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Energy Conservation Program: Energy Conservation Standards for Certain Consumer Products (Dishwashers, Dehumidifiers, Microwave Ovens, and Electric and Gas Kitchen Ranges and Ovens) and for Certain Commercial and Industrial Equipment (Commercial Clothes Washers); Final Rule

DEPARTMENT OF ENERGY

10 CFR Part 431

[Docket Number EERE–2006–STD–0127]

RIN 1904–AB93

Energy Conservation Program: Energy Conservation Standards for Certain Consumer Products (Dishwashers, Dehumidifiers, Microwave Ovens, and Electric and Gas Kitchen Ranges and Ovens) and for Certain Commercial and Industrial Equipment (Commercial Clothes Washers)

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

ACTION: Final rule.

SUMMARY: The U.S. Department of Energy (DOE) is adopting amended energy conservation standards for commercial clothes washers (CCWs). DOE has determined that amended energy conservation standards for these types of equipment would result in significant conservation of energy, and are technologically feasible and economically justified.

DATES: The effective date of this rule is March 9, 2010. The standards established in today's final rule will be applicable starting January 8, 2013.

ADDRESSES: For access to the docket to read background documents, the technical support document, transcripts of the public meetings in this proceeding, or comments received, visit the U.S. Department of Energy, Resource Room of the Building Technologies Program, 950 L'Enfant Plaza, SW., 6th Floor, Washington, DC 20024, (202) 586–2945, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays. Please call Brenda Edwards at the above telephone number for additional information regarding visiting the Resource Room. (**Note**: DOE's Freedom of Information Reading Room no longer houses rulemaking materials.) You may also obtain copies of certain previous rulemaking documents in this proceeding (*i.e.,* framework document, advance notice of proposed rulemaking, notice of proposed rulemaking, supplemental notice of proposed rulemaking), draft analyses, public meeting materials, and related test procedure documents from the Office of Energy Efficiency and Renewable Energy's Web site at *http://www1.eere.energy.gov/buildings/appliance_standards/commercial/clothes_washers.html.*

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I. Summary of the Final Rule and Its Benefits

A. The Standard Levels

The Energy Policy and Conservation Act[1] (EPCA), as amended (42 U.S.C. 6291 *et seq.;* EPCA), directs the Department of Energy (DOE) to consider amended mandatory energy conservation standards for CCWs. (42 U.S.C. 6313(e)(2)(A)) Any such amended energy conservation standard must be designed to "achieve the maximum improvement in energy efficiency * * * which the Secretary determines is technologically feasible and economically justified." (42 U.S.C. 6295(o)(2)(A) and 6316(a)) Furthermore, any new or amended standard must "result in significant conservation of energy." (42 U.S.C. 6295(o)(3)(B) and 6316(a)) The standards in today's final rule, which apply to all CCWs, satisfy these and other statutory criteria discussed in this notice.

Table I.1 shows the amended standard levels that DOE is adopting today. These standards will apply to all CCWs manufactured for sale in the United States, or imported to the United States, on or after January 8, 2013.

TABLE I.1—AMENDED ENERGY CONSERVATION STANDARDS FOR COMMERCIAL CLOTHES WASHERS

Equipment class	Amended energy conservation standards
Top-loading commercial clothes washers.	1.60 Modified Energy Factor/8.5 Water Factor.
Front-loading commercial clothes washers.	2.00 Modified Energy Factor/5.5 Water Factor.

B. Current Federal Standards for Commercial Clothes Washers

EPCA, as amended by the Energy Policy Act of 2005 (EPACT 2005), prescribes standards for CCWs manufactured on or after January 1, 2007. (42 U.S.C. 6313(e)) These standards require that CCWs have a modified energy factor (MEF) of at least 1.26 and a water factor (WF) of not more than 9.5. (*Id.;* 10 CFR 431.156)

C. Benefits to Consumers of Commercial Clothes Washers

Table I.2 indicates the impacts on commercial consumers of today's amended standards. The economic impacts of the amended CCW standards on commercial consumers as measured by the average life-cycle cost (LCC) savings are positive, even though the standards may increase some initial costs. For example, typical top-loading CCWs—the most common type currently being sold—have an average installed price of $760 and average lifetime operating costs (discounted) of $3,286. To meet the amended standards, DOE estimates that the average installed price of such equipment will increase by $214, which will be more than offset by savings of $394 in average lifetime operating costs (discounted).

TABLE I.2—IMPLICATIONS OF AMENDED STANDARDS FOR COMMERCIAL CONSUMERS

Equipment class	Energy conservation standard	Average installed price * $	Average installed price increase $	Average life-cycle cost savings $	Median payback period *years*
Top-loading CCWs	1.60 Modified Energy Factor/8.5 Water Factor	974	214	180	4.3
Front-loading CCWs	2.00 Modified Energy Factor/5.5 Water Factor	1,365	23	** 20	** 0.4

* For a baseline model.
** DOE estimates that 96 percent of front-loading CCW consumers would purchase a model at the standard level even without amended standards. The values refer to average impacts for the 4 percent of consumers who would be affected by the standard.

D. Impact on Manufacturers

Using a real corporate discount rate of 7.2 percent, DOE estimates the industry net present value (INPV) of the CCW industry to be approximately $62 million in 2008$. DOE expects the impact of today's standards on the INPV of manufacturers of CCWs to be a loss of between 7.8 percent and 11.4 percent of the INPV, which is approximately $5 to $7 million. Based on DOE's interviews with the manufacturers of CCWs, DOE expects possible loss of employment for one manufacturer as a result of the standards.

E. National Benefits

DOE estimates that the energy conservation standards will save a significant amount of energy—an estimated 0.10 quadrillion British thermal units (Btu), or quads, of cumulative energy over 30 years (2013–2043). This amount is equivalent to 2 days of U.S. gasoline use. In addition, DOE estimates the standards for CCWs will save over 143 billion gallons of cumulative water consumption over 30 years (2013–2043).

The national net present value (NPV) of CCW consumer benefit resulting from the standards, considering the impacts of equipment sold in 2013–2043, is $0.4 billion using a 7-percent discount rate and $0.9 billion using a 3-percent discount rate, in 2008$. This is the estimated total value of future operating cost savings minus the estimated increased equipment costs, discounted to 2009. The NPV for consumers (at the 7-percent discount rate) would exceed industry losses, discussed above, due to energy efficiency standards by at least 80 times.

By 2043, DOE expects the energy savings from the standards to eliminate the need for approximately 18 MW of electricity generating capacity. The energy savings will result in cumulative greenhouse gas emissions reductions in 2013–2043 of approximately 5.1 million tons (Mt) of carbon dioxide (CO_2), or an amount equal to that produced by approximately 5.1 million new cars in a year. Additionally, the standards will help alleviate air pollution by resulting in approximately 3.0 kilotons (kt) of cumulative nitrogen oxide (NO_X) emission reductions and 0.0003 tons of cumulative mercury (Hg) emission reductions. The estimated net present monetary values of these emissions reductions at a 7-percent discount rate (discounted to 2009 and expressed in 2008$) are between $13 and $140 million for CO_2, between $0.4 and $4.2

[1] 42 U.S.C. 6291 *et seq.*

million for NO_X, and between $0.0 and $0.6 million for Hg. At a 3-percent discount rate, the estimated net present values of these emissions reductions (discounted to 2009 and expressed in 2008$) are between $28 and $303 million for CO_2, between $0.8 million and $8.4 million for NO_X, and between $0.0 and $0.6 million for Hg.

The benefits and costs of today's final rule can also be expressed in terms of annualized values. Estimates of annualized values for three economic growth cases are shown in Table I.3. The annualized monetary values are the sum of the annualized national economic value of operating savings benefits (energy, maintenance and repair), plus the monetary values of the benefits of carbon dioxide emission reductions, monetized using a value of $20 per metric ton of carbon dioxide. The $20 value is a central interim value from a recent interagency process, as discussed in section VI.C.6. Although summing the value of operating savings to the values of CO_2 reductions provides a valuable perspective, please note the following. The national operating savings are domestic U.S. consumer monetary savings found in market transactions while the CO_2 value is based on a range of estimates of imputed marginal social cost of carbon, which are meant to reflect the global benefits of CO_2 reductions. Furthermore, the assessments of operating savings and CO_2 savings are performed with different computer models, leading to different time frames for analysis. The present value of national operating savings considers the impacts of equipment sold in 2013–2043. The value of CO_2, on the other hand is meant to reflect the present value of all future climate-related impacts, which go well beyond the lifetime of the equipment sold in the forecast period.

Using a 7-percent discount rate for the annualized cost analysis, the cost of the standards established in today's final rule for CCWs is $23.4 million per year in increased equipment and installation costs, while the annualized benefits are $60.6 million per year in reduced equipment operating costs and $5.1 million in CO_2 reductions, for a net benefit of $42.2 million per year. Using a 3-percent discount rate, the cost of the standards established in today's final rule is $22.7 million per year in increased equipment and installation costs, while the benefits of today's standards are $72.8 million per year in reduced operating costs and $5.9 million in CO_2 reductions, for a net benefit of $56.0 million per year.

TABLE I.3—ANNUALIZED BENEFITS AND COSTS OF AMENDED STANDARDS FOR COMMERCIAL CLOTHES WASHERS (TSL 3)

Category	Unit	Primary estimate (*AEO* reference case)		Low estimate (*AEO* low-growth case)		High estimate (*AEO* high-growth case)	
		7%	3%	7%	3%	7%	3%
Benefits							
Monetized Operating Cost Savings	*Million 2008$*	60.6	72.8	54.9	65.3	66.6	80.4
Quantified Emissions Reductions	CO_2 *(Mt)*	0.14	0.16	0.14	0.16	0.14	0.16
	NO_X *(kt)*	0.087	0.194	0.087	0.194	0.087	0.194
	Hg *(t)*	0.0002	0.0001	0.0002	0.0001	0.0002	0.0001
Monetized Avoided Emissions Reductions (*Million 2008$*).	CO_2	5.1	5.9	5.1	5.9	5.1	5.9
	NO_X	0.2	0.3	0.2	0.3	0.2	0.3
	Hg	0.0	0.0	0.0	0.0	0.0	0.0
Costs							
Monetized Incremental Product and Installation Costs.	*Million 2008$*	23.4	22.7	21.9	20.9	24.6	23.9
Net Benefits							
Monetized Value	*Million 2008$*	42.5	56.3	38.3	50.6	47.3	62.7

* For CO_2, benefits reflect value of $20/t, which is in the middle of the values considered by DOE for valuing the potential global benefits resulting from reduced CO_2 emissions. For NO_X and Hg, the benefits reflect values of $2,491/t and $17 million/t, respectively. These values are the midpoint of the range considered by DOE.

F. Conclusion

The benefits (energy savings, LCC savings for CCW consumers, positive national NPV, and emissions reductions) to the Nation of the standards outweigh their costs (loss of manufacturer INPV and LCC increases for some CCW consumers). Today's standards also represent the maximum improvement in energy efficiency that is technologically feasible and economically justified, and will result in significant energy savings. At present, CCWs that meet the amended standard levels are commercially available.

II. Introduction

A. Consumer Overview

DOE is amending in today's final rule energy conservation standard levels for CCWs as shown in Table I.1. These standards apply to equipment manufactured or imported on or after January 8, 2013.

DOE research suggests that commercial consumers will see benefits from today's standards even though DOE expects the purchase price of the high efficiency CCWs to increase (by 2 to 28 percent) from the average price of this equipment today. However, the energy efficiency gains are expected to result in lower energy and water costs, saving consumers $53 to $103 per year on their energy and water bills, again depending on the equipment class. When these savings are summed over the lifetime of the equipment, consumers are expected to save an average of $20 to $190, depending on the equipment class, utility costs, and other factors. DOE estimates that the payback period (PBP) for the more efficient, higher-priced equipment will range from 0.2 to 5.6 years, depending on the equipment class.

B. Authority

Title III of EPCA sets forth a variety of provisions designed to improve energy efficiency. Part A–1 of Title III (42 U.S.C. 6311–6317) establishes an energy conservation program for "Certain Industrial Equipment," which deals with a variety of commercial and industrial equipment (referred to hereafter as "covered equipment") including CCWs, the subject of this rulemaking. (42 U.S.C. 6312; 6313(e)) DOE publishes today's final rule pursuant to Part A–1 of Title III, which provides for test procedures, labeling, and energy conservation standards for CCWs and certain other equipment, and authorizes DOE to require information and reports from manufacturers. The test procedures for CCWs appear at 10 CFR part 430, subpart B, appendix J1 (pursuant to 10 CFR 431.154).

Section 136(a) and (e) of the Energy Policy Act of 2005 (EPACT 2005; Pub. L. 109–058) added CCWs as equipment covered under EPCA and established standards for such equipment that is manufactured on or after January 1, 2007.[2] (42 U.S.C. 6311(1) and 6313(e)) These amendments to EPCA also require that DOE issue a final rule by January 1, 2010, to determine whether these standards should be amended. (EPACT 2005, section 136(e); 42 U.S.C. 6313(e)) If amended standards are justified, they would become effective no later than January 1, 2013. (*Id.*)

EPCA provides criteria for prescribing amended standards for covered products and equipment.[3] As indicated above, any amended standard for this equipment must be designed to achieve the maximum improvement in energy efficiency that is technologically feasible and economically justified. (42 U.S.C. 6295(o)(2)(A) and 6316(a)) Additionally, EPCA provides specific prohibitions on prescribing such standards. DOE may not prescribe an amended or new standard for any equipment for which DOE has not established a test procedure. (42 U.S.C. 6295(o)(3)(A) and 6316(a)). Further, DOE may not prescribe an amended standard if DOE determines by rule that such standard would not result in "significant conservation of energy" or "is not technologically feasible or economically justified." (42 U.S.C. 6295(o)(3)(B) and 6316(a))

EPCA also provides that, in deciding whether such a standard is economically justified for equipment such as CCWs, DOE must, after receiving comments on the proposed standard, determine whether the benefits of the standard exceed its burdens by considering, to the greatest extent practicable, the following seven factors:

(1) The economic impact of the standard on manufacturers and consumers of the products or equipment subject to the standard;

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

(3) The total projected amount of energy (or, as applicable, water) savings likely to result directly from the imposition of the standard;

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

(6) The need for national energy and water conservation; and

(7) Other factors the Secretary considers relevant. (42 U.S.C. 6295(o)(2)(B)(i) and 6316(a))

In addition, EPCA, as amended (42 U.S.C. 6295(o)(2)(B)(iii) and 6316(a)), establishes a rebuttable presumption that any standard for covered products is economically justified if the Secretary finds 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 test procedure * * *" in place for that standard. See section III.D.2.

Furthermore, EPCA contains what is commonly known as an "anti-backsliding" provision. (42 U.S.C. 6295(o)(1) and 6316(a)) This provision prohibits the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product or equipment. EPCA further provides that the Secretary may not prescribe an amended standard if interested persons have established by a preponderance of the evidence that the standard is "likely to result in the unavailability in the United States of any product type (or class)" with performance characteristics, features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States at the time of the Secretary's finding. (42 U.S.C. 6295(o)(4) and 6316(a))

Section 325(q)(1) of EPCA is applicable to promulgating standards for most types or classes of equipment, including CCWs, that have two or more subcategories. (42 U.S.C. 6295(q)(1) and 42 U.S.C. 6316(a)) Under this provision, DOE must specify a different standard level than that which applies generally to such type or class of products or equipment "for any group of covered products which have the same function or intended use, if * * * covered products within such group—(A) consume a different kind of energy from that consumed by other covered products within such type (or class); or (B) have a capacity or other performance-related feature which other products within such type (or class) do not have and such feature justifies a higher or lower standard" than applies or will apply to the other products. (42 U.S.C. 6295(q)(1)(A) and (B)) In determining whether a performance-related feature justifies such a different standard for a group of equipment, DOE must consider "such factors as the utility to the consumer of such a feature" and other factors DOE deems appropriate. (42 U.S.C. 6295(q)(1)) Any rule prescribing such a standard must include an explanation of the basis on which DOE established such higher or lower level. (See 42 U.S.C. 6295(q)(2))

Federal energy conservation requirements for commercial equipment, including CCWs, generally supersede State laws or regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6297(a)–(c); 42 U.S.C. 6316(a)) DOE can, however, grant waivers of Federal preemption for particular State laws or regulations, in accordance with the procedures and other provisions of EPCA found in 42 U.S.C. 6297(d). Specifically, States that regulate an energy conservation standard for a type of covered product for which there is a Federal energy conservation standard may petition the Secretary for a DOE rule that allows the State regulation to become effective with respect to such covered product. (42 U.S.C. 6297(d)(1)(A); 42 U.S.C. 6316(a)) DOE must prescribe a rule granting the petition if the Secretary finds that the

[2] Under the statute, a CCW must have an MEF of at least 1.26 and a WF of not more than 9.5.

[3] The EPCA provisions discussed in the remainder of this subsection directly apply to covered products, and also apply to certain covered equipment, such as CCWs, by virtue of 42 U.S.C. 6316(a). Note that the term "product" is used generally to refer to consumer appliances, while "equipment" is used generally to refer to commercial units.

State has established by a preponderance of the evidence that its regulation is needed to meet "unusual and compelling State or local energy * * * interests." (42 U.S.C. 6297(d)(1)(B); 42 U.S.C. 6316(a))

C. Background

1. Current Standards

EPCA, as amended by EPACT 2005, prescribes energy conservation standards for CCWs manufactured on or after January 1, 2007. (42 U.S.C. 6313(e)) These standards require that CCWs have an MEF of at least 1.26 cubic feet of capacity (ft^3) per kilowatt-hour (kWh) and a WF of not more than 9.5 gallons of water (gal) per ft^3. (*Id.;* 10 CFR 431.156)

2. History of Standards Rulemaking

As discussed in the supplemental notice of proposed rulemaking (SNOPR), 74 FR 57738 (Nov. 9, 2009) (the November 2009 SNOPR), the EPACT 2005 amendments to EPCA require that DOE issue a final rule by January 1, 2010, to determine whether standards for CCWs should be amended. (EPACT 2005, section 136(e); 42 U.S.C. 6313(e)) If amended standards are justified, they would become effective no later than January 1, 2013. (*Id.*)

To initiate the current rulemaking to consider energy conservation standards, on March 15, 2006, DOE published on its Web site a document titled, *Rulemaking Framework for Commercial Clothes Washers and Residential Dishwashers, Dehumidifiers, and Cooking Products* (Framework Document).[4] 71 FR 15059 (March 27, 2006). The Framework Document described the procedural and analytical approaches that DOE anticipated using to evaluate energy conservation standards for these products, and identified various issues to be resolved in conducting the rulemaking. DOE held a public meeting on April 27, 2006, to present the Framework Document, to describe the analyses it planned to conduct during the rulemaking, to receive comments from interested parties, and to inform and facilitate interested parties' involvement in the rulemaking. DOE received 11 written comments in response to the Framework Document after the public meeting.

DOE published the advance notice of proposed rulemaking (ANOPR) for this rulemaking on November 15, 2007 (November 2007 ANOPR) (72 FR 64432), and held a public meeting on December 13, 2007, to present and seek comment on the November 2007 ANOPR analytical methodology and results. The November 2007 ANOPR included background information on the history and conduct of this rulemaking. 72 FR 64432, 64438–39 (Nov. 15, 2007) In the November 2007 ANOPR, DOE described and sought further comment on the analytical framework, models, and tools (*e.g.,* LCC and NIA spreadsheets) it was using to analyze the impacts of energy conservation standards for these products. In conjunction with the November 2007 ANOPR, DOE also posted on its Web site the complete November 2007 ANOPR technical support document (TSD). The TSD included the results of a number of DOE's preliminary analyses in this rulemaking. In the November 2007 ANOPR and at the public meeting, DOE invited comment in particular on the following issues concerning CCWs: (1) Product classes; (2) horizontal-axis designs; (3) technologies unable to be analyzed and exempted product classes, including potential limitations of existing test procedures; (4) per-cycle energy consumption; (5) consumer prices; (6) repair and maintenance costs; (7) efficiency distributions in the base case; (8) shipments forecasts; (9) base-case and standards-case forecasted efficiencies; and (10) TSLs. 72 FR 64432, 64512–14 (Nov. 15, 2007).

On October 17, 2008, DOE published a NOPR (October 2008 NOPR) in the **Federal Register,** in which it proposed amended energy conservation standards for certain products and equipment, including CCWs. 73 FR 62034. The energy conservation standards proposed in the October 2008 NOPR for CCWs are shown in Table II.1.

TABLE II.1—COMMERCIAL CLOTHES WASHER ENERGY CONSERVATION STANDARDS PROPOSED IN THE OCTOBER 2008 NOPR

Equipment	Modified energy factor *ft^3/kWh*	Water factor *gal/ft^3*
Top-loading CCWs	1.76	8.3
Front-loading CCWs	2.00	5.5

In the October 2008 NOPR, DOE described and sought further comment on the analytical framework, models, and tools (*e.g.,* LCC and NIA spreadsheets) it was using to analyze the impacts of energy conservation standards for this equipment. In conjunction with the October 2008 NOPR, DOE also posted on its Web site the complete TSD, which along with the October 2008 NOPR, is available at *http://www1.eere.energy.gov/buildings/appliance_standards/*. The TSD included the results of a number of DOE's analyses. In the October 2008 NOPR and at the public meeting held on November 13, 2008 (referred to as the "November 2008 public meeting"), DOE invited comment in particular on the following issues concerning CCWs: (1) The efficiency levels; (2) DOE's determination of the maximum technologically feasible (max-tech) efficiency levels for top-loading and front-loading CCWs; (3) the magnitude of possible equipment class shifting to front-loading CCWs; (4) the analysis and data relevant to the price elasticity of demand for calculating the anticipated energy and water savings at different TSLs; (5) the analysis of consumer knowledge of the Federal ENERGY STAR program and its potential as a resource for increasing knowledge of the availability and benefits of energy efficient appliances in the home appliance consumer market; (6) discount rates other than 7 percent and 3 percent real to discount future emissions reductions; (7) data that might enable DOE to test for market failures or other specific problems for CCWs; and (8) the determination of anticipated environmental impacts of the standards proposed in the October 2008 NOPR, particularly with respect to the methods for valuing the expected CO_2 and NO_X emissions savings. 73 FR 62034, 62133 (Oct. 17, 2008).

The October 2008 NOPR also included background information, in

[4] This document is available on the DOE Web site at: *http://www1.eere.energy.gov/buildings/appliance_standards/commercial/clothes_washers.html.*

addition to that set forth above, on the history and conduct of this rulemaking. 73 FR 62034, 62040–62041 (Oct. 17, 2008). DOE presented the methodologies and results for the October 2008 NOPR analyses at the November 2008 public meeting. Comments presented by interested parties during this meeting and submitted in response to the October 2008 NOPR concerning the accuracy of the stated max-tech CCW efficiency level led to a thorough investigation of CCW efficiencies and the November 2009 SNOPR. DOE subsequently tested the max-tech unit at an independent test facility, revised the max-tech level, updated the analysis, and published the November 2008 SNOPR to allow interested parties to comment on the revised efficiency level proposals. 74 FR 57738 (Nov. 9, 2009).

In the November 2009 SNOPR, DOE revised the proposed energy conservation standards for CCWs. 74 FR 57738 (Nov. 9, 2009). In conjunction with the November 2009 SNOPR, DOE also published on its Web site the complete TSD for the proposed rule, which incorporated the final analyses that DOE conducted, and contained technical documentation for each step of the analysis. The TSD included the engineering analysis spreadsheets, the LCC spreadsheet, and the national impact analysis spreadsheet. The revised energy conservation standards proposed in the November 2009 SNOPR for CCWs are shown in Table II.2.

TABLE II.2—COMMERCIAL CLOTHES WASHER ENERGY CONSERVATION STANDARDS PROPOSED IN THE NOVEMBER 2009 SNOPR

Equipment	Modified energy factor ft^3/kWh	Water factor gal/ft^3
Top-loading CCWs	1.60	8.5
Front-loading CCWs	2.00	5.5

In the November 2009 SNOPR, DOE identified issues on which it was particularly interested in receiving comments and views of interested parties. These included the following: (1) Whether the method of "loading" clothes washers, or any other characteristic commonly associated with traditional "top-loading" or "front-loading" clothes washers, are "features" within the meaning of 42 U.S.C. 6295(o)(4) in EPCA and whether the availability of such feature(s) would likely be affected by eliminating the separate classes for these equipment types previously established by DOE; (2) the revised efficiency levels, including the revised max-tech level for top-loading CCWs; (3) technological feasibility of the proposed max-tech CCW, including washing and rinsing performance measures for CCWs and population data for water heating CCWs; (4) the determination of manufacturer impacts, including the effects of manufacturer tax credits and competitive concerns; (5) the determination of environmental impacts; and (6) the newly proposed energy conservation standards. 74 FR 57738, 57800 (Nov. 9, 2009) After the publication of the November 2009 SNOPR, DOE also held a public meeting in Washington, DC, on November 16, 2009 (referred to as the "November 2009 public meeting"), to hear oral comments on and solicit information relevant to the revised proposed rule. The November 2009 SNOPR included additional background information on the history of this rulemaking. 74 FR 57738, 57742–43 (Nov. 9, 2009).

Comments presented by interested parties during the November 2009 public meeting and submitted in response to the November 2009 NOPR concerning the sensitivity of the analyses to the estimated market share split of CCW shipments among laundromats, multi-family housing, and on-premises laundry applications led DOE to conduct a sensitivity analysis for today's final rule. See appendix 11C of the TSD.

III. General Discussion

A. Test Procedures

EPCA directs DOE to use the same test procedures for CCWs as those established by DOE for residential clothes washers (RCWs). (42 U.S.C. 6314(a)(8)) 73 FR 62034, 62043–44 (Oct. 17, 2008). While DOE believes commercial laundry practices likely differ from residential practices,[5] DOE concluded in the October 2008 NOPR that the existing clothes washer test procedure (at 10 CFR part 430, subpart B, appendix J1) adequately accounts for the efficiency rating of CCWs, and that DOE's methods for characterizing energy and water use in the October 2008 NOPR analyses adequately accounted for the consumer usage patterns specific to CCWs. In response to the October 2008 NOPR, interested parties agreed with DOE's conclusion that the DOE clothes washer test procedure is adequate for rating CCWs. DOE did not receive any comments objecting to the use of the DOE clothes washer test procedure for CCWs. Therefore, for the November 2009 SNOPR, DOE continued to consider the existing DOE test procedure adequate to measure energy and water consumption of CCWs. 74 FR 57738, 57743 (Nov. 9, 2009).

The Appliance Standards Awareness Project (ASAP) commented that DOE is currently reviewing its clothes washer test procedure, and noted that there may be revisions as a result of that rulemaking. ASAP asked whether, under EPACT 2005, those potential changes in the test procedure would apply to the determinations of compliance with this standard that is currently proposed for CCWs. (ASAP, Public Meeting Transcript, No. 67.4 at pp. 13–16[6]) EPCA states that "[w]ith respect to commercial clothes washers, the test procedures shall be the same as the test procedures established by the Secretary for RCWs under section 6295(g) of this title." (42 U.S.C. 6314(a)(8)) Therefore, CCWs will be required to be tested to the DOE clothes washer test procedure that is effective at the time the testing is conducted.

B. Technological Feasibility

1. General

As stated above, any standards that DOE establishes for CCWs must be technologically feasible. (42 U.S.C.

[5] CCWs are typically used more frequently and filled with a larger load than RCWs.

[6] A notation in the form "ASAP, Public Meeting Transcript, No. 67.4 at pp. 13–16" identifies an oral comment that DOE received during the November 16, 2009, SNOPR public meeting and which was recorded in the public meeting transcript in the docket for this rulemaking (Docket No. EE–2006–STD–0127), maintained in the Resource Room of the Building Technologies Program. This particular notation refers to a comment (1) made by the Appliance Standards Awareness Project (ASAP) during the public meeting, (2) recorded in document number 67.4, which is the public meeting transcript that is filed in the docket of this rulemaking, and (3) which appears on pages 13–16 of document number 67.4.

6295(o)(2)(A) and (o)(3)(B); 42 U.S.C. 6316(a)) DOE considers a design option to be technologically feasible if it is in use by the respective industry or if research has progressed to the development of a working prototype. "Technologies incorporated in commercial products or in working prototypes will be considered technologically feasible." 10 CFR part 430, subpart C, appendix A, section 4(a)(4)(i). Therefore, in each standards rulemaking, DOE conducts a screening analysis, based on information it has gathered regarding existing technology options and prototype designs. In consultation with manufacturers, design engineers, and other interested parties, DOE develops a list of design options for consideration in the rulemaking. Once DOE has determined that a particular design option is technologically feasible, it further evaluates each design option in light of the following three additional criteria: (a) Practicability to manufacture, install, and service; (b) adverse impacts on product utility or availability; or (c) adverse impacts on health or safety. 10 CFR part 430, subpart C, appendix A, section 4(a)(3) and (4). All design options that pass these screening criteria are candidates for further assessment in the engineering and subsequent analyses in the NOPR (or SNOPR) stage.

DOE published a list of evaluated CCW technologies in the November 2007 ANOPR. 72 FR 64432, 64458 (Nov. 15, 2007). For the reasons described in the November 2007 ANOPR and in chapter 4 of the TSD, DOE is not considering the following design options, as they do not meet one or more of the screening criteria: Bubble action, electrolytic disassociation of water, ozonated laundering, reduced thermal mass, suds-saving, and ultrasonic washing. In the November 2009 SNOPR, DOE did not screen out any additional technology options that were retained in the October 2008 NOPR analyses. No comments were received objecting to the technology options which were screened out in the October 2008 NOPR. 73 FR 62034, 62052 (Oct. 17, 2008). Therefore, DOE considered the same design options in the November 2009 SNOPR as those evaluated in the October 2008 NOPR. 74 FR 57738, 57743–44 (Nov. 9, 2009).

This final rule considers the same design options as those evaluated in the November 2009 SNOPR. All the evaluated technologies have been used (or are being used) in commercially available equipment or working prototypes. DOE also has determined that there is equipment either in the market or in working prototypes at all of the efficiency levels analyzed in this notice. Therefore, DOE has determined that all of the efficiency levels evaluated in this final rule, which are based upon the retained design options, are technologically feasible. For more detail on DOE's method for developing CCW technology options and the process for screening these options, refer to the chapters 3 and 4 of the TSD.

2. Maximum Technologically Feasible Levels

When DOE considers an amended standard for a type (or class) of equipment such as front-loading or top-loading CCWs, it must "determine the maximum improvement in energy efficiency or maximum reduction in energy use that is technologically feasible" for such equipment. (42 U.S.C. 6295(p)(2) and 6316(a)) For the October 2008 NOPR, DOE determined the max-tech efficiency levels for front-loading and top-loading CCWs in the engineering analysis, based on published MEF and WF values of commercially available equipment. (See chapter 5 in the NOPR TSD.) For the October 2008 NOPR, DOE proposed the max-tech levels shown in Table III.1. 73 FR 62034, 62036 (Oct. 17, 2008).

TABLE III.1—COMMERCIAL CLOTHES WASHER MAX-TECH EFFICIENCY LEVELS PROPOSED IN THE OCTOBER 2008 NOPR

Equipment class	Max-tech level	
	MEF, ft^3/kW	WF, gal/ft^3
Top-Loading CCWs	1.76	8.3
Front-Loading CCWs	2.35	4.4

DOE received comments in response to the October 2008 NOPR questioning the max-tech top-loading CCW efficiency rating presented in the November 2009 SNOPR. DOE examined the max-tech efficiency level for top-loading CCWs, contracting an independent testing laboratory to verify the performance ratings for the max-tech top-loading CCW model. The laboratory results (based on a 3-unit sample) suggested that the max-tech model achieves 1.63 MEF/8.4 WF. Based on this information, DOE revised the max-tech top-loading CCW level in the November 2009 SNOPR downward to 1.60 MEF/8.5 WF, a level proposed in the October 2008 NOPR as a "gap-fill" level and one which DOE concluded in the November 2009 SNOPR is attainable by the max-tech CCW model. For the November 2009 SNOPR, the proposed front-loading max-tech level was the same as in the October 2008 NOPR, whereas the proposed top-loading max-tech level was revised to 1.60 MEF/8.5 WF based on the independent test results. 74 FR 57738, 57744 (Nov. 9, 2009).

DOE received comments in response to the November 2009 SNOPR that objected to the max-tech efficiency level for top-loading CCWs based on lack of wash performance and consumer acceptance of the max-tech top-loading CCW model in a commercial laundry setting. DOE agrees that inherent in a determination of technological feasibility is performance related to the equipment's primary function (*i.e.,* cleaning clothes), but DOE considers as evidence of sufficient performance and consumer acceptance of the highest efficiency top-loading CCWs the presence on the market of two such models at or near the max-tech level proposed in the November 2009 SNOPR. Therefore, for today's final rule, the max-tech levels for both classes are the max-tech levels identified in the November 2009 SNOPR. These levels are shown in Table III.2 below. For more details on this selection of max-tech levels, see section IV.C.1.a of today's final rule.

TABLE III.2—COMMERCIAL CLOTHES WASHER MAX-TECH EFFICIENCY LEVELS

Equipment class	Max-tech level	
	MEF, ft^3/kW	WF, gal/ft^3
Top-Loading CCWs	1.60	8.5
Front-Loading CCWs	2.35	4.4

C. Energy Savings

DOE forecasted energy savings in its national energy savings (NES) analysis through the use of an NES spreadsheet tool, as discussed in the November 2009 SNOPR. 74 FR 57738, 57744 (Nov. 9, 2009).

One criterion that governs DOE's adoption of standards for CCWs is the standard must result in "significant" energy savings. (42 U.S.C. 6295(o)(3)(B) and 42 U.S.C. 6316(a)) While EPCA does not define the term "significant," the U.S. Court of Appeals for the District of Columbia, in *Natural Resources Defense Council* v. *Herrington,* 768 F.2d 1355, 1373 (D.C. Cir. 1985), indicated that Congress intended "significant" energy savings in this context to be savings that were not "genuinely trivial." DOE's estimates of the energy savings for the energy conservation standards adopted in today's final rule are nontrivial. Therefore, DOE considers them "significant" within the meaning of section 325 of EPCA.

D. Economic Justification

1. Specific Criteria

As noted earlier, EPCA provides seven factors to be evaluated in determining whether an energy conservation standard is economically justified. (42 U.S.C. 6295(o)(2)(B) and 42 U.S.C. 6316(a)) The following sections discuss how DOE has addressed each of those seven factors in this rulemaking.

a. Economic Impact on Commercial Consumers and Manufacturers

DOE considered the economic impact of the amended CCW standards on commercial consumers and manufacturers. For consumers, DOE measured the economic impact as the change in installed cost and life-cycle operating costs, *i.e.,* the LCC. (See sections IV.D and IV.E and chapter 8 of the TSD.) DOE investigated the impacts on manufacturers through the manufacturer impact analysis (MIA). (See sections IV.G and VI.C.2, and chapter 13 of the TSD.) The economic impact on commercial consumers and manufacturers is discussed in detail in the November 2009 SNOPR. 74 FR 57738, 57751–55, 57761–65, 57769–77 (Nov. 9, 2009).

b. Life-Cycle Costs

DOE considered life-cycle costs of CCWs, as discussed in the November 2009 SNOPR. 74 FR 57738, 57751–55 (Nov. 9, 2009). DOE calculated the sum of the purchase price and the operating expense—discounted over the lifetime of the equipment—to estimate the range in LCC benefits that commercial consumers would expect to achieve due to the standards.

c. Energy Savings

Although significant conservation of energy is a separate statutory requirement for imposing an energy conservation standard, EPCA also requires DOE, in determining the economic justification of a proposed standard, to consider the total projected energy savings that are expected to result directly from the standard (42 U.S.C. 6295(o)(2)(B)(i)(III) and 42 U.S.C. 6316(a)). As in the November 2009 SNOPR (74 FR 57738, 57755–61 (Nov. 9, 2009)), for today's final rule, DOE used the NIA spreadsheet results in its consideration of total projected savings that are directly attributable to the standard levels DOE considered.

d. Lessening of Utility or Performance of Equipment

In selecting today's standard levels, DOE sought to avoid new standards for CCWs that would lessen the utility or performance of that equipment (42 U.S.C. 6295(o)(2)(B)(i)(IV) and 42 U.S.C. 6316(a)). As with the November 2009 SNOPR (74 FR 57738, 57745 (Nov. 9, 2009)), today's standards do not involve changes in equipment design or unusual installation requirements that would reduce the utility or performance of CCWs.

e. Impact of Any Lessening of Competition

DOE considers any lessening of competition likely to result from standards. Accordingly, as discussed in the November 2009 SNOPR (74 FR 57738, 57745, 57762–63 (Nov. 9, 2009)), DOE requested that the Attorney General transmit to the Secretary a written determination of the impact, if any, of lessening of competition likely to result from the proposed standards, together with an analysis of the nature and extent of such impact (42 U.S.C. 6295(o)(2)(B)(i)(V) and (B)(ii) and 42 U.S.C. 6316(a)).

To assist the Attorney General in making such a determination, DOE provided the U.S. Department of Justice (DOJ) with copies of the November 2009 proposed rule and the TSD for review. The Attorney General's response is discussed in section VI.C.5 below, and is reprinted at the end of this rule. Impacts on manufacturers are also discussed in section IV.G below.

f. Need of the Nation to Conserve Energy

In considering standards for CCWs, the Secretary must consider the need of the Nation to conserve energy (42 U.S.C. 6295(o)(2)(B)(i)(VI) and 42 U.S.C. 6316(a)). The Secretary recognizes that energy conservation benefits the Nation in several important ways. The non-monetary benefits of the standards are likely to be reflected in improvements to the security and reliability of the Nation's energy system. Today's standards will also result in environmental benefits. As discussed in the November 2009 SNOPR, DOE has considered these factors in adopting today's standards. 74 FR 57738, 57765–67 (Nov. 9, 2009).

g. Other Factors

In determining whether a standard is economically justified, EPCA directs the Secretary to consider any other factors deemed relevant (42 U.S.C. 6295(o)(2)(B)(i)(VII) and 42 U.S.C. 6316(a)). In adopting today's amended standards, the Secretary found no relevant factors other than those identified elsewhere in today's final rule.

2. Rebuttable Presumption

Section 325(o)(2)(B)(iii) of EPCA states that there is a rebuttable presumption that an energy conservation standard is economically justified if the additional cost to the consumer that meets the standard level is less than three times the value of the first-year energy savings resulting from the standard (and water savings in the case of a water efficiency standard), as calculated under the applicable DOE test procedure (42 U.S.C. 6295(o)(2)(B)(iii) and 42 U.S.C. 6316(a)).

DOE's LCC and PBP analyses generate values that calculate the PBP for consumers of equipment meeting potential energy conservation standards, which includes, but is not limited to, the 3-year PBP contemplated under the rebuttable presumption test discussed above. (See chapter 8 of the TSD.) However, DOE routinely conducts a full economic analysis that considers the full range of impacts, including those to the consumer, manufacturer, Nation, and environment, as required under 42 U.S.C. 6295(o)(2)(B)(i) and 42 U.S.C. 6316(a). The results of this analysis serve as the basis for DOE to definitively evaluate the economic justification for a potential standard level (thereby supporting or rebutting the results of any preliminary determination of economic justification).

IV. Methodology and Discussion of Comments on Methodology

DOE used several previously developed analytical tools in setting today's standard. Each was adapted for this rule. One of these analytical tools is a spreadsheet that calculates LCC and PBP. Another calculates national energy savings and national NPV. A third tool is the Government Regulatory Impact Model (GRIM), the results of which are the basis for the MIA, among other methods. In addition, DOE developed an approach using the National Energy Modeling System (NEMS) to estimate impacts of energy efficiency standards for CCWs on electric utilities and the environment. The TSD appendices discuss each of these analytical tools in detail.

As a basis for this final rule, DOE has continued to use the spreadsheets and approaches explained in the November 2009 SNOPR. DOE used the same general methodology but has revised some of the assumptions and inputs for this final rule in response to comments from interested parties. The following paragraphs discuss these revisions.

A. Equipment Classes

In the October 2008 NOPR, DOE proposed separate equipment classes and accompanying standards for top-loading and front-loading CCWs with separate standards for each class. 73 FR 62034, 62036 (Oct. 17, 2008). DOE determined in the October 2008 NOPR that two equipment classes were warranted because the method of "loading" had been previously determined, under DOE rulemakings for residential clothes washers, to be a "feature," as defined by EPCA, and because an amended standard for a single equipment class might set the MEF for all CCWs at a level significantly higher than what the max-tech for top-loading machines can attain today, and effectively eliminate top-loading CCWs from the market. 73 FR 62034, 62049–50 (Oct. 17, 2008). This determination remained unchanged in the November 2009 SNOPR, 74 FR 57738, 57746–47, although DOE sought comment as to (1) whether the method of "loading" clothes washers, or any other characteristic commonly associated with traditional "top-loading" or "front-loading" clothes washers, such as presence or absence of agitators, ability to interrupt cycles, and possibly others, are "features" within the meaning of 42 U.S.C. 6295(o)(4) in EPCA; and (2) whether the availability of such feature(s) would likely be affected by eliminating the separate classes for these equipment types previously established by DOE. DOE received comments in response to the November 2009 SNOPR both in support of and opposed to establishing two equipment classes for CCWs. These comments are described in more detail in the following paragraphs.

The Association of Home Appliance Manufacturers (AHAM), GE Consumer & Industrial (GE),[7] Whirlpool Corporation (Whirlpool), and Alliance Laundry Systems (Alliance) stated that they support the definition of separate equipment classes for top-loading and front-loading CCWs. (AHAM, Public Meeting Transcript, No. 67.4 at p. 33; AHAM, No. 67.12 at p. 2;[8]; GE, Public Meeting Transcript, No. 67.4 at p. 44; GE, No. 67.9 at p. 1) Whirlpool, Public Meeting Transcript, No. 67.4 at p. 45; Whirlpool, No. 67.11 at p. 1; Alliance, Public Meeting Transcript, No. 67.4 at p. 46. AHAM stated that EPACT 2005 allows DOE to establish different classes, directing DOE to create "classes of products, depending on their energy use or performance characteristics." AHAM noted that there is a bimodal distribution of efficiencies between top-loading and front-loading CCWs. According to AHAM, the standards proposed for the front-load equipment class in terms of MEF and WF are beyond the capability of a traditional, or even a non-traditional, top-load CCW. (AHAM, Public Meeting Transcript, No. 67.4 at pp. 39–40; AHAM, No. 67.12 at pp. 2–3) GE, Whirlpool, and Alliance agree that DOE has the ability to define two CCW equipment classes. (GE, Public Meeting Transcript, No. 67.4 at p. 44; Whirlpool, Public Meeting Transcript, No. 67.4 at p. 45; Alliance, Public Meeting Transcript, No. 67.4 at p. 46). AHAM further stated that if DOE moves forward with a single equipment class, top-loading CCWs would not be able to meet a standard that would be fairly easy for front-loaders to achieve. With two equipment classes, energy and water savings could be achieved by both top-loaders and front-loaders, albeit at a different level. According to AHAM, this reduces the possibility that consumers would repair older, less efficient top-loading CCWs, because new high efficiency top-loaders would be available. (AHAM, Public Meeting Transcript, No. 67.4 at pp. 40–41; AHAM, No. 67.12 at p. 2.)

Alliance commented that " 'top-loading' is a 'feature' within the meaning of 42 U.S.C. 6295, because it provides consumers the opportunity to purchase lower cost CCWs." Alliance stated that purchase cost is a primary reason why top-loading clothes washers hold an approximate 65-percent market share, since consumers can choose the lower-cost design option of a top-loading door for a vertical-axis machine versus the higher-cost front-loading door design for a horizontal-axis machine. Alliance noted that there is one unique horizontal-axis design that incorporates a loading door on top that essentially opens a door on the side of the horizontally rotatable spin tub, but described this design as "unpopular." Alliance commented that, although the cost difference between vertical-axis and horizontal-axis models has decreased, a comparably featured standard capacity top-loader remains far less costly than a standard capacity front-loader due to the inherent differences in components. Alliance listed variable speed motors, sophisticated motor electronic controls, heavy mass weights, and door assembly costs as the key components contributing to the cost of front-loading designs. More specifically, Alliance stated that a front-loader door must incorporate high-temperature impact-resistant glass, a door/tub boot seal, a very sophisticated lock system, and a heavy-duty hinge system to withstand the abuse in a commercial environment. In contrast, Alliance described a top-loader door as a simple metal stamping

[7] In its December 9, 2009, letter, GE states that it "adopt[s] by reference the comments on the SNOPR that [it] understand[s] will be submitted by the Association of Home Appliance Manufacturers (AHAM) * * * " Therefore, comments submitted by AHAM, designated by comment number 67.12 in the docket for this rulemaking, should be interpreted as representing GE's and well as AHAM's views.

[8] A notation in the form "AHAM, No. 67.12 at p. 2" identifies a written comment (1) made by the Association of Home Appliance Manufacturers (AHAM), (2) recorded in document number 67.12 that is filed in the docket of this rulemaking (Docket No. EE–2006–STD–0127), maintained in the Resource Room of the Building Technologies Program, and (3) which appears on page 2 of document number 67.12.

with a low-cost hinge and a fairly simple micro-switch to remove power from the basket drive mechanism during spin. Additionally, Alliance stated that front-loaders require a "pedestal" to raise the loading door in response to consumer objections to stooping so far down. Alliance estimated the retail price of such a pedestal as $250, which along with an estimated $250 retail price difference between a baseline efficiency top-loader and a comparably featured front-loader, would result in a top-loader costing consumers at least $500 less than a front-loader. Therefore, Alliance concluded that top-loading is "undeniably" a feature for consumers because of its low cost. (Alliance, Public Meeting Transcript, No. 67.4 at pp. 46–48; Alliance, No. 66.4 Letter at pp. 1–2,[9] Alliance, No. 67.8 at p. 2.) Whirlpool described a top-loading horizontal-axis RCW as a rare configuration that is not produced or sold domestically by any major manufacturers of laundry equipment, and one that does not effectively meet the needs of either top-loading or front-loading RCW consumers. According to Whirlpool, the openings of such units are small and prone to snagging of clothes. Further, Whirlpool stated that this configuration is not available in CCWs. (Whirlpool, No. 67.11 at p. 4.)

Alliance also stated that top-loading is a "feature" because of its convenience to the user. A user is not required to stoop or bend to load a top-loader, and according to Alliance most consumers prefer this convenience, though no supporting data was provided. Alliance stated that another convenience is the ability to add a garment to a clothes load in a washer which has already initiated a wash cycle. For top-loaders, such action only requires lifting the lid to drop the item in. Alliance commented that most front-loaders require time to unlock the door and possibly drain the wash water, then require the user to stoop or bend to add the garment to the washer. (Alliance, Public Meeting Transcript, No. 67.4 at pp. 48–49; Alliance, No. 66.4 Letter at p. 2; Alliance, No. 67.8 at p. 2) Finally, Alliance commented that convenient cycle times, as defined by typical top-loading washers, are important to users. According to Alliance, front-loading washers have longer cycle times because there is less mechanical action in tumbling in a front-loading design than the vigorous mechanical action imparted by an agitator in a top-loading design. Alliance cited the February 2009 edition of *Consumer Reports* magazine as stating that "front-loader cycle times are getting longer; many take more than 90 minutes per load," and that the article shows that front-loader cycle times are 70–115 minutes compared to top-loader cycle times of 30–85 minutes. Alliance noted that all front-loaders in the *Consumer Reports* article with cycle times less than 85 minutes scored poorly in Consumer Union's "wash rating" compared to front-loaders with cycle times of 85 minutes or longer, while top-loaders with cycle times of 55 minutes achieved wash ratings of "good" to "very good." Alliance concludes that top-loader door location is associated with providing consumers with their expected good washing performance at a convenient washing cycle time of around 55 minutes. (Alliance, Public Meeting Transcript, No. 67.4 at p. 49; Alliance, No. 66.4 Letter at p. 2; Alliance, No. 67.8 at p. 3) GE agreed that cycle time and cost to the consumer are very important differentiators between top-loading and front-loading CCWs which, along with consumer preference, counsel in favor of maintaining the two separate equipment classes. (GE, Public Meeting Transcript, No. 67.4 at pp. 44–45) AHAM provided a similar consumer utility rationale in support of two equipment classes, specifying level of vibration, ergonomic factors (bending), history, and experience of use, cycle interruption, and preference as consumer utilities and functions. (AHAM, No. 67.12 at p. 3) Whirlpool agreed that vibration, ergonomics, cycle time, and familiarity are factors which consumers use in selecting top-loading CCWs, and added configuration, noise, value proposition, and sour smell. (Whirlpool, No. 67.11 at p. 1) Whirlpool also commented that it does not believe high efficiency top-loaders are viable in the commercial market because clothes rollover necessary for effective washing and rinsing is not possible in an overloaded machine. Whirlpool states that overloading is a common practice by CCW users because they are paying by the load. (Whirlpool, No. 67.11 at p. 4) Alliance also commented that, for the September 21, 2009, RCW Framework public meeting, Whirlpool had stated that one-fifth of consumers who bought a front-loading washer have gone back to a top-loading washer. (Alliance, No. 66.4 Letter at p. 2)

Whirlpool commented that, in addition to the impact on the user of a standard applicable to a single equipment class, there is also an impact on the route operators[10] and multi-housing complexes, most of which have specialized in either top-loading or front-loading CCWs. According to Whirlpool, a major reinvestment in terms of technical training and parts inventories would be required for those companies that have invested in top-loading CCWs if a standard resulted in the phaseout of such machines. Whirlpool also stated that CCWs are often refurbished and moved down-market, possibly multiple times during a particular unit's lifetime, making CCWs available to many socioeconomic classes. (Whirlpool, Public Meeting Transcript, No. 67.4 at p. 45; Whirlpool, No. 67.11 at p. 1; see also AHAM, No. 67.12 at p. 3) AHAM stated that route operators have accumulated expertise on either the top-loading or front-loading platform. (AHAM, No. 67.12 at p. 3)

Whirlpool also commented that separate equipment classes would be consistent with energy conservation standards for refrigeration, which have separate classes for side-by-side, top freezer, and bottom freezer refrigerators, and room air conditioners, since the product classes reflect home configuration, consumer choice, and consumer utility. (Whirlpool, Public Meeting Transcript, No. 67.4 at p. 46; Whirlpool, No. 67.11 at pp. 1–2) Earthjustice (EJ) stated that the separation in EPCA of refrigerator by method of access was codified by Congress as two distinct standards. According to EJ, because Congress enacted a single standard for all CCWs, what it chose to do for refrigerators is not entirely applicable to the CCW rulemaking. (EJ, Public Meeting Transcript, No. 67.4 at pp. 49–50)

EJ stated that Congress has provided several examples of the product attributes that it anticipated as constituting "features" under EPCA: "automatic defrost, through the door ice, size of room air conditioners, and noise levels." H. Rep. 100–11, at 23 (1987). EJ commented that this demonstrates that Congress indicated that the fact of access is a feature (for example, through the door ice), but did not suggest that the method of access is also a feature (for example, side-by-side versus stacked configuration refrigerators) within the meaning of 42 U.S.C. 6295(o)(4). (EJ, No. 67.5 at p. 5)

EJ commented that subparagraph (B) of 42 U.S.C. 6295(q)(1) is permissive, and provides that DOE "shall" create

[9] A notation in the form "Alliance, No. 66.4 Letter at pp. 1–2" identifies pages 1–2 of a written comment submitted by Alliance entitled "Is Top-Loading a Feature Within the Meaning of EPCA?" This letter was entered as comment number 66.4 in the docket for this rulemaking, along with a written comment submitted by Alliance entitled "Response to DOE Commercial Clothes Washer SNOPR."

[10] Route operators supply laundry equipment and maintain facilities in exchange for a percentage of the laundry revenue.

separate classes for products based on the presence of "a capacity or other performance-related feature" only if "such feature justifies a [different] standard." According to EJ, EPCA then sets out very expansive criteria for DOE to apply in determining whether a given feature justifies a unique standard. EJ stated that, although DOE must consider the utility of the feature, DOE is free to supplement this consideration with any other factors it deems appropriate. (EJ, No. 67.5 at p. 3)

EJ stated that 42 U.S.C. 6295(o)(4) provides that DOE may separate covered equipment into distinct classes when necessary to prohibit the adoption of standards that eliminate certain product attributes. EJ further stated that DOE's authority to adopt standards that group all varieties of the given covered equipment into a single class is only barred when such a standard is likely to result in the unavailability of features that are substantially the same as those currently available; *i.e.,* EPCA only mandates the creation of multiple equipment classes when the failure to do so would eliminate certain truly unique equipment attributes from the market. According to EJ, this statutory scheme forecloses an interpretation that EPCA mandates the designation of distinct equipment classes for top-loading and front-loading CCWs. (EJ, No. 67.5 at pp. 3–4) EJ provided four separate reasons why it believes 42 U.S.C. 6295(o)(4) prohibits DOE from adopting standards that would treat all CCWs as a single equipment class: (1) The method of loading a CCW is not a "feature" within the meaning of 42 U.S.C. 6295(o)(4) [11]; (2) the ability to load a CCW from the front is substantially the same as the ability to load from the top; (3) maintaining a single CCW category is not likely to lead to the unavailability of top-loaders; and (4) top-loading CCWs possess no other attributes requiring protection under 42 U.S.C. 6295(o)(4). (EJ, No. 67.5 at pp. 4–8)

EJ commented that if, for the sake of argument, the method provided to access a CCW is a "feature" within the meaning of 42 U.S.C. 6295(o)(4), it did not follow that EPCA would require separate equipment classes. EJ stated that, in enacting the EPCA language, Congress was "careful to note" that the "prohibition against grouping all varieties of a covered product into a single product class was a narrow one." (EJ, No. 67.5 at p. 6)

> A valid standard may entail some minor loss of characteristics, features, sizes, etc.; for this reason, the Act requires that "substantially the same," though not necessarily identical, characteristics or features should continue to be available. [42 U.S.C. 6295(o)(4)] also does not apply to trivial effects in which a standard might result.

H. Rep. 100–11, at 23 (1987).

According to EJ, the inclusion of this "substantially the same" language shows that Congress did not intend the resulting unavailability of any and every feature to be a barrier to the imposition of strong efficiency standards, but rather a standard would be barred only if it would have a substantial impact on product utility. EJ stated that the ability to access the CCW from the top is "substantially the same" as the ability to access the unit from the front because either delivers the same basic functionality of accessing the unit for loading and unloading. Thus EJ states that DOE is not barred from maintaining a single set of efficiency standards for all CCWs, even assuming that those standards would have the consequence of eliminating all top-loading CCWs from the market. (EJ, No. 67.5 at p. 6)

EJ also did not agree with AHAM's statement that a distinction in energy use between two types of CCWs would justify a separate equipment class. According to EJ, that would be at odds with the intent of EPCA. EJ stated that whenever two examples of equipment use different amounts of energy, the intent is for a standard to eliminate the one that uses too much energy. (EJ, Public Meeting Transcript, No. 67.4 at pp. 41–42)

EJ also commented that it is sensible to adopt a strong unitary standard that applies to both top-loading and front-loading CCWs. EJ stated that it had already made the case that the method of loading is not a feature under 42 U.S.C. 6295(o)(4), but even if DOE did determine that the method of loading is a feature, a strong standard would not eliminate top-loading CCWs from the market. (EJ, Public Meeting Transcript, No. 67.4 at pp. 42–43) EJ also commented on the recent Ninth Circuit decision reversing DOE's denial of the California Energy Commission's (CEC) petition for exemption from existing energy efficiency standards for RCWs and remanding the petition for further review.[12] EJ stated that the court, while not directly addressing the "features" issue, indicated that DOE can't just look at the market today, but must assess what the market will be when the standard takes effect. EJ stated that DOE would have to find by preponderance of the evidence that a strong standard would eliminate top-loaders from the market in 2013. EJ noted that it did not believe that top-loaders would be eliminated at that time, based on the existence of very efficient top-loading RCWs currently in the market. (EJ, Public Meeting Transcript, No. 67.4 at p. 43; EJ, No. 67.5 at pp. 6–7)

EJ further commented that no other attributes of CCWs which DOE identified in the November 2009 SNOPR as possibly providing consumer utility, such as the presence or absence of agitators and the ability to interrupt cycles, require protection under 42 U.S.C. 6295(o)(4). EJ stated that DOE has neither explained why the presence or absence of agitators would provide any consumer utility, nor considered that high efficiency CCWs may still be equipped with an agitator. EJ also stated that horizontal-axis CCWs available today are often able to be interrupted mid-cycle. In addition, EJ commented that, although Alliance cited an article which discussed cycle times for top-loaders and front-loaders, Alliance did not contend that the variation in cycle time is an issue for CCWs. EJ stated that the range of cycle times for top-loaders and front-loaders broadly overlap, and because front-loaders typically have a lower ending remaining moisture content (RMC) than top-loaders, the total washing and drying times required for top-loading and front-loading CCWs are likely to be equivalent. (EJ, No. 67.5 at p. 8)

The Pacific Gas and Electric Company, Southern California Gas Company, and San Diego Gas Company (the California Utilities) also supported a single equipment class, arguing for reasons similar to those articulated by EJ that the method of loading and other characteristics commonly associated with the method of loading are not features, and that a single class would not likely result in the unavailability of top-loading CCWs. (California Utilities, No. 67.10 at pp. 2–3) Further, the California Utilities stated that, although CCWs and RCWs are similar in technologies, design, and operating characteristics, a "feature" of RCWs is not necessarily a "feature" of CCWs. (California Utilities, No. 67.10 at p. 3)

[11] EJ stated that the method of loading a CCW is not a feature because: (1) DOE research on the public's valuation of clothes washer characteristics, presented in a December 2000 Technical Support Document, shows that door placement was not among the top ten most important attributes, and the value of this attribute is likely even lower now given the increased prevalence of front-loaders; (2) the FTC eliminated the distinction between top-loading and front-loading machines in its labeling requirements (65 FR 16134 (March 27, 2000)); and (3) the legislative history supports the conclusion that door placement is not a feature because examples cited suggest that while access itself may be a feature, the method of access is not. (EJ No. 67.5 at 4)

[12] California Energy Commission versus DOE, Case No. 07–71576 (October 28, 2009).

The California Utilities also asserted that the LCC savings of a single equipment class with standards at various front-loading TSLs could increase as much at $304 as compared to the LCC savings estimated for the standards proposed in the November 2009 SNOPR. According to the California Utilities and ASAP, American Council for an Energy-Efficiency Economy, American Rivers, National Consumer Law Center, Natural Resources Defense Council, Northeast Energy Efficiency Partnerships, and Seattle Public Utilities (the Joint Comment), cost-effectiveness of standards based on a single equipment class best serves long-term public interest. (California Utilities, No. 67.10 at p. 4; Joint Comment, No. 67.6 at p. 3)

The Joint Comment commented that DOE is concerned that at the highest TSL, significant numbers of potential consumers of front-loading CCWs would choose to purchase a less efficient top-loading CCW instead. (Joint Comment, No. 67.6 at p. 2) According to ASAP and the Joint Comment, this underscores the interchangeability between top-loading and front-loading CCWs in a commercial setting and that this interchangeability could be so broad and substantial that it would facilitate potential recapture of market share by less efficient but less expensive top-loaders. ASAP stated that the real distinction between top-loaders and front-loaders is price point rather than any specific consumer utility. Therefore, ASAP and the Joint Comment recommended a single equipment class for CCWs. ASAP also stated that route operators are operating in a one equipment class environment today, and managing the issues that Whirlpool identified. (ASAP, Public Meeting Transcript, No. 67.4 at pp. 46, 99–102; Joint Comment, No. 67.6 at pp. 2–3)

ASAP and the Joint Comment stated that the standard proposed for front-loaders is already met by almost 97 percent of the front-loaders on the market, and since DOE has seldom, if ever, proposed a standard that has such a low impact on the marketplace, ASAP suggests there are some difficulties in going forward with two equipment classes. (ASAP, Public Meeting Transcript, No. 67.4 at pp. 53–54; Joint Comment, No. 67.6 at p. 2) The California Utilities estimated that a single equipment class with standards set at 2.35 MEF/4.4 WF would achieve 50 percent more energy savings and over 200 percent more water savings over the next 30 years than the standards proposed in the November 2009 SNOPR, and that additional energy and water savings would be captured in future CCW rulemakings. (California Utilities, No. 67.10 at pp. 3–4)

Regarding impacts to competition as these impacts relate to the equipment class issue, EJ stated that it would not agree with DOE if the Department determines that a single standard cannot be adopted because of impacts to the manufacturers and impacts on competition. EJ and the Joint Comment believe those impacts are overstated. (EJ, Public Meeting Transcript, No. 67.4 at pp. 30–31; Joint Comment, No. 67.6 at pp. 4–5; see also California Utilities, No. 67.10 at pp. 4–5) EJ asserted that it is not only the lessening in competition, but rather the effects of such lessening, that DOE must consider. EJ stated that the DOJ, in its letter to DOE on this rulemaking, failed to consider low barriers to entry into the CCW market in its analysis of the impacts to competition, and that consequently, it would be irrational for DOE to conclude that a single standard would result in any significant impact on competition in the CCW market. (EJ, No. 67.5 at p. 9) EJ, ASAP, and the Joint Comment also asserted that DOE must consider adopting a tiered standard, or granting Alliance a temporary waiver, as ways to minimize any impacts on competition that may result from imposition of a single standard. (EJ, No. 67.5 at 9–10; ASAP, Public Meeting Transcript, No. 67.4 at pp. 166–167; Joint Comment, No. 67.6 at p. 6; see also California Utilities, No. 67.10 at pp. 4–5)

In response to the above comments, DOE notes that EPCA provides the criteria under which DOE may define classes for covered equipment:

> A rule prescribing an energy conservation standard for a type (or class) of covered products shall specify a level of energy use or efficiency higher or lower than that which applies (or would apply) for such type (or class) for any group of covered products which have the same function or intended use, if the Secretary determines that covered products within such group—
>
> • Consume a different kind of energy from that consumed by other covered products within such type (or class); or
>
> • Have a capacity or other performance-related feature which other products within such type (or class) do not have and such feature justifies a higher or lower standard from that which applies (or will apply) to other products within such type (or class).
>
> In making a determination under this paragraph concerning whether a performance-related feature justifies the establishment of a higher or lower standard, the Secretary shall consider such factors as the utility to the consumer of such a feature, and such other factors as the Secretary deems appropriate.

42 U.S.C. 6295(q); see also 6316(a).

As stated above, DOE concluded preliminarily in the October 2008 NOPR and the November 2009 SNOPR that separate equipment classes for top-loading and front-loading CCWs were warranted because the method of loading had been previously determined to be a "feature" under rulemakings for RCWs and a single standard would eliminate top-loading CCWs from the market. DOE analysis for this final rule, including evaluation of comments submitted by interested parties, has identified at least one consumer utility related to the method of loading clothes, specifically for CCWs, which represents a "feature" for purposes of 42 U.S.C. 6295(o)(4). Consequently, DOE has retained two equipment classes for CCWs for this standard.

Specifically, DOE believes that the longer cycle times of front-loading CCWs versus cycle times for top-loaders are likely to significantly impact consumer utility. In commercial and multi-housing settings, it is beneficial to consumers with multiple, sequential laundry loads to approximately match CCW cycle times to those of the dryers to maximize throughput and minimize wait times, and wash times of 70–115 minutes would be longer than most drying cycles. Because the longer wash cycle times for front-loaders arise from the reduced mechanical action of agitation as compared to top-loaders, DOE believes such longer cycles may be required to achieve the necessary cleaning, and thereby constitute a performance-related utility of front-loading CCWs versus top-loading CCWs under the meaning of 42 U.S.C. 6295(q).

DOE notes that access without stooping is not a consumer utility that would warrant the definition of separate equipment classes. DOE agrees that top-loaders eliminate the need for stooping, while front-loaders, in the absence of a pedestal, require such action. DOE further notes, however, that commercial clothes dryers are front-loading as well, so it believes that those consumers that dry their clothing loads are already accustomed to stooping. In addition, DOE observes that many laundromat and multi-housing applications have installed the CCWs on a platform to effect the same elevation as a manufacturer-supplied pedestal would, and that the cost of installing such a platform in the event that the owner/operator decides that preventing stooping is important is likely to be minimal.

DOE is aware that a top-loading, horizontal-axis CCW had been available previously. Due to the inherently higher efficiency of a horizontal-axis platform, it is likely that such a design could achieve a higher MEF and lower WF than the max-tech top-loading CCW

efficiency level assumed for this analysis. DOE research determined, however, that this particular washer platform was withdrawn from the market based on a lack of suitability for commercial settings. However, even if a top-loading, horizontal-axis CCW was again marketed, it is likely that such washers would have cycle times similar to those of other horizontal-axis machines and, therefore, would not likely provide substantially the same consumer utility as top-loading, vertical-axis machines.

DOE also does not consider first cost a "feature" that provides consumer utility for purposes of EPCA. DOE acknowledges that price is an important consideration to consumers, but DOE accounts for such consumer impacts in the LCC and PBP analyses conducted in support of this rulemaking.

Given the above discussion on cycle times, DOE concludes, consistent with its preliminary conclusion in the October 2007 NOPR and November 2008 SNOPR, that top-loading involves consumer utilities that, in the context of CCWs, are a feature for purposes of 42 U.S.C. 6295(o)(4). For the reasons stated in section VI.D of the preamble, DOE believes that the standards established for top-loading and front-loading CCWs achieve the maximum improvements in energy efficiency that are technologically feasible and economically justified. DOE further believes that the top-loading standard, set at the max-tech efficiency level, can be achieved by all manufacturers by the time compliance with the standards is required. Therefore, DOE concludes that top-loading CCWs would not be eliminated from the market by the amended energy conservation standards.

In response to the comments related to impacts on competition, DOE believes its analysis accurately describes the impacts of the various TSLs, including the standards established today, on the low-volume manufacturer (LVM). See section VI.C.2 of the preamble for further discussion of these impacts. In addition, EPCA does not permit DOE to establish a tiered standard for CCWs. 42 U.S.C. 6313(e)(2)(A)(ii) states that an amended standard for CCWs "shall apply to products manufactured 3 years after the date on which the final amended standard is published." DOE interprets this provision to mean that the amended standard must apply to all CCWs manufactured 3 years after the date of publication of this final rule, and that imposing some intermediate standard at that time (*i.e.,* 2013) and the final amended standard at some future date (*i.e.,* 2015) is not authorized. In contrast, 42 U.S.C. 6295(g)(4)(C) states in relevant part that amendments to the standards "shall apply to products manufactured after a date which is five years after" the effective date of the previous amendment. DOE believes that the phrase "*after* a date which is 5 years after" (emphasis added) may allow more flexibility for a tiered standard. DOE also believes that the provisions of 42 U.S.C. 7194 that allow for the grant of an exemption from an energy conservation standard promulgated by DOE are not an appropriate justification for the promulgation of a particular efficiency standard in the first instance.

B. Technology Assessment

For the technology assessment in the November 2009 NOPR analyses, DOE considered all RCW and CCW technology options that it was aware have been incorporated into working prototypes or commercially available clothes washers at the time of the analysis. DOE noted in the November 2009 SNOPR that it considered as design options many technologies that are found in both RCWs and CCWs. Of the technology options screened out, only suds-saving [13] has appeared previously as a feature in commercially available RCWs. DOE concluded in the November 2009 SNOPR that suds-savings was an RCW feature that was appropriately screened out for the CCW analysis. 74 FR 57738, 57747 (Nov. 9, 2009).

For the November 2009 SNOPR, DOE also gathered and analyzed data published by CEC, CEE, and the ENERGY STAR Program to provide an overview of the energy efficiency levels achieved in CCWs and RCWs. DOE found that all front-loading CCWs on the market at that time were more efficient than top-loading CCW models. No top-loading CCW listed in these databases had an MEF greater than 1.76, whereas the majority of front-loading CCWs were listed as having MEFs greater than 2.0. Similarly, no top-loading CCWs were rated as having a WF below 8.0, whereas the majority of front-loading CCWs had rated WFs below 7.0. In contrast, DOE research suggested that the most efficient vertical-axis RCWs achieved efficiency levels comparable to some horizontal-axis CCWs.[14] High efficiency, vertical-axis platforms that do not employ an agitator have been sold into the RCW market for several years, but have yet to be released in a CCW form. DOE noted in the November 2009 SNOPR that it expected manufacturers would continue to introduce new features first in the higher-volume residential markets before transitioning them to commercial applications. However, DOE noted that it is not aware of such technologies being incorporated in either commercially available CCWs or working CCW prototypes, and therefore did not consider them in the SNOPR analyses. DOE concluded in the November 2009 SNOPR that it believed it had adequately considered RCW technologies that may be applicable to CCWs in its technology assessment. 74 FR 57738, 57747–48 (Nov. 9, 2009).

Because DOE did not receive any comments on the technology options analyzed in the November 2009 SNOPR, DOE continues to conclude in today's final rule that it has adequately considered RCW technologies that may be applicable to CCWs in its technology assessment.

C. Engineering Analysis

The purpose of the engineering analysis is to characterize the relationship between the incremental manufacturing cost and efficiency improvements of CCWs. DOE used this cost-efficiency relationship as input to the PBP, LCC, and NES analyses. As discussed in the November 2009 SNOPR, DOE conducted the engineering analysis for this rulemaking using the efficiency-level approach, which provides the incremental costs of moving to higher energy efficiency levels, without regard to the particular design option(s) used to achieve such increases. For this analysis, DOE relied upon efficiency data published in multiple databases, including those published by CEC, CEE, and ENERGY STAR, which were supplemented with limited laboratory testing, data gained through engineering analysis, and

[13] A suds-saving feature allows water from one wash cycle to be reused in the next wash cycle. After agitation, sudsy wash water is pumped into a separate storage tub, remaining there until the next wash cycle. While the water is stored, soil settles to the bottom of the tub. During the next wash cycle, all but an inch of the water is pumped back into the washer tub for use again. Clothes washers with the suds-saving feature must be larger than typical clothes washers in order to accommodate the additional storage tub.

[14] Typically, vertical-axis clothes washers are accessed from the top (also known as "top-loaders"), while horizontal-axis clothes washers are accessed from the front (also known as "front-loaders"). However, a limited number of residential horizontal-axis clothes washers which are accessible from the top (using a hatch in the wash basket) are currently available, although DOE is unaware of any such CCWs on the market. For the purposes of this analysis, the terms "vertical-axis" and "top-loading" will be used interchangeably, as will the terms "horizontal-axis" and "front-loading." Additionally, clothes washers that have a wash basket whose axis of rotation is tilted from horizontal are considered to be horizontal-axis machines.

primary and secondary research. 74 FR 57738, 57748–51 (Nov. 9, 2009). Chapter 5 of the TSD contains a detailed discussion of the engineering analysis methodology.

1. Efficiency Levels

In the November 2009 SNOPR, DOE proposed the following efficiency levels for CCWs, shown in Table IV.1, in which the max-tech top-loading level was designated at efficiency level 2 (1.60 MEF/8.5 WF). The top-loading max-tech efficiency level representated a change from the max-tech level proposed in the October 2008 NOPR, based on DOE testing and analysis of the max-tech top-loading CCW model. No changes were made to the efficiency levels proposed in the October 2008 NOPR for front-loading CCWs in the November 2009 SNOPR.

TABLE IV.1—COMMERCIAL CLOTHES WASHER EFFICIENCY LEVELS PROPOSED FOR THE NOVEMBER 2009 SNOPR

Efficiency level	Modified energy factor, *ft³/kWh*/water factor, *gal/ft³*	
	Top-loading	Front-loading
Baseline	1.26/9.5	1.72/8.0
1	1.42/9.5	1.80/7.5
2	1.60/8.5	2.00/5.5
3	N/A	2.20/5.1
4	N/A	2.35/4.4

DOE noted in the November 2009 SNOPR that the max-tech top-loading CCW is currently marketed only to on-premise laundry facilities and is not yet offered with a coin-box or smart card reader option for laundromat or multi-housing laundry use. DOE research indicated that the max-tech CCW is based on a standard vertical-axis RCW platform (*i.e.,* one with an agitator) with similar construction and components as the CCW models marketed by that manufacturer to commercial laundromats. No proprietary technologies were observed, and, thus, DOE stated in the November 2009 SNOPR that it believes that all CCW manufacturers could market vertical-axis clothes washers with similar performance in time for the compliance date of the proposed rule. 74 FR 57738, 57749–50 (Nov. 9, 2009).

DOE research, conducted as part of the November 2009 SNOPR, also suggested that commercial acceptance depends on wash performance. DOE recognized that any amended energy conservation standard could result in a lessening of certain equipment utility and hence interviewed interested parties for the November 2009 SNOPR to better understand the potential impacts of energy efficiency strategies that manufacturers might employ in their equipment. Although interested parties suggested that the max-tech model does not provide acceptable washing and rinsing performance targets, especially when overloaded, they did not submit evidence of such performance degradation. 74 FR 57738, 57750 (Nov. 9, 2009).

EJ commented that, if top-loading CCWs are required to be retained in the commercial market under amended standards, DOE must consider a third standard level based on the performance of Alliance's best-performing top-loader.

Alliance stated that, while no industry standard performance test procedure exists for CCWs, it believes wash and rinse performance would be affected at the top-loading max-tech level, because the max-tech model does not allow true hot or warm water, unlike existing traditional CCWs which offer site-supplied hot water typically of 120 degrees Fahrenheit (°F) and above and user-acceptable 90 °F to 110 °F warm water. Alliance stated that the max-tech top-loading model only provides 108 °F to 112 °F water when the hot setting is selected, which Alliance considers to be warm water. Similarly, Alliance stated that when the user selects a warm setting on the max-tech top-loader, the unit only provides 71 °F to 73 °F wash water, which Alliance considers to be cold water. Alliance believes that CCW users that pay for hot water should receive hot water. Otherwise, CCW users could not clean clothes as well as consumers with access to RCWs. Further, Alliance commented that rinsing is minimal for the max-tech top-loader, unlike typical complete submersion of the clothes load that would allow sand, heavy sediment, or suds trapped between the layers to be properly removed. Alliance stated that the max-tech top-loading model has received almost no acceptance by the industry, based on comments it received from its top 20 multi-housing customers, and that DOE has not tested its ability to clean clothes. Therefore, Alliance believes that max-tech top-loader model is not appropriate for the commercial laundry market. (Alliance, Public Meeting Transcript, No. 67.4 at pp. 22–23, 29); Alliance, No. 66.4 at pp. 4, 7, 9; Alliance, No. 67.8 at p. 3).

Alliance stated that the front-loading max-tech efficiency level should have a WF of 5.0 rather than 4.4. Alliance stated that it tested a competitive front-loading CCW model that had a WF of 4.5 and found that it did not wet the center of the clothes load during the wash tumble portion of the cycle. Therefore, Alliance stated that consumer utility would be negatively affected. (Alliance, Public Meeting Transcript, No. 67.4 at pp. 139–140; Alliance, No. 67.8 at p. 3). Alliance further stated that consumer utility in a CCW must go beyond just getting clothes wetted, applying some mechanical action and then extraction of the moisture. Alliance commented that DOE did not assess if the proposed max-tech CCW cleans clothes to user expectations. According to Alliance, the ability of a CCW to clean clothes sufficiently is a central issue in this rulemaking, and stated that "A rulemaking will be overturned as arbitrary and capricious if 'the [agency] has failed to respond to specific challenges that are sufficiently central to its decision.'" *Horsehead Resource Dev. Co.* v. *Browner*, 16 F.3d 1246, 1263 (DC Cir 1994) (citations omitted). (Alliance, No. 66.4 at pp. 6–7).

GE commented that, while it supports the standards proposed in the November 2009 SNOPR for top-loading and front-loading CCWs, it is concerned that the max-tech top-loading CCW model is designed for on-premises laundry, which is a relatively limited segment of the commercial market. GE stated that the max-tech model has not been shown to be viable in the harsher laundromat environment where CCWs are subject to tougher conditions such as overloading. GE also requested DOE's test data on the max-tech top-loader model. (GE, Public

Meeting Transcript, No. 67.4 at p. 58; GE, No. 67.9 at pp. 1–2).

Whirlpool stated that a top-loading CCW max-tech level of 1.76 MEF/8.3 WF can be attained with sufficient investment of financial and human capital. However, Whirlpool considers this level a considerable stretch target that it has not achieved even in a prototype platform. Whirlpool believes that the front-loading CCW max-tech level could be slightly higher, since the CEE database lists a model at 2.23 MEF/4.3 WF. Whirlpool believes this level is at or near the capabilities of known technologies that are viable in the commercial environment. (Whirlpool, No. 67.11 at p. 2). Northwest Power and Conservation Council (NPCC) asked whether, because the max-tech top-loading CCW model did not meet its rated MEF and WF, DOE would consider testing units at other levels, particularly high-efficiency models, to make sure the performance is as advertised. (NPCC, Public Meeting Transcript, No. 67.4 at pp. 57–59).

In response, DOE notes that, in the absence of an accepted, standardized test procedure for CCW wash and rinse performance, it cannot evaluate the cleaning capabilities of various considered max-tech models. DOE agrees that proper wetting and distribution of the detergent and rinse water in the machine is critical for cleaning performance. However, DOE did not receive any evidence that the max-tech top-loading model does not achieve such action, only the inference that, because the unit employs spray rinse, that it would not exhibit acceptable rinse performance. DOE further notes that it did not receive any evidence that somewhat reduced water temperatures at hot and cold settings would preclude acceptable cleaning performance. DOE notes the existence of multiple wash and rinse performance standards such as AHAM HLW–1, but the industry has yet to come to a consensus regarding the minimum wash and rinse performance that an RCW or CCW should achieve. In the interim, DOE relies on manufacturers to market and sell only those products that they feel perform adequately.

DOE concluded for the November 2009 SNOPR that the performance of the top-loading CCW model was 1.63 MEF/8.4 MEF instead of the rated value of 1.76 MEF/8.3 WF on which the max-tech level for the October 2008 NOPR was based. DOE does not have evidence to suggest that any other CCWs currently on the market can achieve 1.76 MEF/8.3 WF, nor that technology exists to do so without significantly impacting cleaning performance. DOE based the selection of the top-loading max-tech level at efficiency level 2 on test results for the max-tech model and its belief that 1.60 MEF/8.5 WF represented the maximum CCW performance achievable by all manufacturers without material harm. At the time of the analysis, Alliance's highest efficiency top-loading CCW was rated at 1.55 MEF/8.6 WF. DOE believes that Alliance's model and the max-tech model incorporate similar technologies, and that the energy and water usage of the two models are not sufficiently different as to warrant the inclusion of an additional efficiency level slightly below the max-tech level. Given the constraints of the rulemaking schedule, DOE cannot evaluate an undetermined number of CCW models in order to confirm that no other unit which is rated at lower efficiencies than the proposed max-tech model could in actuality achieve higher performance, nor does DOE have any evidence, particularly regarding durability, to demonstrate that the max-tech top-loading CCW model, while designed for on-premises laundry applications, cannot be utilized successfully in other commercial laundry facilities such as laundromats or multi-family housing settings. Therefore, DOE has retained the max-tech top-loader efficiency level for today's final rule based on the max-tech top-loading CCW model proposed in the November 2009 SNOPR.

ASAP suggested that DOE should not limit consideration of max-tech models to CCWs, but that DOE should also consider clothes washer products from the residential market. According to ASAP, the distinctive nature of the CCW market has been characterized by the need for durability and resistance to overloading and misuse, which is typical of laundromats and multi-housing laundry rooms. But CCWs for on-premises laundry facilities are also being considered in this rulemaking, and they typically are subject to less harsh conditions than models destined for laundromats and multi-family housing, Thus, ASAP questioned why RCWs would not be considered for the max-tech levels if CCWs designed for on-premises laundry are. (ASAP, Public Meeting Transcript, No. 67.4 at pp. 61–62, 64–65) Southern California Gas Company (SCG) commented that DOE should consider durability as well as efficiency in selecting the max-tech models. (SCG, Public Meeting Transcript, No. 67.4 at p. 63) Additional comments regarding the applicability of RCWs in CCW application were received (along with other comments) from 20 route operators: All Valley Washer Services, Inc; Angel Coin Service, Inc.; Automatic Industries; Automatic Laundry Services Co., Inc.; B&H Coin Laundry Service; Caldwell and Gregory, LLC; CALECO; Cincinnati Coin Laundry, Inc.; Coin Meter Company; Commercial Laundries, Inc.; Continental Laundry Systems Incorporated; Excalibur Laundries, Inc.; F&B Coin Laundry Route; Family Pride Laundries; FMB Laundry, Inc.; Jetz Service Co., Inc.; Launderama, LLC; Laundry Equipment Corp.; National Coin Washer and Service Company, Inc.; and San Diego Laundry Equipment Co. (the Multiple Route Operators). These comments were originally sent to DOJ in response to the October 2008 NOPR, and were resubmitted by Alliance along with its own comments in response to the November 2009 SNOPR. Ninety-five percent of all route operators who commented on the November 2009 SNOPR stated that they did not consider RCWs suitable for CCW applications. The principal reasons given were the lack of durability, lack of resistance to vandalism, and other specified and unspecified performance issues. Most of the Multiple Route Operators expressed reluctance to try high efficiency top-loading clothes washers due to perceived wash performance issues. Additionally, several of the Multiple Route Operators stated that had tried out such washers and replaced them with regular top-loading clothes washers due to consumer complaints regarding wash performance and other issues. (Multiple Route Operators, No. 67.8, pp. 1–3 [15])

DOE notes that multiple manufacturers stated during interviews that high efficiency RCWs utilize technologies that are not suitable in harsher commercial settings such as laundromats and multi-family housing due to environmental factors such as overloading and abuse. Among these manufacturers were suppliers of high efficiency top-loading RCWs, *i.e.,* manufacturers that would face the lowest conversion costs in the industry to modify a given RCW model for CCW use. Additionally, DOE considered the comments submitted by the Multiple Route Operators with experience

[15] The Multiple Route Operators' letters were attached to the Alliance letter, comment number 67.8, in response to the November 2009 SNOPR. A notation in the form "Multiple Route Operators, No. 67.8 at pp. 1–3" identifies a written comment (1) made by some or all of the Multiple Route Operators, (2) recorded in document number 67.8 that is filed in the docket of this rulemaking (Docket No. EE–2006–STD–0127), maintained in the Resource Room of the Building Technologies Program, and (3) which appears on pages 1–3 of each of the letters submitted by the Multiple Route Operators.

utilizing high efficiency top-loading clothes washers in a commercial setting. Lastly, DOE received no evidence that all the technologies used in a max-tech top-loading RCW can be expected to be ready for inclusion in CCWs by the compliance date of today's final rule while offering similar or better wash performance, given the very different operational environments (short wash cycles, among other factors). Hence, DOE concludes that high efficiency top-loading RCW models should not be considered representative of the efficiency levels that top-loading CCWs can achieve until the technologies required to achieve such efficiency levels have been successfully demonstrated in CCWs.

For front-loaders, DOE observes that multiple models from several manufacturers, including Alliance, are rated with a WF of 4.5 or lower. DOE believes that the presence of these CCW models on the commercial market suggests that sufficient cleaning performance is able to be achieved at such WF levels. Further, DOE did not receive any evidence that the max-tech model, rated at a 4.4 WF, could not demonstrate wash performance on par with consumer utility requirements, nor if, in fact, it did not, that a WF of 5.0 would provide wash performance that would be deemed suitable, DOE notes that the max-tech level proposed in the November 2009 SNOPR had approximately 5 percent higher MEF and 2 percent higher WF than the model that Whirlpool suggests. While the proposed max-tech level therefore was slightly less stringent in terms of water consumption than the level Whirlpool suggested, DOE believes that the higher energy consumption of the proposed level is the primary factor to consider in defining a max-tech level. Therefore, DOE concluded that the max-tech levels proposed in the November 2009 SNOPR are technologically feasible, and it has retained the efficiency levels shown in Table IV.1 for today's final rule.

DOE received comments in response to the October 2008 NOPR that front-loading CCWs with electric heaters have an MEF of 1.96, which would not meet the proposed front-loading standards. According to these comments, consumers in some parts of the northern United States need such heaters to supplement their hot water supply in order to maintain proper wash temperatures despite very cold water supply temperatures. DOE indicated in the November 2009 SNOPR that it had received no data on the extent or size of this impact or of the affected population. DOE sought comment, including population and efficiency impact data, to describe this issue. 74 FR 57738, 57750 (Nov. 9, 2009)

Alliance and NPCC discussed whether a water heating CCW would be measured as having higher water heating energy consumption under the DOE clothes washer test procedure than a non-water heating CCW, given the inlet water temperature requirements. Alliance stated that the test procedure would require measurement of energy consumption with the heater on. (Alliance, Public Meeting Transcript, No. 67.4 at pp. 66–72)

Whirlpool stated that it does not produce any water heating CCWs and does not believe this is a significant segment of the market. In the absence of further data on the affected population or efficiency impacts, DOE is adopting energy conservation standards for front-loading CCWs both with and without electric heaters for the reasons discussed in section VI.D.

DOE did not receive further information regarding the market share or efficiency impact of water heating CCWs, but agrees that it likely does not represent a significant segment of the CCW market. In the absence of additional data, DOE determined that it will retain the max-tech front-loading CCW level that was proposed in the November 2009 SNOPR.

2. Manufacturing Costs

In the October 2008 NOPR, DOE presented manufacturing cost estimates based on the November 2007 ANOPR analysis, revised in response to detailed CCW manufacturer feedback obtained at the NOPR stage for equipment at each efficiency level. 73 FR 62034, 62055–56 (Oct. 17, 2008). These manufacturing costs were the basis of inputs for a number of other analyses in this rulemaking, including the LCC, national impact, and GRIM analyses.

As described in the October 2008 NOPR, DOE found that an LVM operates in both the residential and CCW markets. DOE considers this manufacturer to be low-volume because its annual shipments in the combined RCW and CCW market are significantly lower than those of its larger competitors. However, unlike its larger rivals, most of the LVM's unit shipments are in the CCW market, where the LVM has significant market share. Also unlike its diversified competitors, this company exclusively manufactures laundry equipment. A review of the Securities and Exchange Commission (SEC) 10–K documents filed by the LVM revealed that, as of 2005, this company derived 22 percent of its total revenue from the sale of front- and top-loading clothes washers and 87 percent of that income was from the commercial market.[16] As a result, the LVM could be affected disproportionately by any rulemaking concerning CCWs compared to its competitors, for whom CCWs represent less than 2 percent of total clothes washer sales. Alliance stated in response to the October 2008 NOPR that it is the LVM and that it has neither the purchasing power nor the funding to support wide-ranging research and development programs like those of its larger, more diverse rivals. As a result, the manufacturing costs for Alliance are inherently higher compared to those of its rivals. Alliance believes that the cost of compliance with the top-loading CCW standard proposed in the October 2008 NOPR would be especially high if Alliance were required to introduce non-traditional agitator designs to meet it. 74 FR 57738, 57762 (Nov. 9, 2009).

DOE research, conducted as part of the November 2009 SNOPR, suggests that the proposed efficiency level for vertical-axis clothes washers can be met with conventional, non-proprietary technology that is on the market today. Since the October 17, 2008 NOPR meeting, DOE received no further comments on the manufacturing cost curves. For the November 2009 SNOPR, DOE retained all cost estimates presented in the October 2008 NOPR at the retained efficiency levels, though each value was scaled by the Producer Price Index (PPI) multiplier for the commercial laundry equipment industry (NAICS 333312) between 2007 and 2008 to update the costs in the October 2008 NOPR to 2008$.[17] These are shown in Table IV.2.

[16] SEC documents pertaining to the LVM are available online at *http://sec.gov/*.

[17] PPI data is maintained by the Bureau of Labor Statistics and is available at http://*www.bls.gov/ppi/*

TABLE IV.2—COMMERCIAL CLOTHES WASHER INCREMENTAL MANUFACTURING COSTS PROPOSED IN NOVEMBER 2009 SNOPR

Efficiency level	Modified energy factor *ft³/kWh*/ water factor *gal/ft³*		Incremental cost $	
	Top-loading	Front-loading	Top-loading	Front-loading
Baseline	1.26/9.5	1.72/8.0	0.00	0.00
1	1.42/9.5	1.80/7.5	77.60	0.00
2	1.60/8.5	2.00/5.5	134.99	14.21
3	N/A	2.20/5.1	N/A	39.34
4	N/A	2.35/4.4	N/A	66.16

Because DOE did not receive any new information on the manufacturing cost curves, DOE retained all the incremental manufacturing costs presented in the November 2009 SNOPR at the retained efficiency levels for today's final rule. Table IV.3 shows these costs.

TABLE IV.3—COMMERCIAL CLOTHES WASHER INCREMENTAL MANUFACTURING COSTS

Efficiency level	Modified energy factor *ft³/kWh*/ water factor *gal/ft³*		Incremental cost $	
	Top-loading	Front-loading	Top-loading	Front-loading
Baseline	1.26/9.5	1.72/8.0	0.00	0.00
1	1.42/9.5	1.80/7.5	77.60	0.00
2	1.60/8.5	2.00/5.5	134.99	14.21
3	N/A	2.20/5.1	N/A	39.34
4	N/A	2.35/4.4	N/A	66.16

D. Life-Cycle Cost and Payback Period Analysis

In response to the requirements of section 325(o)(2)(B)(i) of the Act, DOE conducted LCC and PBP analyses to evaluate the economic impacts of possible amended energy conservation standards on CCW consumers. This section of the notice describes these analyses. DOE conducted the analysis using a spreadsheet model developed in Microsoft (MS) Excel for Windows 2007.

The LCC is the total consumer expense over the life of the equipment, including purchase and installation expense and operating costs (energy and water expenditures, repair costs, and maintenance costs). The PBP is the number of years it would take for the consumer to recover the increased costs of a higher-efficiency equipment through energy savings. To calculate the LCC, DOE discounted future operating costs to the time of purchase and summed them over the lifetime of the equipment. DOE measured the change in LCC and the change in PBP associated with a given efficiency level relative to a base case forecast of equipment efficiency. The base case forecast reflects the market in the absence of amended mandatory energy conservation standards. As part of the LCC and PBP analyses, DOE developed data that it used to establish equipment prices, installation costs, annual energy consumption, energy and water prices, maintenance and repair costs, equipment lifetime, and discount rates.

Commenting on DOE's use of LCC and PBP results to evaluate the economic impacts of possible amended energy conservation standards on CCW consumers, Mr. Gayer stated that if the private benefits to consumers of a more efficient CCW outweigh the private costs of a more efficient CCW, then there will be a market for high efficiency CCWs and regulation would not be necessary. He added that if consumers are unwilling to purchase a high efficiency CCW without the regulation, then this suggests they are not willing to pay the higher CCW price in order to accrue lower future energy costs. (Gayer, No. 67.7 at p. 1)

DOE agrees with the observation that many CCW purchasers are unwilling to pay the higher cost of a more efficient CCW in the face of potential operating savings benefits. DOE disagrees that this implies that it is using the wrong cost of capital in its analysis. DOE does not in general assume in its analysis that unregulated markets will equilibrate to a state where consumer decisions are perfectly aligned with private benefits and costs. DOE estimated the cost of capital based on information regarding the cost of borrowing and the opportunity cost of investment for CCW owners. Based on this cost of capital, DOE found that the operating cost benefits for many CCWs exceed the burden of increased initial costs for more efficient CCWs for many consumers who are currently using low-cost, low-efficiency CCWs. There are several possible reasons for the disparity between observed consumer behavior and the results of DOE's consumer financial analysis which may include: (1) Limited consumer information and information processing capabilities and (2) the high transaction costs of fully evaluating LCC and other characteristics of available CCWs prior to purchase or lease. In addition, there remain a number of environmental externalities that are not currently reflected in energy and water prices, which cannot be considered by consumers and which are not included in DOE's LCC and PBP analyses.. DOE did not receive or obtain sufficient information to provide a detailed explanation of why CCW purchasers tend to minimize first costs in the face of financially feasible gains that are likely to accrue from increased energy efficiency. DOE believes that its use of LCC and PBP results to evaluate the economic impacts of possible amended energy conservation standards on CCW consumers is appropriate given the information that is available.

DOE was unable to develop a survey-based consumer sample for CCWs because the U.S. Energy Information Administration's (EIA) *Commercial Building Energy Consumption Survey* (CBECS) does not provide the necessary

data to develop one.[18] Instead, DOE established the variability and uncertainty in energy and water use by defining the uncertainty and variability in the use (cycles per day) of the equipment. The variability in energy and water pricing was characterized by regional differences in energy and water prices. DOE calculated the LCC associated with a baseline CCW. To calculate the LCC savings and PBP associated with equipment meeting higher efficiency standards, DOE substituted the baseline unit with a more efficient design.

Table IV.4 summarizes the approaches and data DOE used to derive the inputs to the LCC and PBP calculations for the November 2009 SNOPR. For today's final rule, DOE did not introduce changes to either the LCC and PBP analyses methodology described in the November 2009 SNOPR or the inputs to the analysis. Chapter 8 of the TSD contains detailed discussion of the methodology utilized for the LCC and PBP analyses as well as the inputs developed for the analyses.

TABLE IV.4—SUMMARY OF INPUTS AND KEY ASSUMPTIONS IN THE LCC AND PBP ANALYSES

Inputs	November 2009 SNOPR	Changes for the final rule
Affecting Installed Costs		
Equipment Price	Derived by multiplying manufacturer cost by manufacturer, distributor markups, and sales tax.	No change.
Installation Cost	Baseline cost updated with RS Means *Mechanical Cost Data,* 2008	No change
Affecting Operating Costs		
Annual Energy and Water Use	Per-cycle energy and water use based on MEF and WF levels. Disaggregated into per-cycle machine, dryer, and water heating energy using data from DOE's 2000 TSD for residential clothes washers. Annual energy and water use determined from the annual usage (number of use cycles). Usage based on several studies including research sponsored by MLA[19] and the Coin Laundry Association[20] (CLA). Different use cycles determined for multi-family and laundromat equipment applications.	No change.
Energy and Water/Wastewater Prices	Electricity: Updated using EIA's 2007 Form 861 data Natural Gas: Updated using EIA's 2007 *Natural Gas Monthly*. Water/Wastewater: Updated using RFC/AWWA's 2006 *Water and Wastewater Survey*. Variability: Regional energy prices determined for 13 regions; regional water/wastewater price determined for four regions.	No change.
Energy and Water/Wastewater Prices Trends.	Energy: Reference Case forecast updated with EIA's *AEO 2009* April Release. High-Growth and Low-Growth forecasts updated with EIA's *AEO 2009* March Release. Water/Wastewater: Linear extrapolation of 1970–2008 historical trends in national water price index. For the four years after 2008, fixed the annual price to the value in 2008 to prevent a dip in the forecasted prices.	No change.
Repair and Maintenance Costs	Estimated annualized repair costs for each efficiency level based on half the equipment lifetime divided by the equipment lifetime.	No change.
Affecting Present Value of Annual Operating Cost Savings		
Equipment Lifetime	Based on data from various sources including the CLA. Different lifetimes established for multi-family and laundromat equipment applications. Variability and uncertainty characterized with Weibull probability distributions.	No change.
Discount Rates	Approach based on cost of capital of publicly traded firms in the sectors that purchase CCWs. Primary data source is Damodaran Online.[21]	No change.
Affecting Installed and Operating Costs		
Effective Date of New Standard	2013	No change.
Base-Case Efficiency Distributions	Analyzed as two equipment classes: top-loading and front-loading. Distributions for both classes based on the number of available models at the efficiency levels. Top-Loading: 64.8% at 1.26 MEF/9.5 WF; 33.8% at 1.42 MEF/9.5 WF; 1.4% at 1.60 MEF/8.5 WF. Front-Loading: 3.5% at 1.72 MEF/8.0 WF; 0.0% at 1.80 MEF/7.5 WF; 73.7% at 2.00 MEF/5.5 WF; 22.8% at 2.20 MEF/5.1 WF; 0.0% at 2.35 MEF/4.4 WF.	No change.

[19] Please see the following Web site for further information: *http://www.mla-online.com/.*
[20] Please see the following Web site for further information: *http://www.coinlaundry.org/.*
[21] Please see the following Web site for further information: *http://pages.stern.nyu.edu/~adamodar/.*

1. Equipment Prices

To calculate the equipment prices faced by CCW purchasers, DOE multiplied the manufacturing costs developed from the engineering analysis by the supply chain markups it developed (along with sales taxes). DOE used the same supply chain markups for today's final rule that were developed

[18] Available online at: *http://www.eia.doe.gov/emeu/cbecs/.*

for the November 2009 SNOPR. See chapter 7 of the TSD for additional information. To calculate the final installed prices, DOE added installation cost to the equipment prices.

2. Installation Cost

Installation costs include labor, overhead, and any miscellaneous materials and parts. For the November 2009 SNOPR and today's final rule, DOE used data from the RS Means *Mechanical Cost Data,* 2008 on labor requirements to estimate installation costs for CCWs.[22] DOE estimates that installation costs do not increase with equipment efficiency.

3. Annual Energy Consumption

DOE determined the annual energy and water consumption of CCWs by multiplying the per-cycle energy and water use by the estimated number of cycles per year. In the November 2009 SNOPR, DOE concluded that the use of the existing RCW test procedure provides a representative basis for rating and estimating the per-cycle energy use of CCWs. For today's final rule, DOE maintained the same approach.

4. Energy and Water Prices

a. Energy Prices

DOE derived average electricity and natural gas prices for 13 geographic areas consisting of the nine U.S. Census divisions, with four large States (New York, Florida, Texas, and California) treated separately.

For the November 2009 SNOPR and today's final rule, DOE estimated commercial electricity prices for each of the 13 geographic areas based on 2007 data from EIA Form 861, *Annual Electric Power Industry Report.*[23] DOE calculated an average commercial electricity price by first estimating an average commercial price for each utility, and then calculated a regional average price by weighting each utility with consumers in a region by the number of commercial consumers served in that region.

For the November 2009 SNOPR and today's final rule, DOE estimated average commercial natural gas prices in each of the 13 geographic areas based on 2007 data from the EIA publication *Natural Gas Monthly.* [24] DOE calculated an average natural gas price for each area by first calculating the average prices for each State, and then calculating a regional price by weighting each State in a region by its population.

To estimate the trends in electricity and natural gas prices for the November 2009 SNOPR and today's final rule, DOE used the price forecasts in the *AEO 2009* April Release.[25] To arrive at prices in future years, DOE multiplied the average prices described above by the forecast of annual average price changes. Because the *AEO* forecasts prices only to 2030, DOE followed past guidelines provided to the Federal Energy Management Program by EIA and used the average rate of change during 2020–2030 to estimate the price trends beyond 2030.

The spreadsheet tools used to conduct the LCC and PBP analysis allow users to select either the *AEO's* high-growth case or low-growth case price forecasts to estimate the sensitivity of the LCC and PBP to different energy price forecasts. The *AEO 2009* April Release provides only forecasts for the Reference Case. Therefore, for the November 2009 SNOPR and today's final rule, DOE used the *AEO 2009* March Release high-growth case or low-growth forecasts to estimate high-growth and low-growth price trends.

b. Water and Wastewater Prices

DOE obtained commercial water and wastewater price data from the *Water and Wastewater Rate Survey* conducted by Raftelis Financial Consultants (RFC) and the American Water Works Association (AWWA). For the November 2009 SNOPR and today's final rule, DOE used the 2006 *Water and Wastewater Rate Survey.*[26] The survey covers approximately 300 water utilities and 200 wastewater utilities, with each industry analyzed separately. DOE calculated values at the Census region level (Northeast, South, Midwest, and West). Edison Electric Institute (EEI) questioned why water and wastewater prices were not developed at the Census division level. (EEI, Public Meeting Transcript, No. 40.5, p. 103 and p. 178) The samples that DOE obtained of 200–300 utilities are not large enough to calculate regional prices for all U.S. Census divisions and large States. Hence, DOE was only able to capture the variability of water and wastewater prices at the Census region level.

To estimate the future trend for water and wastewater prices, DOE used data on the historic trend in the national water price index (U.S. city average) provided by the Bureau of Labor Statistics (BLS). For the October 2008 NOPR, DOE extrapolated a future trend based on the linear growth from 1970 to 2007. For the SNOPR, DOE continued to use the BLS historical data, which now provides data for the year 2008, and extrapolated the future trend based on the linear growth from 1970 to 2008. But rather than use the extrapolated trend to forecast the prices for the four years after 2008, DOE pinned the annual price to the value in 2008. Otherwise, forecasted prices for this 4-year time period would have been up to 8 percent lower than the price in 2008. Estimating prices in this manner is appropriate because it is consistent with the historical trend that demonstrates that prices do not decrease over time. Beyond the 4-year time period, DOE used the extrapolated trend to forecast prices out to the year 2043. DOE continued to use the above approach for today's final rule.

5. Repair and Maintenance Costs

Repair costs are associated with repairing or replacing components that have failed in the appliance, whereas maintenance costs are associated with maintaining the operation of the equipment. DOE was unable to gather any empirical data specific to CCWs to estimate repair and maintenance cost. For the October 2008 NOPR and the November 2009 SNOPR, DOE included increased repair costs based on an algorithm developed by DOE for central air conditioners and heat pumps and which was also used for residential furnaces and boilers.[27] This algorithm calculates annualized repair costs by dividing half of the equipment retail price over the equipment lifetime. In the absence of better data, DOE retained its approach from the November 2009 SNOPR for today's final rule.

6. Equipment Lifetime

For the November 2009 SNOPR and today's final rule, DOE used a variety of sources to establish low, average, and high estimates for equipment lifetime. The average CCW lifetime was 11.3 years for multi-family applications, and 7.1 years in laundromat applications. DOE characterized CCW lifetimes with Weibull probability distributions.

[22] Available online at: *http://www.rsmeans.com/bookstore/.*

[23] Available online at: *http://www.eia.doe.gov/cneaf/electricity/page/eia861.html.*

[24] Available online at: *http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/natural_gas_monthly/ngm.html.*

[25] All AEO publications are available online at: *http://www.eia.doe.gov/oiaf/aeo/.*

[26] Raftelis Financial Consultants, Inc., *2006 RFC/AWWA Water and Wastewater Rate Survey, 2006,* (2006). This document is available at: *http://www.raftelis.com/ratessurvey.html.*

[27] U.S. Department of Energy, Technical Support Document: Energy Efficiency Standards for Consumer Products: Residential Central Air Conditioners and Heat Pumps (May 2002) chapter 5. This document is available at: *http://www.eere.energy.gov/buildings/appliance_standards/residential/ac_central_1000_r.html.*

7. Discount Rates

To establish discount rates for CCWs for the November 2009 SNOPR and today's final rule, DOE estimated the cost of capital of publicly traded firms in the sectors that purchase CCWs as the weighted average of the cost of equity financing and the cost of debt financing. DOE identified the following sectors purchasing CCWs: (1) Educational services; (2) hotels; (3) real estate investment trusts; and (4) personal services. DOE estimated the weighted-average cost of capital (WACC) using the respective shares of equity and debt financing for each sector that purchases CCWs. It calculated the real WACC by adjusting the cost of capital by the expected rate of inflation. To obtain an average discount rate value, DOE used additional data on the number of CCWs in use in various sectors. DOE estimated the average discount rate for companies that purchase CCWs at 5.7 percent.

8. Effective Date of the Amended Standards

The compliance date is the future date when parties subject to the requirements of a new standard must begin compliance. For the November 2009 SNOPR, DOE expected that the final rule will be published by January 1, 2010, as required by EPACT 2005, with compliance with new standards required by January 1, 2013. For today's final rule, DOE used the same date for compliance. DOE calculated the LCC for CCW consumers as if they would purchase new equipment in the year after the standard takes effect.

9. Equipment Energy Efficiency in the Base Case

For the LCC and PBP analysis, DOE analyzes higher efficiency levels relative to a baseline efficiency level. However, some consumers may already purchase equipment with efficiencies greater than the baseline equipment levels. Thus, to accurately estimate the percentage of consumers that would be affected by a particular standard level, DOE estimates the distribution of equipment efficiencies that consumers are expected to purchase under the base case (*i.e.,* the case without new energy efficiency standards). DOE refers to this distribution of equipment energy efficiencies as a base-case efficiency distribution. As discussed previously in section IV.A, DOE decided to analyze CCWs with two equipment classes—top-loading CCWs and front-loading CCWs. For the November 2009 SNOPR and today's final rule, DOE used the number of available models within each equipment class to establish the base-case efficiency distributions. Table IV.5 presents the market shares of the efficiency levels in the base case for CCWs. See chapter 8 of the TSD for further details on the development of CCW base-case market shares.

TABLE IV.5—COMMERCIAL CLOTHES WASHERS: BASE CASE MARKET SHARES

Top-loading				Front-loading			
Standard level	MEF	WF	Market share %	Standard level	MEF	WF	Market share %
Baseline	1.26	9.50	64.8	Baseline	1.72	8.00	3.5
1	1.42	9.50	33.8	1	1.80	7.50	0.0
2	1.60	8.50	1.4	2	2.00	5.50	73.7
				3	2.20	5.10	22.8
				4	2.34	4.40	0.0

10. Split Incentive Between CCW Consumers and Users

Under a split incentive situation, the party purchasing more efficient and presumably more expensive equipment (referred to as "consumers" in this notice) may not realize the operating cost savings from that equipment, because another party may pay the utility bill. Such a situation exists in segments of the CCW market. In comments on the October 2008 NOPR, Whirlpool and Alliance stated that those who own CCWs (usually route operators) often do not incur the operating costs as do, generally, laundromats and owners of multi-family dwellings. 73 FR 62067 (Oct. 17, 2008). Recognizing this, DOE evaluated the ability of CCW consumers to pass on the higher purchase costs of more expensive CCWs and concluded that few route operators would allow themselves to be held to a lease agreement that would prevent them from recovering the cost of more efficient CCW equipment. That is, DOE believes that these CCW consumers would be able to realize a significant share of the operating cost savings from more-efficient equipment. The Joint Comment stated that contracts between route operators and multi-housing property owners are subject to revision and renewal, and that the division of coin-box revenue may be renegotiated to allow for the savings achieved by more-efficient CCWs to be equitably shared between the purchasers/owners of the machines (route operators) and the parties responsible for paying electric, gas, water, and sewer bills (property owners). (Joint Comment, No. 67.6 at p. 3) DOE agrees with the above comment, and continues to conclude that CCW consumers would be able to realize a significant share of the operating cost savings from more-efficient equipment.

11. Rebound Effect

The rebound effect occurs when a piece of equipment, made more efficient and used more intensively, does not yield the expected energy savings from the efficiency improvement. In the case of more efficient clothes washers, limited research indicates that there is no rebound effect for RCWs, although the consumer may choose to purchase larger models with more features that would result in higher energy use.[28] DOE did not receive any comments from interested parties on the issue of the rebound effect for CCWs. Based on the limited research showing no rebound effect for RCWs, DOE did not include a rebound effect in its analysis of CCW standards.

12. Inputs to Payback Period Analysis

The PBP is the amount of time (expressed in years) it takes the consumer to recover the additional installed cost of more efficient equipment through operating cost savings, compared to baseline equipment. The simple PBP does not account for changes in operating expense over time or the time value of money. The inputs to the PBP calculation are the total installed cost of the equipment to the consumer for each efficiency level and the annual (first-

[28] L.A. Greening, D.L. Greene, and C. Difiglio. "Energy efficiency and consumption—the rebound effect—a survey." *Energy Policy* 28 (2000) 389–401. Available for purchase at *http://www.elsevier.com/locate/enpol.*

year) operating expenditures for each efficiency level. For the November 2009 SNOPR and today's final rule, the PBP calculation uses the same inputs as the LCC analysis, except that energy price trends and discount rates are not needed.

13. Rebuttable-Presumption Payback Period

As noted above, EPCA, as amended (42 U.S.C. 6295(o)(2)(B)(iii) and 6316(a)), establishes a rebuttable presumption that a standard is economically justified if the Secretary finds 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 test procedure in place for that standard. For each TSL, DOE determined the value of the first year's energy savings by calculating the quantity of those savings in accordance with DOE's test procedure, and multiplying that amount by the average energy price forecast for the year in which a new standard would be first effective—in this case, 2013.

E. National Impact Analysis—National Energy Savings and Net Present Value Analysis

1. General

DOE's NIA assesses the national energy savings, as well as the national NPV of total consumer costs and savings, expected to result from new standards at specific efficiency levels. DOE applied the NIA spreadsheet to perform calculations of energy savings and NPV, using the annual energy consumption and total installed cost data from the LCC analysis. DOE forecasted the energy savings, energy cost savings, equipment costs, and NPV for each equipment class from 2013 to 2043. The forecasts provide annual and cumulative values for all four parameters. In addition, DOE incorporated into its NIA spreadsheet the capability to analyze sensitivity of the results to forecasted energy prices and equipment efficiency trends. Table IV.6 summarizes the approach and data DOE used to derive the inputs to the NES and NPV analyses for the November 2009 SNOPR. DOE made no changes to the analyses for today's final rule. (See chapter 11 of the final rule TSD for further details.)

TABLE IV.6—APPROACH AND DATA USED TO DERIVE THE INPUTS TO THE NATIONAL ENERGY SAVINGS AND NPV ANALYSES

Inputs	2009 SNOPR Description	Changes for the final rule
Shipments	Annual shipments from Shipments Model	No change.
Effective Date of Standard	2013	No change.
Base-Case Forecasted Efficiencies	Shipment-weighted efficiency (SWEF) determined in the year 2005. SWEF held constant over forecast period.	No change.
Standards-Case Forecasted Efficiencies.	Analyzed as two equipment classes. For each equipment class, roll-up scenario used for determining SWEF in the year that standards become effective for each standards case. SWEF held constant over forecast period.	No change.
Annual Energy Consumption per Unit	Annual weighted-average values as a function of SWEF	No change.
Total Installed Cost per Unit	Annual weighted-average values as a function of SWEF	No change.
Energy and Water Cost per Unit	Annual weighted-average values as a function of the annual energy consumption per unit and energy (and water) prices.	No change.
Repair Cost and Maintenance Cost per Unit.	Incorporated changes in repair costs as a function of efficiency	No change.
Escalation of Energy and Water/Wastewater Prices.	Energy Prices: Updated to *AEO 2009* April Release forecasts for the Reference Case. *AEO 2009* April Release does not provide High-Growth and Low-Growth forecasts; used *AEO 2009* March Release High-Growth and Low-Growth forecasts to estimate high- and low-growth price trends.	
	Water/Wastewater Prices: Linear extrapolation of 1970–2008 historical trends in national water price index. For the four years following 2013, fixed the annual price to the value in 2008 to prevent a dip in the forecasted prices.	No change.
Energy Site-to-Source Conversion	Conversion varies yearly and is generated by DOE/EIA's NEMS program (a time-series conversion factor; includes electric generation, transmission, and distribution losses).	No change.
Effect of Standards on Energy Prices	Determined but found not to be significant	No change.
Discount Rate	3% and 7% real	No change.
Present Year	Future expenses discounted to year 2009	No change.

2. Shipments

The shipments portion of the NIA Spreadsheet is a Shipments Model that uses historical data as a basis for projecting future shipments of the equipment that are the subject of this rulemaking. In projecting CCW shipments, DOE accounted for three market segments: (1) New construction; (2) existing buildings (*i.e.,* replacing failed equipment); and (3) retired units not replaced. DOE used the non-replacement market segment to calibrate the Shipments Model to historical shipments data. For purposes of estimating the impacts of prospective standards on equipment shipments (*i.e.,* forecasting standards-case shipments) DOE considered the combined effects of changes in purchase price, annual operating cost, and household income on the magnitude of shipments.

Table IV.7 summarizes the approach and data DOE used to derive the inputs to the shipments analysis for the November 2009 SNOPR, and the changes it made for today's final rule. The general approach for forecasting CCW shipments for today's final rule remains unchanged from the November 2009 SNOPR. That is, all CCW shipments (for both equipment classes) were estimated for the new construction, replacement, and non-replacement markets. DOE then allocated shipments to each of the two equipment classes based on the market share of each class. For the November 2009 SNOPR, DOE estimated that top-loading washers comprise 70 percent of the market while front-loading washers

comprise 30 percent. DOE estimated that the equipment class market shares would remain unchanged over the time period 2005–2043.

TABLE IV.7—APPROACH AND DATA USED TO DERIVE THE INPUTS TO THE SHIPMENTS ANALYSIS

Inputs	2009 SNOPR description	Changes for the final rule
Number of Equipment Classes.	Two: top-loading washers and front-loading washers. Shipments forecasts established for all CCWs and then disaggregated into the two equipment classes based on the market share of top- and front-loading washers. Updated market share data based on SEC 10K report of the LVM and tax credits claimed by the LVM for producing high-efficiency CCWs. Market share determined to be 70% top-loading and 30% front-loading. Equipment class market shares held constant over forecast period.	No change.
New Construction Shipments.	Determined by multiplying multi-housing forecasts by forecasted saturation of CCWs for new multi-housing. Multi-housing forecasts with *AEO 2009* April Release forecasts for the Reference Case. Verified frozen saturations with data from the U.S. Census Bureau's *American Housing Survey* (AHS) for 1997–2005.	No change.
Replacements	Determined by tracking total equipment stock by vintage and establishing the failure of the stock using retirement functions from the LCC and PBP analysis. Retirement functions revised to be based on Weibull lifetime distributions.	No change.
Retired Units not Replaced (*i.e.,* non-replacements).	Used to calibrate Shipments Model to historical shipments data. Froze the percentage of non-replacements at 15 percent for the period 2007–2043 to account for the increased saturation rate of in-unit washers in the multi-family stock between 1997 and 2005 timeframe shown by the AHS.	No change.
Historical Shipments	Data sources include AHAM data submittal, *Appliance Magazine,* and U.S. Bureau of Economic Analysis' quantity index data for commercial laundry. Relative market shares of the two equipment applications, common-area laundry facilities in multi-family housing and laundromats, estimated to be over time at 85 and 15 percent, respectively.	Conducted a sensitivity analysis based on relative market shares of 66 percent for multi-family housing and a 34-percent share for laundromats.
Purchase Price, Operating Cost, and Household Income Impacts due to efficiency standards.	Developed the "relative price" elasticity which accounts for the purchase price and the present value of operating cost savings divided by household income. Used purchase price and efficiency data specific to residential refrigerators, clothes washers, and dishwashers between 1980 and 2002 to determine a "relative price" elasticity of demand, of −0.34.	No change.
Fuel Switching	Not applicable	No change.

DOE based its Shipments Model for CCWs on the following three assumptions: (1) All equipment shipments for new construction are driven by the new multi-family housing market, (2) the relative market shares of the two equipment applications, common-area laundry facilities in multi-family housing and laundromats, are constant over time at 85 and 15 percent, respectively, and (3) the U.S. Census Bureau's quantity index data can be used to validate the shipments trend observed in the historical data.

The Joint Comment stated that DOE's assumed 85 percent to 15 percent split between sales for multi-family applications and sales for laundromat applications is not based on robust or current data, and understates the energy, water, and dollar savings that would be achieved by all of the standard levels under consideration. It cited information from Alliance's Form 10–K for 2008, which, the Joint Comment asserted, suggested that the ratio of multi-family to laundromat shipments is about 40 percent to 60 percent. It noted that because some laundromats purchase a limited number of larger capacity washers not found in multi-family settings, the commenters believe a split of roughly 45 percent for multi-family venues and 55 percent for laundromats is reasonable, and should be evaluated by DOE for the final rule. (Joint Comment, No. 67.6 at p. 3) Whirlpool commented that it believes the industry mix is not nearly as heavily weighted toward the multi-family channel as DOE assumed. (Whirlpool, No. 67.11 at p. 4). In contrast, Alliance stated that it believes that the split of the distribution channels of laundromat versus multi-family housing common-area laundry rooms of 15 percent and 85 percent respectively is generally representative of the industry. (Alliance, No. 67.8 at p. 2)

In response, DOE believes that the interpretation by the Joint Comment of information from Alliance's Form 10–K for 2008 understates the importance of equipment other than CCWs. The total 2008 revenues from Alliance's sales to the commercial laundry industry are $338 million, and sales to laundromats and multi-family housing amount to $240 million. However, based on data gathered for its MIA, DOE estimated that the total sales of CCWs by Alliance amount to only $73 million. Therefore, it seems evident that a large fraction of the sales to laundromats and multi-family housing are accounted for by equipment other than CCWs. This unaccounted-for equipment would include clothes dryers in addition to washer-extractors and tumblers, which are large-capacity, higher-performance washing machines, and matching large-capacity dryers, respectively. Laundromats account for much more of the larger equipment than multi-family housing, and this type of equipment is more expensive than CCWs. Therefore, the laundromat share of sales to the North American commercial laundry industry by Alliance is as high as it is primarily due to sales of larger equipment. Thus, the revenue share between the multi-family and laundromat markets is not a good indicator of the share of laundromats in sales of CCWs.

The CCW unit shipment shares of 85 percent for multi-family housing and 15 percent for laundromats used in the SNOPR were based upon the input of industry experts consulted in a comprehensive study conducted by the Consortium for Energy Efficiency in

1998.[29] Although the report was conducted over 10 years ago, it was the most reliable data source for developing a market split for CCW shipments that was available. DOE notes that Alliance believes that this split is generally representative of the industry. However, because the assumed shares of laundromats and multi-family housing in shipments have a significant effect on the NIA results, DOE conducted a sensitivity analysis in which it used the data in Alliance's 2008 10K report, coupled with a number of assumptions and input from Whirlpool, to estimate the shares of laundromats and multi-family housing in shipments of CCWs in 2008. The analysis, which is described in appendix 11C of the final rule TSD, yields an estimate of a 66 percent share for multi-family housing and a 34 percent share for laundromats. Using these shares increases national energy savings by approximately 9 percent (compared to the savings when using the 15 percent and 85 percent shares), and increases the NPV of consumer benefit by approximately 12 percent under TSLs 3, 4, and 5.

a. New Construction Shipments

To determine new construction shipments, DOE used a forecast of new housing coupled with equipment market saturation data for new housing. For new housing completions and mobile home placements, DOE adopted the projections from EIA's *AEO 2009* April Release Reference Case through 2030 for the November 2009 SNOPR and today's final rule. For CCWs, DOE relied on new construction market saturation data from the above-mentioned CEE report.

b. Replacements and Non-Replacements

DOE estimated replacements using equipment retirement functions developed from equipment lifetimes. For the November 2009 SNOPR and today's final rule, DOE used retirement functions based on Weibull distributions. DOE determined that the growth of in-unit washer saturations in the multi-family stock over the last 10 years was likely caused by conversions of rental property to condominiums, resulting in the gradual phase-out or non-replacement of failed CCWs in common-area laundry facilities. As a result, DOE used the average percent of non-replacements over the period between 1999 and 2005 (18 percent) and maintained it over the entire forecast period. The effect of maintaining non-replacements at 18 percent results in forecasted CCW shipments staying relatively flat during the forecast period.

c. Impacts of Standards on Shipments

To estimate the combined effects on CCW shipments from increases in equipment purchase price and decreases in equipment operating costs due to amended efficiency standards, DOE relied on a literature review and a statistical analysis that it has conducted on a limited set of appliance price, efficiency, and shipments data. DOE used purchase price and efficiency data specific to residential refrigerators, clothes washers, and dishwashers between 1980 and 2002 to conduct regression analyses. DOE's analysis suggests that the "relative" short-run price elasticity of demand, averaged over the three appliances, is -0.34. Because DOE's forecast of shipments and impacts due to standards spans over 30 years, DOE also considered how the relative price elasticity is affected once a new standard takes effect. After the purchase price change, price elasticity becomes more inelastic over the years until it reaches a terminal value. DOE incorporated a change in relative price elasticity change that resulted in a terminal value of approximately one-third of the short-run elasticity. In other words, DOE determined that consumer purchase decisions, in time, become less sensitive to the initial change in the equipment's relative price.

NPCC suggested that it might be useful for DOE to compare the relative price elasticity approach used for CCWs with the shipments model that was used in the previous rulemaking for RCWs. (NPCC, Public Meeting Transcript, No. 67.4 at pp. 97–98) The approach that was used in the previous rulemaking for RCWs modeled consumer purchase decisions in terms of probabilities that typically depend on the type of stock, the age of the clothes washer, the incremental cost of the decision, and market conditions. The dependence of decision probabilities on price and market conditions was given by a standard econometric logic equation. In the present rulemaking for CCWs, DOE did not use such an approach, in part because it requires detailed information on consumer decision making, which is not available in the case of CCWs.

For its November 2009 SNOPR as well as today's final rule, DOE estimated that price increases due to standards would lead to reductions in unit shipments for both top-loading and front-loading CCWs. DOE analyzed the impacts of increased purchase prices for each equipment class independently of the other. Because the price impacts for more efficient top-loaders are higher than those for more efficient front-loaders, DOE estimated that sales would decrease more for top-loading CCWs than for front-loaders.

DOE did not explicitly model potential switching between top-loaders and front-loaders due to lack of information on the appropriate cross-price elasticity. Whirlpool commented that there are considerable between-class switching costs which would act against class switching by purchasers of commercial clothes washers. (Whirlpool, No. 67.11 at p. 2) DOE notes the comment by Whirlpool but it believes that there is uncertainty regarding the extent of switching that could result from changes in the price differential between top-loaders and front-loaders.

3. Other Inputs

a. Base-Case Forecasted Efficiencies

A key input to the calculations of NES and NPV are the energy efficiencies that DOE forecasts for the base case (without new standards). The forecasted efficiencies represent the annual shipment-weighted energy efficiency (SWEF) of the equipment under consideration over the forecast period (*i.e.,* from the estimated effective date of a new standard to 30 years after that date).

For the November 2009 SNOPR, DOE first determined the distribution of equipment efficiencies currently in the marketplace to develop a SWEF for each equipment class for 2005. Using the SWEF as a starting point, DOE developed base-case efficiencies based on estimates of future efficiency increase. From 2005 to 2013 (2013 being the estimated effective date of a new standard), DOE estimated that there would be no change in the SWEF (*i.e.,* no change in the distribution of equipment efficiencies). Because there are no historical data to indicate how equipment efficiencies have changed over time, DOE estimated that forecasted efficiencies would remain at the 2013 level until the end of the forecast period. DOE recognizes the possibility that equipment efficiencies may change over time (*e.g.,* due to voluntary efficiency programs such as ENERGY STAR). But without historical information, DOE had no basis for estimating how much the equipment efficiencies may change. For today's final rule, DOE maintained its estimate that the SWEF would remain constant from 2005 through the end of the forecast period.

[29] Consortium for Energy Efficiency, *Commercial Family-Sized Washers: An Initiative Description of the Consortium for Energy Efficiency* (1998). This document is available at: *http://www.cee1.org/com/cwsh/cwsh-main.php3.*

b. Standards-Case Forecasted Efficiencies

For its determination of each of the cases with alternative standard levels ("standards cases"), DOE used a "roll-up" scenario in the November 2009 SNOPR to establish the SWEF for 2013. In a roll-up scenario, equipment efficiencies in the base case which do not meet the standard level under consideration are projected to roll-up to meet the new standard level. Further, all equipment efficiencies in the base case that are above the standard level under consideration are not affected by the standard. The same scenario is used for the forecasted standards-case efficiencies as for the base-case efficiencies, namely, that forecasted efficiencies remained at the 2013 efficiency level until the end of the forecast period, as DOE has no data to reasonably estimate how such efficiency levels might change over the next 30 years. By maintaining the same rate of increase for forecasted efficiencies in the standards case as in the base case (*i.e.,* no change), DOE retained a constant efficiency difference between the two cases over the forecast period. Although the no-change trends may not reflect what would happen to base-case and standards-case equipment efficiencies in the future, DOE believes that maintaining a constant efficiency difference between the base case and standards case provides a reasonable estimate of the impact that standards have on equipment efficiency. It is more important to accurately estimate the efficiency difference between the standards case and base case, than to accurately estimate the actual equipment efficiencies in the standards and base cases. DOE retained the approach used in the November 2009 SNOPR for today's final rule.

c. Annual Energy Consumption

The annual energy consumption per unit depends directly on equipment efficiency. For the November 2009 SNOPR and today's final rule, DOE used the SWEFs associated with the base case and each standards case, in combination with the annual energy data, to estimate the shipment-weighted average annual per-unit energy consumption under the base case and standards cases. The national energy consumption is the product of the annual energy consumption per unit and the number of units of each vintage, which depends on shipments.

As noted above in section IV.D, DOE used a relative price elasticity to estimate standards-case shipments for CCWs. As a result, shipments forecasted under the standards cases are lower than under the base case. To avoid the inclusion of energy savings from reduced shipments, DOE used the standards-case shipments projection and the standards-case stock to calculate the annual energy consumption in the base case. For CCWs, any drop in shipments caused by standards is estimated to result in the purchase of used machines. As a result, the standards-case forecast explicitly accounted for the energy and water consumption of new standard-compliant CCWs and also used machines coming into the market due to the drop in new equipment shipments.

DOE retained the use of the base-case shipments to determine the annual energy consumption in the base case and the approach used in the November 2009 SNOPR for today's final rule.

d. Site-to-Source Conversion

To estimate the national energy savings expected from appliance standards, DOE uses a multiplicative factor to convert site energy consumption (energy use at the location where the appliance is operated) into primary or source energy consumption (the energy required to deliver the site energy). For the November 2009 SNOPR and today's final rule, DOE used annual site-to-source conversion factors based on the version of NEMS that corresponds to the *AEO 2009* March Release version. These conversion factors account for natural gas losses from pipeline leakage and natural gas used for pumping energy and transportation fuel. For electricity, the conversion factors vary over time due to projected changes in generation sources (*i.e.,* the power plant types projected to provide electricity to the country). Since the *AEO* does not provide energy forecasts that go beyond 2030, DOE used conversion factors that remain constant at the 2030 values throughout the remainder of the forecast.

In response to a request from the DOE, Office of Energy Efficiency and Renewable Energy (EERE), the National Research Council (NRC) appointed a committee on "Point-of-Use and Full-Fuel-Cycle Measurement Approaches to Energy Efficiency Standards" to conduct a study called for in section 1802 of EPACT 2005.[30] The fundamental task before the committee was to evaluate the methodology used for setting energy efficiency standards and to comment on whether site (point-of-use) or source (full-fuel-cycle) measures of energy efficiency better support rulemaking to achieve energy conservation goals. The NRC committee defined site (point-of-use) energy consumption as reflecting the use of electricity, natural gas, propane, and/or fuel oil by an appliance at the site where the appliance is operated, based on specified test procedures. Full-fuel-cycle energy consumption was defined as including, in addition to site energy use, the energy consumed in the extraction, processing, and transport of primary fuels such as coal, oil, and natural gas; energy losses in thermal combustion in power-generation plants; and energy losses in transmission and distribution to homes and commercial buildings.

In evaluating the merits of using point-of-use and full-fuel-cycle measures, the NRC committee noted that DOE uses what the committee referred to as "extended site" energy consumption to assess the impact of energy use on the economy, energy security, and environmental quality. The extended site measure of energy consumption includes the generation, transmission, and distribution but, unlike the full-fuel-cycle measure, does not include the energy consumed in extracting, processing, and transporting primary fuels. A majority of members on the NRC committee believe that extended site energy consumption understates the total energy consumed to make an appliance operational at the site. As a result, the NRC committee's primary general recommendation is for DOE to consider moving over time to use of a full-fuel-cycle measure of energy consumption for assessment of national and environmental impacts, especially levels of greenhouse gas emissions, and to providing more comprehensive information to the public through labels and other means, such as an enhanced Web site. For those appliances that use multiple fuels (*e.g.,* water heaters), the NRC committee believes that measuring full-fuel-cycle energy consumption would provide a more complete picture of energy used, allowing comparison across many different appliances as well as an improved assessment of impacts. The NRC committee also acknowledged the complexities inherent in developing a full-fuel-cycle measure of energy use and stated that a majority of the committee recommended a gradual transition to that expanded measure and eventual replacement of the currently used extended site measure. To improve consumers' understanding, the

[30] The National Academies, Board on Energy and Environmental Systems, Letter to Dr. John Mizroch, Acting Assistant Secretary, U.S. DOE, Office of EERE from James W. Dally, Chair, Committee on Point-of-Use and Full-Fuel-Cycle Measurement Approaches to Energy Efficiency Standards, May 15, 2009.

committee recommended that DOE and the Federal Trade Commission could evaluate potential indices of energy use and its impacts and could explore various options for label design and content using established consumer research methods.

DOE acknowledges that its site-to-source conversion factors do not capture the energy consumed in extracting, processing, and transporting primary fuels. DOE also agrees with the NRC committee's conclusion that developing site-to-source conversion factors that capture the energy associated with the extraction, processing, and transportation of primary fuels is inherently complex and difficult. As a result, DOE will evaluate whether moving to a full-fuel-cycle measure will enhance its ability to set energy-efficiency standards.

DOE also notes that the NRC committee's recommendation to use a full-fuel-cycle measure was especially focused on appliances using multiple fuels. For single-fuel appliances, the committee recommended that the current practice of basing energy efficiency requirements on the site measure of energy consumption should be retained. Although CCWs utilize heated water from both electric and natural gas water heaters and are credited with improved performance by reducing the energy used in electric and gas clothes dryers, the energy efficiency metric with which they are regulated, the MEF, is expressed in terms of electrical energy usage (cubic feet per kWh). As a result, for labeling and enforcement purposes, CCWs are a single-fuel appliance. Therefore, although a full-fuel-cycle measure may provide a better assessment of national and environmental impacts, it is not necessary for providing energy use comparisons among CCW models.

e. Energy Used in Water and Wastewater Treatment and Delivery

In the October 2008 NOPR and the November 2009 SNOPR, DOE did not include the energy required for water treatment and delivery in its analysis. It stated that EPCA defines "energy use" to be "the quantity of energy directly consumed by a consumer product at point of use, determined in accordance with test procedures under section 6293 of [42 U.S.C.]." (42 U.S.C. 6291(4)) Based on the definition of "energy use," DOE concluded that it does not have the authority to consider embedded energy (*i.e.,* the energy required for water treatment and delivery) in the analysis. It added that, even if DOE had the authority, it does not believe adequate analytical tools exist to conduct such an evaluation.[31]

In response, the California Utilities stated that DOE should account for energy savings associated with energy embedded in water. (California Utilities, No. 67.10 at p. 5) For the reason stated above, DOE did not include the energy required for water treatment and delivery in its analysis of energy savings from amended CCW standards.

EJ commented that two of the additional rationales provided by DOE for not including the energy required for water treatment and delivery in its analysis were not convincing. In reference to DOE's statement that "Inclusion of the embedded energy associated with water and wastewater service, would, for completeness, also require inclusion of the energy associated with all other aspects of the installation and operation of the equipment, *e.g.* the manufacture, distribution, and installation of the equipment;" EJ stated that DOE has offered no explanation for why consideration of the energy embedded in the water used in equipment's operation would mandate this much wider expansion of the Department's analysis. Regarding DOE's contention that its analysis already reflects the cost of the energy embedded in water because the cost of the energy used in treating and delivering water is a component of the cost of water for clothes washer consumers, EJ stated that the outcome of the life-cycle cost analysis is not the only factor DOE must consider in determining whether a standard level is economically justified, and DOE must consider, to the maximum extent practicable, "the total projected amount of energy * * * savings likely to result directly from the imposition of the standard." 42 U.S.C. 6295(o)(2)(B)(i)(III). (EJ, No. 67.5 at p. 12)

In response, DOE notes that neither of the additional rationales on which EJ commented is central to its conclusion that it does not have the authority to consider the energy required for water treatment and delivery in the analysis. In the first instance, DOE was simply pointing out that it is difficult to select what should be included once one deviates from the aforementioned EPCA definition of "energy use." In the second instance, DOE was noting that its analysis does include some aspects of the energy embedded in water delivered to CCWs. DOE agrees that the outcome of the life-cycle cost analysis is not the only factor DOE must consider in determining whether a standard level is economically justified; however, it believes that in considering the energy savings likely to result directly from the imposition of the standard, the appropriate course is to follow the EPCA definition of "energy use."

f. Total Installed Costs and Operating Costs

The increase in total annual installed cost is equal to the difference in the per-unit total installed cost between the base case and standards case, multiplied by the shipments forecasted in the standards case. The annual operating cost savings per unit includes changes in energy, water, repair, and maintenance costs. For the November 2009 SNOPR and today's final rule, DOE forecasted energy prices using data from *AEO 2009* April Release. For today's final rule, DOE maintained the approach it used to develop repair and maintenance costs for more efficient CCWs in the November 2009 SNOPR.

Commenting on valuation of energy savings, the California Utilities urged DOE to assess the energy impacts from the proposed standard such that the analysis captures the value of energy over time. It noted that California has developed an energy costing analysis for standards, called Time-Dependent Valuation of savings (TDV), which places a high value on energy savings that occur during high-cost times of the day and year. It added that water and wastewater can also have time-dependent values, which should be accounted for in DOE's analysis. (California Utilities, No. 67.10 at p. 6) In response, DOE acknowledges that the approach suggested by the California Utilities has merits, but it believes that the amount of effort and time required to develop time-dependent values of energy savings (as well as water and wastewater savings) at a diversity of locations across the nation would it make it impossible to implement this approach within the context of the present rulemaking.

g. Discount Rates

DOE multiplies monetary values in future years by the discount factor to determine the present value. DOE estimated national impacts using both a

[31] An analytical tool equivalent to EIA's NEMS would be needed to properly account for embedded energy impacts on a national scale, including the embedded energy due to water and wastewater savings. This new version of NEMS would need to analyze spending and energy use in dozens, if not hundreds, of economic sectors. This version of NEMS also would need to account for shifts in spending in these various sectors to account for the marginal embedded energy differences among these sectors. 72 FR 64432, 64498–99 (Nov. 15, 2007). DOE does not have access to such a tool or other means to accurately estimate the source energy savings impacts of decreased water or wastewater consumption and expenditures.

3-percent and a 7-percent real discount rate, in accordance with guidance provided by the Office of Management and Budget (OMB) to Federal agencies on the development of regulatory analysis (OMB Circular A–4 (Sept.17, 2003), section E, "Identifying and Measuring Benefits and Costs").[32]

The California Utilities stated that DOE should give primary weight to calculations based on the 3-percent discount rate for its national impact analysis. (California Utilities, No. 67.10 at p. 6) In response, DOE notes that OMB Circular A–4 references an earlier Circular A–94, which states that a real discount rate of 7 percent should be used as a base case for regulatory analysis. The 7-percent rate is an estimate of the average before-tax rate of return to private capital in the U.S. economy. It approximates the opportunity cost of capital, and, according to Circular A–94, it is the appropriate discount rate whenever the main effect of a regulation is to displace or alter the use of capital in the private sector. OMB later found that the average rate of return to capital remains near the 7-percent rate estimated in 1992. Circular A–4 also states that when regulation primarily and directly affects private consumption, a lower discount rate is appropriate: "The alternative most often used is sometimes called the social rate of time preference * * * the rate at which "society" discounts future consumption flows to their present value." It suggests that the real rate of return on long-term government debt may provide a fair approximation of the social rate of time preference, and states that over the last 30 years, this rate has averaged around 3 percent in real terms on a pre-tax basis. Circular A–4 concludes that "for regulatory analysis, [agencies] should provide estimates of net benefits using both 3 percent and 7 percent." Consistent with OMB's guidance, DOE did not give primary weight to results derived using a 3-percent discount rate.

h. Effects of Standards on Energy Prices

For the October 2008 NOPR, DOE conducted an analysis of the impact of reduced energy demand associated with possible standards on CCWs on prices of natural gas and electricity. The analysis found that gas and electric demand reductions resulting from max-tech standards for CCWs would have no detectable change on the U.S. average wellhead natural gas price or the average user price of electricity. Therefore, DOE concluded that CCW standards will not provide additional economic benefits resulting from lower energy prices. For today's final rule, DOE has made no change to its conclusions about the effects of CCW standards on energy prices.

F. Consumer Subgroup Analysis

For the November 2009 SNOPR and today's final rule, DOE analyzed the potential effects of CCW standards on two subgroups: (1) Consumers not served by municipal water and sewer providers, and (2) small businesses. For consumers not served by water and sewer, DOE analyzed the potential impacts of standards by conducting the analysis with well and septic system prices, rather than water and wastewater prices based on RFC/AWWA data. For small businesses, DOE analyzed the potential impacts of standards by conducting the analysis with different discount rates, because small businesses do not have the same access to capital as larger businesses. DOE estimated that for businesses purchasing CCWs, the average discount rate for small companies is 3.5 percent higher than the industry average. Due to the higher costs of conducting business, as evidenced by their higher discount rates, the benefits of CCW standards for small businesses will be lower than for the general population of CCW owners.

More details on the consumer subgroup analysis can be found in chapter 12 of the final rule TSD.

G. Manufacturer Impact Analysis

DOE performed an MIA to estimate the financial impact of amended energy conservation standards on CCW manufacturers, and to calculate the impact of such standards on domestic manufacturing employment and capacity. The MIA has both quantitative and qualitative aspects. The quantitative part of the MIA primarily relies on the GRIM—an industry-cash-flow model customized for this rulemaking. The GRIM inputs are data characterizing the industry cost structure, shipments, and revenues. The key output is the INPV. Different sets of assumptions (scenarios) will produce different results. The qualitative part of the MIA addresses factors such as equipment characteristics, characteristics of particular firms, and market and equipment trends, and it also includes an assessment of the impacts of standards on subgroups of manufacturers. DOE outlined its methodology for the MIA in the October 2008 NOPR. 73 FR 62034, 62075–81 (Oct. 17, 2008). The complete MIA for the October 2008 NOPR is presented in chapter 13 of the NOPR TSD.

For the November 2009 SNOPR, DOE updated the MIA results based on several changes to other analyses that impact the MIA. The total shipments and efficiency distributions were updated using the new estimates outlined in the SNOPR NIA. The SNOPR MIA also used the same analysis period as in the NIA (2013–2043) and updated the base year to 2009. DOE also updated the manufacturer production costs and the capital and equipment conversion costs to 2008$ using the producer price index for commercial laundry equipment manufacturing (NAICS 333312). Additionally, DOE updated the GRIM to allow the inclusion of Federal production tax credits. 74 FR 57738, 57762 (Nov. 9, 2009).

For today's final rule, DOE continued to use the GRIM and revised the MIA results from the November 2009 SNOPR. For details of the MIA, see chapter 13 of the TSD. The following sections describe the revisions made to the MIA for today's final rule.

For the November 2009 SNOPR, DOE used publicly available information, recent SEC filings, and the information published in chapter 13 and appendix 13A of the October 2008 NOPR to estimate the likely Federal production tax credits for which the CCW industry would be eligible. 74 FR 57738, 57764 (Nov. 9, 2009). For today's final rule, DOE used tax and earnings information published in SEC filings for the LVM and the same methodology described in appendix 13C to revise the estimated Federal production tax credits for 2009 and 2010. For details on the Federal production tax credits, see appendix 13C of the TSD.

For the November 2009 SNOPR, DOE received a number of comments from interested parties in response to the distribution and usage patterns for commercial laundry, which affect the shipment analysis. In response, DOE modeled a sensitivity analysis to account for the slightly different shipment results. Shipments affect MIA results because they directly influence the value of the INPV estimated in the GRIM. For today's final rule, the GRIM was revised to include an alternative shipment scenario based on the sensitivity analysis. See appendix 11C for details on the sensitivity analysis, including the INPV results from the analysis.

DOE received a number of comments from interested parties in response to the MIA analysis presented in the November 2009 SNOPR. At the SNOPR public meeting and in its written comments, Alliance stated that DOE's belief that all manufacturers can achieve

[32] OMB circulars are available online at: *http://www.whitehouse.gov/omb/circulars/.*

a top-loading standard greater than or equal to 1.60 MEF and a water factor less than or equal to 8.5 is flawed. (Alliance, No. 66.4 at p. 5 [33]; Alliance, Public Meeting Transcript, No. 67.4 at pp. 24, 57) SCG also inquired if manufacturers can comply with the revised standard proposed in the November 2009 SNOPR. (SCG, Public Meeting Transcript, No. 67.4 at p. 57) Alliance stated that while it currently markets a top-loading CCW that is close to meeting the proposed top-loading standard in the November 2009 SNOPR, that model was developed to allow some customers to earn an ENERGY STAR rating and a CEE rebate. Alliance stated that this model is not accepted by all customers, as some reject the water-saving features required to achieve its rated efficiency level. Since all CCWs currently marketed at or near the proposed top-loading energy conservation standard use similar water-saving techniques, Alliance stated that it would not be appropriate to set a minimum efficiency standard at the level proposed in the November 2009 SNOPR and proposed setting the standard at 1.42 MEF/9.5 WF for top-loading CCWs instead. (Alliance, Public Meeting Transcript, No. 67.4 at p. 139; Alliance, No. 66.4 at p. 9) Whirlpool and GE stated that they are supportive of all standard levels proposed for CCWs in the November 2009 SNOPR. However, Whirlpool also stated that energy and water consumption levels more restrictive than 1.60 MEF/8.5 WF for top-loading CCWs and 2.20 MEF/5.5 WF for front-loading CCWs would likely lead to poor wash performance, poor rinse performance, or both. GE noted that its max-tech top-loading CCW (which meets the proposed top-loading standard) was designed for the on-premise laundry market, a relatively small sub-segment of the CCW market and said that model has not yet demonstrated viability in laundromats. (Whirlpool, No. 67.11 at p. 3 and GE, No. 67.9 at p. 1) Many of the Multiple Route Operators stated opposition to any efficiency level above the baseline for CCWs on the basis of poor wash performance. Additionally, most of the Multiple Route Operators stated that they had experimented with high efficiency top-loading CCWs (*i.e.,* agitator-less models) and encountered sufficient operational and wash performance issues to abandon such models and replace them with traditional top-loading CCWs. Additionally, most of the Multiple Route Operators stated that they would be reluctant to utilize high efficiency top-loading CCWs based on reports of consumer dissatisfaction with such units. Lastly, the Multiple Route Operators strongly oppose the top-loading standard level proposed in the October 2008 NOPR (*i.e.,* 1.76 MEF/8.3 WF) (Multiple Route Operators, No. 67.8 at pp. 1–3).

DOE proposed a 1.60 MEF/8.5 WF standard for top-loading CCWs in the November 2009 SNOPR in response to these and other concerns voiced by interested parties. For the November 2009 SNOPR, DOE stated it believed the proposed top-loading level could be met by all competitors because the unit would be based on a standard top-loading platform that uses a traditional agitator and no proprietary technology. 74 FR 57738, 57762–63 (Nov. 9, 2009). The model that the LVM references in its comment meets a 1.55 MEF/8.6 WF, and DOE research suggests that this model could be modified to meet the amended energy conversation standard. DOE notes that the LVM has not refuted that this model could be modified to meet the amended energy conservation standard, and while a manufacturer may develop higher efficiency models in order to qualify for energy star, tax credits, and similar rebates, DOE believes it is unlikely that a manufacturer would purposely risk its reputation and release a non-functional product onto the market. DOE has noted throughout the rulemaking that the heavy concentration of earnings from CCWs relative to its total clothes washer business, its overall focus on commercial laundry, and its relatively low revenue base compared to its principal CCW competitors would lead to the LVM being impacted disproportionately by any amended efficiency standard for CCWs. DOE also notes that TSL 3 avoids requiring manufacturers, including the LVM, to make concurrent, substantial investments in both top-loading and front-loading platforms. DOE continues to believe that the benefits of the amended energy conservation standard outweigh the burdens, including the negative impacts on manufacturers (see section VI.D).

Alliance stated that its most recent SEC 10–Q for the quarter ending September 30, 2009, shows that its long-term debt bank covenants limit additional borrowing to $19.2 million, that its current credit facility must be refinanced before January 27, 2011, and that it expects tighter credit terms. Alliance estimates that an $18.4 million investment would be required to modify its facilities to manufacture top-loading CCWs at the max-tech efficiency level, double the total annual capital expenditures for the entire company. Alliance stated that, even if the funds were available for a dramatic redesign of its top-loading CCWs, it would not be approved for funding by its investors regardless of the method used to calculate the financial payback because the equipment does not meet customers' minimum requirements. (Alliance, No. 66.4 at p. 5; Alliance, Public Meeting Transcript, No. 67.4 at pp. 24–25) Alliance also stated that it would need to redesign the inner and outer tubs to match the max-tech top-loading CCW's larger capacity. These changes might not be possible to its existing tub fabrication cells while simultaneously meeting demand, and could require a new building due to lack of space to "shoe-horn" fabrication and to avoid shutting down. Alliance stated that its customers do not want larger capacity washers because its tub size has been designed to match commercial laundry users' needs and load sizes, as evidenced by decades of sales and customer experience. (Alliance, No. 67.8 at p. 4)

DOE estimates that the total conversion costs for the industry to meet the top-loading amended energy conservation standard will be approximately $16.6 million. DOE research thus suggests that the LVM's production facilities could be modified at a more modest cost than projected by the LVM to make a sufficient number of top-loading CCWs that would meet the amended energy conservation standards. DOE estimates that the majority of the conversion costs will consist of product development, engineering, testing, marketing, and other costs required to make equipment designs comply with energy conservation standards while addressing consumer acceptance issues raised by the LVM. As of December 31, 2008, Alliance stated in its SEC filings that its principal line of credit was limited to an additional $16.2 million of borrowing and that a substantial portion of its long term debt is due concurrently with the compliance date of the final rule. DOE agrees with the LVM that the company's current debt structure makes it more difficult to finance additional product development and capital expense. In response to these and other concerns voiced by the LVM, DOE revised the proposed top-loading CCW energy conservation standard to a level which a current top-loading LVM model

[33] A notation in the form "Alliance, No. 66.4 at p. 5" identifies page 5 of a written comment submitted by Alliance entitled "Response to DOE Commercial Clothes Washer SNOPR." This document was entered as comment number 66.4 in the docket for this rulemaking, along with a letter submitted by Alliance entitled "Is Top-Loading a Feature Within the Meaning of EPCA?"

almost attains. Thus, the negative impacts on the LVM have been weighed in DOE's consideration of the amended energy conservation standard.

Alliance stated that the standards proposed in the November 2009 SNOPR place 292 union laborers in its Ripon, WI plant at risk of losing their jobs. Of these 292 laborers, 150 union laborers are attributed to CCW production and 142 laborers are associated with companion commercial clothes dryers. The standards proposed in the November 2009 SNOPR could also eliminate an additional 40 non-production jobs. (Alliance, Public Meeting Transcript, No. 67.4 at p. 25; Alliance, No. 66.4 at p. 8)

For the October 2008 NOPR, DOE calculated the direct employment impacts using the GRIM and information gathered from interviews with manufacturers. DOE estimated that there would be positive employment impacts among domestic CCW manufacturers for TSL 1 through TSL 5. Because the LVM had previously stated it could be eliminated from the commercial market, DOE also specifically investigated the LVM employment using its CCW revenues and additional employment estimates. DOE estimated that if the LVM ceased to produce soft-mount dryers and CCWs that this would lead to a loss of 292 production jobs. DOE estimated that a complete closure of the Ripon, WI facility would result in the dismissal of approximately 600 factory employees. 73 FR 60234, 62102–03 (Oct. 17, 2008). For the November 2009 SNOPR, DOE stated that it believes that the proposed energy conservation standard would allow the LVM to continue to produce top-loading CCWs, mitigating any potential closure of its domestic manufacturing facility. 74 FR 57738, 57763 (Nov. 9, 2009). DOE did not receive any additional comments that suggest technical barriers would prevent manufacturers from meeting the energy conservation standards and notes that two competitors support the proposed amended energy conservation standards for top-loading CCWs. Thus, for today's final rule, DOE estimates that the LVM would be able to continue to produce top-loading CCWs, and that significant impacts on LVM manufacturing employment due to today's final rule are hence unlikely. Further discussion of the LVM and the potential impacts on direct employment for the CCW industry is presented in chapter 13 of the TSD.

ASAP stated that much of the SNOPR analysis was driven by DOE's concern for the precarious position of the LVM. ASAP stated that it remains somewhat unconvinced that the numbers are as stark as presented in the revised MIA. (ASAP, Public Meeting Transcript, No. 67.4 at p. 33) ASAP and the Joint Comment questioned DOE's estimates of the potential impacts on the LVM if the market were to shift entirely to front-loading CCWs. ASAP and the Joint Comment stated that the green-field assumption in this analysis was not valid, especially considering that the LVM is already making a substantial number of front-loading washers, and since new buildings are costly and depreciate over a much longer schedule than new equipment. The Joint Comment argues that these assumptions disproportionately increase the annualized financial cost of conversion. (ASAP, Public Meeting Transcript, No. 67.4 at pp. 140–142; Joint Comment, No. 67.6 at pp. 5–6) ASAP also inquired if a shift to only front-loading production would involve a green-field manufacturing facility even if top-loading production is ceasing. (ASAP, Public Meeting Transcript, No. 67.4 at p. 143) ASAP and the Joint Comment stated that a shift to only front-loading washer production would not force the LVM to completely redesign washers nor incur expenses such as research and development. Both ASAP and the Joint Comment argue that, because front-loading washers currently represent 25 to 30 percent of the LVM's unit shipments, the LVM will have the operating experience to gradually reduce production costs and improve production designs without a complete redesign. (ASAP, Public Meeting Transcript, No. 67.4 at p. 146; Joint Comment, No. 67.6 at p. 5)

DOE research confirms that the LVM has been gradually increasing its production of front-loading CCWs. However, the LVM's production of top-loading CCWs still heavily outweighs its production of front-loading CCWs. DOE believes a complete shift to front-loading CCWs would represent a radical departure from the much more gradual market transition that has been occurring. As illustrated in chapter 13 of the TSD, such a market disruption would disproportionately impact the LVM since the LVM would have to increase front-loader manufacturing capacity by multiples, while its competitors would have to increase their overall front-loader manufacturing capacity by less than 5 percent to fully transition their CCW production to only front-loading washers. Since top-loaders and front-loaders share few parts and require separate assembly lines, sub-assembly stations, etc., DOE concluded that the LVM would have to build an annex to house the expanded front-loader fabrication and assembly lines as long as top-loading clothes washer production continues. For example, the LVM could continue to manufacture top-loading RCWs even after ceasing top-loading CCW production. While some equipment and space could potentially be re-purposed towards fabricating front-loader components (*i.e.,* large presses, machining centers, etc.), DOE research suggests that much of the space currently occupied by hard-tooled top-loading clothes washer assembly lines in the LVM facility will remain unavailable until the LVM ceases to produce top-loading clothes washers altogether. DOE expects the LVM to continue to produce top-loading clothes washers as long as it can to fulfill customer demand. Consequently, the space currently occupied by the top-loading clothes washer lines will likely continue to be occupied on the compliance date of today's final rule, necessitating an annex in which to house expanded front-loader assembly and fabrication. Alliance agreed that its existing facility could not accommodate the new equipment for front-loading production and continue to produce its current volumes of top-loading washers. (Alliance, Public Meeting Transcript, No. 67.4 at pp. 145–146) As illustrated in chapter 13 of the TSD, a complete transition to front-loading CCWs would likely lead to a market disruption since switching costs for customers would be minimized. Consequently, DOE research suggests that the LVM would be required to redesign its front-loader platform to become more cost-competitive.

In appendix 13C of the SNOPR TSD, DOE estimated that the LVM would be eligible for about $4.1 million in Federal production tax credits between 2007 and 2010. ASAP and the Joint Comment questioned DOE's conclusion that additional tax credits in 2010 are unlikely. The Joint Comment estimated that additional credits in 2010 are likely as production of front-loaders ramps up further (ASAP, Public Meeting Transcript, No. 67.4 at pp. 126–129; Joint Comment, No. 67.6, at p. 6) ASAP questioned if DOE believed that the LVM was reaching a limit on the number of front-loading washers that it could sell or produce. (ASAP, Public Meeting Transcript, No. 67.4 at pp. 126–129) ASAP also asked if there was an analysis to support the estimate of the cap on machines that would qualify for the Federal production tax credit, and if such tax credits for 2007 were included in the analysis. (ASAP, Public Meeting Transcript, No. 67.4 at p. 129, 135)

Finally, the Joint Comment stated that, even though DOE's analysis of the Federal production tax credits has relatively little impact on the industry as a whole, the Federal production tax credits will mitigate a significant portion of the conversion costs borne by the LVM to convert their entire production to front-loading washers. (Joint Comment, No. 67.6 at p. 6). Alliance stated, while it has earned tax credits for qualifying washers, these tax credits have not been used for a cash benefit. (Alliance, No. 67.8 at p. 4)

For the November 2009 SNOPR, DOE accounted for the impacts of the Federal production tax credits updated by The Energy Improvement and Extension Act of 2008 (Pub. L. 110–343; EIEA 2008). Because only the LVM produces qualifying CCWs, DOE based its estimates of the potential benefits to the CCW industry by estimating the potential Federal production tax credits that the LVM could receive. Using publicly available information, recent SEC filings, and the information published in chapter 13 and appendix 13A of the October 2008 NOPR, DOE estimated the LVM's front-loading CCW shipment projections to 2010 and calculated the Federal production tax credits for qualifying shipments. In the November 2009 SNOPR, DOE estimated that the LVM would likely not qualify for any Federal production tax credits in 2010. 74 FR 57738, 57763–64 (Nov. 9, 2009) DOE's estimate was not based on a cap on the number of qualifying washers the LVM could sell or produce; rather, it was based on statements in the LVM's 10–Q filing for the quarter ending March 31, 2009. The 10–Q at that time suggested that the LVM's front-loading production in 2010 would not increase significantly to qualify for additional Federal production tax credits.

For today's final rule, DOE updated its estimates using the most recent, publicly available information to calculate the likely benefit to the LVM from the tax credit provisions. DOE updated the assumptions for the estimated Federal production tax credit for 2009 and 2010 based on the LVM's recent SEC filings. The LVM's 10–Q filing for the quarter ending September 30, 2009, reported higher tax benefits from the energy efficiency tax program compared to the 10–Q filing for the quarter ending March 31, 2009. DOE revised its figures for 2009 based on this new information and used the LVM's most recent historical estimate for the growth rate of the commercial laundry industry to estimate LVM shipments for 2010.[34] The revised estimates suggest that the LVM will collect approximately $4.0 million in Federal production tax credits from 2008–2010 from the provisions updated by EIEA 2008 and a total of $5.3 million from the program from 2007–2010. The revised estimate for today's final rule is approximately $1.2 million higher than the estimate published in the November 2009 SNOPR.

In the GRIM, DOE accounts for the Federal production tax credit as a direct cash benefit in the base and standards cases that directly increases INPV. Because 2009 is the base year to which industry cash flows are discounted, any Federal production tax credit from 2007 and 2008 is not counted towards the INPV analysis because it falls outside the analysis period. However, any tax benefit in 2009 and 2010 falls within the analysis period and hence increases industry value (potentially decreasing the impacts on manufacturers due to energy conservation standards). DOE's revised Federal production tax credit estimates for the LVM are approximately $1.2 million and $0.4 million for 2009 and 2010, respectively. These revised figures do not significantly impact the INPV calculated by DOE nor do they come close to paying for a facility conversion to front-load only CCW production. DOE estimates that a wholesale conversion to only front-loading CCW production would cost the LVM approximately 12 times the total Federal production tax credit benefit DOE expects the LVM to collect over the life of the program. (See chapter 13 of the TSD for further details.) While DOE research suggests that Federal production tax credits could help the LVM implement gradual changes to its production facilities, such tax credits would not substantially defray wholesale plant conversion costs.

Whirlpool commented that the ability of a manufacturer to use an earned tax credit is a function of the earnings situation for that manufacturer and that many manufacturers cannot use earned tax credits in some years due to current economic conditions. (Whirlpool, No. 67.11 at p. 3) Because the LVM reported earnings from the tax credit and stated that it expected to earn a benefit from the tax credits in 2009, DOE calculated the expected tax credits for the LVM in 2009 and 2010 and assumed that the LVM would benefit in those years. Whirlpool agreed with DOE's conclusion that the past tax credits have only offset a small fraction of the costs necessary to produce high efficiency equipment. Whirlpool also stated that if tax credits were offered in between the issuance of the final rule and the compliance date, they could have an impact on the ability of individual manufacturers to make the capital investment in new product platforms. (Whirlpool, No. 67.11 at p. 3)

DOE agrees that tax credits that were effective between the issuance of the final rule and the compliance date of the amended standards could have an impact on the ability of manufacturers to fund capital investments. However, because most of the benefit from the EIEA 2008 takes place outside of the analysis period, DOE believes it is unlikely that manufacturers could use the credits to fund much of their capital conversion costs.

EJ recommended that DOE review its Federal production tax credit projections for 2010 if it adopts a strong standard that applies to all CCWs. EJ added that such a standard would likely cause manufacturers to ramp up production of qualifying washers over time, not just beginning in 2013. (EJ, Public Meeting Transcript, No. 67.4 at pp. 137–138)

For today's final rule, DOE revised its Federal production tax credit projections for 2010 using the LVM's most recent SEC filings. Based on the LVM's 10–Q for the quarter ending September 30, 2009, DOE revised its estimates to include Federal production tax credits for 2010. DOE continues to believe that it is unlikely that manufacturers would shift their clothes washer production to exclusively manufacture front-loading washers in response to the Federal production tax credits or the energy conservation standards in today's final rule. Thus, DOE relied on the forward-looking projections published by the LVM to estimate CCW sales that qualify for the production tax credits.

Alliance and White & Case (W&C) cited DOJ's letter in response to the October 2008 NOPR that stated there appeared to be a real risk that at least one manufacturer could not meet the proposed amended energy conservation standard for top-loading CCWs. Both Alliance and W&C stated that DOE's response in the November 2009 SNOPR ignored DOJ's conclusion that DOE should consider keeping the existing standard in place for top-loading CCWs to maintain competition. (Alliance, No. 66.4 at p. 3; W&C, Public Meeting Transcript, No. 67.4 at pp. 26–27) Alliance stated that DOJ's recommendation to keep the existing standard in place for top-loading CCWs was the appropriate course of action for

[34] See *http://www.comlaundry.com/investors/relations/sec-filings.asp* for a list of Alliance Laundry System's SEC filings.

this rulemaking. (Alliance, No. 66.4 at p. 9; Alliance, Public Meeting Transcript, No. 67.4 at pp. 29–30) In addition, Multiple Route Operators stated they were concerned that the standards proposed in the October 2008 NOPR could force Alliance to exit the manufacture of top-loading CCWs, which would cause them significant harm because they would pay more for washers. Multiple Route Operators urged DOE to adopt a standard that would enable Alliance to remain the lowest-cost CCW provider. (Multiple Route Operators, No. 67.8 at pp. 1–3)

In the October 2008 NOPR, DOE proposed amended standards of 1.76 MEF/8.3 WF for top-loading CCWs. 73 FR 62034, 62036 (Oct. 17, 2008). In response, DOJ found that there was a real risk that one or more CCW manufacturers could not meet the proposed standard for top-loading CCWs. DOJ stated that it was concerned that meeting the proposed standards could require substantial investment in the development of new technology that some suppliers of top-loading CCWs might not find economically justifiable. 74 FR 57738, 57802 (Nov. 9, 2009). In response to the concerns raised by DOJ and other concerns raised by interested parties, DOE proposed a top-loading CCW standard of 1.60 MEF/8.5 WF in the November 2009 SNOPR. 74 FR 57738, 57763 (Nov. 9, 2009). In today's final rule, DOE determined that 1.60 MEF/8.5 WF is the maximum top-loading CCW efficiency level that is economically justified and technologically feasible while being sensitive to concerns raised by DOJ and the LVM.

EJ stated that DOE failed to consider the low barriers to entry in the CCW market in its analysis of the competition issue. While there are currently only three CCW manufacturers, if the departure of any of these manufacturers increases markups significantly, higher profits would allow RCW manufacturers or small players to expand into the commercial market. EJ asserted that, because these manufacturers would not have to design completely new equipment or construct a new manufacturing facility to begin selling CCWs, it would be "irrational" for DOE to contend that there would be any significant adverse impact on competition in the commercial market. EJ stated that DOE must explain why new entrants would be unable to gain a foothold in the CCW market by taking advantage of this disturbance in the *status quo* if one manufacturer exited the market. (EJ, No. 67.5 at. pp. 8–9; Public Meeting Transcript, No. 67.4 at p. 138) Multiple Route Operators believe they would face higher prices if Alliance were eliminated from the market. (Multiple Route Operators, No. 67.8 at pp. 1–3)

In response to the October 2008 NOPR, DOJ found that there was a real risk that one or more of the manufacturers could not meet the proposed standard for top-loading CCWs. 74 FR 57738, 57802 (Nov. 9, 2009) DOE revised its proposed standards in part to ease these competitive concerns raised by the DOJ and other interested parties. 74 FR 57738, 57763 (Nov. 9, 2009).

In chapter 13 of the TSD, DOE offers multiple reasons why it believes the LVM has succeeded in the CCW market despite low overall production volumes: (1) Well-depreciated machinery and legacy design; (2) effective customer and service networks; (3) a large installed base of top-loading CCWs; and (4) stock of repair parts that ensures a large market for replacement machines. Multiple Route Operators confirmed many of these advantages, stating that they believe Alliance offers CCWs with the lowest total cost of ownership because its washers have the longest functional life. In addition, Multiple Route Operators stated that the quality, service, and unique products with CCW features separate Alliance from other manufacturers. (Multiple Route Operators, No. 67.8 at pp. 1–3) DOE believes that route operators' and distributors' large inventory of service parts and repair knowledge represent a significant switching cost, discouraging customers from adopting rival platforms. As long as the LVM can continue to produce replacement top-loading CCWs, DOE does not believe the LVM will be placed at a substantial disadvantage relative to its larger competitors. However, due to the relatively small stock of front-loading clothes washers installed in the CCW market, DOE believes that a wholesale conversion of the CCW market to front-loading machines would eliminate most of the LVM's advantages that have allowed it to remain competitive.

DOE research suggests that, while the cost of entering the CCW market may be construed as low, statements by multiple manufacturers indicate that actual success in the CCW market depends on many factors. For example, DOE notes that a top-loading, horizontal-axis clothes washer used to be marketed into the CCW market but that it was withdrawn for a number of reasons. Additionally, converting residential platforms for commercial use is not as simple as adding a coin box; substantial investments are required to integrate a variety of payment systems. Custom user interfaces are required, both for compliance with the Americans with Disabilities Act, and to facilitate consumer education. Resultant conversion costs have to be amortized across a much lower production volume than is typically found in the residential market, and critical parts and service personnel have to be present in the territory of any route operator that is going to consider a rival. Hence, while entering the CCW market may not represent significant technical hurdles, the operational and financial challenges are sufficient to limit the market to a small number of competitors.

DOE also received comment regarding its characterization of Alliance as an LVM. The Joint Comment argued that DOE's characterization of Alliance as an LVM is a significant misnomer, as the LVM reported revenues equivalent to approximately half of the total CCW industry revenue and claims to be the leading manufacturer of stand-alone commercial laundry equipment in North America. (Joint Comment, No. 67.6 at p. 5)

For the October 2008 NOPR, DOE presented a separate analysis of the LVM. 73 FR 62034, 62103–04 (Oct. 17, 2008). Although DOE continues to agree with the Joint Comment that the LVM has a significant share of the CCW industry based on reported revenues, DOE maintains that the LVM does not have the same overall clothes washer manufacturing scale as its competitors (for both residential products and commercial equipment) and should hence be characterized as an LVM in the context of this rulemaking. DOE notes that most CCWs on the market in the United States are based largely on RCW platforms that are upgraded selectively. Some investments (such as the controllers) are CCW-specific but only comprise part of the total unit cost. The majority of capital expenditures related to tooling, equipment, and other machinery in a plant can typically be applied to the residential as well as the commercial market. Thus, overall (both RCW and CCW) manufacturing scale has a significant impact on the cost-effectiveness of potential platform upgrades. A manufacturer with a high-volume residential line can cost justify much more capital-intensive solutions if they are applicable in both markets, whereas an LVM could lack the scale and capital to make such investments. Thus, an LVM may be required to purchase upgrade options from third-party vendors instead of developing in-house solutions that reduce costs at higher volumes. In the CCW market, the most direct competitor to the LVM has over 60 times the overall shipment

volumes of the LVM. This scale difference also affects purchasing power because a large, diversified appliance manufacturer can use its production scale to achieve better prices for raw materials and commonly purchased components such as controllers, motors, belts, switches, sensors, and wiring harnesses. Even if a large company purchases fewer items of a certain component, its overall revenue relationship with a supplier may still enable it to achieve better pricing than a smaller competitor, even if that competitor buys certain components in higher quantities. Lastly, high-volume manufacturers benefit from being able to source their components through sophisticated supply chains on a worldwide basis. Therefore, DOE concludes that an LVM is unlikely to be able to compete solely on manufacturing cost.

H. Employment Impact Analysis

DOE considers employment impacts in the domestic economy as one factor in selecting a proposed standard. Employment impacts include direct and indirect impacts. Direct employment impacts are changes in the number of employees for manufacturers of equipment subject to standards, their suppliers, and related service firms. The MIA addresses these impacts.

Indirect employment impacts from standards consist of the net jobs created or eliminated in the national economy, other than in the manufacturing sector being regulated, due to: (1) Reduced spending by end users on energy (electricity, gas (including liquefied petroleum gas), and oil); (2) reduced spending on new energy supply by the utility industry; (3) increased spending on the purchase price of new equipment; and (4) the effects of those three factors throughout the economy. DOE expects the net monetary savings from standards to be redirected to other forms of economic activity. DOE also expects these shifts in spending and economic activity to affect the demand for labor in the short term, as explained below.

One method for assessing the possible effects on the demand for labor of such shifts in economic activity is to compare sectoral employment statistics developed by the BLS. The BLS regularly publishes its estimates of the number of jobs per million dollars of economic activity in different sectors of the economy, as well as the jobs created elsewhere in the economy by this same economic activity. Data from BLS indicate that expenditures in the utility sector generally create fewer jobs (both directly and indirectly) than expenditures in other sectors of the economy. There are many reasons for these differences, including wage differences and the fact that the utility sector is more capital intensive and less labor intensive than other sectors. (See Bureau of Economic Analysis, *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System* (RIMS II), Washington, DC, U.S. Department of Commerce, 1992.) Efficiency standards have the effect of reducing consumer utility bills. Because reduced consumer expenditures for energy likely lead to increased expenditures in other sectors of the economy, the general effect of efficiency standards is to shift economic activity from a less labor-intensive sector (*i.e.,* the utility sector) to more labor-intensive sectors (*e.g.,* the retail and manufacturing sectors). Thus, based on the BLS data alone, DOE believes net national employment will increase due to shifts in economic activity resulting from standards for CCWs.

In developing the November 2009 SNOPR, DOE estimated indirect national employment impacts using an input/output model of the U.S. economy called Impact of Sector Energy Technologies (ImSET).[35] ImSET is a special-purpose version of the "U.S. Benchmark National Input-Output" (I–O) model designed to estimate the national employment and income effects of energy-saving technologies. The ImSET software includes a computer-based I–O model with structural coefficients to characterize economic flows among 188 sectors most relevant to industrial, commercial, and residential building energy use. The Joint Comment stated that DOE must consider its projections that an increase in employment will result from the adoption of standards in weighing the economic costs and benefits of strong efficiency standards. (Joint Comment, No. 44 at p. 13) As described in section VI.C.3 below, DOE takes into consideration the indirect employment impacts estimated using ImSET when evaluating alternative standard levels. Direct employment impacts on the manufacturers that produce CCWs are analyzed in the MIA, as discussed in section IV.G. For today's final rule, DOE has made no change to its method for estimating employment impacts. For further details, see chapter 15 of the final rule TSD.

[35] More information regarding ImSET is available online at: *http://www.pnl.gov/main/publications/external/technical_reports/PNNL-15273.pdf*

I. Utility Impact Analysis

The utility impact analysis estimates the change in the forecasted power generation capacity for the Nation that would be expected to result from adoption of new standards. For the November 2009 SNOPR and today's final rule, DOE calculated this change using the NEMS–BT computer model. NEMS–BT models certain policy scenarios such as the effect of reduced energy consumption by fuel type. The analysis output provides a forecast for the needed generation capacities at each TSL. The estimated net benefit of the standard in today's final rule is the difference between the forecasted generation capacities by NEMS–BT and the *AEO 2009* April Release Reference Case. DOE obtained the energy savings inputs associated with efficiency improvement on CCW energy consumption electricity and natural gas from the NIA. These inputs reflect the effects of both fuel (natural gas) and electricity consumption savings. Chapter 14 of the final rule TSD presents results of the utility impact analysis.

In its November 2009 SNOPR, DOE did not estimate impacts on water and wastewater utilities because the water and wastewater utility sector exhibits a high degree of geographic variability produced by a large diversity of water resource availability, institutional history, and regulatory context. 73 FR 62034, 62082 (Oct. 17, 2008). EJ commented that given the water supply and water and wastewater infrastructure concerns that are affecting and will continue to affect many parts of the country, it would be arbitrary and capricious for the Department to fail to address the impact on water and wastewater utilities of reduced water consumption resulting from commercial clothes washer standards. (EJ, No. 67.5 at p. 13)

In response, DOE refers again to the diversity of the water and wastewater utility sector. Whereas in the case of the electric utility sector DOE has a tool and data set that allows estimation of impacts on infrastructure (in terms of installed generation capacity), DOE does not have (and is not aware of) a comparable tool and data set that would allow estimation of impacts on infrastructure in the water and wastewater utility sector resulting from commercial clothes washer standards. Therefore, for today's final rule, DOE did not estimate impacts to the water and wastewater utility sector.

J. Environmental Assessment

Pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 *et seq.*) 42 U.S.C. 6295(o)(2)(B)(i)(VI), DOE prepared a draft environmental assessment (EA) of the potential impacts of the standards for CCWs in today's final rule, which it has included as chapter 16 of the TSD. DOE found that the environmental effects associated with the standards for CCWs were not significant. Therefore, DOE is issuing a Finding of No Significant Impact (FONSI), pursuant to NEPA, the regulations of the Council on Environmental Quality (40 CFR parts 1500–1508), and DOE's regulations for compliance with NEPA (10 CFR part 1021). The FONSI is available in the docket for this rulemaking.

In the EA, DOE estimated the reduction in power sector emissions of CO_2, NO_X, and Hg using the NEMS–BT computer model. Because the on-site operation of CCWs requires use of fossil fuels and results in emissions of CO_2 and NO_X, DOE also accounted for the reduction in these emissions due to the standards.

In the EA, NEMS–BT is run similarly to the *AEO* NEMS, except that CCW energy use is reduced by the amount of energy saved (by fuel type) due to the TSLs. The inputs of national energy savings come from the NIA analysis; the output is the forecasted physical emissions. The estimated net benefit of the standard in today's final rule is the difference between the forecasted emissions by NEMS–BT at each TSL and the *AEO 2009* April Release Reference Case. NEMS–BT tracks CO_2 emissions using a detailed module that provides results with broad coverage of all sectors and inclusion of interactive effects.

DOE has determined that sulfur dioxide (SO_2) emissions from affected Electric Generating Units (EGUs) are subject to nationwide and regional emissions cap and trading programs that create uncertainty about the impact of energy conservation standards on SO_2 emissions. Title IV of the Clean Air Act sets an annual emissions cap on SO_2 for all affected EGUs. SO_2 emissions from 28 eastern States and the District of Columbia (D.C.) are also limited under the Clean Air Interstate Rule (CAIR, published in the **Federal Register** on May 12, 2005; 70 FR 25162 (May 12, 2005), which creates an allowance-based trading program that will gradually replace the Title IV program in those States and D.C. (The recent legal history surrounding CAIR is discussed below.) The attainment of the emissions caps is flexible among EGUs and is enforced through the use of emissions allowances and tradable permits. Energy conservation standards could lead EGUs to trade allowances and increase SO_2 emissions that offset some or all SO_2 emissions reductions attributable to the standard. DOE is not certain that there will be reduced overall SO_2 emissions from the standards. The NEMS–BT modeling system that DOE uses to forecast emissions reductions currently indicates that no physical reductions in power sector emissions would occur for SO_2. The above considerations prevent DOE from estimating SO_2 reductions from standards at this time.

Even though DOE is not certain that there will be reduced overall emissions from the standard, there may be an economic benefit from reduced demand for SO_2 emission allowances. Electricity savings from standards decrease the generation of SO_2 emissions from power production, which can lessen the need to purchase emissions allowance credits, and thereby decrease the costs of complying with regulatory caps on emissions.

Much like SO_2 emissions, NO_X emissions from 28 eastern States and the District of Columbia (D.C.) are limited under the CAIR. Although CAIR has been remanded to EPA by the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit), it will remain in effect until it is replaced by a rule consistent with the Court's July 11, 2008, opinion in *North Carolina* v. *EPA.* 531 F.3d 896 (D.C. Cir. 2008); see also *North Carolina* v. *EPA,* 550 F.3d 1176 (D.C. Cir. 2008). These court positions were taken into account in the November 2009 SNOPR and in today's final rule. Because all States covered by CAIR opted to reduce NO_X emissions through participation in cap and trade programs for electric generating units, emissions from these sources are capped across the CAIR region.

In the 28 eastern States and D.C. where CAIR is in effect, DOE's forecasts indicate that no NO_X emissions reductions will occur due to energy conservation standards because of the permanent cap. Energy conservation standards have the potential to produce an economic impact in the form of lower prices for NO_X emissions allowances, if their impact on electricity demand is large enough. However, DOE has concluded that the standards in today's final rule will not have such an effect because the estimated reduction in electricity demand in States covered by the CAIR cap would be too small to affect allowance prices for NO_X under the CAIR.

New or amended energy conservation standards would reduce NO_X emissions in those 22 States that are not affected by the CAIR. DOE used the NEMS–BT to forecast emission reductions from the CCW standards in today's final rule.

Similar to emissions of SO_2 and NO_X, future emissions of Hg would have been subject to emissions caps. The Clean Air Mercury Rule (CAMR) would have permanently capped emissions of Hg from new and existing coal-fired plants in all States beginning in 2010 (70 FR 28606). The CAMR was vacated by the D.C. Circuit in its decision in *New Jersey* v. *Environmental Protection Agency* prior to the publication of the October 2008 NOPR. 517 F 3d 574 (D.C. Cir. 2008). However, the NEMS–BT model DOE initially used to estimate the changes in emissions for the proposed rule assumed that Hg emissions would be subject to CAMR emission caps. Thus, after CAMR was vacated, DOE was unable to use the NEMS–BT model to estimate any changes in the physical quantity of Hg emissions that would result from standard levels it considered in the October 2008 NOPR. Instead, DOE used an Hg emission rate (in metric tons of Hg per energy produced) based on the *AEO 2008.* Because virtually all Hg emitted from electricity generation is from coal-fired power plants, DOE based the emission rate on the metric tons of Hg emitted per TWh of coal-generated electricity. To estimate the reduction in Hg emissions, DOE multiplied the emission rate by the reduction in coal-generated electricity associated with the standard levels considered. DOE continued to use the above approach, updated for the *AEO 2009* April Release, to estimate the Hg emission reductions due to standards for the SNOPR. For today's final rule, however, DOE used the latest version of NEMS–BT, which reflects CAMR being vacated and does not incorporate CAMR emission caps, to estimate the reduction in Hg emissions.

In addition to electricity generation, the operation of gas-fired CCWs results in emissions of CO_2 and NO_X at the sites where the appliances are used. NEMS–BT provides no means for estimating such emissions. Therefore, DOE calculated separate estimates of the effect of the potential standards on site emissions of CO_2 and NO_X based on emissions factors derived from the literature. Because natural gas combustion does not yield SO_2 emissions, DOE did not report in either the November 2009 SNOPR or today's final rule the effect of the proposed standards on site emissions of SO_2.

For its November 2009 SNOPR, DOE conducted a separate analysis of wastewater discharge impacts as part of

the environmental assessment for commercial clothes washers. 73 FR 62034, 62112–13 (Oct. 17, 2008). For today's final rule, DOE retained the same analysis method for estimating wastewater discharge impacts.

EJ commented that given the water supply concerns that are affecting and will continue to affect many parts of the country, it would be arbitrary and capricious for the Department to fail to address the environmental benefits of reduced water consumption resulting from commercial clothes washer standards. (EJ, No. 67.5 at p. 13) In response, DOE notes that the environmental impacts of reduced water use are highly variable across the country. DOE has neither an analytical tool that could estimate such impacts nor sufficient information to draw definitive conclusions about such impacts. Therefore, it was not able to account for potential environmental benefits of reduced water consumption resulting from the commercial clothes washer standards considered for today's final rule.

K. Monetizing Carbon Dioxide and Other Emissions Impacts

For the November 2009 SNOPR, DOE calculated the possible monetary benefit of CO_2, NO_X, and Hg reductions. Cumulative monetary benefits were determined using discount rates of 3 and 7 percent. DOE monetized reductions in CO_2 emissions due to standards based on a range of monetary values drawn from studies that attempt to estimate the present value of the marginal economic benefits (based on the avoided marginal social cost of carbon) likely to result from reducing greenhouse gas emissions. The marginal social cost of carbon is an estimate of the monetary value to society of the environmental damages of CO_2 emissions.

In the October 2008 NOPR, DOE used the range $0 to $20 per ton CO_2 for reductions in the year 2007 in 2007$. These estimates were intended to represent the lower and upper bounds of the costs and benefits likely to be experienced in the United States. The lower bound was based on an assumption of no benefit and the upper bound was based on an estimate of the mean value of worldwide impacts due to climate change that was reported by the Intergovernmental Panel on Climate Change (IPCC) in its "Fourth Assessment Report." For the November 2009 SNOPR and today's final rule, DOE is relying on a new set of values recently developed by an interagency process that conducted a thorough review of existing estimates of the social cost of carbon (SCC).

The SCC is intended to be a monetary measure of the incremental damage resulting from greenhouse gas (GHG) emissions, including, but not limited to, net agricultural productivity loss, human health effects, property damages from sea level rise, and changes in ecosystem services. Any effort to quantify and to monetize the harms associated with climate change will raise serious questions of science, economics, and ethics. But with full regard for the limits of both quantification and monetization, the SCC can be used to provide estimates of the social benefits of reductions in GHG emissions.

For at least three reasons, any single estimate of the SCC will be contestable. First, scientific and economic knowledge about the impacts of climate change continues to grow. With new and better information about relevant questions, including the cost, burdens, and possibility of adaptation, current estimates will inevitably change over time. Second, some of the likely and potential damages from climate change—for example, the value society places on adverse impacts on endangered species—are not included in all of the existing economic analyses. These omissions may turn out to be significant in the sense that they may mean that the best current estimates are too low. Third, controversial ethical judgments, including those involving the treatment of future generations, play a role in judgments about the SCC (see in particular the discussion of the discount rate, below).

To date, regulations have used a range of values for the SCC. For example, a regulation proposed by the U.S. Department of Transportation (DOT) in 2008 assumed a value of $7 per ton CO_2 (2006$) for 2011 emission reductions (with a range of $0–$14 for sensitivity analysis). Regulation finalized by DOE used a range of $0–$20 (2007$). Both of these ranges were designed to reflect the value of damages to the United States resulting from carbon emissions, or the "domestic" SCC. In the final Model Year 2011 Corporate Average Fuel Economy rule, DOT used both a domestic SCC value of $2/t CO_2 and a global SCC value of $33/t CO_2 (with sensitivity analysis at $80/t CO_2), increasing at 2.4 percent per year thereafter.

In recent months, a variety of agencies have worked to develop an objective methodology for selecting a range of interim SCC estimates to use in regulatory analyses until improved SCC estimates are developed. The following summary reflects the initial results of these efforts and proposes ranges and values for interim social costs of carbon used in this rule. It should be emphasized that the analysis described below is preliminary. These complex issues are of course undergoing a process of continuing review. Relevant agencies will be evaluating and seeking comment on all of the scientific, economic, and ethical issues before establishing final estimates for use in future rulemakings.

The interim judgments resulting from the recent interagency review process can be summarized as follows: (a) DOE and other Federal agencies should consider the global benefits associated with the reductions of CO_2 emissions resulting from efficiency standards and other similar rulemakings, rather than continuing the previous focus on domestic benefits; (b) these global benefits should be based on SCC estimates (in 2007$) of $55, $33, $19, $10, and $5 per ton of CO_2 equivalent emitted (or avoided) in 2007 (in calculating the benefits reported in this notice, DOE has escalated the 2007$ values to 2008$ for consistency with other dollar values presented in this notice); (c) the SCC value of emissions that occur (or are avoided) in future years should be escalated using an annual growth rate of 3 percent from the current values); and (d) domestic benefits are estimated to be approximately 6 percent of the global values. These interim judgments are based on the following considerations.

1. *Global and domestic estimates of SCC.* Because of the distinctive nature of the climate change problem, estimates of both global and domestic SCC values should be considered, but the global measure should be "primary." This approach represents a departure from past practices, which relied, for the most part, on measures of only domestic impacts. As a matter of law, both global and domestic values are permissible; the relevant statutory provisions are ambiguous and allow the agency to choose either measure. (It is true that Federal statutes are presumed not to have extraterritorial effect, in part to ensure that the laws of the United States respect the interests of foreign sovereigns. But use of a global measure for the SCC does not give extraterritorial effect to Federal law and hence does not intrude on such interests.)

It is true that under OMB guidance, analysis from the domestic perspective is required, while analysis from the international perspective is optional. The domestic decisions of one nation are not typically based on a judgment about the effects of those decisions on other nations. But the climate change

problem is highly unusual in the sense that it involves (a) a global public good in which (b) the emissions of one nation may inflict significant damages on other nations and (c) the United States is actively engaged in promoting an international agreement to reduce worldwide emissions.

In these circumstances, the global measure is preferred. Use of a global measure reflects the reality of the problem and is expected to contribute to the continuing efforts of the United States to ensure that emission reductions occur in many nations.

Domestic SCC values are also presented. The development of a domestic SCC is greatly complicated by the relatively few region- or country-specific estimates of the SCC in the literature. One potential estimate comes from the DICE (Dynamic Integrated Climate Economy, William Nordhaus) model. In an unpublished paper, Nordhaus (2007) produced disaggregated SCC estimates using a regional version of the DICE model. He reported a U.S. estimate of $1/t CO_2 (2007 value, 2007$), which is roughly 11 percent of the global value.

An alternative source of estimates comes from a recent EPA modeling effort using the FUND (Climate Framework for Uncertainty, Negotiation and Distribution, Center for Integrated Study of the Human Dimensions of Global Change) model. The resulting estimates suggest that the ratio of domestic to global benefits varies with key parameter assumptions. With a 3-percent discount rate, for example, the U.S. benefit is about 6 percent of the global benefit for the "central" (mean) FUND results, while, for the corresponding "high" estimates associated with a higher climate sensitivity and lower global economic growth, the U.S. benefit is less than 4 percent of the global benefit. With a 2-percent discount rate, the U.S. share is about 2 to5 percent of the global estimate.

Based on this available evidence, a domestic SCC value equal to 6 percent of the global damages is used in this rulemaking. This figure is in the middle of the range of available estimates from the literature. It is recognized that the 6 percent figure is approximate and highly speculative and alternative approaches will be explored before establishing final values for future rulemakings.

2. *Filtering existing analyses.* There are numerous SCC estimates in the existing literature, and it is legitimate to make use of those estimates to produce a figure for current use. A reasonable starting point is provided by the meta-analysis in Richard S. J. Tol's, "The Social Cost of Carbon: Trends, Outliers, and Catastrophes, Economics: The Open-Access, Open-Assessment E-Journal," Vol. 2, 2008-25. *http://www.economics-ejournal.org/economics/journalarticles/2008–25* (2008). With that starting point, it is proposed to "filter" existing SCC estimates by using those that (1) are derived from peer-reviewed studies; (2) do not weight the monetized damages to one country more than those in other countries; (3) use a "business as usual" climate scenario; and (4) are based on the most recent published version of each of the three major integrated assessment models (IAMs): FUND, DICE and PAGE (Policy Analysis of the Greenhouse Effect).

Proposal (1) is based on the view that those studies that have been subject to peer review are more likely to be reliable than those that have not been. Proposal (2) is based on a principle of neutrality and simplicity; it does not treat the citizens of one nation differently on the basis of speculative or controversial considerations. Proposal (3) stems from the judgment that as a general rule, the proper way to assess a policy decision is by comparing the implementation of the policy against a counterfactual state where the policy is not implemented. A departure from this approach would be to consider a more dynamic setting in which other countries might implement policies to reduce GHG emissions at an unknown future date, and the United States could choose to implement such a policy now or in the future.

Proposal (4) is based on three complementary judgments. First, the FUND, PAGE, and DICE models now stand as the most comprehensive and reliable efforts to measure the damages from climate change. Second, the latest versions of the three IAMs are likely to reflect the most recent evidence and learning, and hence they are presumed to be superior to those that preceded them. It is acknowledged that earlier versions may contain information that is missing from the latest versions. Third, any effort to choose among them, or to reject one in favor of the others, would be difficult to defend at this time. In the absence of a clear reason to choose among them, it is reasonable to base the SCC on all of them.

The agency is keenly aware that the current IAMs fail to include all relevant information about the likely impacts from greenhouse gas emissions. For example, ecosystem impacts, including species loss, do not appear to be included in at least two of the models. Some human health impacts, including increases in food-borne illnesses and in the quantity and toxicity of airborne allergens, also appear to be excluded. In addition, there has been considerable recent discussion of the risk of catastrophe and of how best to account for worst-case scenarios. It is not clear whether the three IAMs take adequate account of these potential effects.

3. *Use a model-weighted average of the estimates at each discount rate.* At this time, there appears to be no scientifically valid reason to prefer any of the three major IAMs (FUND, PAGE, and DICE). Consequently, the estimates are based on an equal weighting of estimates from each of the models. Among estimates that remain after applying the filter, the average of all estimates within a model is derived. The estimated SCC is then calculated as the average of the three model-specific averages. This approach ensures that the interim estimate is not biased towards specific models or more prolific authors.

4. *Apply a 3-percent annual growth rate to the chosen SCC values.* SCC is assumed to increase over time, because future emissions are expected to produce larger incremental damages as physical and economic systems become more stressed as the magnitude of climate change increases. Indeed, an implied growth rate in the SCC is produced by most studies that estimate economic damages caused by increased GHG emissions in future years. But neither the rate itself nor the information necessary to derive its implied value is commonly reported. In light of the limited amount of debate thus far about the appropriate growth rate of the SCC, applying a rate of 3 percent per year seems appropriate at this stage. This value is consistent with the range recommended by IPCC (2007) and close to the latest published estimate (Hope, 2008).

For climate change, one of the most complex issues involves the appropriate discount rate. OMB's current guidance offers a detailed discussion of the relevant issues and calls for discount rates of 3 percent and 7 percent. It also permits a sensitivity analysis with low rates for intergenerational problems. ("If your rule will have important intergenerational benefits or costs you might consider a further sensitivity analysis using a lower but positive discount rate in addition to calculating net benefits using discount rates of 3 and 7 percent.") The SCC is being developed within the general context of the current guidance.

The choice of a discount rate, especially over long periods of time, raises highly contested and exceedingly difficult questions of science,

economics, philosophy, and law. See, *e.g.,* William Nordhaus, "The Challenge of Global Warming (2008); Nicholas Stern, The Economics of Climate Change" (2007); "Discounting and Intergenerational Equity" (Paul Portney and John Weyant, eds., 1999). Under imaginable assumptions, decisions based on cost-benefit analysis with high discount rates might harm future generations—at least if investments are not made for the benefit of those generations. (See Robert Lind, "Analysis for Intergenerational Discounting," *id.* at 173, 176–177.) At the same time, use of low discount rates for particular projects might itself harm future generations, by ensuring that resources are not used in a way that would greatly benefit them. In the context of climate change, questions of intergenerational equity are especially important.

Reasonable arguments support the use of a 3-percent discount rate. First, that rate is among the two figures suggested by OMB guidance, and hence it fits with existing National policy. Second, it is standard to base the discount rate on the compensation that people receive for delaying consumption, and the 3-percent rate is close to the risk-free rate of return, proxied by the return on long term inflation-adjusted U.S. Treasury Bonds. (In the context of climate change, it is possible to object to this standard method for deriving the discount rate.) Although these rates are currently closer to 2.5 percent, the use of 3 percent provides an adjustment for the liquidity premium that is reflected in these bonds' returns.

At the same time, other arguments support use of a 5-percent discount rate. First, that rate can also be justified by reference to the level of compensation for delaying consumption, because it fits with market behavior with respect to individuals' willingness to trade off consumption across periods as measured by the estimated post-tax average real returns to private investment (*e.g.,* the Standard & Poor's 500 Index). In the climate setting, the 5-percent discount rate may be preferable to the riskless rate because it is based on risky investments and the return to projects to mitigate climate change is also risky. In contrast, the 3-percent riskless rate may be a more appropriate discount rate for projects where the return is known with a high degree of confidence (*e.g.,* highway guardrails).

Second, 5 percent, and not 3 percent, is roughly consistent with estimates implied by reasonable inputs to the theoretically derived Ramsey equation, which specifies the optimal time path for consumption. That equation specifies the optimal discount rate as the sum of two components. The first reflects the fact that consumption in the future is likely to be higher than consumption today (even accounting for climate impacts), so diminishing marginal utility implies that the same monetary damage will cause a smaller reduction of utility in the future. Standard estimates of this term from the economics literature are in the range of 3 to 5 percent. The second component reflects the possibility that a lower weight should be placed on utility in the future, to account for social impatience or extinction risk, which is specified by a pure rate of time preference (PRTP). A conventional estimate of the PRTP is 2 percent. (Some observers believe that a principle of intergenerational equity suggests that the PRTP should be close to zero.) It follows that a discount rate of 5 percent is within the range of values which are able to be derived from the Ramsey equation, albeit at the low end of the range of estimates usually associated with Ramsey discounting.

It is recognized that the arguments above—for use of market behavior and the Ramsey equation—face objections in the context of climate change, and of course there are alternative approaches. In light of climate change, it is possible that consumption in the future will not be higher than consumption today, and if so, the Ramsey equation will suggest a lower figure. Some people have suggested that a very low discount rate, below 3 percent, is justified in light of the ethical considerations calling for a principle of intergenerational neutrality. See Nicholas Stern, "The Economics of Climate Change" (2007); for contrary views, see William Nordhaus, "A Question of Balance" (2008); Martin Weitzman, "*Review* of the *Stern Review* on the Economics of Climate Change," *Journal of Economic Literature,* 45(3): 703–724 (2007). Additionally, some analyses attempt to deal with uncertainty with respect to interest rates over time; a possible approach enabling the consideration of such uncertainties is discussed below. Richard Newell and William Pizer, "Discounting the Distant Future: How Much Do Uncertain Rates Increase Valuations?" J. Environ. Econ. Manage. 46 (*2003*) 52–71.

The application of the methodology outlined above yields estimates of the SCC that are reported in Table IV.8. These estimates are reported separately using 3-percent and 5-percent discount rates. The cells are empty in rows 10 and 11 because these studies did not report estimates of the SCC at a 3-percent discount rate. The model-weighted means are reported in the final or summary row; they are $33 per t CO_2 at a 3-percent discount rate and $5 per t CO_2 with a 5-percent discount rate.

TABLE IV.8—GLOBAL SOCIAL COST OF CARBON (SCC) ESTIMATES ($/t CO_2 IN 2007 IN 2007$), BASED ON 3% AND 5% DISCOUNT RATES *

	Model	Study	Climate scenario	3%	5%
1	FUND	Anthoff et al. 2009	FUND default	6	−1
2	FUND	Anthoff et al. 2009	SRES A1b	1	−1
3	FUND	Anthoff et al. 2009	SRES A2	9	−1
4	FUND	Link and Tol 2004	No THC	12	3
5	FUND	Link and Tol 2004	THC continues	12	2
6	FUND	Guo et al. 2006	Constant PRTP	5	−1
7	FUND	Guo et al. 2006	Gollier discount 1	14	0
8	FUND	Guo et al. 2006	Gollier discount 2	7	−1
			FUND Mean	8.25	0
9	PAGE	Wahba & Hope 2006	A2-scen	57	7
10	PAGE	Hope 2006			7
11	DICE	Nordhaus 2008			8

TABLE IV.8—GLOBAL SOCIAL COST OF CARBON (SCC) ESTIMATES ($/t CO_2 IN 2007 IN 2007$), BASED ON 3% AND 5% DISCOUNT RATES *—Continued

	Model	Study	Climate scenario	3%	5%
Summary			Model-weighted mean	33	5

* The sample includes all peer reviewed, non-equity-weighted estimates included in Tol (2008), Nordhaus (2008), Hope (2008), and Anthoff et al. (2009), that are based on the most recent published version of FUND, PAGE, or DICE and use business-as-usual climate scenarios. All values are based on the best available information from the underlying studies about the base year and year dollars, rather than the Tol (2008) assumption that all estimates included in his review are 1995 values in 1995$. All values were updated to 2007 using a 3-percent annual growth rate in the SCC, and adjusted for inflation using GDP deflator.

DOE used the model-weighted mean values of $33 and $5 per ton (2007$), as these represent the estimates associated with the 3-percent and 5-percent discount rates, respectively. The 3-percent and 5-percent estimates have independent appeal and at this time a clear preference for one over the other is not warranted. These values were then escalated to 2008$ and rounded to $34 and $5. Thus, DOE has also included—and centered its current attention on—the average of the estimates associated with these discount rates, which is approximately $20 (in 2008$). (Based on the $20 global value, the domestic value would be approximately $1 per ton of CO_2 equivalent.)

It is true that there is uncertainty about interest rates over long time horizons. Recognizing that point, Newell and Pizer have made a careful effort to adjust for that uncertainty. See Newell and Pizer, *supra.* This is a relatively recent contribution to the literature.

There are several concerns with using this approach in this context. First, it would be a departure from current OMB guidance. Second, an approach that would average what emerges from discount rates of 3 percent and 5 percent reflects uncertainty about the discount rate, but based on a different model of uncertainty. The Newell-Pizer approach models discount rate uncertainty as something that evolves over time; in contrast, one alternative approach would assume that there is a single discount rate with equal probability of 3 percent and 5 percent.

Table IV.9 reports on the application of the Newell-Pizer adjustments. The precise numbers depend on the assumptions about the data generating process that governs interest rates. Columns (1a) and (1b) assume that "random walk" model best describes the data and uses 3-percent and 5-percent discount rates, respectively. Columns (2a) and (2b) repeat this, except that it assumes a "mean-reverting" process. As Newell and Pizer report, there is stronger empirical support for the random walk model.

TABLE IV.9—GLOBAL SOCIAL COST OF CARBON ESTIMATES ($/t CO_2 IN 2007 IN 2007$),* USING NEWELL & PIZER ADJUSTMENT FOR FUTURE DISCOUNT RATE UNCERTAINTY **

	Model	Study	Climate scenario	Random-walk model		Mean-reverting model	
				3%	*5%*	*3%*	*5%*
				(1a)	(1b)	(2a)	(2b)
1	FUND	Anthoff et al. 2009	FUND default	10	0	7	−1
2	FUND	Anthoff et al. 2009	SRES A1b	2	0	1	−1
3	FUND	Anthoff et al. 2009	SRES A2	15	0	10	−1
4	FUND	Link and Tol 2004	No THC	20	6	13	4
5	FUND	Link and Tol 2004	THC continues	20	4	13	2
6	FUND	Guo et al. 2006	Constant PRTP	9	0	6	−1
7	FUND	Guo et al. 2006	Gollier discount 1	14	0	14	0
8	FUND	Guo et al. 2006	Gollier discount 2	7	−1	7	−1
			FUND Mean	12	1	9	0
9	PAGE	Wahba & Hope 2006	A2-scen	97	13	63	8
10	PAGE	Hope 2006			13		8
11	DICE	Nordhaus 2008			15		9
Summary			Model-weighted mean	55	10	36	6

* The sample includes all peer reviewed, non-equity-weighted estimates included in Tol (2008), Nordhaus (2008), Hope (2008), and Anthoff et al. (2009), that are based on the most recent published version of FUND, PAGE, or DICE and use business-as-usual climate scenarios. All values are based on the best available information from the underlying studies about the base year and year dollars, rather than the Tol (2008) assumption that all estimates included in his review are 1995 values in 1995$. All values were updated to 2007 using a 3-percent annual growth rate in the SCC, and adjusted for inflation using GDP deflator.

** Assumes a starting discount rate of 3 percent. Newell and Pizer (2003) based adjustment factors are not applied to estimates from Guo et al. (2006) that use a different approach to account for discount rate uncertainty (rows 7–8).

The resulting estimates of the social cost of carbon are necessarily greater. When the adjustments from the random walk model are applied, the estimates of the social cost of carbon are $10 and $55, with the 3-percent and 5-percent discount rates, respectively. The application of the mean-reverting adjustment yields estimates of $6 and $36 (2007$). Since the random walk model has greater support from the data, DOE also used the SCC values of $10 and $55 (2007$). When escalated to 2008$, these values are approximately $10 and $56.

In summary, in considering the potential global benefits resulting from reduced CO_2 emissions, DOE used values based on a social cost of carbon of approximately $5, $10, $20, $34 and $56 per metric ton avoided in 2007 (values expressed in 2008$). DOE also calculated the domestic benefits based on a value of approximately $1 per metric ton avoided in 2007. To value the CO_2 emissions reductions expected to result from amended standards for CCWs in 2013–2043, DOE escalated the above values for 2007 using a 3-percent escalation rate. As indicated in the discussion above, estimates of SCC are assumed to increase over time since future emissions are expected to produce larger incremental damages as physical and economic systems become more stressed as the magnitude of climate change increases. Although most studies that estimate economic damages caused by increased GHG emissions in future years produce an implied growth rate in the SCC, neither the rate itself nor the information necessary to derive its implied value is commonly reported. However, applying a rate of 3 percent per year is consistent with the range recommended by IPCC (2007).

DOE also investigated the potential monetary benefit of reduced NO_X and Hg emissions from the TSLs it considered. As noted above, new or amended energy conservation standards would reduce NO_X emissions in those 22 States that are not affected by CAIR, in addition to the reduction in site NO_X emissions nationwide. DOE estimated the monetized value of NO_X emissions reductions resulting from each of the TSLs considered for today's final rule based on environmental damage estimates from the literature. Available estimates suggest a very wide range of monetary values for NO_X emissions, ranging from $370 per ton to $3,800 per ton of NO_X from stationary sources, measured in 2001$ (equivalent to a range of $442 to $4,540 per ton in 2008$). Refer to the OMB, Office of Information and Regulatory Affairs, "2006 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities," Washington, DC, for additional information.

For Hg emissions reductions, DOE estimated the national monetized values resulting from the TSLs considered for today's rule based on environmental damage estimates from the literature. The impact of mercury emissions from power plants on humans is considered highly uncertain. However, DOE identified two estimates of the environmental damage of Hg based on estimates of the adverse impact of childhood exposure to methyl mercury on IQ for American children, and subsequent loss of lifetime economic productivity resulting from these IQ losses. The high-end estimate of $1.3 billion per year in 2000$ (which works out to $33.3 million per ton emitted per year in 2008$) is based on an estimate of the current aggregate cost of the loss of IQ in American children that results from exposure to Hg of U.S. power plant origin.[36] DOE's low-end estimate of $0.66 million per ton emitted in 2004$ ($0.745 million per ton in 2008$) was derived from an evaluation of mercury control that used different methods and assumptions from the first study, but was also based on the present value of the lifetime earnings of children exposed to Hg.[37]

As previously stated, DOE's analysis assumed the presence of nationwide emission caps on SO_2 and caps on NO_X emissions in the 28 States covered by CAIR. In the presence of these caps, the NEMS–BT modeling system that DOE used to forecast emissions reduction indicated that no physical reductions in power sector emissions would occur (although there remains uncertainty about whether physical reduction of SO_2 will occur), but that the standards could put slight downward pressure on the prices of emissions allowances in cap-and-trade markets. Estimating this effect is very difficult because factors such as credit banking can change the trajectory of prices. From its modeling to date, DOE is unable to estimate a benefit from energy conservation standards on the prices of emissions allowances at this time. See the environmental assessment in the final rule TSD for further details.

V. Discussion of Other Comments

Since DOE opened the docket for this rulemaking, it has received more than 44 written comments from a diverse set of parties, including manufacturers and their representatives, wholesalers and distributors, energy conservation advocates, State officials and agencies, and electric utilities. Section IV of this preamble discusses comments DOE received on the analytic methodologies it used. Additional comments DOE received in response to the November 2009 SNOPR addressed the burdens and benefits associated with new energy efficiency standards, the information DOE used in its analyses, results of and inferences drawn from the analyses, impacts of standards, the merits of the different TSLs and standards options DOE considered, other issues affecting adoption of standards for CCWs, and the DOE rulemaking process. DOE addresses these comments in this section.

A. Proposed Trial Standard Levels (TSLs) for Commercial Clothes Washers

For the October 2008 NOPR, DOE based the TSLs on efficiency levels explored in the November 2007 ANOPR, and selected the TSLs on consideration of economic factors and current market conditions. ASAP suggested that DOE set TSLs based upon industry benchmarks such as current and forthcoming ENERGY STAR qualification levels and pending Federal tax incentive performance levels. (ASAP, Public Meeting Transcript, No. 40.5 at p. 33 and pp. 148–149) EIEA 2008 provided an Energy Efficient Appliance Credit to manufacturers for any RCW or CCW (front-loading or top-loading) produced domestically through 2010 with an efficiency level of at least 2.0 MEF/6.0 WF, or a larger credit for one that achieves 2.2 MEF/4.5 WF. The legislation also provides a separate tax credit for any top-loading RCW that achieves an efficiency level of at least 1.72 MEF/8.0 WF or a larger credit for one that exceeds 1.8 MEF/7.5 WF. DOE considered the impacts of these tax credits on the CCW industry in detail as part of the MIA. DOE accounts for the Federal tax credit as a direct cash benefit in the base and standards cases that increases the INPV. See section IV.G of today's supplemental notice and appendix 13C of the SNOPR TSD for further discussion of this issue.

B. Proposed Standards for Commercial Clothes Washers

For the November 2009 SNOPR, DOE made the preliminary determination that the standards for top-loading and front-loading CCWs listed in Table II.1 are technologically feasible and economically justified, and invited comment on these proposed standard levels.

In response, Alliance stated that it opposes the standard proposed for top-loading CCWs, noting that it is based on a "residential construction" product with almost no acceptance in the marketplace, instead of a true "commercial construction" product meeting the needs of the U.S.

[36] Trasande, L., *et al.,* "Applying Cost Analyses to Drive Policy that Protects Children," 1076 Ann. N.Y. Acad. Sci. 911 (2006).

[37] Ted Gayer and Robert Hahn, "Designing Environmental Policy: Lessons from the Regulation of Mercury Emissions," Regulatory Analysis 05–01, AEI-Brookings Joint Center for Regulatory Studies, Washington, DC (2004). A version of this paper was published in the *Journal of Regulatory Economics* in 2006. The estimate was derived by back-calculating the annual benefits per ton from the net present value of benefits reported in the study.

commercial clothes washer market segment. It stated that the proposed standard is inappropriate because equipment meeting the standard would not provide true hot water (120 °F or greater), true warm water (80 °F to 120 °F), or adequate rinsing. Alliance commented that WEB Service Company, California's largest multi-housing route operator, deployed an all-spray-rinse top-loading CCW in the late 1990's and was forced to take back all deployed units because they didn't meet the needs of the users. It stated that it could support a top-loading class standard of MEF ≥ 1.42/WF ≤ 9.5 (TSL 2), and that it supports the proposed standard for front-loading CCWs. (Alliance, No. 66.4 at p. 4; Alliance, No. 67.8 at pp. 1, 4)

Whirlpool commented that it supports both the top-loading and front-loading standards proposed in the November 2009 SNOPR. It stated that energy and water consumption levels that are more restrictive than these will likely lead to poor wash performance, poor rinse performance, or both. (Whirlpool, No. 67.11 at p. 3) AHAM and GE stated support for the proposed MEF and water factor levels that DOE proposed for front-loading CCWs. (AHAM, No. 67.12 at p. 3; GE, No. 67.9 at p. 1) GE added that it supports DOE's proposed MEF and WF requirements for front-load commercial clothes washers. In addition, GE expressed support for DOE's proposed MEF and WF requirements for top-load commercial clothes washers, but stated its concern that the max-tech model on which this level is based is designed for a relatively limited segment of the market (the on-premises laundry commercial segment), and that this model has not yet been demonstrated as sustainable in the harsher environment of laundromats, where the units are subject to tougher conditions such as overloading. (GE, No. 67.9 at p. 1)

EJ and the California Utilities advocated adoption of a single set of energy and water efficiency standards for all commercial clothes washers, which will deliver greater energy and water savings than separate standards for top-loading and front-loading commercial washers. The California Utilities stated that its preliminary analysis suggests that over the next 30 years, DOE could save as much as 50 percent more in energy savings and over 200 percent more in water savings with a single equipment class standard (set at levels of MEF 2.35/WF 4.4) than the standard that DOE has proposed in the SNOPR. (EJ, No. 67.5 at pp. 10–11; California Utilities, No. 67.10 at pp. 3–4) EJ stated that the proposed separate standards for front-loaders would increase the installed price differential between front-loaders and top-loaders, which could result in increased energy and water consumption to the extent that the increased installed price differential would encourage the market to shift from front-loaders to less efficient top-loaders. It noted that the modest energy and water savings that DOE has estimated for its proposed separate front-loader standards could be exceeded by that standard's impact on the relative shipments of top-loading and front-loading washers. It added that if DOE's standards were to necessitate design changes to top-loaders exclusively, the resulting increase in installed costs for top-loaders would foster the market's transition to front-loaders, increasing the net energy and water savings produced by the standard. (EJ, No. 67.5 at pp. 10–11)

EJ and the California Utilities also noted the availability of flexible regulatory approaches that would facilitate adoption of a strong, uniform set of standards for all commercial washers and also minimize any adverse impacts on competition. They stated that DOE could adopt a tiered approach to standards, maintaining a 2013 compliance date for initial energy and water efficiency standards, while phasing in stronger requirements later. This approach, they said, would give the LVM (Alliance) and other manufacturers additional time to raise needed capital and to optimize product designs and manufacturing processes to meet strong standards at a lower cost. (EJ, No. 67.5 at pp. 9–10; California Utilities, No. 67.10 at pp. 4–5) EJ added that alternatively, DOE could accommodate Alliance's key concerns by granting a temporary waiver from compliance with revised standards. This would enable DOE to adopt effective standards while giving Alliance an extended compliance period in which to raise needed capital and optimize its product designs and manufacturing processes. (EJ, No. 67.5 at p. 9–10)

The Joint Comment stated that DOE's proposed rule establishing two product classes for CCWs is not satisfactory for either of the proposed classes, as it would require manufacturers to make substantial investments to achieve modest improvements in the efficiency of a protected class of inherently less-efficient top-loaders, while establishing a standard for front-loaders that 97 percent of the front-loading models on the market today already meet. It noted that a stronger standard for front-loaders would widen the price differential between front-loaders and top-loaders, which would encourage a portion of the market to shift from front-loaders back to less efficient top-loaders. The Joint Comment recommended that a standard be set for CCWs as a single product class, with performance levels that are readily achievable by today's high-efficiency front-loading washers. It stated that the highest standard level identified for front-loaders (MEF 2.35/WF 4.4) maximizes energy and life-cycle cost savings when applied to all commercial washers, and thus should be the strongest candidate for adoption. Regarding the problems that the recommended standards could pose for the LVM (*i.e.,* Alliance), the Joint Comment stated that the standard should take effect in stages, allowing most capital conversion costs to be deferred for an additional two years. It added that the manufacturer hardship waiver process in current law remains open to Alliance should unforeseen circumstances arise making compliance impossible. (Joint Comment, No. 67.6 at p. 1)

In considering standards for today's final rule, DOE first notes that it has retained separate equipment classes for top-loading and front-loading CCWs, for reasons discussed in section IV.A. DOE has retained the analyses of standards for both equipment classes that it conducted for the SNOPR, which are described in section IV. Section VI presents a discussion of DOE's reasons for adopting the standard levels in today's final rule.

VI. Analytical Results and Conclusions

A. Trial Standard Levels

DOE analyzed the benefits and burdens of a number of TSLs for the CCWs that are the subject of today's final rule. As discussed in section IV.A, for the October 2008 NOPR, DOE based the TSLs on efficiency levels explored in the November 2007 ANOPR, and selected the TSLs on consideration of economic factors and current market conditions. As also discussed in section IV.C.1.a, DOE eliminated the maximum technologically efficiency level of 1.76 MEF/8.3 WF for the top-loading equipment class in the November 2009 SNOPR. For today's final rule, DOE considered the same TSLs it considered for the November 2009 SNOPR.

Table VI.1 presents the TSLs analyzed for today's final rule and the efficiency levels (consisting of a combination of MEF and WF) within each TSL for each class of equipment. In all, DOE has considered five TSLs. TSL 1 corresponds to the first candidate standard level from each equipment class and represents the efficiency level for each class with the least significant design change. TSL 2 represents the

second candidate standard level for front-loading washers while keeping top-loading washers at its first candidate standard level. Over 96 percent of the front-loading CCW equipment Stock Keeping Units (SKUs) currently on the market either meet or exceed the second candidate standard level for front-loading washers. In the case of the second candidate standard level for top-loading washers, a significant percentage of the market, over 35 percent, also meets or exceeds this efficiency level. Therefore, TSL 2 corresponds to the candidate standard levels for each equipment class that still represent a significant share of the market. TSL 3 represents the second candidate standard level for top-loading washers (the maximum efficiency level for this class), and keeps front-loading washers at the second candidate standard level. For TSL 3, front-loading washers were held to the second candidate standard level in order to minimize the equipment price difference between the two equipment classes. For TSL 4, top-loading washers are retained at their maximum efficiency level while front-loading washers are incremented to their third candidate standard level. Finally, TSL 5 corresponds to the maximum technologically feasible level for each equipment class. In progressing from TSL 1 to TSL 5, the LCC savings, NES, and NPV all increase. TSL 5 represents the level with the minimum LCC and maximum NES and NPV.

TABLE VI.1—TRIAL STANDARD LEVELS FOR COMMERCIAL CLOTHES WASHERS

	TSL 1	TSL 2	TSL 3	TSL 4	TSL 5
Top-Loading:					
MEF	1.42	1.42	1.60	1.60	1.60
WF	9.5	9.5	8.5	8.5	8.5
Front-Loading:					
MEF	1.80	2.00	2.00	2.20	2.35
WF	7.5	5.5	5.5	5.1	4.4

B. Significance of Energy Savings

To estimate the energy savings through 2043 due to amended energy conservation standards, DOE compared the energy consumption of equipment under the base case to energy consumption of this equipment under each TSL that DOE considered for CCWs. Table VI.2 shows DOE's NES estimates (and national water savings results) for each TSL. The table also shows the magnitude of the savings if they are discounted at 7-percent and 3-percent discount rates. Discounted energy savings represent a policy perspective where energy savings further in the future are less significant than energy savings closer to the present. Each TSL considered in this rulemaking would result in significant energy savings, and the amount of savings increases with higher energy conservation standards (ranging from an estimated 0.04 quads to 0.12 quads, undiscounted, for TSLs 1 through 5).

TABLE VI.2—SUMMARY OF CUMULATIVE NATIONAL ENERGY AND WATER SAVINGS FOR CCWS

[Savings for Units Sold from 2013 to 2043]

Trial standard level	Undiscounted		3% Discounted		7% Discounted	
	National energy savings, *quads*	National water savings, *trillion gallons*	National energy savings, *quads*	National water savings, *trillion gallons*	National energy savings, *quads*	National water savings, *trillion gallons*
1	0.04	0.00	0.02	0.00	0.01	0.00
2	0.04	0.01	0.02	0.00	0.01	0.00
3	0.10	0.14	0.06	0.08	0.03	0.04
4	0.11	0.16	0.06	0.09	0.03	0.04
5	0.12	0.21	0.07	0.11	0.03	0.06

C. Economic Justification

1. Economic Impacts on Commercial Customers

a. Life-Cycle Cost and Payback Period

To evaluate the net economic impact of standards on CCW customers, DOE conducted LCC and PBP analyses for each TSL. More efficient CCWs affect customers in two ways: (1) Purchase price is expected to increase; and (2) annual operating expense is expected to decrease. DOE analyzed the net effect by calculating the LCC. Inputs used for calculating the LCC include total installed costs, annual energy savings, average electricity prices, energy price trends, repair and maintenance costs, equipment lifetime, and discount rates.

Table VI.3 and Table VI.4 show the LCC and PBP results for each CCW application for the top-loading equipment class, and Table VI.5 and Table VI.6 show the results for the front-loading equipment class. DOE's LCC and PBP analyses provided five outputs for each considered TSL. The first three outputs are the percentages of standard-compliant machine purchases that would result in (1) a net LCC increase, (2) no impact, or (3) a net LCC savings for the customer. The fourth output is the average net LCC savings from standard-compliant equipment. The fifth output is the average PBP for the customer purchasing a design that complies with the TSL.

For the top-loading equipment class, the highest average LCC savings and shortest PBP occur at TSLs 3, 4, and 5. At these TSLs, 85 percent of multi-family customers have a net benefit, and 96 percent of laundromat customers have a net benefit. For the front-loading equipment class, the highest average LCC savings occur at TSL 5, and the PBP is lower than at TSL 4. TSLs 1 through 3 have little impact because most of the market is already at or above this level in the base case.

TABLE VI.3—COMMERCIAL CLOTHES WASHERS, TOP-LOADING, MULTI-FAMILY APPLICATION: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

TSL	MEF/WF	Life-cycle cost			Life-cycle cost savings				Payback period years	
		Average installed price $	Average operating cost $	Average LCC $	Average savings $	Customers with			Median	Average
						Net cost %	No impact %	Net benefit %		
Baseline	1.26/9.50	760	3,263	4,023	.....	.....	.....	.....	.....	.....
1, 2	1.42/9.50	883	3,153	4,036	−8.1	43.3	35.3	21.5	11.7	17.3
3, 4, 5	1.60/8.50	974	2,873	3,847	178.6	13.8	1.2	85.0	4.6	5.6

TABLE VI.4—COMMERCIAL CLOTHES WASHERS, TOP-LOADING, LAUNDROMAT APPLICATION: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

TSL	MEF/WF	Life-cycle cost			Life-cycle cost savings				Payback period years	
		Average installed price $	Average operating cost $	Average LCC $	Average savings $	Customers with			Median	Average
						Net cost %	No impact %	Net benefit %		
Baseline	1.26/9.50	760	3,422	4,182	.....	.....	.....	.....	.....	.....
1, 2	1.42/9.50	883	3,326	4,209	−17.7	51.4	35.3	13.3	7.9	9.1
3, 4, 5	1.60/8.50	974	3,025	3,999	190.0	2.9	1.2	95.9	2.8	3.0

TABLE VI.5—COMMERCIAL CLOTHES WASHERS, FRONT-LOADING, MULTI-FAMILY APPLICATION: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

TSL	MEF/WF	Life-cycle cost			Life-cycle cost savings				Payback period years	
		Average installed price $	Average operating cost $	Average LCC $	Average savings $	Customers with			Median	Average
						Net cost %	No impact %	Net benefit %		
Baseline	1.72/8.00	1,365	2,855	4,220	.....	.....	.....	.....	.....	.....
1	1.80/7.50	1,365	2,855	4,091	4.7	0.0	96.3	3.7	0.0	0.0
2, 3	2.00/5.50	1,388	2,726	3,690	19.5	0.0	96.3	3.7	0.4	0.4
4	2.20/5.10	1,428	2,302	3,596	91.5	1.4	23.1	75.5	3.0	3.2
5	2.35/4.40	1,470	2,168	3,484	202.7	1.1	0.0	98.9	2.9	3.1

TABLE VI.6—COMMERCIAL CLOTHES WASHERS, FRONT-LOADING, LAUNDROMAT APPLICATION: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

TSL	MEF/WF	Life-cycle cost			Life-cycle cost savings				Payback period years	
		Average installed price $	Average operating cost $	Average LCC $	Average savings $	Customers with			Median	Average
						Net cost %	No impact %	Net benefit %		
Baseline	1.72/8.00	1,365	2,014	4,380	.....	.....	.....	.....	.....	.....
1	1.80/7.50	1,365	3,014	4,240	5.2	0.0	96.3	3.7	0.0	0.0
2, 3	2.00/5.50	1,388	2,874	3,787	22.0	0.0	96.3	3.7	0.2	0.2
4	2.20/5.10	1,428	2,400	3,695	93.4	0.0	23.1	76.9	1.8	1.9
5	2.35/4.40	1,470	2,267	3,572	216.1	0.0	0.0	100.0	1.6	1.7

b. Commercial Consumer Subgroup Analysis

Using the LCC spreadsheet model, DOE estimated the impact of the considered TSLs on the following CCW customer subgroups: (1) Small business owners, and (2) customers without municipal water and sewer.

For customers without municipal water and sewer, the LCC impacts and PBPs are similar to the LCC impacts and PBPs for the full sample of CCW customers. But for small business owners (small multi-family property owners and small laundromats), the LCC impacts and PBPs are different from those associated with the general population.

For the top-loading equipment class, Table VI.7 shows the LCC impacts and PBPs for small multi-family property owners and small laundromats, while Table VI.8 shows the same for the front-loading equipment class. For all TSLs for both equipment classes, both sets of small business owners, on average, realize LCC savings similar to the general population. The difference between the small business population and the general population occurs in the percentage of each population that realizes LCC savings from standards. With the exception of TSL 1 for top-loading washers, an overwhelming majority of the small business and general populations benefit from standards at each TSL. But for both equipment classes, a larger percentage of the general population benefits from

standards than do small business owners. This occurs because small businesses do not have the same access to capital as larger businesses. As a result, smaller businesses have a higher average discount rate than the industry average. Because of the higher discount rates, smaller businesses do not value future operating costs savings from more efficient CCWs as much as the general population. But to emphasize, in spite of the higher discount rates, a majority of small businesses still benefit from higher CCW standards at all TSLs, with the exception of TSL 1 for the top-loading equipment class.

TABLE VI.7—COMMERCIAL CLOTHES WASHERS, TOP-LOADING: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS FOR SMALL BUSINESS OWNERS

TSL	MEF/WF	Life-cycle cost			Life-cycle cost savings				Payback period *years*	
		Average installed price $	Average operating cost $	Average LCC $	Average savings $	Households with			Median	Average
						Net cost $	No impact %	Net benefit %		
Multi-Family Application										
Baseline	1.26/9.50	760	2,659	3,419	.....	.....	.....	.....	.....	.....
1, 2	1.42/9.50	883	2,569	3,452	(22.0)	50.7	35.6	13.7	11.7	17.7
3, 4, 5	1.60/8.50	974	2,341	3,315	112.6	21.2	1.5	77.4	4.5	5.6
Laundromat Application										
Baseline	1.26/9.50	760	2,963	3,723	.....	.....	.....	.....	.....	.....
1, 2	1.42/9.50	883	2,880	3,764	(26.1)	58.6	35.6	5.8	7.8	9.2
3, 4, 5	1.60/8.50	974	2,620	3,594	140.9	5.6	1.5	92.9	2.8	3.0

Note: Numbers in parentheses indicate negative values.

TABLE VI.8—COMMERCIAL CLOTHES WASHERS, FRONT-LOADING: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS FOR SMALL BUSINESS OWNERS

TSL	MEF/WF	Life-cycle cost			Life-cycle cost savings				Payback period *years*	
		Average installed price $	Average operating cost %	Average LCC $	Average savings $	Households with			Median	Average
						Net cost %	No impact %	Net benefit %		
Multi-Family Application										
Baseline	1.72/8.00	1,365	2,327	3,693	.....	.....	.....	.....	.....	.....
1	1.80/7.50	1,365	2,327	3,587	3.7	0.0	96.4	3.6	0.0	0.0
2, 3	2.00/5.50	1,388	2,222	3,265	14.9	0.0	96.4	3.6	0.4	0.5
4	2.20/5.10	1,428	1,877	3,196	69.1	4.1	22.2	73.7	3.0	3.2
5	2.35/4.40	1,470	1,768	3,113	151.7	4.2	0.0	95.8	2.9	3.1
Laundromat Application										
Baseline	1.72/8.00	1,365	1,643	3,977	.....	.....	.....	.....	.....	.....
1	1.80/7.50	1,365	2,611	3,855	4.2	0.0	96.4	3.6	0.0	0.0
2, 3	2.00/5.50	1,388	2,490	3,467	17.6	0.0	96.4	3.6	0.2	0.2
4	2.20/5.10	1,428	2,079	3,392	75.9	0.0	22.2	77.7	1.8	1.9
5	2.35/4.40	1,470	1,964	3,291	176.4	0.0	0.0	100.0	1.6	1.7

c. Rebuttable-Presumption Payback

As discussed above, EPCA establishes a rebuttable presumption that an energy conservation standard is economically justified if the increased purchase cost for equipment that meets the standard is less than three times the value of the first-year energy savings resulting from the standard. (42 U.S.C. 6295(o)(2)(B)(iii)) DOE calculated a rebuttable-presumption PBP for each TSL to determine whether DOE could presume that a standard at that level is economically justified. Table VI.9 shows the rebuttable-presumption PBPs for CCWs. As required by EPCA, DOE based the calculation on the assumptions in the DOE test procedures for CCWs. (42 U.S.C. 6295(o)(2)(B)(iii)) As a result, DOE calculated a single rebuttable-presumption payback value, and not a distribution of PBPs, for each TSL.

TABLE VI.9—REBUTTABLE-PRESUMPTION PAYBACK PERIODS FOR COMMERCIAL CLOTHES WASHERS

TSL	Payback period, *years*			
	Top-loading		Front-loading	
	Multi-family application	Lauundromat application	Multi-family application	Laundromat application
1	>100	>100	0	0
2	>100	>100	1.2	1.3

TABLE VI.9—REBUTTABLE-PRESUMPTION PAYBACK PERIODS FOR COMMERCIAL CLOTHES WASHERS—Continued

TSL	Payback period, *years*			
	Top-loading		Front-loading	
	Multi-family application	Lauundromat application	Multi-family application	Laundromat application
3	24.0	>100	1.2	1.3
4	24.0	>100	9.4	17.3
5	24.0	>100	10.0	17.6

With the exception of TSLs 1 to 3 for front-loading CCWs, the TSLs in Table VI.9 do not have rebuttable-presumption PBPs of less than 3 years. As stated above, in addition to calculating the rebuttable-presumption PBP DOE routinely conducts a thorough economic analysis that considers the full range of impacts, including those to consumers, manufacturers, the Nation, and the environment, as required under 42 U.S.C. 6295(o)(2)(B)(i). The results of this full analysis serve as the basis for DOE to definitively determine the economic justification for a potential standard level (thereby supporting or rebutting the results of any preliminary determination of economic justification.) Section IV.D provides a complete discussion of how DOE considered the range of impacts to select the standards in today's final rule.

2. Economic Impacts on Manufacturers

For the November 2009 SNOPR, DOE used the INPV in the MIA to compare the financial impacts of different TSLs on CCW manufacturers. 74 FR 57738, 57773–76 (Nov. 9, 2009). The INPV is the sum of all net cash flows discounted by the industry's cost of capital (discount rate). DOE used the GRIM to compare the INPV of the base case (no new energy conservation standards) to that of each TSL for the CCW industry. To evaluate the range of cash-flow impacts on the CCW industry, DOE constructed different scenarios using different assumptions for shipments that correspond to the range of anticipated market responses. Each scenario results in a unique set of cash flows and corresponding industry value at each TSL. These steps allowed DOE to compare the potential impacts on the industry as a function of TSLs in the GRIM. The difference in INPV between the base case and the standards case is an estimate of the economic impacts that implementing that standard level would have on the entire industry. For today's final rule notice, DOE continues to use the above methodology and presents the results in the subsequent sections. See chapter 13 of the TSD for additional information on MIA methodology and results.

a. Industry Cash-Flow Analysis Results

Using scenarios based on two shipment projections from the NIA, DOE estimated the impact of amended energy conservation standards for CCWs on the INPV of the CCW industry. The impact consists of the difference between INPV in the base case and INPV in the standards case. INPV is the primary metric used in the MIA, and represents one measure of the fair value of the industry in today's dollars. DOE calculated the INPV by summing all of the net cash flows, discounted at the CCW industry's cost of capital or discount rate.

As discussed in section IV.G of today's final rule, DOE also considered the impact of Federal production tax credits on the CCW industry. DOE does not include the benefit of these tax credits in its results shown below. DOE includes these results in appendix 13C of the TSD. DOE estimated that the total benefit of these Federal production tax credits to the CCW industry from 2007 through 2010 would be approximately $5.3 million. Because DOE discounts the industry cash flows to the 2009 base year, DOE estimates that approximately $1.6 million of the total benefit from the tax credits will occur during the analysis period. In the scenario that considers the benefits of the tax credits, the base case INPV increases by approximately $1.6 million. As previously stated, although the base-case and standards-case INPV increase as a result of Federal production tax credits, the benefits do not significantly mitigate possible impacts due to standards. For additional information on the assumptions and calculations of Federal production tax credits for CCWs, see appendix 13C of the TSD.

Also discussed in section IV.G of today's final rule, DOE incorporated a sensitivity analysis from the NIA that impacts shipments in the MIA. The methodology and subsequent INPV results from the sensitivity analysis are found in appendix 11C of the TSD.

To assess the lower end of the range of potential impacts for the CCW industry, DOE considered a scenario wherein unit shipments will not be impacted regardless of new energy conservation standards—this scenario is called the base-case shipments scenario. To assess the higher end of the range of potential impacts for the CCW industry, DOE considered a scenario in which total industry shipments would decrease due to the combined effects of increases in purchase price and decreases in operating costs due to new energy conservation standards—this scenario is called the price elasticity of demand scenario. In both scenarios, it is assumed that manufacturers will be able to maintain the same gross margins (as a percentage of revenues) that are currently obtained in the base case. Table VI.10 through Table VI.11 show the changes in INPV that DOE estimates would result from the TSLs DOE considered for this final rule.

TABLE VI.10—MANUFACTURER IMPACT ANALYSIS FOR COMMERCIAL CLOTHES WASHERS WITH BASE-CASE SHIPMENTS. NOT INCLUDING DOE'S ESTIMATES OF FEDERAL PRODUCTION TAX CREDITS

[Preservation of gross margin percentage markup with base-case shipments]

	Units	Base case	Trial standard level				
			1	2	3	4	5
INPV	*2008$ millions*	62	65	63	57	54	41
Change in INPV	*2008$ millions**		4	1	(5)	(8)	(20)

TABLE VI.10—MANUFACTURER IMPACT ANALYSIS FOR COMMERCIAL CLOTHES WASHERS WITH BASE-CASE SHIPMENTS. NOT INCLUDING DOE'S ESTIMATES OF FEDERAL PRODUCTION TAX CREDITS—Continued

[Preservation of gross margin percentage markup with base-case shipments]

	Units	Base case	Trial standard level				
			1	2	3	4	5
	%		5.97	2.24	−7.81	−12.73	−33.09
Amended Energy Conservation Standards Equipment Conversion Expenses.	*2008$ millions*		0.00	3.12	18.72	22.56	35.87
Amended Energy Conservation Standards Capital Investments.	*2008$ millions*		0.00	0.62	1.66	2.44	5.09
Total Investment Required	*2008$ millions*		0.0	3.7	20.4	25.0	41.0

* Parentheses indicate negative (−) values.

TABLE VI.11—MANUFACTURER IMPACT ANALYSIS FOR COMMERCIAL CLOTHES WASHERS WITH BASE-CASE SHIPMENTS. PRESERVATION OF GROSS MARGIN PERCENTAGE MARKUP WITH BASE-CASE SHIPMENTS

[Not including DOE's estimates of Federal production tax credits]

	Units	Base case	Trial standard level				
			1	2	3	4	5
INPV	*2008$ millions*	62	64	62	55	51	39
Change in INPV	*2008$ millions**		2.8	0.5	(7.0)	(10.2)	(23.0)
	%		4.50	0.76	−11.39	−16.57	−37.30
Amended Energy Conservation Standards Equipment Conversion Expenses.	*2008$ millions*		0.00	3.12	18.72	22.56	35.87
Amended Energy Conservation Standards Capital Investments.	*2008$ millions*		0.00	0.62	1.66	2.44	5.09
Total Investment Required	*2008$ millions*		0.0	3.7	20.4	25.0	41.0

* Parentheses indicate negative (−) values.

The November 2009 SNOPR discusses the estimated impact of amended CCW standards on INPV for each equipment class. 74 FR 57738, 57775–76 (Nov. 9, 2009). See chapter 13 of the TSD for details.

b. Cumulative Regulatory Burden

While any one regulation may not impose a significant burden on manufacturers, the combined effects of several regulations may have serious consequences for some manufacturers, groups of manufacturers, or an entire industry. Assessing the impact of a single regulation may overlook this cumulative regulatory burden.

DOE recognizes that each regulation can significantly affect manufacturers' financial operations. Multiple regulations affecting the same manufacturer can reduce manufacturers' profits and possibly cause manufacturers to exit from the market. DOE did not identify any additional DOE regulations that would affect the manufacturers of CCW apart from the ones discussed in the October 2008 NOPR. 73 FR 62034, 62104 (Oct. 17, 2008). These included other DOE regulations, State regulations, and international standards. For further information about the cumulative regulatory burden on the CCW industry, see chapter 13 of the TSD.

c. Impacts on Employment

To quantitatively assess the impacts of energy conservation standards on CCW manufacturing employment, DOE used the GRIM to estimate the domestic labor expenditures and number of employees in the base case and at each TSL from 2009 through 2043 for the CCW industry. DOE used statistical data from the U.S. Census Bureau's 2006 *Annual Survey of Manufactures* [38] (*2006 ASM*) and 2006 *Current Industry Report* [39] (*2006 CIR*), the results of the engineering analysis, and interviews with manufacturers to estimate the inputs necessary to calculate industry-wide labor expenditures and domestic employment levels.

Using the GRIM, DOE calculates that there are 188 U.S. production workers in the CCW industry. Using the *CIR* data, DOE estimates that approximately 81 percent of CCWs sold in the United States are manufactured domestically. Today's final rule estimates the impacts on U.S. production workers in the CCW industry impacted by energy conservation standards as shown in Table VI.12.

TABLE VI.12—CHANGE IN TOTAL NUMBER OF DOMESTIC PRODUCTION EMPLOYEES IN 2013 IN THE COMMERCIAL CLOTHES WASHER INDUSTRY

	Baseline	TSL 1	TSL 2	TSL 3	TSL 4	TSL 5
Total Number of Domestic Production Workers in 2013	188	204	204	222	224	228
Change in Total Number of Domestic Production Workers in 2013		16	16	33	36	40

[38] The 2006 *Annual Survey of Manufactures* is available online at: *http://www.census.gov/mcd/asmhome.html.*

[39] The 2006 *Current Industry Report* is available online at: *http://www.census.gov/cir/www/alpha.html.*

The November 2009 SNOPR discussed the estimated impacts of amended CCW standards on manufacturing employment. 74 FR 57738, 57776–77 (Nov. 9, 2009). A further discussion of the potential impacts of amended energy conservation standards on manufacturing employment for the CCW industry at each TSLs are presented in chapter 13 of the TSD.

d. Impacts on Manufacturing Capacity

According to the majority of CCW manufacturers, amended energy conservation standards could potentially impact manufacturers' production capacity depending on the efficiency level required. For today's final rule, DOE continues to believe manufacturers will be able to maintain manufacturing capacity levels and continue to meet market demand under amended energy conservation standards as long as manufacturers can continue to offer top-loading and front-loading CCWs.

As stated in the November 2009 SNOPR, a very high efficiency standard for top-loading CCWs could potentially cause one or more manufacturer(s) to abandon further manufacture of top-loading CCWs after the compliance date (due to concerns about wash quality, for example). Instead of manufacturing top-loading CCWs, manufacturers could elect to switch their entire production over to front-loading CCWs. Since top-loading and front-loading CCWs share few, if any parts, are built on completely separate assembly lines, and are built at very different production volumes, a manufacturer may not be able to make a platform switch from top-loading to front-loading CCWs without significant impacts on equipment development and capital expenses, along with capacity constraints. 74 FR 57738, 57777 (Nov. 9, 2009). However, for today's final rule, DOE estimates that the energy conservation standard in today's final rule for top-loading CCWs mitigates that risk.

As reported in the November 2009 SNOPR, multiple manufacturers stated during interviews that front-loading CCWs represent a relatively small segment of their total production volumes. Depending on the manufacturer, front-loading production capacity may need to be substantially expanded to meet the demand that top-loading production lines currently meet. This expansion could possibly affect capacity until new production lines come on-line to service demand. In addition, manufacturers stated that the higher prices of front-loading washers could lead to a decrease in shipments. This could lead to a permanently lower production capacity as machines are repaired and the equipment lifetime of existing washers is extended. 74 FR 57738, 57777 (Nov. 9, 2009). DOE research continues to suggest that the energy conservation standards in today's final rule can be achieved by all manufacturers using existing platforms and technologies; hence, there appears little reason for the market to wholly transition to front-loading CCWs.

A further discussion of the potential impacts of amended energy conservation standards on manufacturing capacity for the CCW industry is presented in chapter 13 of the TSD.

e. Impacts on Subgroups of Manufacturers

As discussed in the November 2009 SNOPR, 74 FR 57738, 57777 (Nov. 9, 2009), DOE evaluated the impacts of amended energy conservation standards on subgroups of manufacturers. As outlined earlier, an LVM that concentrates on building laundry equipment will be affected disproportionately by any energy efficiency regulation regarding CCWs. The LVM's business is focused mostly on the commercial laundry market segment and its total production volume is many times lower than its diversified competitors. Due to this combination of market concentration and size, the LVM is at greater risk of material harm to its business due to any regulation that affects commercial laundry products than its competitors, regardless of the TSL chosen.

For today's final rule, DOE reevaluated the CCW energy conservation standards proposed in the November 2009 SNOPR in response to comments received from interested parties. DOE continues to believe that the energy conservation standards adopted in today's final rule greatly lessen the potential disadvantages faced by the LVM. Further details of the separate analysis of the impacts on the LVM are found in chapter 13 of the TSD.

3. National Impact Analysis

a. Amount and Significance of Energy Savings

To estimate the energy savings through 2043 that would be expected to result from amended CCW energy conservation standards, DOE compared the projected energy consumption of CCWs under the base case to energy consumption of this equipment under each of the considered TSLs. The energy consumption calculated in the NIA takes into account energy losses in the generation and transmission of electricity as discussed in section VI.B.

Table VI.13 and Table VI.14 show the forecasted national energy and water savings at each TSL for top-loading and front-loading CCWs, respectively. In addition to undiscounted savings, the tables show the magnitude of the estimated energy and water savings if the savings are discounted at 7-percent and 3-percent discount rates. Each TSL considered in this rulemaking would result in significant energy and water savings, and the amount of savings increases with higher energy conservation standards. See chapter 11 of the TSD for details of the NIA.

TABLE VI.13—SUMMARY OF CUMULATIVE NATIONAL ENERGY AND WATER SAVINGS FOR TOP-LOADING COMMERCIAL CLOTHES WASHERS (2013 TO 2043)

Trial standard level	Undiscounted		Discounted at 3%		Discounted at 7%	
	National energy savings, *quads*	National water savings, *trillion gallons*	National energy savings, *quads*	National water savings, *trillion gallons*	National energy savings, *quads*	National water savings, *trillion gallons*
1	0.04	0.00	0.02	0.00	0.01	0.00
2	0.04	0.00	0.02	0.00	0.01	0.00
3	0.10	0.14	0.05	0.08	0.03	0.04
4	0.10	0.14	0.05	0.08	0.03	0.04
5	0.10	0.14	0.05	0.08	0.03	0.04

TABLE VI.14—CUMULATIVE NATIONAL ENERGY AND WATER SAVINGS FOR FRONT-LOADING COMMERCIAL CLOTHES WASHERS (2013 TO 2043)

Trial standard level	Undiscounted		3% Discounted		7% Discounted	
	National energy savings, *quads*	National water savings, *trillion gallons*	National energy savings, *quads*	National water savings, *trillion gallons*	National energy savings, *quads*	National water savings, *trillion gallons*
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.01	0.00	0.00	0.00	0.00
3	0.00	0.01	0.00	0.00	0.00	0.00
4	0.01	0.03	0.01	0.01	0.00	0.01
5	0.02	0.07	0.01	0.04	0.01	0.02

b. Net Present Value of Customer Costs and Benefits

The NPV of customer costs and benefits is a measure of the cumulative impact of energy conservation standards. In accordance with the OMB's guidelines on regulatory analysis (OMB Circular A–4, section E, Sept. 17, 2003), DOE calculated an estimated NPV using both a 7-percent and a 3-percent real discount rate. The 7-percent rate is an estimate of the average before-tax rate of return on private capital in the U.S. economy, and reflects the returns on real estate and small business capital as well as corporate capital. DOE used this discount rate to approximate the opportunity cost of capital in the private sector, since recent OMB analysis has found the average rate of return to capital to be near this rate. DOE also used the 3-percent rate to capture the potential effects of standards on private consumption (*e.g.,* through higher prices for equipment and the purchase of reduced amounts of energy). This rate represents the rate at which society discounts future consumption flows to their present value. This rate can be approximated by the real rate of return on long-term government debt (*i.e.,* yield on Treasury notes minus annual rate of change in the Consumer Price Index), which has averaged about 3 percent on a pre-tax basis for the last 30 years.

Table VI.15 shows the forecasted NPV at each TSL for CCWs. At both 7-percent and 3-percent discount rates, TSLs 1 through 5 show positive cumulative NPVs. The highest NPV is provided by TSL 5: $0.51 billion with 7-percent discount rate, and $1.25 billion with 3-percent discount rate.

TABLE VI.15—SUMMARY OF CUMULATIVE NET PRESENT VALUE FOR COMMERCIAL CLOTHES WASHERS (IMPACTS FOR UNITS SOLD FROM 2013 TO 2043)

TSL	NPV, *billion 2008$*					
	Top-loading		Front-loading		Total	
	7% Discount rate	3% Discount rate	7% Discount rate	3% Discount rate	7% Discount rate	3% Discount rate
1	0.01	0.07	0.00	0.01	0.01	0.08
2	0.01	0.07	0.01	0.03	0.02	0.10
3	0.34	0.86	0.01	0.03	0.36	0.89
4	0.34	0.86	0.07	0.17	0.41	1.03
5	0.34	0.86	0.17	0.39	0.51	1.25

c. Impacts on Employment

In addition to considering the direct employment impacts for the manufacturers of equipment covered by this rulemaking (discussed above,) DOE develops estimates of the indirect employment impacts of proposed standards in the economy in general. As noted previously, DOE expects energy conservation standards for CCWs to reduce energy bills for commercial customers, with the resulting net savings being redirected to other forms of economic activity. The impacts concern a variety of businesses not directly involved in the decision to make, operate, or pay the utility bills for CCWs. Thus, they are "indirect."

To estimate these indirect employment impacts, DOE used an input/output model of the U.S. economy using BLS data (described in section IV.H). In this input/output model, the spending of the money saved on utility bills when more efficient CCWs are deployed is centered in economic sectors that create more jobs than are lost in electric utilities when spending is shifted from electricity to other products and services. As Table VI.16 shows, DOE estimates that net indirect employment impacts from the considered TSLs are likely to be very small. Furthermore, neither the BLS data nor the input/output model DOE uses include the quality or wage level of the jobs.

TABLE VI.16—NET NATIONAL INDIRECT EMPLOYMENT IMPACTS UNDER COMMERCIAL CLOTHES WASHER TSLS

TSL	Net national change in jobs in 2043, *thousands*
1	0.07
2	0.08
3	0.46
4	0.52
5	0.62

4. Impact on Utility or Performance of Equipment

As indicated in section II.G.1.d of the November 2009 SNOPR, the amended standards DOE is adopting today will not lessen the utility or performance of equipment under consideration in this

rulemaking. 74 FR 57738, 57745 (Nov. 9, 2009).

5. Impact of Any Lessening of Competition

As discussed in the November 2009 SNOPR, 74 FR 57738, 57779 (Nov. 9, 2009), and in section III.D.1.e of this preamble, DOE considers any lessening of competition likely to result from standards. The Attorney General determines the impact, if any, of any lessening of competition.

DOE carefully considered the determination received from DOJ in response to the October 2008 NOPR, and accordingly chose efficiency levels for the November 2009 SNOPR that appear achievable by all CCW manufacturers using existing equipment platforms and technologies. As such, DOE stated that there should be minimal impact on the CCW market and hence its manufacturers. To assist the Attorney General in making a determination for the November 2009 SNOPR, DOE provided DOJ with copies of the supplemental notice and the TSD for review. The DOJ did not provide a response to the November 2009 SNOPR. Therefore, DOE considers the impact of any lessening of competition for today's final rule based, in part, on the Attorney General's earlier response, which is reprinted at the end of today's rulemaking.

6. Need of the Nation to Conserve Energy

Improving the energy efficiency of CCWs, where economically justified, would likely improve the security of the Nation's energy system by reducing overall demand for energy, potentially reducing the Nation's reliance on foreign sources of energy. Reduced electricity demand would also likely improve the reliability of the electricity system, particularly during peak-load periods. As a measure of this reduced demand, DOE expects the energy savings from the adopted standards to eliminate the need for approximately 0.010 gigawatts (GW) of generating capacity by 2043.

The energy savings from the standards for CCWs also produce environmental benefits in the form of reduced emissions of air pollutants and greenhouse gases associated with energy production, and with use of fossil fuels at sites where CCWs are used. Table VI.17 provides DOE's estimate of cumulative CO_2, NO_X, and Hg emissions reductions that would result from the TSLs considered in this rulemaking. In the environmental assessment (chapter 16 of the TSD), DOE reports estimated annual changes in CO_2, NO_X, and Hg emissions attributable to each TSL.

TABLE VI.17—CUMULATIVE EMISSIONS REDUCTIONS UNDER COMMERCIAL CLOTHES WASHER TSLS (IN 2013 TO 2043)

Emissions	TSL				
	1	2	3	4	5
CO_2, *Mt*	2.36	2.39	5.07	5.66	6.11
NO_X, *kt*	1.43	1.45	3.04	3.39	3.66
Hg, *t*	0.0002	0.0002	0.0003	0.0004	0.0004

Mt = million metric tons.
kt = thousand metric tons.
t = metric tons.

As discussed in section IV.J of this final rule, DOE does not report SO_2 emissions reductions from power plants because there is uncertainty about the effect of energy conservation standards on the overall level of SO_2 emissions in the United States due to SO_2 emissions caps. DOE also did not include NO_X emissions reduction from power plants in States subject to CAIR because an energy conservation standard would likely not affect the overall level of NO_X emissions in those States due to the emissions caps mandated by CAIR.

Table VI.18 presents the estimated wastewater discharge reductions due to the TSLs for CCWs. In chapter 16 of the TSD, DOE reports annual changes in wastewater discharge attributable to each TSL.

TABLE VI.18—CUMULATIVE WASTEWATER DISCHARGE REDUCTIONS UNDER COMMERCIAL CLOTHES WASHER TRIAL STANDARD LEVELS

[For 2013–2043]

	TSL				
	1	2	3	4	5
Wastewater Discharge Reduction, *trillion gallons*	0.00	0.01	0.14	0.16	0.21

As discussed in section IV.J of this final rule, DOE estimated the cumulative monetary value of the economic benefits associated with CO_2 emissions reductions expected to result from amended standards for CCWs. In considering the potential global benefits resulting from reduced CO_2 emissions, DOE used values based on a social cost of carbon of approximately $5, $10, $20, $34 and $56 per metric ton avoided in 2007 (values expressed in 2008$). DOE also calculated the domestic benefits based on a value of approximately $1 per metric ton avoided in 2007. To value the CO_2 emissions reductions expected to result from amended standards for CCWs in 2013–2043, DOE escalated the above values for 2007 using a 3-percent escalation rate. Table VI.19 and Table VI.20 present the cumulative monetary value for each TSL using 7-percent and 3-percent discount rates, respectively.

TABLE VI.19—ESTIMATES OF VALUE OF CO_2 EMISSIONS REDUCTIONS UNDER COMMERCIAL CLOTHES WASHER TRIAL STANDARD LEVELS AT 7-PERCENT DISCOUNT RATE

TSL	Estimated cumulative CO_2 emission reductions, *Mt*	Value of CO_2 emission reductions, *million 2008$* *					
		Domestic	Global				
		CO_2 Value $1/metric ton CO_2	CO_2 Value $5/metric ton CO_2	CO_2 Value $10/metric ton CO_2	CO_2 Value $20/metric ton CO_2	CO_2 Value $34/metric ton CO_2	CO_2 Value $56/metric ton CO_2
1	2.36	1	6	12	22	39	65
2	2.39	1	6	12	23	40	66
3	5.07	3	13	25	48	84	140
4	5.66	3	14	28	54	93	156
5	6.11	3	15	31	58	101	168

* Unit values are approximate and are based on escalating 2007$ to 2008$ for consistency with other values presented in this notice.

TABLE VI.20—ESTIMATES OF VALUE OF CO_2 EMISSIONS REDUCTIONS UNDER COMMERCIAL CLOTHES WASHER TRIAL STANDARD LEVELS AT 3-PERCENT DISCOUNT RATE

TSL	Estimated cumulative CO_2 emission reductions, *Mt*	Value of CO_2 emission reductions, *million 2008$**					
		Domestic	Global				
		CO_2 Value $1/metric ton CO_2	CO_2 Value $5/metric ton CO_2	CO_2 Value $10/metric ton CO_2	CO_2 Value $20/metric ton CO_2	CO_2 Value $34/metric ton CO_2	CO_2 Value $56/metric ton CO_2
1	2.36	3	13	26	49	84	141
2	2.39	3	13	26	49	86	143
3	5.07	6	28	55	105	182	303
4	5.66	7	31	61	117	202	337
5	6.11	8	33	66	126	219	364

* Unit values are approximate and are based on escalating 2007$ to 2008$ for consistency with other values presented in this notice.

DOE is well aware that scientific and economic knowledge about the contribution of CO_2 and other GHG emissions to changes in the future global climate and the potential resulting damages to the world economy continues to evolve rapidly. Thus, any value placed in this rulemaking on reducing CO_2 emissions is subject to change. DOE, together with other Federal agencies, will continue to review various methodologies for estimating the monetary value of reductions in CO_2 and other GHG emissions. This ongoing review will consider the comments on this subject that are part of the public record for this and other rulemakings, as well as other methodological assumptions and issues. However, consistent with DOE's legal obligations, and taking into account the uncertainty involved with this particular issue, DOE has included in this rule the most recent values and analyses resulting from the ongoing interagency review process.

DOE also estimated a range for the cumulative monetary value of the economic benefits associated with NO_X and Hg emissions reductions anticipated to result from amended standards for CCWs. The dollar per ton values that DOE used are discussed in section IV.J of this final rule. Table VI.21 and Table VI.22 present the estimates calculated using 7-percent and 3-percent discount rates, respectively.

TABLE VI.21—ESTIMATES OF VALUE OF REDUCTIONS OF NO_X AND HG EMISSIONS UNDER COMMERCIAL CLOTHES WASHER TRIAL STANDARD LEVELS AT A 7-PERCENT DISCOUNT RATE

Commercial clothes washer TSL	Cumulative NO_X emission reductions, *kt*	Value of NO_X emission reductions, *million 2008$*	Cumulative Hg emission reductions, *t*	Value of Hg emission reductions, *million 2008$*
1	1.43	0.19 to 1.96	0.0002	0.00 to 0.03.
2	1.45	0.19 to 1.99	0.0002	0.00 to 0.03.
3	3.04	0.41 to 4.17	0.0003	0.00 to 0.06.
4	3.39	0.45 to 4.64	0.0004	0.00 to 0.07.
5	3.66	0.49 to 5.01	0.0004	0.00 to 0.08.

TABLE VI.22—ESTIMATES OF VALUE OF REDUCTIONS OF NO_X AND HG EMISSIONS UNDER COMMERCIAL CLOTHES WASHER TRIAL STANDARD LEVELS AT A 3-PERCENT DISCOUNT RATE

Commercial clothes washer TSL	Cumulative NO_X emission reductions, *kt*	Value of NO_X emission reductions, *million 2008$*	Cumulative Hg emission reductions, *t*	Value of Hg emission reductions, *million 2008$*
1	1.43	0.38 to 3.92	0.0002	0.00 to 0.03.

TABLE VI.22—ESTIMATES OF VALUE OF REDUCTIONS OF NO_X AND HG EMISSIONS UNDER COMMERCIAL CLOTHES WASHER TRIAL STANDARD LEVELS AT A 3-PERCENT DISCOUNT RATE—Continued

Commercial clothes washer TSL	Cumulative NO_X emission reductions, *kt*	Value of NO_X emission reductions, *million 2008$*	Cumulative Hg emission reductions, *t*	Value of Hg emission reductions, *million 2008$*
2	1.45	0.39 to 3.98	0.0002	0.00 to 0.03.
3	3.04	0.81 to 8.36	0.0003	0.00 to 0.06.
4	3.39	0.91 to 9.31	0.0004	0.00 to 0.07.
5	3.66	0.98 to 10.04	0.0004	0.00 to 0.07.

The NPV of the monetized benefits associated with emissions reductions can be viewed as a complement to the NPV of the consumer savings calculated for each TSL considered in this rulemaking. Table VI.23 presents the NPV values for CCWs that would result if DOE were to add the low-end and high-end estimates of the potential benefits resulting from reduced CO_2, NO_X, and Hg emissions to the NPV of consumer savings calculated for each TSL considered in this rulemaking, at both a 7-percent and 3-percent discount rate. For CO_2, only the low and high global benefit values are used for these tables ($5 and $56 in 2008$).

Although adding the value of consumer savings to the values of emission reductions provides a valuable perspective, please note the following: (1) The national consumer savings are domestic U.S. consumer monetary savings found in market transactions, while the values of emissions reductions are based on ranges of estimates of imputed marginal social costs, which, in the case of CO_2, are meant to reflect global benefits; and (2) the assessments of consumer savings and emission-related benefits are performed with different computer models, leading to different time frames for the analyses. For CCWs, the present value of national consumer savings is measured for the period in which units shipped from 2013 to 2043 continue to operate. However, the time frames of the benefits associated with the emission reductions differ. For example, the value of CO_2 emissions reductions is meant to reflect the present value of all future climate-related impacts, even those beyond 2065.

TABLE VI.23—ESTIMATES OF ADDING NPV OF CONSUMER SAVINGS TO NPV OF LOW- AND HIGH-END GLOBAL MONETIZED BENEFITS FROM CO_2, NO_X, AND HG EMISSIONS REDUCTIONS AT ALL TSLS FOR COMMERCIAL CLOTHES WASHERS

TSL	CO_2 Value of $5/metric ton CO_2* and low values for NO_X and Hg** *billion 2008$*	CO_2 Value of $56/metric ton CO_2* and high values for NO_X and Hg*** *billion 2008$*		
		7-percent discount rate	3-percent discount rate	7-percent discount rate
1	0.02	0.09	0.08	0.22
2	0.03	0.11	0.09	0.25
3	0.37	0.92	0.50	1.20
4	0.42	1.06	0.57	1.38
5	0.53	1.28	0.68	1.62

* These values per ton represent the global negative externalities of CO_2.
** Low Values correspond to $442 per ton of NO_X emissions and $0.745 million per ton of Hg emissions.
*** High Values correspond to $4,540 per ton of NO_X emissions and $33.3 million per ton of Hg emissions.

7. Other Factors

EPCA 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. (42 U.S.C. 6295(o)(2)(B)(i)(VII) and 6316(a)) In adopting today's amended standards, the Secretary found no relevant factors other than those identified elsewhere in today's final rule.

D. Conclusion

EPCA contains criteria for prescribing new or amended energy conservation standards. It provides that any such standard for CCWs must be designed to achieve the maximum improvement in energy efficiency that the Secretary determines is technologically feasible and economically justified. (42 U.S.C. 6295(o)(2)(A) and 42 U.S.C. 6316(a)) As stated above, in determining whether a standard is economically justified, the Secretary must determine whether the benefits of the standards exceed its burdens considering the seven factors discussed in section II.B. A determination of whether a standard level is economically justified is not made based on any one of these factors in isolation. The Secretary must weigh each of these seven factors in total in determining whether a standard is economically justified. Further, the Secretary may not establish an amended standard if such standard would not result in "significant conservation of energy," or "is not technologically feasible or economically justified." (42 U.S.C. 6295(o)(3)(B) and 42 U.S.C. 6316(a))

In selecting today's energy conservation standards for CCWs, DOE started by examining the maximum technologically feasible levels, and determined whether those levels were economically justified. If DOE determined that the maximum technologically feasible level was not justified, DOE then analyzed the next lower TSL to determine whether that level was economically justified. DOE repeated this procedure until it identified an economically justified TSL.

To aid the reader in understanding the benefits and/or burdens of each TSL, Table VI.24 summarizes the quantitative analytical results for each TSL, based on the assumptions and methodology

discussed above. These tables present the results—or, in some cases, a range of results—for each TSL. The range of values reported in these tables for industry impacts represents the results for the different markup scenarios that DOE used to estimate manufacturer impacts.

In addition to the quantitative results, DOE also considers other burdens and benefits that affect economic justification.

In sum, today's standard levels for the equipment that is the subject of this rulemaking reflect DOE's careful balancing of the relevant statutory factors under EPCA.

TABLE VI.24—SUMMARY OF RESULTS FOR COMMERCIAL CLOTHES WASHERS

Category	TSL 1	TSL 2	TSL 3	TSL 4	TSL 5
Primary Energy Saved, *quads*	0.04	0.04	0.10	0.11	0.12
7% Discount Rate	0.01	0.01	0.03	0.03	0.03
3% Discount Rate	0.02	0.02	0.06	0.06	0.07
Primary Water Saved, *trillion gallons*	0.00	0.01	0.14	0.16	0.21
7% Discount Rate	0.00	0.00	0.04	0.04	0.06
3% Discount Rate	0.00	0.00	0.08	0.09	0.11
Generation Capacity Reduction, *gigawatts***	0.005	0.005	0.010	0.011	0.012
NPV of Customer Benefit, *2008$ billion:*					
7% Discount Rate	0.01	0.02	0.36	0.41	0.51
3% Discount Rate	0.08	0.10	0.89	1.03	1.25
Industry Impacts:					
Industry NPV, *2008$ million*	4–3	1–0	(5)–(7)	(8)–(10)	(20)–(23)
Industry NPV, *% change*	6.0–4.5	2.2–0.8	(7.8)–(11.4)	(12.7)–(16.6)	(33.1)–(37.3)
Emissions Impacts: †					
CO_2, *Mt*	2.36	2.39	5.07	5.66	6.11
NO_X, *kt*	1.43	1.45	3.04	3.39	3.66
Hg, *t*	0.0002	0.0002	0.0003	0.0004	0.0004
Value of Emission Reductions:					
CO_2, *2008$ million:*††					
7% Discount Rate	6–65	6–66	13–140	14–156	15–168
3% Discount Rate	13–141	13–143	28–303	31–337	33–364
NO_X, *2008$ million:*					
7% Discount Rate	0.2–2.0	0.2–2.0	0.4–4.2	0.5–4.6	0.5–5.0
3% Discount Rate	0.4–3.9	0.4–4.0	0.8–8.4	0.9–9.3	1.0–10.0
Hg, *2008$ million:*					
7% Discount Rate	0.00–0.03	0.00–0.03	0.00–0.06	0.00–0.07	0.00–0.08
3% Discount Rate	0.00–0.03	0.00–0.03	0.00–0.06	0.00–0.07	0.00–0.07
Wastewater Discharge Impacts, *trillion gallons*	0.00	0.01	0.14	0.16	0.21
Mean LCC Savings,* *2008$:*					
Top-Loading, Multi-Family	(8.1)	(8.1)	179	179	179
Top-Loading, Laundromat	(17.7)	(17.7)	190	190	190
Front-Loading, Multi-Family	4.7	19.5	19.5	91	203
Front-Loading, Laundromat	5.2	22.0	22.0	93	216
Median PBP, *years:*					
Top-Loading, Multi-Family	11.7	11.7	4.6	4.6	4.6
Top-Loading, Laundromat	7.9	7.9	2.8	2.8	2.8
Front-Loading, Multi-Family	0.0	0.4	0.4	3.0	2.9
Front-Loading, Laundromat	0.0	0.2	0.2	1.8	1.6
LCC Customer Impacts:					
Top-Loading:					
Multi-Family:					
Net Cost, %	43.3	43.3	13.8	13.8	13.8
No Impact, %	35.3	35.3	1.2	1.2	1.2
Net Benefit, %	21.5	21.5	85.0	85.0	85.0
Laundromat:					
Net Cost, %	51.4	51.4	2.9	2.9	2.9
No Impact, %	35.3	35.3	1.2	1.2	1.2
Net Benefit, %	13.3	13.3	95.9	95.9	95.9
Front-Loading:					
Multi-Family:					
Net Cost, %	0.0	0.0	0.0	1.4	1.1
No Impact, %	96.3	96.3	96.3	23.1	0.0
Net Benefit, %	3.7	3.7	3.7	75.5	98.9
Laundromat:					
Net Cost, %	0.0	0.0	0.0	0.0	0.0
No Impact, %	96.3	96.3	96.3	23.1	0.0
Net Benefit, %	3.7	3.7	3.7	76.9	100.0

* Parentheses indicate negative (−) values. For LCCs, a negative value means an increase in LCC by the amount indicated.
** Changes in installed generation capacity by 2043 based on *AEO 2009* April Release Reference Case.
† Emissions impacts include physical reductions at power plants and at buildings where the appliance is being used.
†† Range of the economic value of CO_2 reductions based on global estimates of the benefit of reduced CO_2 emissions.

First, DOE considered TSL 5, the max-tech level. TSL 5 would likely save 0.12 quads of energy and 0.21 trillion gallons of water through 2043, an amount DOE considers significant. DOE projects that TSL 5 would result in a net increase of $0.51 billion in NPV of customer benefits using a discount rate of 7 percent, and of $1.25 billion using a discount rate of 3 percent. The emissions reductions at TSL 5 are 6.11 Mt of CO_2, 3.66 kt of NO_X, and 0.0004 t of Hg. At TSL 5, the estimated benefit of reducing CO_2 emissions based on global estimates of the value of CO_2 ranges from $15 million to $168 million at a 7-percent discount rate, and $33 million to $364 million at a 3-percent discount rate. Total generating capacity in 2043 is estimated to decrease compared to the reference case by 0.012 GW under TSL 5.

At TSL 5, DOE projects that the average top-loading CCW customer would experience a decrease in LCC of $179 in multi-family applications and $190 in laundromats. DOE also estimates an LCC decrease for an overwhelming majority of customers that purchase top-loading CCWs—85 percent of customers in multi-family applications and 96 percent of customers in laundromats. The median PBP of the average consumer at TSL 5 in multi-family applications and in laundromats is projected to be 4.6 years and 2.8 years, respectively.

At TSL 5, DOE projects that the average front-loading CCW consumer would experience a decrease in LCC of $203 in multi-family applications and $216 in laundromats. DOE also estimates an LCC decrease for an overwhelming majority of customers that purchase front-loading CCWs—99 percent of customers in multi-family applications and 100 percent of customers in laundromats. The median PBP of the average consumer at TSL 5 in multi-family applications and in laundromats is projected to be 2.9 years and 1.6 years, respectively.

At TSL 5, DOE estimated the projected change in INPV ranges from a total decrease of $20.4 million for both equipment classes to a total decrease of $23.0 million. At TSL 5, DOE recognizes the risk of very large negative impacts if manufacturers' expectations about reduced shipments are realized. TSL 5 could result in a net loss as high as 37.3 percent in INPV to CCW manufacturers. Also, DOE is especially sensitive to the potentially severe impacts to the LVM of CCWs. Because the LVM's clothes washer revenue is so dependent on CCW sales, DOE is concerned that TSL 5 will cause material harm to the LVM.

Although DOE recognizes the increased economic benefits that could result from TSL 5, DOE has concluded that the benefits of a standard at TSL 5 would be outweighed by the potential for disincentivizing customers from purchasing more efficient front-loading CCWs. At TSL 5, front-loading CCWs are highly efficient but have a purchase price estimated to be $497 more expensive than top-loading CCWs. With such a large price differential between the two types of CCWs, and with less than 2 percent of the front-loading market at TSL 5, DOE is concerned that significant numbers of potential customers of front-loading CCWs would choose to purchase a less efficient top-loading unit.

As described in section IV.E.2.c, DOE did analyze the impacts of increased purchase prices for each equipment class, but considered each independently of the other. Because the price impacts for more efficient top-loaders are higher than those for more efficient front-loaders, DOE estimated that top-loading CCW sales would decrease slightly more rapidly than for front-loaders. But DOE did not have sufficient data to estimate the cross-price elasticity of demand between the two equipment classes to determine the extent to which customers of front-loadings CCWs would switch to less expensive top-loaders.

If potential front-loading CCW customers did decide to switch to less expensive top-loading washers, the NES and NPV realized from TSL 5 would be diminished. DOE notes that in developing the energy savings and water savings estimates for TSL 5, it effectively held constant the ratio of front-loading to top-loading CCW shipments across the various TSLs. Particularly at TSL 3 to TSL 5, the differences in these estimates are small, especially at a 7-percent discount rate. DOE believes that the values in Table VI.24 represent the high end of the potential energy and water savings for these TSLs. Taking into account cross-price elasticity of demand could affect the anticipated energy and water savings of the various TSLs, and it could potentially result in a change in the TSL with the highest projected energy/water savings level.

In addition, TSL 5 would adversely impact manufacturers' INPV to a significant extent. Not only does the industry face a potential significant loss in industry INPV, but manufacturers would also need to make significant capital investments for both types of CCWs in order to produce both top-loading and front-loading washers at the maximum technologically feasible levels.

After carefully considering the analysis and weighing the benefits and burdens of TSL 5, the Secretary has reached the following conclusion: At TSL 5, the benefits of energy savings, economic benefit, and emissions reductions would be outweighed by the potential for giving customers less incentive to purchase high efficiency front-loading CCWs and the large capital conversion costs that could result in a substantial reduction in INPV for manufacturers.

Next, DOE considered TSL 4. TSL 4 would likely save 0.11 quads of energy and 0.16 trillion gallons of water through 2043, an amount DOE considers significant. DOE projects that TSL 4 would result in a net increase of $0.41 billion in NPV of customer benefits using a discount rate of 7 percent, and of $1.03 billion using a discount rate of 3 percent. The emissions reductions at TSL 4 are 5.66 Mt of CO_2, 3.39 kt of NO_X, and 0.0004 t of Hg. At TSL 4, the estimated benefits of reducing CO_2 emissions based on global estimates of the value of CO_2 ranges from $14 million to $156 million at a 7-percent discount rate and $31 million to $337 million at a 3-percent discount rate. Total generating capacity in 2043 is estimated to decrease compared to the reference case by 0.011 GW under TSL 4.

At TSL 4, top-loading CCWs have the same efficiency as at TSL 5. Therefore, top-loading CCW customers will experience the same LCC impacts and PBPs as TSL 5. At TSL 4 for front-loading CCWs, DOE projects that the average front-loading CCW consumer would experience a decrease in LCC of $91 in multi-family applications and $93 in laundromats. DOE also estimates an LCC decrease for an overwhelming majority of customers that purchase front-loading CCWs—76 percent of customers in multi-family applications and 77 percent of customers in laundromats. The median PBP of the average consumer at TSL 4 in multi-family applications and in laundromats is projected to be 3.0 years and 1.8 years, respectively.

DOE estimated the projected change in INPV ranges from a decrease of $7.8 million to a decrease of $10.2 million. At TSL 4, DOE recognizes the risk of very large negative impacts if manufacturers' expectations about reduced shipments are realized. TSL 4 could result in a net loss as high as 16.6 percent in INPV to CCW manufacturers. Also, DOE is especially sensitive to the potentially severe impacts to the LVM. Since the LVM's clothes washer revenue

is so dependent on CCW sales, DOE is concerned that TSL 4 will materially harm the LVM.

Although DOE recognizes the increased economic benefits that could result from TSL 4, DOE has the same concerns regarding TSL 4 as for TSL 5. Namely, DOE has concerns as to the potential of TSL 4 to give customers less incentive to purchase more efficient front-loading washers. At TSL 4, front-loading CCWs are highly efficient but have a purchase price estimated to be $454 more expensive than top-loading washers. With such a price differential between the two types of CCWs, and with less than 4 percent of the front-loading market currently meeting TSL 4, DOE is concerned that a significant number of potential customers of front-loading CCWs would be more likely to purchase a top-loading CCW, which is less efficient. If potential front-loading CCW customers did decide to switch to top-loading models, the NES and NPV realized from TSL 4 would be diminished.

In addition, TSL 4 would adversely impact manufacturers' INPV to a significant extent. Not only does the industry face a potential loss in industry INPV, but manufacturers would also need to make significant capital investments for both types of CCWs in order to produce both top-loading washers at the maximum technologically feasible level and front-loading washers at a level which only 3 percent of the market currently meets.

After carefully considering the analysis and weighing the benefits and burdens of TSL 4, the Secretary has reached the following conclusion: At TSL 4, the benefits of energy savings, economic benefit, and emissions reductions would be outweighed by the potential for giving customers less incentive to purchase high efficiency front-loading CCWs and the large capital conversion costs that could result in a substantial reduction in INPV for manufacturers.

Next, DOE considered TSL 3. TSL 3 would likely save 0.10 quads of energy and 0.14 trillion gallons of water through 2043, an amount DOE considers significant. DOE projects that TSL 3 would result in a net increase of $0.36 billion in NPV of customer benefits using a discount rate of 7 percent, and of $0.89 billion using a discount rate of 3 percent. The emissions reductions at TSL 3 are 5.07 Mt of CO_2, 3.04 kt of NO_X, and 0.0003 t of Hg. The estimated benefits of reducing CO_2 emissions based on global estimates of the value of CO_2 ranges from $13 million to $140 million at a 7-percent discount rate, and $28 million to $303 million at a 3-percent discount rate. Total generating capacity in 2043 is estimated to decrease compared to the reference case by 0.010 GW under TSL 3.

At TSL 3, top-loading CCWs have the same efficiency as at TSL 5. Therefore, top-loading CCW customers would experience the same LCC impacts and PBPs as TSL 5. At TSL 3 for front-loading CCWs, DOE projects that the average front-loading CCW consumer would experience a decrease in LCC of $19 in multi-family applications and $22 in laundromats. DOE also estimates an LCC decrease for all customers that do not already purchase front-loading CCWs with an efficiency meeting TSL 3. The median PBP of the average consumer at TSL 3 in multi-family applications and in laundromats is projected to be 0.4 years and 0.2 years, respectively.

DOE estimated the projected change in INPV ranges from a decrease of $4.8 million to a decrease of $7.0 million. At TSL 3, DOE recognizes the risk of very large negative impacts if manufacturers' expectations about reduced shipments are realized. TSL 3 could result in a net loss as high as 11.4 percent in INPV to CCW manufacturers. Also, DOE is especially sensitive to the potential adverse impacts to the LVM. Since the LVM's clothes washer revenue is so dependent on CCW sales, DOE is concerned that TSL 3 could disproportionately impact the LVM.

DOE recognizes the increased economic benefits that could result from TSL 3. DOE still has concerns of the potential for giving customers less incentive to purchase more efficient front-loading washers, but at TSL 3, the price difference between front-loading and top-loading CCWs drops to $414. Given that DOE projects that the average front-loading CCW consumer would experience an LCC savings at TSL 3, DOE believes that most front-loading CCW customers not already purchasing washers at TSL 3 would likely continue to purchase a front-loading unit if standards are set at TSL 3. DOE notes that TSL 3 adversely impacts manufacturers' INPV, but because such a large percentage of the front-loading market is already at TSL 3, manufacturers would likely not need to make significant capital investments for front-loading CCWs. Product development and conversion expenses and capital investments would only be required in order to produce higher efficiency top-loading washers at TSL 3.

After considering the analysis and weighing the benefits and the burdens, DOE has concluded that the benefits of a TSL 3 standard outweigh the burdens. In particular, the Secretary has concluded that TSL 3 saves a significant amount of energy and is technologically feasible and economically justified. Further, benefits from carbon dioxide reductions (at a central value of $20) would increase NPV by $48 million (2008$) at a 7% discount rate and $105 million at a 3% discount rate. These benefits from carbon dioxide emission reductions, when considered in conjunction with the consumer savings NPV and other factors described above support DOE's conclusion that TSL 3 is economically justified. Therefore, DOE establishes TSL 3 as the energy conservation standards for CCWs in this final rule. Table VI.25 lists today's energy conservation standards for CCWs. DOE's amended energy conservation standards for CCWs at TSL 3 reflect its conclusion that this standard level would minimize the potential adverse impacts on the LVM and, therefore, would also minimize the adverse impacts on CCW market competition.

TABLE VI.25—AMENDED ENERGY CONSERVATION STANDARDS FOR COMMERCIAL CLOTHES WASHERS

Equipment class	Amended energy conservation standards
Top-Loading	1.60 Modified Energy Factor/8.5 Water Factor.
Front-Loading	2.00 Modified Energy Factor/5.5 Water Factor.

DOE also calculated the annualized values for certain benefits and costs under the considered TSLs. The annualized values refer to consumer operating cost savings, consumer incremental product and installation costs, the quantity of emissions reductions for CO_2, NO_X, and Hg, and the monetary value of CO_2 emissions reductions (using a value of $20/t CO_2, which is in the middle of the values considered by DOE for valuing the

potential global benefits resulting from reduced CO_2 emissions).

DOE used a two-step calculation process to convert the time-series of costs and benefits into annualized values. First, DOE calculated a present value for the time-series of costs and benefits using a discount rate of either 3 or 7 percent. From the present value, DOE then calculated the fixed annual payment over the analysis time period (2013 to 2043) that yielded the same present value. The fixed annual payment is the annualized value. Although DOE calculated annualized values, this does not imply that the time-series of cost and benefits from which the annualized values were determined are a steady stream of payments.

Table VI.26 presents the annualized values for each TSL considered for CCWs. The tables also present the annualized net benefit resulting from summing the two monetary benefits and subtracting the consumer incremental product and installation costs. Although summing the value of operating savings with the value of CO_2 reductions provides a valuable perspective, please note the following. The operating cost savings are domestic U.S. consumer monetary savings found in market transactions while the CO_2 value is based on an estimate of imputed marginal SCC, which is meant to reflect the global benefits of CO_2 reductions. In addition, the SCC value considers a longer time frame than the period considered for operating cost savings.

TABLE VI.26—ANNUALIZED BENEFITS AND COSTS FOR COMMERCIAL CLOTHES WASHERS BY TRIAL STANDARD LEVEL

TSL	Category	Unit	Primary estimate (AEO reference case)		Low estimate (AEO low growth case)		High estimate (high growth case)	
			7%	3%	7%	3%	7%	3%
1	**Benefits**							
	Monetized Operating Cost Savings ...	*Million 2008$*	12.75	15.32	11.25	13.46	14.63	17.70
	Quantified Emissions Reductions	CO_2, *Mt*	0.07	0.07	0.07	0.07	0.07	0.07
		NO_X, *kt*	0.041	0.044	0.041	0.044	0.041	0.044
		Hg, *t*	0.000	0.000	0.000	0.000	0.000	0.000
	Monetized Avoided CO_2 Value (at $20/t).	*Million 2008$*	2.35	2.73	2.35	2.73	2.35	2.73
	Costs							
	Monetized Incremental Product and Installation Costs.	*Million 2008$*	11.44	11.06	10.67	10.19	12.01	11.65
	Net Benefits							
	Monetized Value	*Million 2008$*	3.66	6.99	2.93	6.01	4.97	8.79
2	**Benefits**							
	Monetized Operating Cost Savings ...	*Million 2008$*	13.98	16.79	12.43	14.86	15.90	19.23
	Quantified Emissions Reductions	CO_2, *Mt*	0.07	0.07	0.07	0.07	0.07	0.07
		NO_X, *kt*	0.042	0.045	0.042	0.045	0.042	0.045
		Hg, *t*	0.000	0.000	0.000	0.000	0.000	0.000
	Monetized Avoided CO_2 Value (at $20/t).	*Million 2008$*	2.38	2.77	2.38	2.77	2.38	2.77
	Costs							
	Monetized Incremental Product and Installation Costs.	*Million 2008$*	11.49	11.11	10.72	10.23	12.06	11.70
	Net Benefits							
	Monetized Value	*Million 2008$*	4.87	8.45	4.09	7.40	6.22	10.30
3	**Benefits**							
	Monetized Operating Cost Savings ...	*Million 2008$*	60.62	72.82	54.87	65.33	66.59	80.43
	Quantified Emissions Reductions	CO_2, *Mt*	0.14	0.16	0.14	0.16	0.14	0.16
		NO_X, *kt*	0.087	0.094	0.087	0.094	0.087	0.094
		Hg, *t*	0.001	0.001	0.001	0.001	0.001	0.001
	Monetized Avoided CO_2 Value (at $20/t).	*Million 2008$*	5.05	5.88	5.05	5.88	5.05	5.88
	Costs							
	Monetized Incremental Product and Installation Costs.	*Million 2008$*	23.44	22.67	21.85	20.87	24.61	23.87
	Net Benefits							

TABLE VI.26—ANNUALIZED BENEFITS AND COSTS FOR COMMERCIAL CLOTHES WASHERS BY TRIAL STANDARD LEVEL—Continued

TSL	Category	Unit	Primary estimate (AEO reference case)		Low estimate (AEO low growth case)		High estimate (high growth case)	
			7%	3%	7%	3%	7%	3%
	Monetized Value	*Million 2008$*	42.23	56.04	38.07	50.34	47.04	62.44
4	**Benefits**							
	Monetized Operating Cost Savings	*Million 2008$*	68.83	82.66	62.65	74.62	75.33	90.94
	Quantified Emissions Reductions	CO_2, *Mt*	0.16	0.17	0.16	0.17	0.16	0.17
		NO_X, *kt*	0.097	0.105	0.097	0.105	0.097	0.105
		Hg, *t*	0.001	0.001	0.001	0.001	0.001	0.001
	Monetized Avoided CO_2 Value (at $20/t).	*Million 2008$*	5.63	6.56	5.63	6.56	5.63	6.56
	Costs							
	Monetized Incremental Product and Installation Costs.	*Million 2008$*	25.45	24.62	23.81	22.75	26.67	25.87
	Net Benefits							
	Monetized Value	*Million 2008$*	49.01	64.60	44.47	58.43	54.29	71.63
5	**Benefits**							
	Monetized Operating Cost Savings	*Million 2008$*	81.19	97.52	74.46	88.77	88.24	106.51
	Quantified Emissions Reductions	CO_2, *Mt*	0.17	0.19	0.17	0.19	0.17	0.19
		NO_X, *kt*	0.105	0.113	0.105	0.113	0.105	0.113
		Hg, *t*	0.001	0.001	0.001	0.001	0.001	0.001
	Monetized Avoided CO_2 Value (at $20/t).	*Million 2008$*	6.08	7.08	6.08	7.08	6.08	7.08
	Costs							
	Monetized Incremental Product and Installation Costs.	*Million 2008$*	28.19	27.26	26.47	25.30	29.47	28.57
	Net Benefits							
	Monetized Value	*Million 2008$*	59.08	77.34	54.08	70.55	64.86	85.02

VII. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

Executive Order 12866 requires that each agency identify in writing the problem the agency intends to address that warrants new agency action (including, where applicable, the failures of private markets or public institutions), as well as assess the significance of that problem to determine whether any new regulation is necessary. Executive Order 12866, section 1(b)(1).

Because today's regulatory action is a "significant regulatory action" under section 3(f)(1) of Executive Order 12866, section 6(a)(3) of the Executive Order requires DOE to prepare and submit for review to the Office of Information and Regulatory Affairs (OIRA) in OMB an assessment of the costs and benefits of today's rule. Accordingly, DOE presented to the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget for review the draft final rule and other documents prepared for this rulemaking, including a regulatory impact analysis (RIA). These documents are included in the rulemaking record and are available for public review in the Resource Room of the Building Technologies Program, 950 L'Enfant Plaza, SW., 6th Floor, Washington, DC, 20024, (202) 586–2945, between 9 a.m. and 4 p.m. Monday through Friday, except Federal holidays.

The Executive Order requires each agency to identify the problem the agency intends to address that warrants new agency action (including, where applicable, the failures of private markets or public institutions), as well as to assess the significance of that problem in evaluating whether any new regulation is warranted. E.O. 12866, section 1(b)(1).

DOE believes that there is a lack of consumer information and/or information processing capability about energy efficiency opportunities in the CCW market. If this is the case, DOE would expect the energy efficiency for CCWs to be randomly distributed across key variables such as energy prices and usage levels. DOE is not able to correlate the consumer's usage pattern and energy price with the efficiency of the purchased equipment, however. In the October 2008 NOPR, DOE sought data on the efficiency levels of existing CCWs by how often they are used and their associated energy prices (and/or geographic regions of the country). 73 FR 62034, 62123 (Oct. 17, 2008). DOE received no such data from interested parties. Therefore, DOE was unable to test for today's final rule the extent to which purchasers of CCWs behave as if they lack information about the costs associated with CCW energy

consumption and/or the benefits of more-efficient equipment.

In addition, this rulemaking addresses the problem that certain external benefits resulting from improved energy efficiency of CCWs are not captured by the users of such equipment and thus may not play a role in their purchase decisions. These benefits include externalities related to environmental protection and energy security, such as reduced emissions of greenhouse gases. The TSLs that DOE evaluated resulted in CO_2, NO_X, and Hg emissions reductions. DOE also determined a range of possible monetary benefits associated with the emissions reductions. DOE considered both the emissions reductions and their possible monetary benefit in determining the economic feasibility of the TSLs.

The November 2009 SNOPR contained a summary of the RIA, which evaluated the extent to which major alternatives to standards for CCWs could achieve significant energy savings at reasonable cost, as compared to the effectiveness of the proposed rule. The complete RIA (Regulatory Impact Analysis for Proposed Energy Conservation Standards for Commercial Clothes Washers) is contained in the TSD prepared for today's rule. The RIA 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 today's standards.

As shown in Table VII.1 below, DOE identified the following major policy alternatives for achieving increased energy efficiency in CCWs:

(1) No new regulatory action;
(2) Financial incentives;
(3) Consumer rebates;
(4) Consumer tax credits;
(5) Manufacturer tax credits;
(6) Voluntary energy efficiency targets;
(7) Bulk government purchases;
(8) Early replacement; and
(9) Today's approach (national performance standards).

TABLE VII.1—NON-REGULATORY ALTERNATIVES TO COMMERCIAL CLOTHES WASHER STANDARDS

Policy alternatives	Energy savings,* *quads*	Water savings, *trillion gallons*	Net present value** *billion 2008$*	
			7% Discount rate	3% Discount rate
No New Regulatory Action	0	0	0	0
Consumer Rebates	0.06	0.07	0.18	0.47
Consumer Tax Credits	0.01	0.01	0.03	0.08
Manufacturer Tax Credits	0.00	0.01	0.02	0.06
Voluntary Energy Efficiency Targets***	0.02	0.02	0.06	0.15
Early Replacement	0.01	0.01	0.11	0.17
Bulk Government Purchases***	0.00	0.01	0.02	0.04
Today's Standards at TSL 3	0.10	0.14	0.36	0.89

* Energy savings are in source quads.
** DOE determined the net present value for shipments in 2013–2043.
*** Voluntary energy efficiency target and bulk government purchase alternatives are not considered for front-loading washers because the percentage of the market at TSL 3 is well over the market adoption target level that each alternative strives to attain.

The net present value amounts shown in Table VII.1 refer to the NPV for CCW consumers. The costs to the government of each policy (such as rebates or tax credits) are not included in the costs for the NPV since, on balance, consumers would be both paying for (through taxes) and receiving the benefits of the payments. As explained in detail in section VI of the November 2009 SNOPR, none of the alternatives DOE examined would save as much energy or have an NPV as high as the proposed standards. The same conclusion applies to the standards in today's rule. Also, several of the alternatives would require new enabling legislation, because DOE does not have authority to implement those alternatives. Additional detail on the regulatory alternatives is found in the RIA chapter in the TSD.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis (IRFA) for any rule that by law must be proposed for public comment, and a final regulatory flexibility analysis (FRFA) for any such rule that an agency adopts as a final rule, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. A regulatory flexibility analysis examines the impact of the rule on small entities and considers alternative ways of reducing negative impacts. Also, as required by Executive Order 13272, *Proper Consideration of Small Entities in Agency Rulemaking,* 67 FR 53461 (Aug. 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of General Counsel's Web site: *http://www.gc.doe.gov.*

For the manufacturers of equipment covered by this rulemaking, the SBA has set two size thresholds that define which entities are "small businesses" for the purposes of the statute. See *http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.* Because all CCW manufacturers also produce RCWs, limits for both categories are presented in Table VII.2. DOE used these small business definitions to determine whether any small entities would be required to comply with the rule. (65 FR 30836, 30848 (May 15, 2000), as amended at 65 FR 53533, 53544 (September 5, 2000) and codified at 13 CFR Part 121.) The size standards are listed by NAICS code and industry description.

TABLE VII.2—SBA AND NAICS CLASSIFICATION OF SMALL BUSINESSES POTENTIALLY AFFECTED BY THIS RULE

Industry description	Revenue limit	Employee limit	NAICS
Residential Laundry Equipment Manufacturing	N/A	1,000	335224
Commercial Laundry Equipment Manufacturing	N/A	500	333312

As explained in the November 2009 SNOPR, the CCW industry consists of three principal competitors that make up almost 100 percent of the market share. Two of them are high-volume, diversified appliance manufacturers, while the third is a focused laundry equipment manufacturer. Before issuing November 2009 SNOPR, DOE interviewed all major CCW manufacturers. Because all CCW manufacturers also make RCWs, DOE also considered whether a CCW manufacturer could be considered a small business entity in that industry. None of the CCW manufacturers fall into any small business category. As a result, DOE certifies that today's final rule will not have a significant impact on a substantial number of small entities and that a regulatory flexibility analysis is not required.

C. Review Under the Paperwork Reduction Act

DOE stated in the October 2008 NOPR that this rulemaking would impose no new information and recordkeeping requirements, and that OMB clearance is not required under the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*). 73 FR 62034, 62130 (Oct. 17, 2008). DOE received no comments on this in response to the October 2008 NOPR or the November 2009 SNOPR, and, as with the proposed rule, today's final rule imposes no information and recordkeeping requirements. Therefore, DOE has taken no further action in this rulemaking with respect to the Paperwork Reduction Act.

D. Review Under the National Environmental Policy Act

DOE prepared an environmental assessment of the impacts of today's standards which it published as chapter 16 within the TSD for the final rule. DOE found the environmental effects associated with today's various standard levels for CCWs to be insignificant. Therefore, DOE is issuing a FONSI pursuant to NEPA (42 U.S.C. 4321 *et seq.*), the regulations of the Council on Environmental Quality (40 CFR parts 1500–1508), and DOE's regulations for compliance with NEPA (10 CFR part 1021). The FONSI is available in the docket for this rulemaking.

E. Review Under Executive Order 13132

DOE reviewed this rule pursuant to Executive Order 13132, "Federalism," 64 FR 43255 (Aug. 4, 1999), which imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. In accordance with DOE's statement of policy describing the intergovernmental consultation process it will follow in the development of regulations that have federalism implications, 65 FR 13735 (March 14, 2000), DOE examined the November 2009 proposed rule and 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. 74 FR 57738, 57798 (Nov. 9, 2009). DOE received no comments on this issue in response to the November 2009 SNOPR, and its conclusions on this issue are the same for the final rule as they were for the proposed rule. Therefore, DOE has taken no further action in today's final rule with respect to Executive Order 13132.

F. Review Under Executive Order 12988

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 (Feb. 7, 1996)) imposes on Federal 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. Section 3(b) of Executive Order 12988 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 section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, today's final regulations meet the relevant standards of Executive Order 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

As indicated in the November 2009 SNOPR, DOE reviewed the proposed rule under title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) (UMRA), which imposes requirements on Federal agencies when their regulatory actions will have certain types of impacts on State, local and Tribal governments and the private sector. 74 FR 57738, 57798–99 (Nov. 9, 2009). For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted for inflation), section 202 of UMRA requires an agency to publish a written statement assessing the costs, benefits, and other effects of the rule on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed "significant intergovernmental mandate," and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA (62 FR 12820) (also available at *http://www.gc.doe.gov*). Although today's final rule does not contain a Federal intergovernmental mandate, it may impose expenditures of $100 million or more on the private sector, although DOE believes such expenditures are likely to be less than $50 million.

Section 202 of UMRA authorizes an agency to respond to the content

requirements of UMRA in any other statement or analysis that accompanies the supplemental notice. 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 this supplemental notice and the "Regulatory Impact Analysis" section of the SNOPR TSD respond to those requirements.

Under section 205 of UMRA, DOE 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 42 U.S.C. 6295(h) and (o), 6313(e), and 6316(a), today's final rule would establish energy conservation standards for CCWs 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.

H. Review Under the Treasury and General Government Appropriations Act, 1999

DOE determined that, for this rulemaking, it need not prepare a Family Policymaking Assessment under section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105–277). *Id.* DOE received no comments concerning section 654 in response to the November 2009 SNOPR, and, therefore, takes no further action in today's final rule with respect to this provision.

I. Review Under Executive Order 12630

DOE determined, under Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 53 FR 8859 (March 18, 1988), that today's rule would not result in any takings which might require compensation under the Fifth Amendment to the U.S. Constitution. 73 FR 62034, 62131 (Oct. 17, 2008). DOE received no comments concerning Executive Order 12630 in response to the October 2008 NOPR or November 2009 SNOPR, and, therefore, has taken no further action in today's final rule with respect to this Executive Order.

J. Review Under the Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. The OMB guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed today's final rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

K. Review Under Executive Order 13211

Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001) requires Federal agencies to prepare and submit to the OIRA a Statement of Energy Effects for any significant energy action. For the October 2008 NOPR, DOE determined that the proposed rule, which set energy conservation standards for commercial clothes washers, was not a "significant energy action" within the meaning of Executive Order 13211. 73 FR 62034, 62132 (Oct. 17, 2008). The rule was also not designated as such by OIRA. Accordingly, it did not prepare a Statement of Energy Effects on that proposed rule. DOE received no comments on this issue in response to the October 2008 NOPR. As with the October 2008 NOPR, DOE has concluded that today's final rule is not a significant energy action within the meaning of Executive Order 13211, and OIRA has not designated the rule as such. As a result, DOE has not prepared a Statement of Energy Effects on the final rule.

L. Review Under the Information Quality Bulletin for Peer Review

On December 16, 2004, the OMB, in consultation with the Office of Science and Technology, issued its Final Information Quality Bulletin for Peer Review (the Bulletin). 70 FR 2664 (Jan. 14, 2005). The purpose of the Bulletin is to enhance the quality and credibility of the Government's scientific information. The Bulletin establishes that certain scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal Government. As indicated in the November 2009 SNOPR, this includes influential scientific information related to agency regulatory actions, such as the analyses in this rulemaking. 74 FR 57738, 57799 (Nov. 9, 2009).

As more fully set forth in the November 2009 SNOPR, DOE held formal in-progress peer reviews of the types of analyses and processes that DOE has used to develop the energy conservation standards in today's rule, and issued a report on these peer reviews. The report is available at *http://www.eere.energy.gov/buildings/appliance_standards/peer_review.html. Id.*

M. 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. 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). DOE also will submit the supporting analyses to the Comptroller General in the U.S. Government Accountability Office (GAO) and make them available to each House of Congress.

VIII. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of today's final rule.

List of Subjects in 10 CFR Part 431

Administrative practice and procedure, Energy conservation, Household appliances.

Issued in Washington, DC, on December 18, 2009.

Cathy Zoi,

Assistant Secretary, Energy Efficiency and Renewable Energy.

■ For the reasons stated in the preamble, chapter II, subchapter D, of title 10 of the Code of Federal Regulations, part 431 is amended to read as set forth below:

PART 431—ENERGY EFFICIENCY PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT

■ 1. The authority citation for part 431 continues to read as follows:

Authority: 42 U.S.C. 6291–6317.

■ 2. Section 431.156 of subpart I is revised to read as follows:

§ 431.156 Energy and water conservation standards and effective dates.

Each CCW manufactured on or after January 8, 2013, shall have a modified

energy factor no less than and a water factor no greater than:

Equipment class	Modified energy factor, *cu. ft./kWh/cycle*	Water factor, *gal./cu. ft./cycle*
Top-Loading	1.60	8.5
Front-Loading	2.00	5.5

Appendix

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

DEPARTMENT OF JUSTICE

Antitrust Division

DEBORAH A. GARZA

Acting Assistant Attorney General

Main Justice Building, 950 Pennsylvania Avenue, NW., Washington, DC 20530–0001, (202) 514–2401/(202) 616–2645 (Fax), E-mail: *antitrust@usdoj.gov*, Web site: *http://www.usdoj.gov/atr.*

December 16, 2008.

Warren Belmar, Esq., Deputy General Counsel for Energy Policy, Department of Energy, Washington, DC 20585.

Dear Deputy General Counsel Belmar: I am responding to your October 1, 2008, letter seeking the views of the Attorney General about the potential impact on competition of proposed amended energy conservation standards for residential kitchen ranges and ovens, microwave ovens, and commercial clothes washers (CCWs). Your request was submitted under Section 325(0)(2)(B)(i)(V) of the Energy Policy and Conservation Act, as amended, ("ECPA"), 42 U.S.C. § 6295(0)(B)(i)(V), 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 conservation 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).

In conducting its analysis the Antitrust Division examines whether a proposed standard may lessen competition, for example, by substantially limiting consumer choice, leaving consumers with fewer competitive alternatives, placing certain manufacturers of a product at an unjustified competitive disadvantage compared to other manufacturers, or by inducing avoidable inefficiencies in production or distribution of particular products.

We have reviewed the proposed standards contained in the Notice of Proposed Rulemaking (73 Fed. Reg. 62034, October 17, 2008) and supplementary information submitted to the Attorney General. We also attended the November 13 public meeting on the proposed standards and conducted interviews with industry members. Based on this review, we have determined that legitimate issues arise as to whether the proposed standards adversely effect competition and consumer choice with respect to (1) gas cooking products with standing pilot lights and (2) top-loading CCWs.

The proposed standards would extend the ban on constant burning pilot lights, currently applicable to cooking appliances equipped with electrical supply cords, to appliances that are not equipped with electrical supply cords. As the notice regarding the proposed standards recognizes, certain consumers, including those with religious and cultural practices that prohibit the use of line electricity, those without access to line electricity, and those whose kitchens do not have appropriate electrical outlets, rely on gas cooking appliances with standing pilots in lieu of electrical ignition devices. For these consumers, gas cooking appliances with electronic ignition are not a reasonable substitute. The notice states that gas cooking appliances may become available with technological options such as battery-powered ignition to replace a standing pilot light. However, it is unclear whether such battery-powered devices have been tested for indoor use and whether they are in compliance with safety standards for such use. If these options prove not to be feasible, then the proposed standard could substantially limit consumer choice by eliminating the cooking appliance that most closely meets these consumers' needs.

As to top-loading CCWs, it appears that meeting the proposed standards may require substantial investment in the development of new technology that some suppliers of top-loading CCWs may not find it economical to make. CCWs are used primarily in multi-housing laundries, with top-loading machines accounting for approximately 80 percent of machines in these locations. The remaining 20 percent are front-loading machines, which are more energy efficient but significantly more expensive than top-loading models. There are only three manufacturers of top-loading CCWs selling in the United States. It appears that there is a real risk that one or more of these manufacturers cannot meet the proposed standard. In such a case, CCW purchasers would have fewer competitive alternatives for top-loading machines, potentially resulting in purchasers facing higher prices from the remaining top-loading manufacturer or manufacturers.

Although the Department of Justice is not in a position to judge whether manufacturers will be able to meet the proposed standards, we urge the Department of Energy to take into account these possible impacts on competition and the availability of options to consumers in determining its final energy efficiency standard for CCWs and residential gas cooking appliances with constant burning pilots. To maintain competition, the Department of Energy should consider keeping the existing standard in place for top-loading CCWs. The Department of Energy may wish to consider setting a "no standard" standard for residential gas cooking products with constant burning pilots to address the potential for certain customers to be stranded without an economical product alternative.

The Department of Justice does not believe that the proposed standards for other products listed in the NOPR would likely lead to an adverse effect on competition.

Sincerely,

Deborah A. Garza.

[FR Doc. E9–30891 Filed 1–7–10; 8:45 am]

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