
THE GEORGE WASHINGTON UNIVERSITY

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Public Interest Comment¹ on

The Department of Energy's Notification of a webinar and
availability of preliminary technical support document

Energy Conservation Program: Energy Conservation Standards for
Residential Clothes Washers²

Docket ID No. EERE-2017-BT-STD-0014
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The George Washington University Regulatory Studies Center

The George Washington University Regulatory Studies Center improves regulatory policy through research, education, and outreach. As part of its mission, the Center conducts careful and independent analyses to assess rulemaking proposals from the perspective of the public interest. This comment on the Department of Energy's preliminary notice regarding efficiency standards for residential clothes washers does not represent the views of any particular affected party or

¹ This comment reflects the views of the authors and does not represent an official position of the institutions with which we are affiliated, including the National Academies of Sciences, Engineering, and Medicine, the GW Regulatory Studies Center, and the George Washington University.

² Department of Energy. Energy Conservation Program: Energy Conservation Standards for Residential Clothes Washers, Webinar and Availability of the Preliminary Technical Support Document. 86 FR 53886-53893. Available at: <https://www.regulations.gov/document/EERE-2017-BT-STD-0014-0027>

³ We served as members of the National Academy of Sciences Committee on Review of Methods for Setting Building and Equipment Performance Standards. This letter is not intended as an official NAS communication.

special interest. It is authored by members of the committee the National Academies of Science, Engineering, and Medicine convened to provide a peer review of methods used by the U.S. Department of Energy in setting appliance and equipment standards.

Introduction

This public comment responds to the U.S. Department of Energy’s (DOE) request for comments on

- “the analytical framework, models, and tools that DOE is using to evaluate potential standards for [residential clothes washers or RCWs];
- the results of preliminary analyses performed by DOE for this product;
- the potential energy conservation standard levels derived from these analyses that DOE could consider for this product should it determine that proposed amendments are necessary; and
- any other issues relevant to the evaluation of energy conservation standards for RCWs” (86 FR 53886).

We served as members of the National Academy of Sciences Committee on Review of Methods for Setting Building and Equipment Performance Standards, and offer these comments based on the peer review we conducted between the fall of 2019 and spring of 2021. Our full Consensus Report is available on the National Academies website.⁴

Statutory Authority

Pursuant to the Energy Policy and Conservation Act of 1975 (EPCA) as amended and other authorities, DOE issues “standards regulations” for energy conservation to “achieve the maximum improvement in energy [or water] efficiency...which the Secretary determines is technologically feasible and economically justified” (42 U.S.C. 6291–6317). These regulations define maximum water and energy use or minimum energy efficiency and apply to a variety of consumer products and commercial and industrial equipment.

In setting new or amended standards, EPCA directs DOE to design standards to “achieve the maximum improvement in energy [or water] efficiency...which the Secretary determines is technologically feasible and economically justified” (42 U.S.C. §6295(o) and 42 U.S.C. §6313(a)(6)(B)(iii)). It further guides the Secretary to determine whether a standard is “economically justified” using a benefit-cost standard, based on “whether the benefits of the

⁴ National Academies of Sciences, Engineering, and Medicine. 2021. Review of Methods Used by the U.S. Department of Energy in Setting Appliance and Equipment Standards. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25992>.

standard exceed its burdens,” taking into consideration the standard’s economic impact on the product’s manufacturers and consumers, product prices and operating costs, energy or water savings, and impacts on product performance and competition (42 U.S.C. §6295(o)(2)(B)(i)).

Committee Recommendations

Relevant for this and future proceedings, the Committee’s Consensus Report recommends that by organizing its analysis of new and amended standards according to the longstanding Regulatory Impact Analysis (RIA) framework, DOE could better examine and present the social welfare implications of its rules. The Report also offers specific recommendations for presenting and addressing uncertainty and variability in ex-ante estimates; for quantifying different impacts; and for gathering data ex-post to improve future analyses. It encourages DOE to consider the role of standards in a changing environment and to avoid methods or standards that would impede innovation that could further DOE’s statutory goals.

A complete list of recommendations follows.

RECOMMENDATION 2-1: To better understand the social impacts of its standards, DOE should organize its analysis following the regulatory analysis framework laid out in OMB Circular A-4. For example, rather than presenting the RIA as the last stage in the process, the analyses shown in Figure S.1 could be technical appendices to the RIA, which would integrate this information in presenting estimates of the net benefits and distributional impacts of the proposed efficiency standard and reasonable alternatives, referencing information from relevant appendices as it describes a baseline scenario and cost and benefit models.

RECOMMENDATION 2-2: DOE should pay greater attention to the justification for the standards, as required by executive orders and the EPCA requirement that standards be economically justified. DOE should attempt to find significant failures of private markets or irrational behavior by consumers in the no-standards case and should consider such a finding as being necessary to conclude that standards are economically justified.

RECOMMENDATION 2-3: DOE should commit to collecting data necessary to conduct more rigorous ex post analysis of the effects of standards on consumers, producers, energy consumption, and environmental impacts.

RECOMMENDATION 3-1: DOE should consider technologies that are at early, pre-competitive technological readiness levels and have promise for use in consumer products and commercial/industrial equipment as part of product population analyzed, even if it seems plausible that they will be screened out in later stages of the analysis such as in the Screening Analysis made during the Notice of Proposed Rulemaking. DOE should continue to use the tools at its disposal, such as reconsidering a previously excluded technology, to avoid prematurely screening-out innovative technologies.

RECOMMENDATION 3-2: DOE should adopt a taxonomy for labeling the readiness of technologies, such as technology readiness level or “TRL” as it is widely known.

RECOMMENDATION 3-3: DOE should characterize the uncertainty on the efficiency rating in its analyses. Rather than providing a “point” estimate of efficiency, DOE should provide a range that reflects the variability in energy consumption under different uses and consumer behavior. This should reflect the need to account for the uncertainty arising from the range of conditions under which a consumer may use a product and then using those use-case ranges to establish sensitivity studies so that efficiency can be communicated as a range rather than a single estimate.

RECOMMENDATION 3-4: DOE should launch a study to investigate improved methods for data acquisition and analysis for use in setting and revising standards. This study should include an overview of where DOE helps enable collection of these data now and how they can improve that process at minimum impact on manufacturers.

RECOMMENDATION 3-5: DOE should expand the Cost Analysis segment of the Engineering Analysis to include ranges of costs, patterns of consumption, diversity factors, energy peak demand, and variance regarding environmental factors.

RECOMMENDATION 3-6: DOE should consider Demand Response readiness as a factor in cost-efficiency calculations. This necessitates the inclusion of power system benefits not currently considered. (See also Recommendation 4-10.)

RECOMMENDATION 4-1: DOE should put greater weight on ex post and market-based evidence of markups to project a more realistic range of likely effects of a standard on prices, including the possibility that prices may fall. This would improve future analyses.

RECOMMENDATION 4-2: To account properly for uncertainty and variability across manufacturers, DOE should report ranges for the input values that feed the GRIM model and run GRIM with the lower bound and upper values in the observed ranges. To make the MIA more transparent, DOE should present its estimates of financial parameters and cost of capital from publicly available sources and then report the adjusted values after the responses to interviews have been considered.

RECOMMENDATION 4-3: DOE should collect data on consumer choices in appliance markets and estimate a discrete choice model of consumer behavior to quantify the trade-offs that consumers face from changes in appliance performance.

RECOMMENDATION 4-4: The committee recommends that DOE propagate the uncertainty in the shipments model’s input parameters and present the full range of shipment estimates.

RECOMMENDATION 4-5: DOE should make changes to the Technical Support Documents underpinning its rulemakings to clearly communicate the dependence of the life-cycle cost (LCC) calculation on shipments assumptions and thereby add clarity on the interpretation of LCC savings. In order to clarify the engineering scope of a standard, apart from consumer demand estimates, the technical support documents should include (1) LCC savings for one consumer choosing between purchasing a baseline product or purchasing a TSL and (2) LCC savings for one consumer that could continue to own a baseline product or replace it with a TSL and (3) life-cycle cost savings for products or equipment that meet a given TSL as compared to the baseline without adjusting for the assumed current and future distribution of sales (shipments).

RECOMMENDATION 4-6: DOE should improve the representation of variability and uncertainty on Installed Costs by considering the variation in costs components across states and by leveraging the engineering analysis to obtain a probabilistic characterization of costs components.

RECOMMENDATION 4-7: DOE should improve the accuracy of its estimates of all of the LCC calculation components by (1) taking full advantage of disaggregated data to account for geographical and temporal variability when available, (2) specifying probability distributions instead of one-point estimates and compounding or propagating the uncertainty they represent throughout the calculation, (3) better recording the data collected by RECS to avoid losing information provided by respondents, (4) better documenting the engineering analysis to obtain disaggregated probabilistic information necessary for the LCC, (5) prioritizing the collection of information for parameters likely to have a significant impact such as the lifetime of a product (i.e., durability), and (6) validating the assumptions made in previous analyses with data collection through the engineering analyses, focus groups with manufacturers, retailers, consumers, and other means.

RECOMMENDATION 4-8: DOE should seek to gather and make use of in situ performance data wherever possible to account for any performance gaps. When estimates of situ performance data are unavailable, DOE should include a qualitative assessment of the potential for a performance gap. Indicators of performance include maintenance requirements and product lifetime as well as energy and water consumption.

RECOMMENDATION 4-9: For purposes of calculating changes in energy use, DOE should consider direct rebound wherever possible; if DOE believes there to be minimal rebound, they should document the reasons why. However, consumer welfare should be understood to benefit from rebound, rather than be harmed by it, notwithstanding the implied increase in energy use. Approximations of the welfare gain from rebound can be incorporated wherever sufficient information allows.

RECOMMENDATION 4-10: DOE should credit as economically valuable those features and innovations that save consumers money and enable appliances to contribute to grid efficiency and reliability.

RECOMMENDATION 4-11: To estimate changes in emissions during the compliance year, DOE should estimate for each state, the changes in the hourly load curve that would result from the adoption of an energy efficiency standard during a full year. Using these estimates, the National Energy Modeling System can incorporate different assumptions about decarbonization of the U.S. electricity system such as the natural gas prices and the penetration of renewable energy and energy storage and estimate a range of emissions changes for each relevant region and time.

RECOMMENDATION 4-12: DOE should monetize all emissions impacts for which meaningful estimates of social impacts are available, considering policy interactions when those interactions are deemed significant.

RECOMMENDATION 4-13: DOE should place greater emphasis on providing an argument for the plausibility and magnitude of any market failure related to the energy efficiency gap in their analyses. For some commercial goods in particular, there should be a presumption that the market actors behave rationally unless DOE can provide evidence or argument to the contrary.

RECOMMENDATION 4-14: The committee recommends that DOE give greater attention to a broader set of potential market failures on the supply side, including not just how standards might reduce the number of competing firms, but also how they might impact price discrimination, technological diffusion, and collusion.

RECOMMENDATION 4-15: In order to evaluate the economic costs and benefits of a standard, DOE should present the distribution of costs and benefits estimated in its models when (1) uncertain parameters are represented by probability distributions and (2) parameters that vary across geographic and other relevant dimensions are disaggregated. The uncertainty or variability the parameters represent should be compounded or propagated—properly accounting for any correlations—throughout the calculation. This methodology is necessary for the markup analysis and manufacturer impact analysis (Recommendation 4-2), the shipments analysis (Recommendation 4-4), and all components of the life-cycle cost analysis. (Recommendations 4-5 and 4-7). Where multiple sources of uncertainty must be combined for the final benefits result, as with net benefits depending on both the shipments analysis and the appliance unit cost and performance, the subcomponents should be reported as well. (Recommendation 4-5).

RECOMMENDATION 4-16: DOE should obtain better data for improving the economic analyses of appliance and equipment performance standards. Empirical data are needed on markups (Recommendation 4-1), consumer choices in appliance markets (Recommendation 4-3), and in situ performance (Recommendation 4-8). Some of this information can come from

relatively simple changes to current surveys and studies, including engineering analyses of the Appliance and Equipment Standards Program and the Residential Energy Consumption Survey (Recommendation 4-7).

RECOMMENDATION 4-17: Ex post analyses can validate assumptions made in prior standards and evaluate the implications of prior forecasts' inaccuracies and mistakes. DOE should use such ex-post analyses routinely to improve forward-looking standards iteratively.

RECOMMENDATION 5-1: The RIA should be grounded in an appreciation of consumer needs beyond reduced energy costs. The RIA should analyze not only the impact of appliance and equipment standards but also the additional impact of measures within a framework that includes

- The portfolio of voluntary elements of demand-side management; and
- Impact of standards on the overall power system external and internal to the building and of the natural gas supply and transmission and distribution.

RECOMMENDATION 5-2: DOE should consider how to incorporate a greenhouse gas cap-and-trade or tax program into its evaluations of the costs and benefits of energy efficiency appliance standards.

Conclusion

The NAS peer review of DOE's analytical approach to setting efficiency standards offers findings and recommendations for improving DOE's methodology, and ultimately, the net social benefits of the appliance and equipment standards DOE establishes under EPCA.

As members of the Committee responsible for the peer review, we respectfully submit the full Consensus Report to the docket of the current review of residential clothes washer standards (EERE-2017-BT-STD-0014).