public education”—will insist on a payback period of slightly more than two years. Since high efficiency washing markets are already on the market, this change in the payback period will cause some consumers who are at the margin of buying an efficient model to switch from buying a V-axis machine to an H-axis machine, but the impact is modest. Because DOE arrives at the 47% figure by assumption rather than by examination of any evidence, the Department does not appear to seriously consider enhanced public education and information.⁵⁸

The policy alternative that comes closest to the proposed standard in terms of saving the most energy and water is “Voluntary Efficiency Target (5 year delay).” However, despite the word “voluntary” in the policy description, this policy alternative assumes that the efficiency goals would be made mandatory if those goals were not met within a specified period.⁵⁹

The next best option, according to DOE, is the “Voluntary Efficiency Target (10 year delay).” DOE rejects this option based on the *assumption* that the time needed to reach the efficiency targets will be “considerable” and because of the “uncertainties about future consumer demand for energy-efficiency products.”⁶⁰

⁵⁶ DOE, *Federal Register*, Table 23, p. 59582.

⁵⁷ DOE, RIA, p. RIA-3.

⁵⁸ DOE equates the education program with a \$37 price discount. “The results of the Clothes Washer Consumer Analysis (in Appendix J of the TSD) indicates that when consumers have complete information, the effective market discount rate for the purchase of a higher efficiency washer is 20%...In contrast, an intercept survey conducted by Northwest Energy Efficiency Alliance indicates that the actual market discount rate is closer to 75% when consumers are shopping for their clothes washer...We can translate the impact of a public education and information campaign is 50% effective then the effective market discount rate for consumer purchase decisions would change from 75% to $(0.5*75%+0.5*20%)=47%$. And this change in the consumer market discount rate can be changed into an effective market incentive. In the base case, high efficiency machines save approximately \$50 per year per household. [Note: in the “Consumer Overview,” DOE states that the saving per household are approximately \$30 per year per household.]...The net effect of an approximately 50% effective public education program would be about the same as a \$39 discount.” DOE, RIA, p. RIA-3, words in brackets are added.

⁵⁹ “A voluntary program that is made mandatory if the goals are not met is assumed to achieve the energy efficiencies of the performance standards with a 5-year delay.” DOE, RIA, p. RIA-9.

⁶⁰ DOE states: “Although it is possible that voluntary targets might have been as effective as mandated performance targets in achieving the energy savings goals, there probably would have been a considerable time lag because of the many uncertainties associated with a program requiring the concurrence from so many participants as well as uncertainties about future consumer demand for energy-efficient products.” DOE, RIA, p. RIA-9.

In brief, DOE does not evaluate policy alternatives because it assumes their effects rather than estimates them based on any credible data or evidence.

IV. Conclusion and Recommendations

DOE has not established that the proposed standards are economically justified. Indeed, the evidence collected by DOE suggests that the proposed standards will harm the vast majority of consumers without helping the remainder.

DOE's proposed standards for clothes washers would take away consumer choice by eliminating the most popular (V-axis) washing machine models. The standards would force Americans to buy washing machines that DOE estimates will be 57 percent more expensive than machines today, with fewer of the attributes consumers seek. DOE claims that mandating washing machine specifications is necessary to save consumers money through lower operating costs over the life of the machine. Yet, manufacturers currently offer energy- and water-efficient washing machines that would meet the new standards (and, by DOE's calculus, save consumers money), but only seven percent of consumers choose to buy them.

Rather than respect (or try to understand) consumers' revealed and expressed preferences, DOE assumes they are either misinformed or irrational. Its analysis is premised on the assumption that DOE knows more than consumers do about the tradeoffs that are important to individuals. It focuses purely on the cost savings, without considering the value consumers place on the convenience or other attributes that V-axis machines offer over H-axis machines. It estimates annual operating savings of \$30 over the lifetime of a machine, but this is based on washing 392 loads per year, or 7.5 loads per week. Consumers who use the machine less frequently will achieve much lower benefits. According to our analysis, a household that washed 5 or fewer loads per week would lose money, as well as convenience, if DOE imposes the proposed mandate. Even if annual savings were as high as \$50.55, households running fewer than 3.5 loads of laundry per week would lose money. Thus, the evidence collected by DOE suggests that the proposed standards will harm the vast majority of consumers without helping the remainder. Even under its own methodology (which ignores factors important to consumers), reserving the market option of V-axis washing machines will clearly benefit many consumers.

DOE should not go forward with the proposed standards. Since DOE believes that consumers pass up energy efficient washers because they are "misinformed" about operating costs, the Department should seriously consider constructing a program to correct this deficiency (instead of simply assuming a relatively small reduction in consumers' implied market discount rate for energy-efficient products). Consumers do not need to be coerced into saving money.

Appendix I

RSP Checklist

DOE’s Clothes Washer Appliance Standards

Element	Agency Approach	RSP Comments
1. Has the agency identified a significant market failure?	DOE implies market failure by suggesting consumers lack adequate knowledge about clothes washer operating costs. Grade: F	DOE does not seriously consider the possibility that consumers value attributes in addition to price and operating costs when purchasing clothes washers. Adjusting for other attributes could reveal consumers to be well informed.
2. Has the agency identified an appropriate federal role?	DOE justifies the proposed standards under EPCA but does not establish “economic justification” for the standards as required by EPCA. Grade: F	The proposed federal one-size-fits-all standards will harm the majority of consumers by eliminating the basic model of clothes washer that 94 percent of consumers now purchase. The other 6 percent of consumers would not gain because they already buy the basic model preferred by DOE.
3. Has the agency examined alternative approaches?	DOE gives cursory attention to 10 policy alternatives. The Department estimates the effects of these alternatives on the basis of assumptions rather than on data or evidence. Grade: D	Even though DOE suggests that many consumers lack adequate information about washer operating costs, the Department claims that education programs would have negligible impact on consumer purchases. However, the Department reaches that conclusion through assumption, not evidence. DOE should reassess this option based on credible data and evidence.

Element	Agency Approach	RSP Comments
4. Does the agency attempt to maximize net benefits?	DOE examines benefits and costs, but ignores important factors that consumers value. Grade: D	DOE considers only two attributes: price and operating costs. Other attributes – door placement, risk of leaks, child safety – are effectively ignored because they “cannot be quantified.” Moreover, even based on these narrow cost considerations, DOE’s analysis shows that its proposed standards would harm several consumer subgroups.
5. Does the proposal have a strong scientific or technical basis?	DOE has conducted focus groups and surveyed consumers in an effort to understand consumer preferences. Grade: C	DOE’s own evidence shows that low purchase price and such attributes as door placement, risk of leaks and child safety are important. However, it justifies the proposal without regard to these values. Instead, projected operating cost savings, driven by uncertain estimates of energy prices 20 years into the future, form the basis of the rule.
6. Are distributional effects clearly understood?	DOE claims that low-income households would receive greater gains than average from the proposed standards because they operate their washers more intensively than households generally. Grade: F	DOE surveys and consumer studies indicate purchase price is even more important for low-income households than for consumers generally, and that only one in eight would purchase a more efficient washer at the higher price. It disregards this evidence, however, in asserting that low-income households will benefit from the mandates.
7. Are individual choices and property impacts understood?	Despite its accumulated evidence regarding consumers’ revealed and expressed preference, DOE’s approach presumes that the Department can make better choices than consumers about which clothes washers best suit household needs. Grade: F	DOE does not recognize that, by eliminating the most popular and least expensive model of clothes washer from the market, the proposed standards would substantially limit the choices available to consumers. DOE’s application of EPCA presumes that the policy goal of minimizing energy consumption supercedes the right of consumers to select the major energy-using appliances that best suit their needs.

