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# Part II

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## 10 CFR Part 430

## 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 430**

**[Docket Number: EERE–2006–STD–0127]**

**RIN 1904–AB49**

## 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 Department of Energy (DOE) is announcing that it is amending energy conservation standards pertaining to the cooking efficiency of residential gas kitchen ranges and ovens, because it has determined that such standards would be technologically feasible and economically justified and would result in significant conservation of energy, the three primary statutory criteria for adoption of standards under the Energy Policy and Conservation Act (EPCA). DOE is not adopting energy conservation standards pertaining to the cooking efficiency of residential electric kitchen ranges and ovens and microwave ovens, because it has determined that such standards would not be technologically feasible and economically justified. At this point, DOE has decided to defer its decision regarding adoption of amended energy conservation standards for the energy efficiency of commercial clothes washers and standby mode and off mode power consumption by microwave ovens, pending further rulemaking. Finally, DOE is not adopting amended standards for dishwashers and dehumidifiers in this rulemaking, because recent amendments to EPCA have already set standards for those products.

**DATES:** The effective date of this rule is June 8, 2009. Compliance with the standards set by today's final rule is required on April 9, 2012.

**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 Ms. Brenda Edwards at the above telephone number for additional information regarding visiting the Resource Room. 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), 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/residential/cooking_products.html*

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## I. Summary of the Final Rule

### *A. The Standard Levels*

DOE notes that this rulemaking originally bundled four separate residential and commercial products (dishwashers, dehumidifiers, electric and gas kitchen ranges and ovens and microwave ovens, and commercial clothes washers). However, as explained in further detail below, various events occurred during the course of the rulemaking which resulted in the consideration of a number of these products separately. For example, Congress set efficiency levels by statute for dishwashers and dehumidifiers, which DOE codified in its regulations through a separate rulemaking (along with numerous other statutory changes). At the notice of proposed rulemaking (NOPR) stage, public commenters made DOE aware of problems with the efficiency data for certain commercial clothes washer models upon which DOE had relied in its analyses. For microwave ovens, public commenters urged DOE to await the impending finalization of the industry standard for measurement of microwave oven standby mode and off mode power consumption before adopting a corresponding DOE test procedure (a prerequisite for an energy conservation standard addressing standby power). DOE believes that both of these developments warrant further rulemaking action. For these reasons, today's final rule is limited to addressing energy conservation standards for the cooking efficiency of electric and gas kitchen ranges and ovens and microwave ovens.

#### 1. Statutorily Set Standard Levels for Dehumidifiers and Dishwashers

As explained in detail in the NOPR in this proceeding, the Energy Policy and Conservation Act, as amended (42 U.S.C. 6291 *et seq.*; EPCA or the Act), initially contained energy conservation standards for dehumidifiers and residential dishwashers, as well as requirements for DOE to amend those standards, and DOE announced it would consider such amendments to those standards in this rulemaking. 73 FR 62034, 62036–40 (Oct. 17, 2008) (the October 2008 NOPR). However, the Energy Independence and Security Act of 2007 (EISA 2007), Public Law No. 110–40, subsequently amended these EPCA provisions in two ways pertinent here. First, EISA 2007 prescribed efficiency standards for dehumidifiers manufactured on or after October 1, 2012 and removed the requirement for a rulemaking to amend the EPCA standards for this product. Second, EISA 2007 prescribed maximum energy and water use levels for residential dishwashers manufactured on or after January 1, 2010, and required completion of a final rule no later than January 1, 2015 to consider amendment of these dishwasher standards. 73 FR 62034, 62038–40 (Oct. 17, 2008). (EISA 2007, section 311(a)(1)–(2); 42 U.S.C. 6295(g)(10) and (cc)) DOE notes that although EISA 2007 did not formally remove the requirement to conduct the current rulemaking, the statutory standards for dishwashers are to become effective well before the effective date of any amended standards that would have arisen from the present rulemaking. Consequently, DOE has not conducted further analysis in this rulemaking of standards for dehumidifiers and residential dishwashers. 73 FR 62034, 62040 (Oct. 17, 2008). Instead, DOE has incorporated into its regulations all of the energy conservation standards prescribed by EISA 2007 for various products and equipment, including those for dehumidifiers and residential dishwashers, in a separate rulemaking notice. 74 FR 12058 (March 23, 2009).

#### 2. The Standard Levels for the Energy Efficiency of Residential Cooking Products

Pursuant to EPCA, any amended energy conservation standard that DOE prescribes for cooking products [1] or commercial clothes washers (collectively referred to in this final rule as ''the two appliance products'') 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, the new standard must ''result in significant conservation of energy.'' (42 U.S.C. 6295(o)(3)(B) and 6316(a)) In today's final rule, DOE has decided to adopt amended energy conservation standards pertaining to the cooking efficiency of residential gas kitchen ranges and ovens pursuant to these criteria. Today's final rule requires that residential gas kitchen ranges and ovens without an electrical supply cord manufactured after April 9, 2012 must not be equipped with a constant burning pilot light. DOE has decided not to adopt energy conservation standards pertaining to the cooking efficiency of residential electric kitchen ranges and ovens and microwave ovens. As explained in further detail below, no cooking efficiency standards for these products were found to be technologically feasible and economically justified.

#### 3. Further Rulemaking for Commercial Clothes Washers and Microwave Ovens

DOE has decided to defer its decision regarding whether to adopt amended energy conservation standards for the energy efficiency of commercial clothes washers (CCWs) and for the standby mode and off mode power consumption of microwave ovens, pending further rulemaking. The reasons for DOE's decision are summarized below.

In the October 2008 NOPR, DOE tentatively concluded for CCWs that a standard of 1.76 modified energy factor (MEF) and 8.3 water consumption factor (WF) for top-loading CCWs and a standard of 2.0 MEF and 5.5 WF for front-loading CCWs are technologically feasible and economically justified. 73 FR 62034, 62036 (Oct. 17, 2008). As

[1] The term ''cooking products'' as used in this notice refers to residential electric and gas kitchen ranges and ovens, including microwave ovens.

discussed in more detail in section II.B.3, DOE received comments on the October 2008 NOPR that questioned the validity of the maximum technologically feasible (max-tech) level that was used in the analysis of top-loading CCWs. DOE has concluded that additional information is required to verify whether the max-tech level specified in the NOPR is appropriate.

Likewise, the October 2008 NOPR tentatively concluded that a standard for microwave oven standby mode and off mode energy consumption would be technologically feasible and economically justified. Therefore, concurrent with the standards NOPR, DOE published in the **Federal Register** a test procedure NOPR for microwave ovens to provide for the measurement of standby mode and off mode power consumption by these products. 73 FR 61134 (Oct. 17, 2008). As discussed in section II.B.3, DOE received comments on the October 2008 NOPR that objected to certain definitions that were included in the proposed microwave oven test procedure amendments. The commenters supported the incorporation of definitions provided in a revision of an industry standard for measuring standby power consumption expected to be completed later this year. DOE has concluded that it should defer consideration of microwave oven energy conservation standards until the revised industry standard becomes available for consideration in the microwave oven test procedure amendments.

DOE intends to complete the rulemaking process for these products and equipment as expected once additional key data and information become available, keeping in mind the relevant statutory deadlines. As discussed in the October 2008 NOPR, 73 FR 62034, 62041 (Oct. 17, 2008), the EISA 2007 amendments to EPCA require DOE to amend the ranges and ovens and microwave oven test procedure to incorporate standby and off mode energy consumption no later than March 31, 2011. (42 U.S.C. 6295(gg)(2)(B)(vi)) For CCWs, EPCA requires that DOE issue a final rule by January 1, 2010, to determine whether the existing energy conservation standards should be amended. (42 U.S.C. 6313(e)(2)(A))

*B. Current Federal Standards*

DOE established the current energy conservation standards for dishwashers manufactured on or after May 14, 1994, in a final rule published in the **Federal Register** on May 14, 1991 (56 FR 22250). These standards include a requirement that the energy factor (EF) of a standard-size dishwasher must not be less than 0.46 cycles per kilowatt-hour (kWh) and that the EF of a compact-size dishwasher must not be less than 0.62 cycles per kWh. (10 CFR 430.32(f)) Section 311(a)(2) of EISA 2007 established maximum energy and water use levels for dishwashers manufactured on or after January 1, 2010. (42 U.S.C. 6295(g)(10)) Under the amended statute, a standard-size dishwasher shall not exceed 355 kWh/year and 6.5 gallons of water per cycle, and a compact-size dishwasher shall not exceed 260 kWh/year and 4.5 gallons of water per cycle.

EPCA, as amended by the Energy Policy Act of 2005 (EPACT 2005), Public Law 109–58, prescribes the current energy conservation standard for dehumidifiers, shown in Table I.1. (42 U.S.C. 6295(cc)(1); 10 CFR 430.32(v)) Section 311(a)(1) of EISA 2007 amended EPCA to prescribe minimum efficiency levels for dehumidifiers manufactured on or after October 1, 2012. (42 U.S.C. 6295(cc)(2))

TABLE I.1—FEDERAL STANDARDS FOR RESIDENTIAL DEHUMIDIFIERS

| EPACT 2005 standards effective October 1, 2007 | | EISA 2007 standards effective October 1, 2012 | |
|---|---|---|---|
| Dehumidifier capacity *pints/day* | EF *liters/kWh* | Dehumidifier capacity *pints/day* | EF *liters/kWh* |
| 25.00 or less | 1.00 | Up to 35.00 | 1.35 |
| 25.01–35.00 | 1.20 | 35.01–45.00 | 1.50 |
| 35.01–54.00 | 1.30 | 45.01–54.00 | 1.60 |
| 54.01–74.99 | 1.50 | 54.01–75.00 | 1.70 |
| 75.00 or more | 2.25 | Greater than 75.00 | 2.5 |

EPCA prescribes the current energy conservation standard for cooking products, which includes a requirement that gas ranges and ovens with an electrical supply cord that are manufactured on or after January 1, 1990, not be equipped with a constant burning pilot light. (42 U.S.C. 6295(h)(1); 10 CFR 430.32(j)) Currently, no mandatory Federal energy conservation standards exist for conventional electric ranges and ovens or for microwave ovens.

EPCA also prescribes standards for CCWs manufactured on or after January 1, 2007, requiring that CCWs have an MEF of at least 1.26 and a WF of not more than 9.5. (42 U.S.C. 6313(e)(1); 10 CFR 431.156)

*C. Benefits and Burdens to Purchasers of Cooking Products*

In the October 2008 NOPR, DOE considered the impacts on consumers of several trial standard levels (TSLs) related to the cooking efficiency of conventional cooking products and microwave ovens. 73 FR 62034, 62037, 62084–90 (Oct. 17, 2008). In the October 2008 NOPR, DOE tentatively concluded that none of the TSLs for microwave oven cooking efficiency were economically justified. 73 FR 62034, 62119 (Oct. 17, 2008). DOE has reached the same conclusion in today's final rule. Therefore, at this time, DOE is not adopting standards for microwave oven cooking efficiency (EF), so there will be no positive or negative impacts on purchasers of these products.

Also in the October 2008 NOPR, DOE determined that at TSL 1, the economic impacts (*i.e.,* the average life-cycle cost (LCC) savings) on consumers of the proposed standards for conventional cooking products would be positive. (TSL 1 prohibits constant burning pilots for gas appliances but does not change standards for the other product classes.) DOE has reached the same conclusion in today's final rule. Table I.2 presents the impacts on consumers of the energy conservation standards adopted in today's final rule.

TABLE I.2—IMPLICATIONS OF AMENDED STANDARDS FOR CONSUMERS

| | Gas cooktops | Gas standard ovens |
|---|---|---|
| New average installed cost | $332 | $464. |
| Estimated installed cost increase | $22 | $34. |
| Lifetime operating cost savings | $37 | $43. |
| Average payback period | 3.3 years | 7.0 years. |

The typical baseline gas cooktop has an installed price of $310 and an average lifetime operating cost of $561, resulting in a total life-cycle cost of $871. To meet the new standards, DOE estimates that the installed price of this product will be $332, an increase of $22. This price increase will be offset by lifetime operating cost savings of $37, resulting in life-cycle cost savings of $15. For gas standard ovens, the typical baseline product has an installed price of $430 and an annual average lifetime operating cost of $406, resulting in a total life-cycle cost of $836. To meet the new standards, DOE estimates that the installed price of this product will be $464, an increase of $34. This price increase will be offset by lifetime operating cost savings of $43, resulting in life-cycle cost savings of $9.

For the subgroup of consumers who do not have access to the electrical grid or whose religious and cultural practices prohibit the use of grid electricity, the amended standards would require use of technologies (*e.g.,* a battery-powered spark-ignition device) that have not yet been certified to meet applicable safety standards. See 42 U.S.C. 6295(o)(2)(B)(i)(VII) and 10 CFR part 430, subpart C, appendix A, sections 4(a)(4)(i) and (iv), and 5(b)(1) and (4). (See sections III.C.2 and VI.D.2 of this notice for further discussion.) Based on its research, DOE expects that certification of such technologies under applicable safety standards will likely be completed when these standards become effective.

*D. Impact on Manufacturers*

Using a real corporate discount rate of 7.2 percent, DOE estimates the industry net present value (INPV) in 2006$ of the gas cooktop, gas oven, and microwave oven industries to be $288 million, $469 million, and $1.46 billion, respectively, in the absence of new or amended standards. DOE estimates the impact of the cooking efficiency standards adopted in today's final rule on the INPV of manufacturers of these products to be between a 1.73-percent loss and a 4.11-percent loss (−$5 million to −$12 million) for gas cooktop manufacturers and between a 1.56-percent loss and a 2.10-percent loss (−$7 million to −$10 million) for gas oven manufacturers. Because DOE is not adopting standards for cooking efficiency of conventional electric cooking products or microwave ovens (and because consideration of a standby mode and off mode standard for microwave ovens has been deferred), this final rule will have no net impact on manufacturers of these products.

Based on DOE's interviews with manufacturers of cooking products and on comments received on the October 2008 NOPR, DOE determined that two small businesses that manufacture gas cooking products could be disproportionately affected by standards. (See section VII.B of this notice for further discussion.)

*E. National Benefits*

DOE estimates the standards will save approximately 0.14 quads (quadrillion ($10^{15}$) British thermal units (BTU)) of energy over 30 years (2012–2042). This is equivalent to 2.9 days of U.S. gasoline use.

By 2042, DOE expects the energy savings from the standards to eliminate the need for approximately 62 megawatts (MW) of generating capacity.[2] These energy savings will result in cumulative (undiscounted) greenhouse gas emission reductions of approximately 13.7 million tons (Mt) of carbon dioxide ($CO_2$). Based on a methodology developed during 2008, these emission reductions were estimated to represent domestic benefits of $0 to $109 million using a 7-percent discount rate and $0 to $241 million using a 3-percent discount rate, cumulative from 2012 to 2042 in 2007$. The methodology used to develop these estimates is now under review.

Additionally, the standards will help alleviate air pollution by resulting in approximately 6.1 kilotons (kt)) of nitrogen oxides ($NO_X$) cumulative emission reductions at the sites where appliances are used from 2012 through 2042. In addition, the standards would result in power plant $NO_X$ emissions reductions of 0.6 kt from 2012 to 2042. The total $NO_X$ emissions reductions at these locations would be an amount equal to $0.7 to $7.3 million using a 7-percent discount rate and $1.5 to $15.4 million using a 3-percent discount rate, in 2006$. The standards would also possibly result in power plant mercury (Hg) emissions reductions of up to 0.15 tons (t) from 2012 to 2042, or an amount equal to $0 to $1.3 million using a 7-percent discount rate and $0 to $2.6 million using a 3-percent discount rate, in 2006$.

The national NPV of the standards is $254 million using a 7-percent discount rate and $706 million using a 3-percent discount rate, cumulative from 2012 to 2042 in 2006$. This is the estimated total value of future savings minus the estimated increased equipment costs, discounted to 2007.

The benefits and costs of today's final rule to the Nation can also be expressed in terms of annualized [2006$] values over the forecast period (2012 through 2042). Using a 7-percent discount rate for the annualized cost analysis, the cost of the standards established in today's final rule is $17 million per year in increased product and installation costs, while the annualized benefits are $37 million per year in reduced product operating costs. Using a 3-percent discount rate, the cost of the standards established in today's final rule is $28 million per year and the benefits are $85 million per year.

*F. Conclusion*

DOE has evaluated the benefits (energy savings, consumer LCC savings, positive national NPV, and emissions reductions) to the Nation of amended energy conservation standards for gas cooking products and of new cooking efficiency standards for conventional electric cooking products and microwave ovens, as well as the costs of such standards (loss of manufacturer INPV and consumer LCC increases for some users of the cooking products). Based on all available information, DOE has determined that the benefits to the

[2] Because the amended standards affect solely residential gas consumption, the installed power plant generating capacity change represents only 0.005 percent of the total installed generating capacity forecasted for the year 2030. Therefore, both the installed capacity change and its associated emission reductions are negligible. Although effectively negligible, installed generation capacity and emission impacts are still reported in section VI of today's final rule for TSL 1 (the amended standards).

Nation of the standards for gas cooking products outweigh their costs. 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, gas cooking products that meet the amended standard levels are commercially available or, for the subgroup of consumers without access to the electrical grid or whose religious or cultural practices prohibit the use of grid electricity, are likely to be commercially available at the time the standards become effective.

## II. Introduction

### *A. Authority*

Title III of EPCA sets forth a variety of provisions designed to improve energy efficiency. Part A [3] of Title III (42 U.S.C. 6291–6309) provides for the ''Energy Conservation Program for Consumer Products Other Than Automobiles.'' The program covers consumer products and certain commercial products (all of which are referred to hereafter as ''covered products''), including electric and gas kitchen ranges and ovens. (42 U.S.C. 6292(10), 6295(h)) Part A–1 [4] of Title III (42 U.S.C. 6311–6317) establishes a similar program for ''Certain Industrial Equipment'' (referred to hereafter as ''covered equipment''), including commercial clothes washers. (42 U.S.C. 6312, 6313(e)) Part A of Title III provides for test procedures, labeling, and energy conservation standards for residential cooking products and certain other types of products, and it authorizes DOE to require information and reports from manufacturers.

The National Appliance Energy Conservation Act of 1987 (NAECA), Pub. L. 100–12, amended EPCA to establish prescriptive standards for cooking products. NAECA requires gas ranges and ovens with an electrical supply cord that are manufactured on or after January 1, 1990, not to be equipped with a constant burning pilot light, and requires DOE to conduct two cycles of rulemakings for ranges and ovens to determine if the standards established should be amended. (42 U.S.C. 6295(h)(1)–(2)) The test procedures for cooking products appear at 10 CFR part 430, subpart B, appendix I.

DOE is conducting the present rulemaking for cooking products pursuant to the authority set forth above. The following paragraphs discuss some of the key provisions of EPCA relevant to the standards-setting rulemaking.

EPCA provides criteria for prescribing new or amended standards for covered products. As indicated above, any new or amended standard for cooking products 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)) Additionally, DOE may not prescribe an amended or new standard if DOE determines by rule that such a 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 covered products, 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 subject to the standard;
2. The savings in operating costs throughout the estimated average life of products 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 savings likely to result directly from the imposition of the standard;
4. Any lessening of the utility or the performance of the products 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 conservation; and
7. Other factors the Secretary of Energy (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.

EPCA also contains what is commonly known as an ''anti-backsliding'' provision. (42 U.S.C. 6295(o)(1) and 6316(a)) This provision mandates that the Secretary not prescribe any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. EPCA further provides that the Secretary may not prescribe an amended or new 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) of performance characteristics (including reliability), 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 any type or class of covered product that has two or more subcategories. (42 U.S.C. 6295(q)(1) and 6316(a)) Under this provision, DOE must specify a different standard level than that which applies generally to such type or class of product for any group of products ''which have the same function or intended use, if * * * 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 products, 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 standards for covered products generally supersede State laws or regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6297(a)–(c) and 6316(a)) DOE can, however, grant waivers of preemption for particular State laws or regulations, in accordance with the procedures and

[3] This part was originally titled Part B. It was redesignated Part A in the United States Code for editorial reasons.

[4] This part was originally titled Part C. It was redesignated Part A–1 in the United States Code for editorial reasons.

other provisions of section 327(d) of the Act. (42 U.S.C. 6297(d) and 6316(a))

*B. Background*

1. Current Standards

As described in greater detail in the October 2008 NOPR, 73 FR 62034, 62039–40 (Oct. 17, 2008), the current energy conservation standards in EPCA for dishwashers apply to all products manufactured on or after May 14, 1994 (10 CFR 430.32(f)); for dehumidifiers, to all products manufactured on or after October 1, 2007 (42 U.S.C. 6295(cc)(1); 10 CFR 430.32(v)); for cooking products, to all products manufactured on or after January 1, 1990, (42 U.S.C. 6295(h)(1); 10 CFR 430.32(j)); and for CCWs to all equipment manufactured on or after January 1, 2007 (42 U.S.C. 6313(e)(1); 10 CFR 431.156). In addition, EISA 2007 established standards for dishwashers manufactured on or after January 1, 2010 (42 U.S.C. 6295(g)(10)) and for dehumidifiers manufactured on or after October 1, 2012 (42 U.S.C. 6295(cc)(2)). These standards are discussed in section I.B.

2. History of Standards Rulemaking for the Two Appliance Products

As noted above, this rulemaking originally bundled four products (dishwashers, dehumidifiers, residential cooking products, and commercial clothes washers). However, during the course of this rulemaking, Congress set energy conservation standard levels by statute for dishwashers and dehumidifiers as part of EISA 2007. Accordingly, the regulatory history provided below focuses on the two remaining appliance products—residential cooking products and commercial clothes washers.

NAECA amended EPCA to establish the current prescriptive standard requiring gas ranges and ovens with an electrical supply cord not to be equipped with a constant burning pilot light. (42 U.S.C. 6295(h)(1)) In a rulemaking undertaken pursuant to EPCA (42 U.S.C. 6295(h)(2)), DOE issued a final rule in which it found that standards were not justified for electric cooking products and, partially due to the difficulty of conclusively demonstrating the economic impacts of standards for gas-fired ranges and ovens, did not include amended standards for gas-fired ranges and ovens in the final rule. 63 FR 48038 (Sept. 8, 1998).

Section 136(a) and (e) of the Energy Policy Act of 2005 (EPACT 2005), Public Law 109–58, amended EPCA to add CCWs as covered equipment, establish the current standards for such equipment, and require that DOE do two cycles of rulemakings to determine whether these standards should be amended. (42 U.S.C. 6311(1) and 6313(e)) DOE has incorporated these standards into its regulations. 70 FR 60407, 60416 (Oct. 18, 2005); 10 CFR 431.156.

DOE commenced this rulemaking on March 15, 2006, by publishing its framework document for the rulemaking, and then gave notice of a public meeting and of the availability of the document. 71 FR 15059 (March 27, 2006). The framework document described the approaches DOE anticipated using and issues to be resolved in the rulemaking. DOE held the public meeting on April 27, 2006, to present the contents of the framework document, describe the analyses DOE planned to conduct during the rulemaking, obtain public comment on these subjects, and facilitate the public's involvement in the rulemaking. DOE also allowed the submission of written statements after the public meeting. In response, DOE received 11 written statements.

On December 4, 2006, DOE posted two spreadsheet tools for this rulemaking on its Web site. The tools included calculation of the impacts of the candidate standard levels developed for the two appliance products. One tool calculates LCC and payback periods (PBPs); the other—the National Impact Analysis (NIA) Spreadsheet—calculates shipments, national energy savings (NES), and NPV.

On November 15, 2007, DOE published an advance notice of proposed rulemaking (ANOPR) in this proceeding. 72 FR 64432 (November 2007 ANOPR). In the November 2007 ANOPR, DOE described and sought comment on the analytical framework, models, and tools that DOE was using to analyze the impacts of energy conservation standards for the relevant appliance products. In addition, DOE published on its Web site the complete ANOPR technical support document (TSD), which included the results of DOE's preliminary analyses in this rulemaking. In the November 2007 ANOPR, DOE requested oral and written comments on these preliminary results and on a range of other issues, including the measurement of microwave oven standby power consumption and potential CCW product classes. DOE held a public meeting in Washington, DC, on December 13, 2007, to present the methodology and results of the ANOPR analyses, and to receive oral comments from those who attended. The oral and written comments DOE received focused on DOE's assumptions, approach, and analytical results, and were addressed in detail in the October 2008 NOPR.

In the October 2008 NOPR, DOE proposed new energy conservation standards for the two appliance products. 73 FR 62034, 62134 (Oct. 17, 2008). It also provided additional background information on the history of this rulemaking. *Id.* at 62040–41. In conjunction with the October 2008 NOPR, DOE also published on its Web site the complete TSD for the proposed rule, which incorporated the analyses DOE conducted and technical documentation for each analysis. The LCC spreadsheets, national impact analysis spreadsheets, Government Regulatory Impact Model (GRIM) spreadsheets, and regulatory impact analysis (RIA) spreadsheets are also available on DOE's Web site.[5] The standards proposed for the two appliance products are presented in Table II.1.

TABLE II.1—OCTOBER 2008 PROPOSED ENERGY EFFICIENCY STANDARDS

| Product class | Proposed energy conservation standards |
|---|---|
| Kitchen ranges and ovens: | |
| Gas cooktops/conventional burners | No constant burning pilot lights. |
| Electric cooktops/low or high wattage open (coil) elements | No standard. |
| Electric cooktops/smooth elements | No standard. |
| Gas ovens/standard oven | No constant burning pilot lights. |
| Gas ovens/self-clean oven | No change to existing standard. |
| Electric ovens | No standard. |

[5] Available online at DOE's Web site: *http://www1.eere.energy.gov/buildings/appliance_standards/residential/home_appl_analysis.html.*

TABLE II.1—OCTOBER 2008 PROPOSED ENERGY EFFICIENCY STANDARDS—Continued

| Product class | Proposed energy conservation standards |
|---|---|
| Microwave ovens | Maximum standby power = 1.0 watt. |
| Commercial clothes washers: | |
| Top-loading commercial clothes washers | 1.76 Modified Energy Factor/8.3 Water Factor. |
| Front-loading commercial clothes washers | 2.00 Modified Energy Factor/5.5 Water Factor. |

In the October 2008 NOPR, DOE discussed and invited comment specifically on the following topics: (1) The proposed standards for residential gas kitchen ranges and ovens, microwave ovens, and CCWs, as well as DOE's tentative conclusion that standards for residential electric kitchen ranges and ovens other than microwave ovens and gas self-cleaning ovens are not technologically feasible and economically justified; (2) whether battery-powered spark ignition modules are a viable alternative to standing pilots for manufacturers of gas ranges, ovens, and cooktops; (3) the technical feasibility of incorporating microwave oven cooking efficiency with standby mode and off mode power into a single metric for the purpose of developing energy conservation standards; (4) input and data regarding off mode power for microwave ovens; (5) input and data on the utility provided by specific features that contribute to microwave oven standby power, particularly display technologies and cooking sensors that do not require standby power; (6) input and data on control strategies available to allow manufacturers to make design tradeoffs between incorporating standby-power-consuming features such as displays or cooking sensors and including a function to turn power off to these components during standby mode, as well as on the viability and cost of microwave oven control board circuitry that could accommodate transistors to switch off cooking sensors and displays; (7) whether switching or similar modern power supplies can operate successfully inside a microwave oven and the associated efficiency impacts on standby power; (8) the selection of microwave oven standby standard levels for the engineering analysis; (9) input and data on the estimated incremental manufacturing costs, the assumed approaches to achieve each standby level for microwave ovens, and whether any intellectual property or patent infringement issues are associated with the design options presented in the TSD to achieve each standby level; (10) input and data on the estimated market share of microwave ovens at different standby power consumption levels; (11) the appropriateness of using other discount rates in addition to 7 percent and 3 percent real to discount future emissions reductions; and (12) the determination of the anticipated environmental impacts of the proposed rule, particularly with respect to the methods for valuing the expected carbon dioxide ($CO_2$) and oxides of nitrogen ($NO_X$) emissions savings due to the proposed standards. 73 FR 62034, 62133 (Oct. 17, 2008).

In addition to these topics on which it requested comment specifically, DOE addressed four topics in the October 2008 NOPR: (1) The determination of product classes for both cooking products and CCWs; (2) the adequacy of the residential clothes washer test procedure for CCWs; (3) small business impacts of the proposed cooking products standards; and (4) impacts of the proposed CCW standards on the competitive landscape.

DOE held a public meeting in Washington, DC, on November 13, 2008, to hear oral comments on and solicit information relevant to the proposed rule.

3. Further Rulemaking To Consider Energy Conservation Standards for Microwave Oven Standby Mode and Off Mode Power Use and for Commercial Clothes Washers

Among the responses to the October 2008 NOPR, DOE received a number of comments from interested parties that presented information and arguments for continuing the rulemaking process to consider standards for microwave oven standby mode and off mode power consumption, as well as standards for CCWs. These comments and DOE's response are discussed below.

Regarding microwave oven standby mode and off mode power consumption, interested parties raised concerns over issues associated with the concurrent microwave oven test procedure rulemaking. As mentioned above and discussed in detail in section III.B of today's notice, DOE proposed to amend the microwave oven (MWO) test procedure to incorporate by reference specific clauses of International Electrotechnical Commission (IEC) Standard 62301, *Household electrical appliances—Measurement of standby power*. DOE would have adopted definitions for ''standby mode'' and ''off mode'' in accordance with the EISA 2007 amendments to EPCA. 73 FR 62134 (Oct. 17, 2008) (MWO test procedure NOPR).

The Association of Home Appliance Manufacturers (AHAM) raised concerns about the ''robustness'' of these proposed microwave oven test procedure amendments, and supported continuing the microwave oven energy conservation standards rulemaking to allow additional time for DOE to collect data and to clarify the test procedure. (AHAM, No. 47 at pp. 3 and 5)[6] Whirlpool Corporation (Whirlpool) stated that DOE could perform better data gathering and analysis for a microwave oven standby power standard if DOE used the entire time until the EISA 2007 deadline of March 31, 2011 for a test procedure amendment to incorporate measurement of standby mode and off mode power consumption. Whirlpool and GE Consumer & Industrial (GE) requested that DOE halt the current microwave oven energy conservation standards rulemaking and work with industry to gather and analyze more comprehensive energy performance data. (Whirlpool, No. 50 at pp. 1–2; GE, No. 48 at p. 2) GE further stated that DOE's approach to standby mode and off mode power consumption for microwave ovens could have important implications for other covered products, and that the microwave oven energy conservation standards rulemaking should be postponed to allow DOE to address standby power issues for covered products either through negotiation or through a rulemaking that considers how the definition of ''standby power'' will affect all appliances, not just microwave ovens. (GE, No. 48 at p. 4)

AHAM raised four other concerns about the proposed microwave oven test procedure amendments: (1) Which microwave ovens are covered products; (2) the incorporation of the EPCA

[6] A notation in the form ''AHAM, No. 47 at pp. 3 and 5'' identifies a written comment (1) made by AHAM; (2) recorded in document number 47 that is filed in the docket of this rulemaking (Docket No. EE–2006–STD–0127) and maintained in the Resource Room of the Building Technologies Program; and (3) which appears on pages 3 and 5 of document number 47.

definitions for ''standby mode'' and ''off mode,'' which AHAM claims are outdated; (3) the conditions for standby power testing; and (4) the test period for measuring standby power. AHAM stated that there is considerable confusion regarding the definition of microwave ovens as covered products. DOE stated in the microwave oven test procedure NOPR that the test procedure amendments would apply to microwave ovens for which the primary source of heating energy is electromagnetic (microwave) energy, including microwave ovens with or without browning thermal elements designed for surface browning of food. The proposed test procedure amendments would not cover combination ovens (*i.e.*, ovens consisting of a single compartment in which microwave energy and one or more other technologies, such as thermal or halogen cooking elements or convection systems, contribute to cooking the food). 73 FR 62134, 62137 (Oct. 17, 2008). AHAM stated that it had been working to set up negotiations on a microwave oven standby power standard, but that confusion caused by DOE's definition of microwave ovens required AHAM to cancel its efforts until the definition is clarified. (AHAM, No. 47 at p. 3) Whirlpool concurred that the definition of microwave ovens needs to be clarified. It claimed that DOE appears to be creating a new product definition without properly engaging interested parties. (Whirlpool, Public Meeting Transcript, No. 40.5 at p. 29; Whirlpool, No. 50, at pp. 1–2) [7]

The Appliance Standards Awareness Project (ASAP) commented that it appreciates DOE accelerating development of the microwave oven test procedure ahead of the EISA 2007 deadline of 2011 so that standby power savings can be captured in this round of rulemaking for cooking products. (ASAP, Public Meeting Transcript, No. 40.5 at p. 32)

Regarding definitions of ''standby mode'' and ''off mode,'' AHAM and Whirlpool recognize that DOE is using the definitions provided under the EISA 2007 amendments to EPCA, but stated that DOE should consider IEC's recent work in developing the second edition of IEC Standard 62301, particularly the clarifications of the definitions of ''standby mode'' and ''off mode.'' AHAM cited the case in which a microwave oven would be plugged in and only energize a light-emitting diode (LED) or some other indication that the unit is in ''off mode.'' AHAM commented that this would represent a different way for the product to communicate with the consumer that might not be covered under the proposed mode definitions. (AHAM, Public Meeting Transcript, No. 40.5 at pp. 58–60; Whirlpool, Public Meeting Transcript, No. 40.5 at pp. 60–61) In contrast, ASAP stated that the EISA 2007 language defining ''standby mode'' and ''off mode'' was reviewed and agreed to by AHAM, and jointly recommended by AHAM and efficiency advocates to Congress. Therefore, ASAP asserted that DOE has definitions that were recommended by interested parties. (ASAP, Public Meeting Transcript, No. 40.5 at p. 64)

In the November 2007 ANOPR, DOE proposed considering a single product class for microwave ovens, encompassing microwave ovens with and without browning (thermal) elements. This product class did not include microwave ovens that incorporate convection systems. DOE stated that it was unaware of any data evaluating the efficiency characteristics of microwave ovens incorporating convection systems, and sought comments and information that would help it evaluate the performance of such products. 72 FR 64432, 64445, 64513 (Nov. 15, 2007). AHAM commented in response that the single product class should be broken up into subcategories according to features that may be different than when the standard was first put into effect. 73 FR 62034, 62049 (Oct. 17, 2008). However, in the October 2008 NOPR, DOE concluded, based on data supplied by AHAM and its own testing, that no features or utilities were uniquely correlated with efficiency that would warrant defining multiple product classes for microwave ovens. *Id.* Therefore, for the purposes of the NOPR analyses, DOE retained a single product class for microwave ovens. No additional data or information was submitted in response to the October 2008 NOPR that would justify amending the definition of the microwave oven product class.

DOE agrees with commenters that it is beneficial to harmonize, where possible, its standards and test procedures with those of other countries and international agencies, particularly in the area of standby power. DOE recognizes that IEC Standard 62301 is an internationally accepted test standard for the measurement of standby power in residential appliances, and that it would be beneficial to many manufacturers to be required to meet only a single standby power standard because they produce microwave ovens for markets in multiple countries. In considering a standby power standard for microwave ovens, along with associated amendments to the microwave oven test procedure, DOE proposed to incorporate language for definitions of ''active mode,'' ''standby mode,'' and ''off mode'' as provided by the EISA 2007 amendments to EPCA. (42 U.S.C. 6295(gg)(1)(A)) However, in directing DOE to amend its test procedures to address standby and off mode power consumption, the EISA 2007 amendments to EPCA allow DOE to amend the EPCA definitions of these modes, while requiring that DOE take ''into consideration the most current versions'' of IEC Standard 62301 and IEC Standard 62087. (42 U.S.C. 6295(gg)(1)(B) and (2)(A)) In light of these statutory provisions and recognizing the benefits of harmonization, DOE has decided to continue this rulemaking, as to microwave oven standby power standards, until the second edition of IEC Standard 62301 is finalized, which is expected to occur by July 2009. At such time, DOE will consider further modifications to DOE's microwave oven test procedure, particularly the ''standby mode'' and ''off mode'' definitions, and, on the basis of such amended test procedures, DOE will analyze potential energy conservation standards for microwave oven standby mode and off mode energy consumption. DOE invites data and information that will allow it to further conduct the analysis for standby and off mode power consumption of microwave ovens. DOE anticipates issuing supplemental notices of proposed rulemaking (SNOPRs) for microwave oven energy conservation standards and the microwave oven test procedure in order to obtain public input on DOE's updated proposals. As part of such SNOPRs, DOE will carefully consider and address any microwave oven-related comments on the October 2008 NOPR that remain relevant.

For CCWs, interested parties raised questions at the November 13, 2008, NOPR public meeting and in written comments on the max-tech level that DOE had identified in the October 2008 NOPR for top-loading units. (See section III.C.3 of this notice for additional discussion of max-tech levels.)

[7] A notation in the form ''Whirlpool, Public Meeting Transcript, No. 40.5 at p. 29'' identifies an oral comment that DOE received during the November 13, 2008, NOPR public meeting, was recorded in the public meeting transcript in the docket for this rulemaking (Docket No. EE–2006–STD–0127), and is maintained in the Resource Room of the Building Technologies Program. This particular notation refers to a comment (1) made by Whirlpool during the public meeting; (2) recorded in document number 40.5, which is the public meeting transcript that is filed in the docket of this rulemaking; and (3) which appears on page 29 of document number 40.5.

Specifically, at the public meeting, Alliance Laundry Systems (Alliance) questioned the validity of the certification data for the CCW model on which DOE based the max-tech level for top-loading machines. Alliance recommended that DOE, at a minimum, test and confirm the performance of the max-tech model before using it as the basis for assessing technical feasibility for the proposed standards. (Alliance, Public Meeting Transcript, No. 40.5 at pp. 90–92) GE responded that it produces the model in question, and its internal testing confirms that the model meets the max-tech level. (GE, No. 48 at pp. 4–5) GE and Alliance agreed that there would not be consumer acceptance of the technology required to achieve the max-tech level (*i.e.,* whether CCWs incorporating advanced controls in a lightweight, non-rugged platform would be able to withstand the harsher usage in a laundromat or multi-family housing setting compared to a residential installation). (GE, Public Meeting Transcript, No. 40.5 at pp. 173–174; Alliance, Public Meeting Transcript, No. 40.5 at p. 23; Alliance, No. 45 at p. 1; Alliance, No. 45.1 at pp. 3, 7, 13) GE stated that it had received anecdotal consumer questions on the water levels and clothing turnover (*i.e.,* rotation of the clothing from top to bottom in the wash basket) during the cycle utilized by its CCW that meets the top-loading max-tech level. According to GE, while this CCW has achieved the max-tech level during actual use in the on-premises laundry segment,[8] it has not yet been justified as sustainable in commercial laundromats where the units are subject to much tougher conditions, such as overloading. (GE, No. 48 at p. 4)

The Multi-Housing Laundry Association (MLA) commented that there is no acceptable CCW currently that can meet the top-loading max-tech level presented in the October 2008 NOPR. According to MLA, previous non-agitator CCWs that could achieve max-tech performance have had poor load capacity, poor wash results, and high maintenance costs. MLA believes that the only way to meet the max-tech requirements would be to have either a cold water wash or such limited amounts of hot water that the clothes would not be effectively cleaned. According to MLA, to meet the max-tech requirements, water in the rinse cycle would be so limited that some soils, detergents, and sand would not be removed. (MLA, No. 49 at p. 4) ASAP stated that DOE's conclusion in the TSD on the max-tech model (*i.e.,* that all higher-efficiency residential clothes washers are impeller-type or do not have traditional agitators) is erroneous, commenting that there are agitator-type residential clothes washers on the market today that perform at higher levels than the CCW max-tech level that DOE has presented in the October 2008 NOPR. (ASAP, Public Meeting Transcript, No. 40.5 at p. 203) Whirlpool commented that the max-tech level cannot be achieved with the technologies implemented on current CCW models, but it believes that technology exists to develop such products by the time standards would become effective. (Whirlpool, No. 50 at p. 3)

EPCA requires DOE to consider the max-tech level in the analysis of efficiency levels for CCW energy conservation standards. (42 U.S.C. 6295(o)(2)(A) and 6316(a)) In the NOPR analysis, DOE determined that the max-tech level for top-loading CCWs, which was analyzed as part of TSL 3, is technologically feasible and economically justified. 73 FR 62034, 62122 (Oct. 17, 2008). However, the comments submitted by Alliance in response to the October 2008 NOPR raised questions on the validity of the max-tech level. (Alliance, Public Meeting Transcript, No. 40.5 at pp. 90–92; Alliance, No. 45 at p. 1; Alliance, No. 45.1 at pp. 4–5) In light of this uncertainty surrounding the performance of the CCW model upon which the top-loading max-tech level was based, DOE tested several units of that model. Preliminary results indicate that the MEF and WF of these units are below and above, respectively, the max-tech levels. Therefore, DOE has decided that it will continue the CCW rulemaking to further evaluate what an appropriate max-tech level should be for top-loading CCWs, and it will revise its analyses for this product class as necessary. DOE anticipates issuing an SNOPR to obtain public input on DOE's updated proposal regarding CCW standards. As part of such SNOPR, DOE will carefully consider and address any CCW-related comments on the October 2008 NOPR that remain relevant.

## III. General Discussion

### *A. Standby Power for Cooking Products*

An issue in this rulemaking has been whether DOE should consider power use in the standby and off modes in adopting energy conservation standards for cooking products. As discussed in greater detail in the October 2008 NOPR,[9] EISA 2007 amended EPCA to require that DOE address standby mode and off mode energy consumption both in adopting standards for all covered products (for final rules for new or amended standards adopted after July 1, 2010), including residential ranges and ovens and microwave ovens, and in test procedures for covered products (by March 31, 2011, for cooking products). (42 U.S.C. 6295(gg)) As noted above, these provisions are not yet operative as requirements for residential cooking products. *Id.*

Nonetheless, DOE has examined in this rulemaking whether to incorporate standby mode and off mode power consumption in its energy conservation standards for residential cooking products. 73 FR 62034, 62041 (Oct. 17, 2008). Specifically, in the October 2008 NOPR, DOE stated that it does not intend to pursue revision of its standards and test procedures to include standby power use by conventional cooking products at this time, because it lacks data indicating the potential for significant energy savings with respect to such power use. *Id.* at 62041, 62044. Accordingly, DOE tentatively decided to consider test procedure amendments for conventional cooking products in a later rulemaking that meets the March 31, 2011, deadline set by EISA 2007 under 42 U.S.C. 6295(gg)(2)(B). 73 FR 62034, 62041, 62044 (Oct. 17, 2008).

However, DOE did state its intention in the October 2008 NOPR to amend its test procedure for microwave ovens to incorporate a measurement of standby power and to consider inclusion of such power as part of the energy conservation standards rulemaking for the following reasons: (1) Energy use in this mode is a significant proportion of microwave oven energy consumption; and (2) currently, the range of standby power use among microwave ovens suggests that a standard would result in significant energy savings. *Id.* at 62041–42. As already discussed in sections II.B.2 and II.B.3, DOE proposed standards for microwave oven standby power use. *Id.* at 62120, 62134.

In response to the October 2008 NOPR, Whirlpool stated that no test procedure has yet been proposed for conventional cooking product standby power, and that Whirlpool does not have experience with or data available on standby power in these products. It further stated that DOE should request such data promptly to allow adequate time to develop it, noting that display technologies will be an issue. (Whirlpool, Public Meeting Transcript, No. 40.5 at p. 30) DOE expects to

[8] This segment refers to commercial clothes washers that are installed in multi-family housing.

[9] 73 FR 62034, 62041 (Oct. 17, 2008).

evaluate standby power for conventional cooking products in a future test procedure rulemaking that will meet the EPCA deadline of March 31, 2011, set forth in 42 U.S.C. 6295(gg)(2)(B). 73 FR 62034, 62041 (Oct. 17, 2008). DOE welcomes relevant data to support this rulemaking activity.

Edison Electric Institute (EEI) commented that standby power could effectively be addressed in gas cooking products with constant burning pilots by a performance standard for the energy consumption of the pilot, rather than by a prescriptive standard that would eliminate constant burning pilots altogether. EEI argued that even though energy savings would be reduced using this approach, such savings could still be fairly significant, and manufacturers would have more flexibility in meeting the energy conservation standards. (EEI, Public Meeting Transcript, No. 40.5 at pp. 19–20 and 50–51; EEI, No. 56 at p. 2)

In response, DOE notes as a preliminary matter that it considered EEI's suggestion of reduced input rate pilots as a technology option separately in section IV.A.2. The following responds to EEI's suggestion to consider an energy conservation standard for standby power consumption of ranges and ovens by regulating the performance of constant burning pilots. For standby power in conventional cooking products, the current DOE test procedures already provide a means for measurement of certain standby energy use (*i.e.,* pilot gas consumption in gas cooking products and clock energy consumption in ovens), which is included in the relevant EF metric. However, as explained above, to measure additional standby mode and off mode energy use as directed by EISA 2007, DOE would need to amend the test procedure to provide for more comprehensive measurement of standby mode and off mode power consumption. As discussed above, DOE is not contemplating revision of its standards and test procedures to address standby power use for conventional cooking products at this time. DOE plans to consider such revisions to the test procedure in a later rulemaking which meets the EPCA deadline of March 31, 2011. (42 U.S.C. 6295(gg)(2)(B)(vi)). DOE will also consider standby mode and off mode energy use in its next energy conservation standards rulemaking, as required by the EISA 2007 amendments to EPCA. (42 U.S.C. 6295(gg)(3)).

Further, even if DOE were to implement in this rulemaking the requirements of the EISA 2007 amendments to EPCA regarding standby mode and off mode energy use to conventional cooking products, DOE would be unable to prescribe a separate standard for pilot energy consumption in gas cooking products. The EISA 2007 amendments require that any final rule establishing or revising a standard for a covered product, adopted after July 1, 2010, shall incorporate standby mode and off mode energy use into a single amended or new standard, if feasible. If not feasible, the final rule shall establish a separate standard for standby mode and off mode energy consumption, if justified under 42 U.S.C. 6295(o). (42 U.S.C. 6295(gg)(3)) Because gas cooking product EF already incorporates gas consumption of the pilot by means of the calculation of annual energy consumption (10 CFR 430.23(i) and 10 CFR part 430, subpart B, appendix I, sections 4.1.2 and 4.2.2), the feasibility of a single metric integrating both active mode and standby mode energy use has clearly been demonstrated. AHAM stated that it strongly advocates, for products other than microwave ovens, that standby power be incorporated in active energy standards as directed by EISA 2007. (AHAM, No. 47 at p. 4) DOE expects to address standby mode and off mode power consumption in future test procedure and standards rulemakings for products other than microwave ovens in accordance with the requirements of the EISA 2007 amendments to EPCA. At such time, DOE will determine whether standby mode and off mode energy use can be incorporated into a new or amended energy conservation standard as directed by 42 U.S.C. 6295(gg)(3).

For microwave ovens, DOE separately considered whether it is feasible to incorporate standby mode and off mode energy use into a single metric. DOE tentatively concluded in the October 2008 NOPR that although it may be mathematically possible to combine energy consumption into a single metric encompassing active (cooking), standby, and off modes, it is not technically feasible to do so at this time because of the high variability in the current cooking efficiency measurement from which the active mode EF and annual energy consumption are derived, and because of the significant contribution of standby power to overall microwave oven energy use. 73 FR 62034, 62042–43 (Oct. 17, 2008). AHAM, Whirlpool, ASAP, and EEI individually, as well as ASAP, American Council for an Energy-Efficient Economy (ACEEE), American Rivers (AR), Natural Resources Defense Council (NRDC), Northeast Energy Efficiency Partnerships (NEEP), Northwest Power and Conservation Council (NPCC), Southern California Gas Company (SCG), San Diego Gas and Electric Company (SDG&E), Southern California Edison (SCE), and Earthjustice (EJ) jointly (hereafter ''Joint Comment'') supported the determination that a combined energy metric for microwave ovens is technically infeasible. (AHAM, Public Meeting Transcript, No. 40.5 at pp. 27 and 54–55; Whirlpool, Public Meeting Transcript, No. 40.5 at p. 29; ASAP, Public Meeting Transcript, No. 40.5 at p. 53; EEI, Public Meeting Transcript, No. 40.5 at p. 55; Whirlpool, No. 50 at p. 4; AHAM, No. 47 at p. 4; Joint Comment, No. 44 at p. 10)

Giving consideration to its previous findings and this general support from interested parties, DOE expects to maintain the approach, consistent with its preliminary determination, that a separate standby mode and off mode energy use metric should be developed in the continuation of the microwave oven energy conservation standards rulemaking, as discussed in section II.B.3 of this notice.

*B. Test Procedures*

For the reasons set forth in the October 2008 NOPR, DOE is not pursuing modification of its test procedures for cooking products in conjunction with this rulemaking, other than an amendment to address the standby power consumption of microwave ovens. 73 FR 62034, 62043–44 (Oct. 17, 2008). As to the latter, DOE published an MWO test procedure NOPR in which it proposed (1) to incorporate by reference into its microwave oven test procedure specific clauses from IEC Standard 62301 as to methods for measuring average standby mode and average off mode power consumption; (2) to incorporate into that test procedure pertinent definitions that are set forth in EISA 2007 amendments to EPCA; and (3) to adopt language to clarify the application of certain of the clauses that DOE proposes to incorporate by reference from IEC Standard 62301. 73 FR 62134 (Oct. 17, 2008). In the MWO test procedure NOPR, DOE also proposed a technical correction to an equation in the existing microwave oven test procedure, which concerns energy use in the active mode. *Id.* at 62137, 62141–42.

Largely because of the issues surrounding the MWO test procedure, DOE is continuing the energy conservation standards rulemaking for microwave oven standby mode and off mode power consumption. Therefore, DOE is also continuing to consider microwave oven test procedure amendments that would reflect clarified and expanded definitions of ''standby

mode'' and ''off mode'' power, which are expected to be incorporated in the second edition of IEC Standard 62301.

*C. Technological Feasibility*

1. General

As stated above, any standards that DOE establishes for cooking products must be technologically feasible. (42 U.S.C. 6295(o)(2)(A) and (o)(3)(B)) 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).

This final rule considers the same design options as those evaluated in the October 2008 NOPR. (See the final rule TSD accompanying this notice, chapters 3 and 4.) All the evaluated technologies have been used (or are being used) in commercially available products or working prototypes. DOE also has determined that there are products either on 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 notice are technologically feasible.

2. Gas Cooking Products—Alternatives to Line-Powered Electronic Ignition Systems

For gas cooking products, TSL 1 corresponds to the replacement of baseline constant burning (standing) pilots with electronic ignition systems. Line-powered electronic ignition systems are incorporated into many gas cooking products currently on the market, and, thus, this prescriptive standard is clearly technologically feasible. For the consumer subgroup consisting of households without access to electricity, however, TSL 1 would require a battery-powered ignition system. In the October 2008 NOPR, DOE stated that DOE research suggests that battery-powered ignition systems could be incorporated by manufacturers at a modest cost if manufacturers' market research suggested that a substantial number of consumers found such a product attribute to be important. DOE noted that such systems have been incorporated successfully in a range of related appliances, such as instantaneous water heaters. Further, DOE stated it believed that there is nothing in the applicable safety standards that would prohibit such ignition systems from being implemented on gas cooking products. Therefore, DOE stated in the October 2008 NOPR that households that use gas for cooking and are without electricity would likely have technological options that would enable them to continue to use gas cooking if standing pilot ignition systems were eliminated. 73 FR 62034, 62048, 62075, 62130 (Oct. 17, 2008). Numerous interested parties objected to DOE's tentative conclusion for the following reasons.

*Safety.* AHAM, Whirlpool, and GE commented that DOE did not address potential safety concerns of eliminating standing pilots, and expressed concern that battery-powered ignition systems would not meet the applicable safety standard, American National Standards Institute (ANSI) Standard Z21.1, ''American National Standard for Household Cooking Gas Appliances'' (ANSI Z21.1). (AHAM, Public Meeting Transcript, No. 40.5 at pp. 15–16, 48–49; AHAM, No. 47 at p. 2; Whirlpool, No. 50 at p. 4; GE, No. 48 at p. 2) AHAM believes that ANSI Z21.1 would need to be revised to incorporate battery-powered ignition systems for unattended units (*i.e.*, gas ovens), and this would not likely take place before the proposed 2012 effective date of potential standards. (AHAM, No. 47 at p. 2 and p. 4)

The American Gas Association (AGA) and AHAM commented that battery-powered ignition systems are not viable on a residential range because of cost and safety, particularly regarding the need for battery replacement. If a battery is not readily available, these commenters argued that consumers may attempt to light the range with a match or use an extension cord. Furthermore, these commenters suggested that if battery-powered ignition systems are not on the market, the reason may be economics. AGA recommended that DOE use caution before determining viability of such systems. (AGA, Public Meeting Transcript, No. 40.5 at pp. 44–45; AHAM, No. 47 at p. 4) Whirlpool noted that battery-powered ignition systems are subject to failure when the battery is weak or dead, and that the consumer cannot determine battery status. According to Whirlpool, using matches as a backup for ignition is unsafe and would also lead to making matches more accessible to small children. (Whirlpool, No. 50 at p. 4) U.S. Representatives Joseph Pitts and Bill Shuster (Pitts and Shuster) also commented that a safety concern exists if a consumer tries to light a range with matches when the batteries in the ignition system are dead. (Pitts and Shuster, No. 57 at p. 2) Whirlpool, AHAM, and GE expressed concern about the viability of using ignition systems typically designed for outdoor grills in an indoor application, primarily for reasons of potential gas leakage and reliability. (Whirlpool, No. 50 at p. 4; AHAM, No. 47 at p. 4; AHAM, Public Meeting Transcript, No. 40.5 at p. 49; GE, No. 48 at p. 2) Whirlpool stated that, in outdoor applications such as grills, air movement would likely disperse gas if the unit failed to ignite. However, in indoor applications, dispersion is unlikely, thereby resulting in an elevated threat of explosion or suffocation. (Whirlpool, No. 50 at p. 4) Sempra Utilities (Sempra) agreed with AGA about potential safety issues, particularly for low-income consumers. (Sempra, Public Meeting Transcript, No. 40.5 at p. 46) Pacific Gas and Electric (PG&E) responded to Sempra's comment by stating that although DOE cannot compromise safety in considering battery-powered ignition systems, frequently initial cost is weighted too much relative to operating cost. (PG&E, Public Meeting Transcript, No. 40.5 at p. 47) DOE understands PG&E's comment to mean that, even for low-income consumers, a higher cost for a safe, reliable battery-powered ignition system may be economically justified. GE stated there are currently no proven safe, reliable alternative to standing pilots, and until such time as a proven alternative exists, standing pilots should be retained. (GE, No. 48 at pp. 1–2)

*Commercial Availability.* AGA and Sempra questioned whether battery-powered ignition systems have been applied to other residential products, such as instantaneous water heaters or furnaces. AGA, Pitts and Shuster, and the National Propane Gas Association (NPGA) recognized that there are recreational vehicle (RV) water heaters and furnaces which use a 12-volt (V) battery ignition system, but they believe this specialty application would be difficult to apply to a domestic range due to cost, safety certification, and other issues. (AGA, Public Meeting Transcript, No. 40.5 at pp. 18, 44, and 93; Sempra, Public Meeting Transcript, No. 40.5 at p. 46; NPGA, No. 52 at p. 2; AGA, No. 46 at p. 2; Pitts and Shuster, No. 57 at p. 2)

EEI asked if there are battery-powered ignition systems in any commercially available indoor gas cooking products on the market. (EEI, Public Meeting Transcript, No. 40.5 at p. 43) AGA and NPGA stated that there are currently no design-certified and listed household products available that incorporate battery-powered ignition systems. According to AGA and NPGA, any presumption that such systems could be incorporated into covered products

raises a host of uncertainties regarding safety, certification, and other issues, and, therefore, goes beyond the scope of this rulemaking. (AGA, No. 46 at p. 2; NPGA, No. 52 at p. 2) Pitts and Shuster commented that battery-powered ignitions systems are not currently on the market because they are not cost effective. (Pitts and Shuster, No. 57 at p. 2) AHAM and GE do not see that there are any other viable technologies to eliminate standing pilots. (AHAM, Public Meeting Transcript, No. 40.5 at p. 48; GE, No. 48 at p. 2) LG Electronics (LG) asked whether DOE considered technologies and products available in other parts of the world. (LG, Public Meeting Transcript, No. 40.5 at p. 47)

*Households Without Electricity*. GE and Peerless-Premier Appliance Company (Peerless-Premier) stated that standing pilots provide consumer utility for customers without line power for economic, religious, or other reasons. (GE, Public Meeting Transcript, No. 40.5 at p. 31; GE, No. 48 at p. 2; Peerless Letter, No. 57 [10] at pp. 1–2) AGA and NPGA also questioned DOE's assertion that consumer subgroups that are prohibited from using electricity would be allowed to use battery-powered ignition. (AGA, No. 46 at p. 2; NPGA, No. 52 at p. 2)

*DOE Response to Comments*. In response to these comments, DOE conducted additional research on battery-powered ignition systems for residential gas cooking products. As an initial matter, DOE could not identify any indoor ranges incorporating such ignition systems that are on the market in the United States. DOE was able to identify a single gas range for sale in the United Kingdom (U.K.) that incorporates a battery-powered ignition system that appeared to meet the functional safety requirements of ANSI Z21.1 (*i.e.*, that the oven main burner is lit by an intermittent gas pilot that is in turn lit by a battery-powered spark igniter.) This ignition system does not require the user to push a separate ''light'' button at the same time as the control knob is turned to allow pilot gas flow. Such a separate operation would be prohibited under ANSI Z21.1. However, further DOE research determined that the ignition system does not include a safety device to shut off the main gas valve in the event that no flame is detected, which is required by the ANSI standard.

However, as noted from interested parties' comments, there are gas cooking products with battery-powered ignition for RV applications that are available in the United States. DOE determined that the sections in the ANSI safety standards for RV gas cooking products and residential gas cooking products that relate to the ignition system are equivalent. Thus, it could be inferred that a battery-powered ignition system designed for an RV gas range could be integrated into a residential gas range that could meet ANSI Z21.1 requirements. Such certification, though, does not appear to have been obtained thus far. In addition, these ignition systems are powered by 12 V automotive-type batteries and consume enough energy during operation to preclude the use of typical household-scale batteries, such a 1.5 V ''AA'' or 9 V batteries. Since 12 V batteries must be periodically recharged, this approach would likely not be viable for consumers without household electricity.

DOE next investigated the possibility that battery-powered ignition systems used in other indoor residential appliances in the United States could meet the requirements of ANSI Z21.1, even though they are not currently being incorporated in gas cooking products. DOE identified several such appliances, including a remote-controlled gas fireplace and instantaneous gas water heaters. For these products, the battery-powered ignition systems are required to meet the same or equivalent component-level ANSI safety standards as are required for automatic ignition systems in gas cooking products. DOE contacted several manufacturers of gas cooking products, fireplaces, and instantaneous water heaters, as well as ignition component suppliers, to investigate the technological feasibility of integrating these existing battery-powered ignition systems into gas cooking products that would meet ANSI Z21.1. None of these manufacturers could identify insurmountable technological impediments to the development of such a product. Based on its research, DOE determined that the primary barrier to commercialization of battery-powered ignition systems in gas cooking products has been lack of market demand and economic justification rather than technological feasibility. Therefore, DOE concludes that a gas range incorporating one of these ignition systems could meet ANSI Z21.1. In addition, DOE research suggests that the market niche for gas cooking products equipped with battery-powered ignition systems, which would be created by the proposed gas cooking product standards, would likely attract entrants among ignition component suppliers.

After considering issues regarding safety and commercial availability, DOE concludes that technologically feasible alternative ignition systems to standing pilots in gas cooking products for the small subgroup of households without electricity will likely be available at the time these energy conservation standards are effective. For more information, see chapter 3 of the TSD accompanying this notice.

3. Maximum Technologically Feasible Levels

As required by EPCA under 42 U.S.C. 6295(p)(2), in developing the October 2008 NOPR, DOE identified the design options that would increase the energy efficiency of cooking products. 73 FR 62034, 62045 (Oct. 17, 2008). (See chapter 5 of the NOPR TSD.) DOE did not receive any comments on the maximum technologically feasible levels in the October 2008 proposed rule that would lead DOE to consider changes to these levels. Therefore, for today's final rule, the max-tech levels for all cooking product classes are the max-tech levels identified in the October 2008 NOPR. These levels are provided in Table III.1 below.

TABLE III.1—OCTOBER 2008 PROPOSED MAX-TECH LEVELS FOR COOKING PRODUCTS

| Product | Max-Tech EF |
|---|---|
| Gas Cooktops | 0.42 |
| Electric Open (Coil) Cooktops | 0.769 |
| Electric Smooth Cooktops | 0.753 |
| Gas Standard Ovens | 0.0583 |
| Gas Self-Clean Ovens | 0.0632 |
| Electric Standard Ovens | 0.1209 |
| Electric Self-Clean Ovens | 0.1123 |
| Microwave Ovens | 0.602 |

*D. Energy Savings*

DOE forecasted energy savings in its NES analysis through the use of an NES spreadsheet tool, as discussed in the October 2008 NOPR. 73 FR 62034, 62045–46, 62068–74, 62104–05 (Oct. 17, 2008).

One criterion that governs DOE's adoption of standards for cooking products is that the standard must result in ''significant conservation of energy.'' (42 U.S.C. 6295(o)(3)(B)) While EPCA does not define the term ''significant,'' a U.S. Court of Appeals, in *Natural Resources Defense Council* v. *Herrington,* 768 F.2d 1355, 1373 (D.C. Cir. 1985), indicated that Congress

[10] In addition to its comments submitted to DOE, entered into the docket as comment number 42, Peerless-Premier Appliance Co. submitted a letter (Peerless Letter) to Congressman Whitfield of Kentucky regarding the October 2008 NOPR. A copy of the letter was entered into the docket as comment number 55 for this rulemaking in addition to comments that Peerless-Premier submitted directly to DOE.

intended ''significant'' energy savings in this context to be savings that were not ''genuinely trivial.'' DOE's estimates of the energy savings for energy conservation standards at each of the TSLs considered for cooking products for today's rule indicate that the energy savings each would achieve are nontrivial. Therefore, DOE considers these savings ''significant'' within the meaning of section 325 of EPCA.

*E. Economic Justification*

1. Specific Criteria

As noted earlier, EPCA provides seven factors to evaluate in determining whether an energy conservation standard for covered products is economically justified. (42 U.S.C. 6295(o)(2)(B)(i) The following sections discuss how DOE has addressed these factors in evaluating efficiency standards for cooking products.

a. Economic Impact on Consumers and Manufacturers

DOE considered the economic impact of potential standards on consumers and manufacturers of cooking products. 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.C of this notice and chapter 8 of the TSD accompanying this notice.) DOE investigated the impacts on manufacturers through the manufacturer impact analysis (MIA). (See sections IV.F and VI.C.2 of this notice and chapter 13 of the TSD accompanying this notice.) This factor is discussed in detail in the October 2008 NOPR. 73 FR 62034, 62046, 62057–68, 62075–81, 62085–104, 62128–30 (Oct. 17, 2008).

b. Life-Cycle Costs

DOE considered life-cycle costs of cooking products, as discussed in the October 2008 NOPR. 73 FR 62034, 62046, 62057–68, 62085–91 (Oct. 17, 2008). DOE calculated the sum of the purchase price and the operating expense—discounted over the lifetime of the product—to estimate the range in LCC benefits that consumers would expect to achieve due to standards.

c. Energy Savings

Although significant conservation of energy is a separate statutory requirement for imposing an energy conservation standard, EPCA also requires DOE to consider the total projected energy savings that are expected to result directly from a proposed standard in determining the economic justification of that standard. (42 U.S.C. 6295(o)(2)(B)(i)(III)) As in the October 2008 NOPR (73 FR 62034, 62045–46, 62068–74, 62104–05 (Oct. 17, 2008)), DOE used the NES spreadsheet results for today's final rule in its consideration of total projected savings that are directly attributable to the standard levels DOE considered.

d. Lessening of Utility or Performance of Products

In considering standard levels, DOE sought to avoid new standards for cooking products that would lessen the utility or performance of such products. (42 U.S.C. 6295(o)(2)(B)(i)(IV)) 73 FR 62034, 62046–47, 62107 (Oct. 17, 2008).

e. Impact of Any Lessening of Competition

DOE considers any lessening of competition that is likely to result from standards. Accordingly, as discussed in the October 2008 NOPR (73 FR 62034, 62047, 62107 (Oct. 17, 2008)), DOE requested that the Attorney General transmit to the Secretary a written determination of the impact, if any, of any lessening of competition likely to result from the standards proposed in the October 2008 NOPR, including those for cooking products, 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))

To assist the Attorney General in making such a determination, DOE provided the Department of Justice (DOJ) with copies of the October 2008 proposed rule and the TSD for review. The Attorney General's response is discussed in section VI.C.5 and is reprinted at the end of this rule. (DOJ, No. 53 at pp. 1–2)

f. Need of the Nation To Conserve Energy

In considering standards for cooking products, the Secretary must consider the need of the Nation to conserve energy. (42 U.S.C. 6295(o)(2)(B)(i)(VI)) The Secretary recognizes that energy conservation benefits the Nation in several important ways. The non-monetary benefits of standards are likely to be reflected in improvements to the security and reliability of the Nation's energy system. Standards generally are also likely to result in environmental benefits. As discussed in the proposed rule, DOE has considered these factors in considering whether to adopt standards for cooking products. 73 FR 62034, 62047, 62081–84, 62107–62113, 62130–31 (Oct. 17, 2008).

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 of a product that meets the standard level is less than three times the value of the first-year energy (and, as applicable, water) savings resulting from the standard, as calculated under the applicable DOE test procedure. (42 U.S.C. 6295(o)(2)(B)(iii)) DOE's LCC and PBP analyses generate values that calculate the payback period for consumers of a product meeting potential energy conservation standards, which includes, but is not limited to, the 3-year payback period contemplated under the rebuttable presumption test discussed above. (See chapter 8 of the TSD that accompanies this notice.) 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). 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 analytical tools that it developed previously and adapted for use in this rulemaking. One is a spreadsheet that calculates LCC and PBP. Another tool calculates national energy savings and national NPV. DOE also used the GRIM, along with other methods, in its MIA. Finally, DOE developed an approach using the National Energy Modeling System (NEMS) to estimate impacts of energy efficiency standards for residential cooking products 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 October 2008 NOPR. DOE used the same general methodology as applied in the October 2008 NOPR, but revised some of the assumptions and inputs for the final rule in response to interested parties' comments. The following paragraphs discuss these revisions.

*A. Market and Technology Assessment*

When beginning an energy conservation standards rulemaking, DOE develops information that provides an overall picture of the market for the products concerned, including the purpose of the products, the industry structure, and market characteristics. This activity includes both quantitative

and qualitative assessments based primarily on publicly available information. DOE presented various subjects in the market and technology assessment for this rulemaking. (See the October 2008 NOPR and chapter 3 of the NOPR TSD.) These include product definitions, product classes, manufacturers, quantities and types of products sold and offered for sale, retail market trends, and regulatory and nonregulatory programs.

1. Product Classes

In general, when evaluating and establishing energy conservation standards, DOE divides covered products into classes by the type of energy used, capacity, or other performance-related features that affect consumer utility and efficiency. (42 U.S.C. 6295(q)) Different energy conservation standards may apply to different product classes. *Id.*

For cooking products, DOE based its product classes on energy source (*e.g.*, gas or electric) and cooking method (*e.g.*, cooktops, ovens, and microwave ovens). DOE identified five categories of cooking products: gas cooktops, electric cooktops, gas ovens, electric ovens, and microwave ovens. The following discussion provides clarification regarding DOE's selection of product classes for residential cooking products.

In its regulations implementing EPCA, DOE defines a ''conventional range'' as ''a class of kitchen ranges and ovens which is a household cooking appliance consisting of a conventional cooking top and one or more conventional ovens.'' 10 CFR 430.2. The November 2007 ANOPR presented DOE's reasons for not treating gas and electric ranges as a distinct product category and for not basing its product classes on that category, primarily based upon DOE's determination that, because ranges consist of both a cooktop and oven, any potential cooktop and oven standards would apply to the individual components of the range. 72 FR 64432, 64443 (Nov. 15, 2007). In the November 2007 ANOPR, DOE defined a single product class for gas cooktops as gas cooktops with conventional burners. 72 FR 64432, 64443–44 (Nov. 15, 2007) For gas ovens, DOE defined two product classes—gas standard ovens with or without a catalytic line and gas self-cleaning ovens. 72 FR 64432, 64445 (Nov. 15, 2007) These product class definitions were maintained in the October 2008 NOPR. 73 FR 62034, 62048 (Oct. 17, 2008).

DOE tentatively concluded in the November 2007 ANOPR that standing pilot ignition systems are not performance-related features that provide unique utility and would, therefore, not warrant a separate product class. 72 FR 64432, 64463 (Nov. 15, 2007). In response to interested parties' comments on this proposed determination, DOE noted in the October 2008 NOPR that the purpose of ignition systems is to ignite the gas when burner operation is needed for cooking, and either standing pilot or electronic ignition provides this function. In addition, DOE concluded from previous analysis that the ability to operate in the event of an electric power outage is not a utility feature that affects performance of gas cooking products. 73 FR 62034, 62048 (Oct. 17, 2008).

DOE notes that the EISA 2007 amendments to EPCA provide an exception from the residential boiler energy conservation standards for ''[a] boiler that is manufactured to operate without any need for electricity or any electric connection, electric gauges, electric pumps, electric wires, or electric devices. * * *'' (42 U.S.C. 6295(f)(3)(C)) Such units are typically equipped with a standing pilot. The October 2008 NOPR referred indirectly to this exception by stating that DOE addressed it in its residential furnace and boiler rulemaking. 73 FR 62034, 62048 (Oct. 17, 2008). DOE is clarifying this statement in today's final rule as follows. DOE's full rulemaking analysis (conducted prior to passage of EISA 2007) did not result in such an exception in its most recent energy conservation standards rulemaking for residential furnaces and boilers. 72 FR 65136 (Nov. 19, 2007). However, DOE subsequently published a final rule in the form of a technical amendment whose sole purpose was to codify the EISA 2007 amendments to EPCA pertaining to residential furnace and boiler standards set by statute, including the exception above. 73 FR 43611, 43613 (July 28, 2008). Because the July 28, 2008, rule implemented statutory provisions over which the Department had no rulemaking discretion, DOE did not conduct any supporting analysis or provide any input on this boiler exclusion. Congress incorporated this exclusion in the energy conservation standards for boilers, but Congress chose not to include a similar provision for gas cooking products with standing pilots. Accordingly, DOE used the applicable EPCA provisions for determining whether performance-related features warrant separate energy conservation standards (42 U.S.C. 6295(q)(1)), and DOE determined in the October 2008 NOPR that it would be unable to create a similar exception for gas cooking products because there is no unique utility associated with gas cooking products equipped with standing pilot ignition, compared to those with electronic ignition. 73 FR 62034, 62048 (Oct. 17, 2008). DOE based this understanding on its tentative conclusion that there is not expected to be any appreciable difference in cooking performance between gas cooking products with or without a standing pilot and that battery-powered electronic ignitions systems could provide ignition in the absence of line power (*i.e.*, electricity from the utility grid). *Id.*

Through market research for the October 2008 NOPR, DOE determined that battery-powered electronic ignition systems have been implemented in other products, such as instantaneous gas water heaters, barbeques, furnaces, and other appliances, and the use of such ignition systems appeared acceptable under ANSI Z21.1. Therefore, subgroups that prohibit the use of line electricity, or that do not have line electricity available, could still use gas cooking products without standing pilots, assuming gas cooking products would be made available with battery-powered ignition. Thus, DOE concluded that standing pilot ignition systems do not provide a distinct utility and that a separate class for standing pilot ignition systems would not be warranted under 42 U.S.C. 6295(q). 73 FR 62034, 62048 (Oct. 17, 2008).

In response to the October 2008 NOPR, AGA commented that DOE should assign a separate product class to gas cooking products with standing pilots. According to AGA, NPGA, and Pitts and Shuster, DOE acknowledged in the October 2008 NOPR that some religious groups do not allow electricity or adopt it in their area, and that DOE made an exception in EISA 2007 to allow standing pilots for gravity-fed gas boilers for such consumers. These commenters believe that gas ranges with standing pilots should remain available due to their unique utility. (AGA, Public Meeting Transcript, No. 40.5 at pp. 16–18; AGA, No. 46 at p. 2; NPGA, No. 52 at p. 2; Pitts and Shuster, No. 57 at p. 1) NPGA also objected to DOE's determination in the October 2008 NOPR that gas ranges incorporating pilot ignition systems do not provide a unique utility to gas customers, as well as DOE's determination that power outages are not frequent or long enough for residential electricity customers to be affected by the inability to cook food. NPGA and AGA stated that the utility of having an appliance with a standing pilot is important, especially for that segment of the population that cannot use electricity due to religious or

cultural practices or current economic status, or for whom electrical service is unavailable (such as for hunting cabins). (NPGA, No. 52 at p. 2; AGA, No. 46 at p. 2) AGA also stated that the unique consumer utility of an ignition system is conveyed by the installed environment (*i.e.*, whether line electricity is present) rather than by the ignition technology itself. According to AGA, EPCA addresses consumer utility associated with the covered product, not with a specific system or technology used in the product. (AGA, No. 46 at p. 2)

As discussed above, Congress created the exception to the standards in EPCA for residential boilers which operate without the need for electricity (*i.e.*, ''gravity-fed gas boilers''). Such an exception was not based on analysis in DOE's most recent energy conservation standards rulemaking for residential furnaces and boilers. Congress did not provide a similar exclusion for gas cooking products with standing pilots. Certain consumer subgroups currently use such gas cooking products due to religious or cultural practices or a lack of access to electrical service. However, DOE continues to believe that the consumer utility that would need to be maintained for these subgroups is the same as for all consumers (*i.e.*, the ability to ignite the cooking product under the nominal conditions of installation, which for these consumer subgroups includes the absence of electrical service.) DOE also considered whether additional utility is conferred by the ability to provide ignition during an atypical event such as a loss of line power for those consumers who have electrical service, but DOE did not receive additional information regarding duration and frequency of power outages that would lead it to conclude that the ability to operate during such an event represents significant utility. Therefore, DOE maintains that there is no unique utility provided by standing pilot ignition systems, and that a separate product class for gas cooking products incorporating standing pilots is not warranted under 42 U.S.C. 6295(q). In making this determination, however, DOE recognizes that achieving safe ignition in gas cooking products for consumer subgroups without electricity in the home in the absence of standing pilot ignition requires an alternative ignition technology that does not rely on line power. As discussed in section III.C.2 of today's notice and chapter 3 of the TSD accompanying it, DOE identified battery-powered ignition systems as a potential alternative to standing pilots, and believes that such systems will likely be commercially available to these consumer subgroups by the time the energy conservation standards are effective.

2. Technology Options

As discussed above in section III.A, EEI suggested that DOE consider methods to reduce the input rate of standing pilot ignition systems in gas cooking products, thereby lowering the product's overall energy consumption, rather than strictly considering a ban on the use of standing pilots. EEI stated that DOE should create a performance standard for standing pilot lights, similar to what was proposed in the October 2008 NOPR for microwave ovens. EEI claimed a performance standard restricting the input rate of standing pilots could save a large fraction of standby energy usage in gas cooking products, while still providing flexibility to manufacturers. (EEI, Public Meeting Transcript, No. 40.5 at pp. 19–20 and 50–51; EEI, No. 56 at p. 2)

In the framework document for this rulemaking, DOE requested comment on a list of technologies, based on its 1996 analysis in the ''Technical Support Document for Residential Cooking Products'' [11] (1996 TSD), that it would consider for improving the efficiency of cooking products. These technologies did not include the one EEI now suggests (*i.e.*, one reducing the input rate of standing pilot ignition systems.) In response, several interested parties submitted comments on the framework document that indicated the list of technology options was still relevant because there have been no major technological breakthroughs in conventional cooking products since 1996. 72 FR 64432, 64452 (Nov. 15, 2007) No interested parties suggested any additional technologies for DOE to consider. DOE presented this list again in the November 2007 ANOPR, along with the analyses based on efficiency levels derived from the same technology options. 72 FR 64432, 64451–52, 64463–64 (Nov. 15, 2007). DOE did not receive any comments in response to the November 2007 ANOPR which suggested analyzing additional technology options for conventional cooking products. Furthermore, EEI's comments in response to the October 2008 NOPR provided no supporting information to validate the technological feasibility of reduced pilot input rate for improving the energy usage of gas cooking products equipped with standing pilots. DOE research did not identify any commercially available pilots suitable for gas range applications that operate at input rates substantially lower than that assumed for the baseline efficiency levels (117 British thermal units per hour (Btu/h) for gas cooktops and 175 Btu/h for gas ovens.) These baseline pilot input rates are based upon data DOE received as inputs to its analyses presented in the 1996 TSD, and the baseline values are intended to represent average input rates for the distribution of pilots incorporated in baseline ovens and cooktops. DOE does not have information on the distribution of pilot input rates that are associated with the range of ovens and cooktops currently on the market, but DOE believes that pilot capacities are closely related to the specific burner system(s) in each cooking product. DOE concluded that specifying a maximum pilot input rate without consideration of the diversity of such systems would likely raise utility issues, wherein the pilot could potentially fail to perform its required ignition function in some cooking products. For these reasons, DOE is not considering reduced pilot input rates in this rulemaking.

3. Excluded Product Classes and Technologies

DOE stated in the November 2007 ANOPR that it lacks efficiency data to determine whether certain designs (*e.g.*, commercial-style cooking products) and certain technologies (*e.g.*, induction cooktops) should be excluded from the rulemaking. 72 FR 64432, 64444–45, 64460 (Nov. 15, 2007). Due to a lack of public comments or other information that would counter DOE's tentative decision to exclude these products and technologies, DOE maintained these proposed exclusions in the October 2008 NOPR. 73 FR 62034, 62048 (Oct. 17, 2008).

AHAM and Whirlpool agree with the proposal to exclude commercial-style cooking products and induction technology. (AHAM, No. 47 at p. 3; Whirlpool, No. 50 at p. 1) In light of these comments in support of the proposal and in the absence of any new information, DOE has decided not to include commercial-style cooking products and induction technology in today's final rule.

*B. Engineering Analysis*

1. Efficiency Levels

In the November 2007 ANOPR, DOE reviewed and updated the design options and efficiency levels published in the 1996 TSD analysis, an approach generally supported by interested parties. DOE did not receive any

[11] Available online at DOE's Web site: *http://www.eere.energy.gov/buildings/appliance_standards/residential/cooking_products_0998_r.html.*

comments on the November 2007 ANOPR regarding omitted cooking technologies and retained all the cooking technologies, design options, and efficiency levels for cooking product energy factor as part of the October 2008 NOPR. 73 FR 62034, 62052 (Oct. 17, 2008).

AGA commented in response to the October 2008 NOPR that DOE did not consider alternative technologies to banning standing pilots, which places a great burden on the justification of pilot ignition products as the baseline technology. AGA stated that DOE had difficulty in defining reasonable design options for these gas products, but that does not justify defining standing pilots as the baseline product. (AGA, No. 46 at p. 3)

In response, DOE notes that baseline products refer to a model or models that have features and technologies typically found in products currently offered for sale. The baseline model in each product class represents the characteristics of products in that class, and typically achieves minimum energy efficiency performance. In the case of gas cooking products that are not equipped with an electrical cord (*i.e.*, gas cooktops and gas standard ovens), minimum energy efficiency performance is associated with products equipped with standing pilot ignition systems. DOE research has not revealed any other design options that would support the definition of different baseline efficiency levels for gas cooktops and gas standard ovens, and DOE did not receive any information on alternative technologies or design options. Therefore, DOE is maintaining the baseline efficiency levels associated with standing pilots for gas cooktops and gas standard ovens in today's final rule.

2. Manufacturing Costs

In the November 2007 ANOPR, DOE estimated a manufacturing cost at each efficiency level in this rulemaking by scaling the manufacturing costs that were provided in the 1996 TSD by the producer price index (PPI).[12] 72 FR 64432, 64467–69 (Nov. 15, 2007). DOE retained these same manufacturing costs in the October 2008 NOPR and is also retaining them in today's final rule because it has determined that there has been no significant change in the PPI since the analysis for the November 2007 ANOPR, which used the PPI from 2006. For electric cooking products (including microwave ovens), the PPI increased 1.4 percent between 2006 and 2007, the most recent year for which final PPI values are available from the U.S. Department of Labor's Bureau of Labor and Statistics. The PPI for gas cooking products increased 2.9 percent in that same time period.

As discussed in the October 2008 NOPR, AGA had commented that DOE underestimated the incremental manufacturing cost of electronic ignition, which for gas cooking products corresponds to efficiency level 1. According to AGA, the Harper-Wyman Co., in 1998 comments to DOE, provided an incremental retail price of $150 for a gas range with electronic ignition relative to a gas range with standing pilot ignition system. AGA argued that this retail price increment stands in sharp contrast to the $37 incremental manufacturing cost estimated by DOE. 73 FR 62034, 62054 (Oct. 17, 2008).

In response to AGA's comments on the November 2007 ANOPR, DOE contacted component suppliers of gas cooking product ignition systems to validate DOE's manufacturing cost estimates. DOE believes that the information collected verified that the costs in the November 2007 ANOPR represented current costs and, therefore, continued in the October 2008 NOPR to characterize the incremental manufacturing costs for the non-standing pilot ignition systems with the estimates developed for the November 2007 ANOPR. *Id.*

In response to the October 2008 NOPR, AGA stated it disagrees with DOE's approach for estimating incremental manufacturing costs for electronic ignition. AGA commented that DOE's use of survey data on appliance prices is a poor proxy for manufacturing cost because pricing policy is based on a host of factors (including marginal product demand), not strictly on manufactured cost. Therefore, the commenter stated that it disagrees with DOE's estimate of $37 in incremental cost for electronic ignition. Instead, AGA believes that DOE should use a figure closer to the estimate of $150 previously provided by AGA, which was based on manufacturer estimates for redesign of pilot ignition products. AGA also stated that DOE should examine the impact on consumers, not on the manufacturer's costs. (AGA, Public Meeting Transcript, No. 40.5 at pp. 17–18; AGA, No. 46 at p. 4)

For this final rule, DOE conducted further research regarding retail prices for comparable gas ranges with standing pilot and electronic ignition systems. A comparison of manufacturer suggested retail prices for four brands showed a price differential ranging from $0 to $50 for a consumer to purchase a gas range with an electronic ignition system, rather than a standing pilot, from the same manufacturer. (See chapter 3 of the TSD accompanying this notice.) DOE recognizes that manufacturer pricing takes many factors into account, but the consistency of the price increments among four different manufacturers suggests that DOE's estimate of $37 for a manufacturing cost increment to eliminate standing pilots in a gas range has greater validity than an increment of $150. DOE further notes that, according to AGA's comments on the November 2007 ANOPR, the $150 estimate was provided by Harper-Wyman Co. in 1998. DOE believes that its own discussions with ignition component suppliers during the ANOPR phase of this rulemaking may represent more current technologies and costs. Therefore, DOE has decided to retain the proposed incremental manufacturing costs in today's final rule.

*C. Life-Cycle Cost and Payback Period Analyses*

The purpose of the LCC and PBP analyses is to evaluate the economic impacts of possible new energy conservation standards for cooking products on individual consumers. The LCC is the total consumer expense over the life of the product, including purchase and installation expense and operating costs (energy 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 purchasing a higher efficiency product through energy savings. To calculate LCC, DOE discounted future operating costs to the time of purchase and summed them over the lifetime of the product. DOE measured the change in LCC and the change in PBP associated with a given efficiency level relative to a base-case forecast of product 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 product prices, installation costs, annual household energy consumption, energy prices, maintenance and repair costs, product lifetime, and discount rates.

DOE calculated the LCC and payback periods for cooking products for a nationally representative set of housing units, which was selected from the Energy Information Administration (EIA) Residential Energy Consumption

[12] Please see the following Web site for further information: *http://www.bls.gov/pPI.*

Survey (RECS).[13] Similar to the October 2008 NOPR, the analysis for today's final rule used the 2001 RECS. (EIA had not yet released the 2005 RECS when the analysis was performed. Although DOE was unable to use the most recent RECS, the 2001 version still offers a relatively recent national representation of how consumers utilize cooking products. Also, no other public survey provides a representative national household sample indicating how frequently consumers use their cooking appliances.) By using a representative sample of households, the analysis captured the variability in energy consumption and energy prices associated with cooking product use.

For each sample household, DOE determined the energy consumption for the cooking product and the energy price. DOE calculated the LCC associated with a baseline cooking product for each household. To calculate the LCC savings and PBP associated with products meeting higher efficiency standards, DOE substituted the baseline unit with a more efficient design.

Table IV.1 summarizes the approaches and data DOE used to derive the inputs to the LCC and PBP calculations for the October 2008 NOPR, and the changes it made for today's final rule. For this final rule, DOE did not introduce changes to the LCC and PBP analyses methodology described in the October 2008 NOPR. However, DOE revised its energy prices and energy price forecasts based upon the most recently available data from EIA. Chapter 8 of the TSD accompanying this notice contains detailed discussion of the methodology utilized for the LCC and PBP analyses, as well as the inputs developed for the analyses.

TABLE IV.1—SUMMARY OF INPUTS AND KEY ASSUMPTIONS IN THE LCC AND PBP ANALYSES

| Inputs | October 2008 NOPR | Changes for the final rule |
|---|---|---|
| **Affecting Installed Costs** | | |
| Product Price | Derived by multiplying manufacturer cost by manufacturer, retailer markups and sales tax. | No change. |
| Installation Cost | Baseline cost based on RS Means *Mechanical Cost Data*, 2008.[14] Based the percentage of households with gas cooking products that would need to install an electrical outlet on requirements in the National Electrical Code (NEC). Determined that only households built before 1960 would require the installation of an outlet. Overall, estimated that 10 percent of households with gas standard ovens and 4 percent of households with gas cooktops would need to install an electrical outlet to accommodate designs that require electricity. Based electrical outlet installation costs on requirements in the NEC. | No change. |
| **Affecting Operating Costs** | | |
| Annual Energy Use | Based on recent estimates from the 2004 "California Residential Appliance Saturation Survey"[15] (RASS) and the Florida Solar Energy Center[16] (FSEC). Used 2001 RECS data to establish the variability of annual cooking energy consumption. Included standby power consumption for microwave ovens. | No change. |
| Energy Prices | Electricity: Based on EIA's 2006 Form 861 data.[17]<br>Natural Gas: Based on EIA's 2006 *Natural Gas Monthly*[18].<br>Variability: Regional energy prices determined for 13 regions. | Electricity: Updated using EIA's 2007 Form 861 data.<br>Natural Gas: Updated using EIA's 2007 *Natural Gas Monthly*.<br>Variability: No change. |
| Energy Price Trends | Forecasted with EIA's *Annual Energy Outlook (AEO) 2008*. | Reference Case forecasts updated with EIA's *AEO2009* Early Release.[19] *AEO2009* Early Release *does not provide High-Growth and Low-Growth forecasts, Scaled AEO2008 High-Growth and Low-Growth forecasts by the ratio of AEO2009 and AEO2008 Reference Case forecasts to estimate high-growth and low-growth price trends.* |
| Repair and Maintenance Costs. | For gas cooktops and standard ovens, accounted for increased costs associated with glo-bar or electronic spark ignition systems relative to standing pilot ignition systems. For all standard levels for all other product classes, estimated no change in costs between products more efficient than baseline products. | No change. |
| **Affecting Present Value of Annual Operating Cost Savings** | | |
| Product Lifetime | Based on data from *Appliance Magazine*,[20] past DOE TSDs, and the California Measurement Advisory Committee (CALMAC).[21] Variability and uncertainty characterized with Weibull probability distributions. | No change. |

[13] U.S. Department of Energy—Energy Information Administration, *Residential Energy Consumption Survey, 2001 Public Use Data Files (2001)*. Available at: *http://www.eia.doe.gov/emeu/recs/recs2001/publicuse2001.html*.

TABLE IV.1—SUMMARY OF INPUTS AND KEY ASSUMPTIONS IN THE LCC AND PBP ANALYSES—Continued

| Inputs | October 2008 NOPR | Changes for the final rule |
|---|---|---|
| Discount Rates | Approach based on the finance cost of raising funds to purchase appliances either through the financial cost of any debt incurred to purchase products, or the opportunity cost of any equity used to purchase products. Primary data source is the Federal Reserve Board's *Survey of Consumer Finances* (SCF) for 1989, 1992, 1995, 1998, 2001, and 2004[22]. | No change. |
| **Affecting Installed and Operating Costs** | | |
| Effective Date of New or Amended Standards. | 2012 | No change. |
| Base-Case Efficiency Distributions. | Gas cooktops: 7% at baseline; 93% with electronic spark ignition. | No change. |
| | Gas standard ovens: 18% at baseline; 74% with glo-bar ignition; 8% with electronic spark ignition. | No change. |
| | Microwave ovens: 100% at baseline EF | No change. |
| | All other cooking products: 100% at baseline | No change. |

1. Product Prices

To calculate the product prices faced by consumers, DOE multiplied the manufacturing costs developed from the engineering analysis by the supply chain markups it developed (along with sales taxes). To calculate the final installed prices, DOE added installation costs to the consumer product prices. In response to the October 2008 NOPR, interested parties provided no additional comment on DOE's methods for establishing consumer product prices. As a result, DOE used the same supply chain markups for the final rule that were developed for the October 2008 NOPR. See chapter 7 of the TSD accompanying this notice for additional information.

2. Installation Cost

Installation costs include labor, overhead, and any miscellaneous materials and parts. For the October 2008 NOPR and today's final rule, DOE used data from the ''RS Means Mechanical Cost Data, (2008),'' on labor requirements to estimate installation costs for cooking products.

For the October 2008 NOPR, DOE did not include an installation cost for microwave ovens. Electrolux stated that over-the-range (OTR) microwave ovens do have an installation cost. (Electrolux, Public Meeting Transcript, No. 40.5 at p. 123) DOE acknowledges that OTR microwave ovens incur installation costs. However, as noted below, because DOE estimated that the installation cost does not change with product efficiency, the omission of this cost for microwave ovens has no effect on the LCC saving and PBP results.

For many cooking products, DOE estimated that installation costs would be the same for different efficiency levels. For gas cooktops and gas standard ovens, DOE evaluated the impact that eliminating standing pilot ignition systems would have on the installation cost. Peerless-Premier stated that eliminating pilots would affect customers who live in older houses, apartments, and manufactured homes without a power receptacle located at the range site. (Peerless-Premier, No. 42 at pp. 1–2) For the October 2008 NOPR and today's final rule, DOE considered the percentage of households with gas ranges, cooktops, and ovens that would require the installation of an electrical outlet in the kitchen to accommodate a gas cooking product without standing pilot ignition, as well as the cost of installing an electrical outlet.

For the October 2008 NOPR, DOE reviewed the gas oven and gas cooktop household samples to establish which houses may require installation of an outlet. DOE was able to determine the composition of the household sample of particular vintage (year built) groupings by conducting an assessment of National Electrical Code (NEC) requirements over time to help determine which homes may need an electrical outlet to accommodate a gas cooking product that requires electricity. Because the NEC requires spacing electrical outlets every 6 feet for homes built since 1960, DOE concluded that homes built after 1959 would not need an additional outlet. Pre-1960 homes represent 57 percent of the standard gas oven sample and 54 percent of the gas cooktop sample. Based on shipments data of gas cooking products indicating that fewer than 7 percent and 18 percent of gas cooktops and standard ovens, respectively, came equipped with standing pilots, DOE also concluded that many pre-1960 homes already have a gas cooking product without standing pilot ignition, which implies that they would not need to install an additional outlet.

The Joint Comment asserted that DOE erroneously assumed that 100 percent of pre-1960 homes with gas cooktops and ovens do not have adequate electrical outlets, without regard to the extensive number of kitchens that have been remodeled since 1960. (Joint Comment, No. 44 at p. 11) EEI made a similar point. (EEI, Public Meeting Transcript, No. 40.5 at pp. 111–112) In response, DOE did not assume that all pre-1960 homes with gas cooktops and gas ovens would require an electrical outlet. Rather, it concluded that only those households that currently have a gas cooking product with standing pilot ignition would need to install an electrical outlet to accommodate a gas cooking product without standing pilot ignition. Based on the percentage of recent shipments of gas cooking products with standing pilots and the fraction of the household sample built

[14] RS Means, *Mechanical Cost Data* (30th Annual Edition) (2008). Available for purchase at *http://www.rsmeans.com/bookstore/*.

[15] Please see the following Web site for further information: *http://www.energy.ca.gov/appliances/rass/*.

[16] Please see the following Web site for further information: *http://www.fsec.ucf.edu/en/*.

[17] Please see the following Web site for further information: *http://www.eia.doe.gov*.

[18] Please see the following Web site for further information: *http://www.eia.doe.gov*.

[19] Please see the following Web site for further information: *http://www.eia.doe.gov/oiaf/aeo/index.html?featureclicked=1&*.

[20] Please see the following Web site for further information: *http://www.appliancemagazine.com*.

[21] Please see the following Web site for further information: *http://www.calmac.org*.

[22] Please see the following Web site for further information: *http://www.federalreserve.gov*.

before 1960, DOE estimated that 10 percent of the overall gas standard oven household sample would need to install an electrical outlet to accommodate a gas standard oven that requires electricity to operate. It is worth noting that some portion of gas cooking products with standing pilot ignition is evidently purchased by consumers in post-1959 homes, even though they have an electrical outlet adequate to accommodate a gas cooking product without standing pilot ignition.

AGA and AHAM stated that DOE's approach should not consider all gas cooking product consumers, but only the market for gas cooking products that utilize standing pilot ignition systems. They believe the resulting weighted-average installation cost for all gas cooking products would be greater than DOE's estimate. (AGA, No. 46 at pp. 3–4; AHAM, No. 47 at p. 2) As described above, DOE did estimate the share of the gas oven and gas cooktop household samples that still use standing pilot ignition systems, and further estimated the fraction of those homes that may require installation of an outlet to accommodate a gas cooking product that requires electricity to operate. DOE correctly calculated the respective weighted-average installation costs for all homes with either gas cooktops or ovens, although the weighted averages are reported for informational purposes only and do not directly figure into the LCC calculations. For further details on the development of the electrical outlet installation cost and the percentage of households requiring an outlet, see chapter 8 of the TSD accompanying this notice.

3. Annual Energy Consumption

In the October 2008 NOPR, DOE based its estimates of annual energy use for cooking products (except microwave ovens) on results from the 2004 California Residential Appliance Saturation Survey (RASS) and the Florida Solar Energy Center (FSEC.). For today's final rule, DOE continued to rely on these sources, because they are the latest available public sources describing the field consumption of cooking products. In addition, DOE continued to use the 2001 RECS data to establish the variability of annual energy consumption for cooktops and ovens. The 2001 RECS is the most recently available public data source that indicates the variability of cooking product usage in U.S. households.

For microwave ovens, DOE used the 2004 RASS to estimate the product's annual energy consumption, and it used the 2001 RECS data to establish the variability of annual cooking energy consumption. For today's final rule, DOE continued to use the above approaches. As noted above, the 2004 RASS is the latest available public data source describing the average field consumption of microwave ovens, and the 2001 RECS is the most recently available public data source that indicates the variability of microwave oven usage in U.S. households. See chapter 6 of the TSD accompanying this notice for further details.

4. 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 Census divisions containing one of these large States, DOE calculated the regional average values minus the data for the large State.

DOE estimated residential electricity prices for each of the 13 geographic areas based on data from EIA Form 861, *Annual Electric Power Industry Report.* DOE calculated an average residential electricity price by first estimating an average residential price for each utility by dividing the residential revenues by residential kilowatt-hour sales and then calculating a regional average price by weighting each utility with customers in a region by the number of residential consumers served in that region. The calculations for today's final rule used the most recent available data from 2007.

DOE estimated residential natural gas prices in each of the 13 geographic areas based on data from the EIA publication *Natural Gas Monthly.* For the October 2008 NOPR, DOE used the data for 2006 to calculate an average summer and winter price for each area. For today's final rule, DOE used 2007 data from the same source. DOE calculated an average natural gas price 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. This method differs from the method used to calculate electricity prices, because EIA does not provide consumer-level or utility-level data on gas consumption and prices.

To estimate the trends in electricity and natural gas prices for the October 2008 NOPR, DOE used the price forecasts in EIA's *Annual Energy Outlook (AEO) 2008.* To arrive at prices in future years, DOE multiplied the average prices described above by the forecast of annual average price changes in *AEO2008.* For today's final rule, DOE updated its energy price forecasts to those in the *AEO2009* Early Release. 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 after 2030.

The spreadsheet tools used to conduct the LCC and PBP analyses 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 *AEO2009* Early Release provides only forecasts for the reference case. Therefore, for the final rule, DOE scaled the *AEO2008* high-growth case or low-growth forecasts by the ratio of *AEO2009* and *AEO2008* reference case forecasts to estimate high-growth and low-growth price trends.

The Joint Comment recommended that DOE conduct a sensitivity analysis using other forecasts in addition to the *AEO,* as they believe that the *AEO* has estimated lower electricity prices than most other forecasts. (Joint Comment, No. 44 at p. 11) As mentioned above, DOE included the *AEO's* high-growth case and low-growth case price forecasts in its spreadsheet tools to estimate the sensitivity of the LCC and PBP results to different energy price forecasts. *AEO's* high-economic-growth and low-economic-growth cases show the effects of alternative economic growth assumptions on the energy market projections. In the high-growth case, real gross domestic product (GDP) growth averages 3.0 percent per year, as a result of higher assumed growth rates for the labor force, non-farm employment, and non-farm labor productivity. With higher productivity gains and employment growth, inflation and interest rates are lower than in the reference case. In the low-growth case, growth in real GDP is 1.8 percent per year, as a result of lower assumed growth rates for the labor force, non-farm employment, and labor productivity. Consequently, the low-growth case shows higher inflation and interest rates and slower growth in industrial output and employment than are projected in the reference case. DOE believes the *AEO* alternative forecasts provide a suitable range that brackets the forecasts resulting from other energy-economy models. In addition, the Joint Comment provides no specific information on any other forecasts or on why *AEO's* high-growth and low-growth cases do not provide a reasonable range of forecasts. As a result, DOE has concluded that *AEO's* high-growth and low-growth cases provide an adequate basis to examine the sensitivity of LCC and PBP results to other price forecasts.

The Joint Comment stated that to realistically depict energy prices in the future, DOE must consider the impact of carbon control legislation, since such legislation is very likely. The Joint Comment also noted that there are regional cap-and-trade programs in effect in the Northeast (Regional Greenhouse Gas Initiative (RGGI)) and the West (Western Climate Initiative (WCI)) that will affect the price of electricity but are not reflected in the *AEO* energy price forecasts. (Joint Comment, No. 44 at p. 12) Earthjustice stated that Federal caps will likely be in place by the time new standards become effective, so DOE should increase its electricity prices to reflect the cost of complying with emission caps. (Earthjustice, Public Meeting Transcript, No. 40.5 at pp. 195–196) In response, DOE notes that the shape of Federal carbon control legislation, and the ensuing cost of carbon mitigation to electricity generators, is as yet too uncertain to incorporate into the energy price forecasts that DOE uses. The costs of carbon mitigation to electricity generators resulting from the regional programs are also very uncertain over the forecast period for this rulemaking. Even so, EIA did include the effect of the RGGI in its *AEO2009* Early Release energy price forecasts, but WCI did not provide sufficient detail for EIA to model the impact of the WCI on energy price forecasts. Therefore, the energy price forecasts used in today's final rule do include the impact of one of the two regional cap-and-trade programs to the extent possible.

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 product.

For the October 2008 NOPR, DOE contacted six contractors in different States to estimate whether repair and maintenance costs differ between standing pilot and non-standing pilot ignition systems. Based on the contractors' input, DOE determined that standing pilots are less costly to repair and maintain than either electric glo-bar/hot surface ignition systems (used in most gas ovens) or electronic spark ignition systems (used in gas cooktops and a small percentage of gas ovens); that standing pilot ignition systems require repair and maintenance every 10 years to clean valves; and that electric glo-bar/hot surface ignition systems require glo-bar replacement approximately every 5 years. 73 FR 62034, 62064 (Oct. 17, 2008). Electrolux stated that its testing indicates that glo-bar ignition systems tend to hold their life, but it did not provide data to support this point. (Electrolux, Public Meeting Transcript, No. 40.5 at p. 112) In the absence of new data from Electrolux, DOE decided to continue to use the information provided by the contractors from which it collected data. In the case of electronic ignition systems, control modules tend to last about 10 years. The electrodes/igniters can fail because of hard contact from pots or pans, although failures are rare.

Based on the above findings, DOE estimated an average cost comprised of a mix of maintenance and repair costs. For standing pilot ignition systems, DOE estimated a cost of $126 occurring in the tenth year of the product's life. For electric glo-bar/hot surface ignition systems, DOE estimated an average cost of $147 occurring every fifth year during the product's lifetime. For electronic spark ignition systems, DOE estimated an average cost of $178 occurring in the tenth year of the product's life. AGA generally agreed with DOE's approach for consideration of maintenance of standing pilots and electronic ignition systems. However, AGA suggested that DOE use the incremental manufacturing cost for electronic ignition systems as a basis for developing the maintenance costs for these systems. Using this approach, AGA reasoned that the resultant maintenance costs would be higher than DOE estimated. (AGA, No. 46 at p. 4) DOE's approach resulted in a combined maintenance and repair cost that is well above the incremental manufacturing cost for electronic ignition systems. Therefore, DOE retained its approach for estimating electronic ignition maintenance costs for today's final rule as it captures more costs than solely the manufacturing costs of the electronic ignition components. See chapter 8 of the TSD accompanying this notice for further information regarding these estimates.

6. Product Lifetime

For the October 2008 NOPR and today's final rule, DOE used a variety of sources to establish low, average, and high estimates for product lifetime. DOE established average product lifetimes of 19 years for conventional electric and gas cooking products and 9 years for microwave ovens. DOE characterized residential cooking product lifetimes with Weibull probability distributions. See chapter 8 of the TSD accompanying this notice for further details on the sources used to develop product lifetimes, as well as the use of Weibull distributions.

7. Discount Rates

To establish discount rates for cooking products for the October 2008 NOPR and today's final rule, DOE derived estimates of the finance cost of purchasing these appliances. Because the purchase of products for new homes entails different finance costs for consumers than the purchase of replacement products, DOE used different discount rates for new construction and replacement installations.

DOE estimated discount rates for new-housing purchases using the effective real (after inflation) mortgage rate for homebuyers. This rate corresponds to the interest rate after deduction of mortgage interest for income tax purposes and after adjusting for inflation. DOE used the Federal Reserve Board's Survey of Consumer Finances (SCF) for 1989, 1992, 1995, 1998, and 2001 mortgage interest rates. After adjusting for inflation and interest tax deduction, effective real interest rates on mortgages across the six surveys averaged 3.2 percent.

For replacement purchases, DOE's approach for deriving discount rates involved identifying all possible debt or asset classes that might be used to purchase replacement products, including household assets that might be affected indirectly. DOE estimated the average shares of the various debt and equity classes in the average U.S. household equity and debt portfolios using data from the SCFs from 1989 to 2004. DOE used the mean share of each class across the six sample years (1989, 1992, 1995, 1998, 2001, 2004) as a basis for estimating the effective financing rate for replacement products. DOE estimated interest or return rates associated with each type of equity and debt using SCF data and other sources. The mean real effective rate across the classes of household debt and equity, weighted by the shares of each class, is 5.6 percent.

See chapter 8 of the TSD accompanying this notice for further details on the development of discount rates for cooking products.

8. Effective Date of the Amended Standards

The effective date is the future date when parties subject to the requirements of a new standard must begin compliance. DOE assumes that any new energy conservation standards adopted in this rulemaking would become effective 3 years after the final rule is published in the **Federal Register**. Therefore, for the purpose of the analysis, the amended standard is

assumed to be effective March 2012. DOE calculated the LCC for the appliance consumers as if they would purchase a new product in the year the standard takes effect.

9. Product Energy Efficiency in the Base Case

For the LCC and PBP analyses, DOE analyzes candidate standard levels relative to a baseline efficiency level. However, some consumers may already purchase products with efficiencies greater than the baseline product levels. Thus, to accurately estimate the percentage of consumers that would be affected by a particular standard level, DOE considered the distribution of product efficiencies that consumers are expected to purchase under the base case (*i.e.*, the case without new energy conservation standards). DOE refers to this distribution of product of efficiencies as a base-case efficiency distribution.

Using the base-case efficiency distributions, DOE assigned a specific product efficiency to each sample household. If a household were assigned a product efficiency greater than or equal to the efficiency of a specific standard level under consideration, the LCC calculation would show that this household would not be affected by that standard level.

Unfortunately, little is known about the distribution of cooking product efficiencies that consumers currently purchase. Whirlpool stated that it is not aware of data on the number of consumers purchasing electric cooking products that are more efficient than the baseline products in the analysis. (Whirlpool, No. 50 at p. 4) In the absence of any additional data for electric cooking products and gas self-cleaning ovens, DOE continued to estimate that 100 percent of the market will be at the baseline efficiency levels in 2012.

For gas cooktops and gas standard ovens, available data allowed DOE to estimate the percentage of units sold that have standing pilot lights. DOE developed the market share of gas standard ovens with standing pilots based on actual shipments data, the most recent being data from the Appliance Recycling Information Center (ARIC) for 1997, 2000, and 2004.[23] Based on the ARIC data, the entire market share of products without standing pilots should be allocated to standard level 1 (products with glo-bar ignition). But based on information collected from contractors, DOE estimated that 10 percent of products without standing pilots use spark ignition systems. As a result, DOE allocated 90 percent of the market share of products without standing pilots to standard level 1 (with glo-bar ignition) and the remaining 10 percent to standard level 1a (with spark ignition).

Table IV.2 shows the market shares of the efficiency levels in the base case for gas cooktops and gas standard ovens. Standard level 1 represents products without standing pilot light ignition systems.

TABLE IV.2—GAS COOKTOPS AND GAS STANDARD OVENS: BASE CASE MARKET SHARES

| Gas cooktops | | | Gas standard ovens | | |
|---|---|---|---|---|---|
| Standard level | EF | Market share % | Standard level | EF | Market share % |
| Baseline | 0.156 | 6.8 | Baseline | 0.0298 | 17.6 |
| 1 | 0.399 | 93.2 | 1* | 0.0536 | 74.2 |
| 2 | 0.420 | 0 | 2 | 0.0566 | 0 |
| | | | 3 | 0.0572 | 0 |
| | | | 4 | 0.0593 | 0 |
| | | | 5 | 0.0596 | 0 |
| | | | 6 | 0.0600 | 0 |
| | | | 1a* | 0.0583 | 8.2 |

* For gas standard ovens, candidate standard levels 1 and 1a correspond to designs that are used for the same purpose—to eliminate the need for a standing pilot—but the technologies for each design are different. Candidate standard level 1 is a hot surface ignition device, whereas candidate standard level 1a is a spark ignition device.

For microwave ovens, very little is known about the distribution of product efficiencies that consumers currently purchase. For the October 2008 NOPR and the final rule, DOE estimated that 100 percent of the microwave oven market is at the baseline efficiency level (EF = 0.557).

10. Inputs to Payback Period Analysis

The payback period is the amount of time (expressed in years) it takes the consumer to recover the additional installed cost of more efficient products through operating cost savings compared to baseline products. The simple payback period does not account for changes in operating expense over time or the time value of money. Payback periods greater than the life of the product mean that the increased total installed costs are not recovered in reduced operating expenses.

The inputs to the PBP calculation are the total installed cost of the product to the customer for each efficiency level and the annual (first-year) operating expenditures for each efficiency level. The PBP calculation uses the same inputs as the LCC analysis, except that energy price trends and discount rates are not needed.

11. 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 expected to take effect—in this case, 2012.

[23] Appliance Recycling Information Center, INFOBulletin #8, ''Applications in Appliances'' (March 2005). Please see the following Web site for further information: *http://www.aham.org/industry/ht/action/GetDocumentAction/id/5370.*

DOE also received comments addressing the topic of using a rebuttable presumption payback period to establish the economic justification of an energy conservation standard level. The Joint Comment and Earthjustice stated that DOE's view that consideration of a full range of impacts is necessary because the rebuttable presumption payback period criterion is not sufficient for determining economic justification does not reflect the extent to which the rebuttable presumption analysis constrains DOE's authority to reject standards based on economic impacts. (Joint Comment, No. 44 at appendix B, p. 1; Earthjustice, Public Meeting Transcript, No. 40.5 at p. 130) The Joint Comment claimed that in 42 U.S.C. 6295(o)(2)(B)(iii), Congress erected a significant barrier to DOE's rejection, on the basis of economic justifiability, of standard levels to which the rebuttable presumption applies. These commenters also claimed that the fact that DOE seems to prefer to proceed under the seven-factor test contained in 42 U.S.C. 6295(o)(2)(B)(i) is not pertinent. The Joint Comment agreed with DOE that analysis under the seven factor test is necessary and has typically supported standards with paybacks longer than 3 years. However, the Joint Comment stated that DOE's decision-making must reflect the expressed intent of Congress that the highest standard level resulting in cost recovery within 3 years constitutes the presumptive lowest standard level that DOE must adopt (Joint Comment, No. 44 at appendix B, pp. 1–2)

DOE does consider both the rebuttable presumption payback criteria, as well as a full analysis including all seven relevant statutory criteria under 42 U.S.C. 6295(o)(2)(B)(i) when examining potential standard levels. However, DOE believes that the commenters are misinterpreting the statutory provision in question. The Joint Comment and Earthjustice present one possible reading of an ambiguous provision (*i.e.*, that DOE need not look beyond the results of the rebuttable presumption inquiry), but DOE believes that such an approach is neither required nor appropriate, because it would ask the agency to potentially ignore other relevant information that would bear on the selection of the most stringent standard level that meets all applicable statutory criteria. The commenters' interpretation would essentially restrict DOE from being able to rebut the findings of the preliminary presumptive analysis. However, the statute contains no such restriction, and such an approach would hinder DOE's efforts to base its regulations on the best available information.

Similarly, DOE believes that the Joint Comment misreads the statute in calling for a level that meets the rebuttable presumption test to serve as a minimum level when setting the final energy conservation standard. To do so would not only eliminate the ''rebuttable'' aspect of the presumption but would also lock in place a level that may not be economically justified based upon the full complement of statutory criteria. DOE is already obligated under EPCA to select the most stringent standard level that meets the applicable statutory criteria, so there is no need to tie the same requirement to the rebuttable presumption.

*D. National Impact Analysis—National Energy Savings and Net Present Value*

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, product costs, and NPV for each product class from 2012 through 2042. The forecasts provide annual and cumulative values for all four parameters. In addition, DOE incorporated into its NIA spreadsheet the ability to analyze sensitivity of the results to forecasted energy prices and product efficiency trends.

Table IV.3 summarizes the approach and data DOE used to derive the inputs to the NES and NPV analyses for the October 2008 NOPR and the changes made in the analyses for today's final rule. A discussion of the inputs and the changes follows. (See chapter 11 of the TSD accompanying this notice for further details.)

TABLE IV.3—APPROACH AND DATA USED TO DERIVE THE INPUTS TO THE NATIONAL ENERGY SAVINGS AND NPV ANALYSES

| Inputs | October 2008 NOPR | Changes for the final rule |
|---|---|---|
| Shipments | Annual shipments from Shipments Model | See Table IV.4. |
| Effective Date of Standard | 2012 | No change. |
| Base-Case Forecasted Efficiencies. | Shipment-weighted efficiency (SWEF) determined in the year 2005. SWEF held constant over forecast period of 2005–2042. | No change. |
| Standards-Case Forecasted Efficiencies. | ''Roll-up'' scenario used for determining SWEF in the year 2012 for each standards case. SWEF held constant over forecast period of 2012–2042. | 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 Cost per Unit | Annual weighted-average values a function of the annual energy consumption per unit and energy prices. | No change. |
| Repair Cost and Maintenance Cost per Unit. | Incorporated changes in repair costs for non-standing pilot ignition systems. | No change. |
| Escalation of Energy Prices | *AEO2008* forecasts (to 2030) and extrapolation to 2042 | Updated to *AEO2009 Early Release* forecasts for the Reference Case. *AEO2009 Early Release* does not provide High-Growth and Low-Growth forecasts; scaled *AEO2008* High-Growth and Low-Growth forecasts by the ratio of *AEO2009* and *AEO2008* Reference Case forecasts to estimate high-growth and low-growth price trends. |

TABLE IV.3—APPROACH AND DATA USED TO DERIVE THE INPUTS TO THE NATIONAL ENERGY SAVINGS AND NPV ANALYSES—Continued

| Inputs | October 2008 NOPR | Changes for the final rule |
|---|---|---|
| Energy Site-to-Source Conversion. | Conversion varies yearly and is generated by DOE/EIA's National Energy Modeling System (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 percent real | No change. |
| Present Year | Future expenses are discounted to year 2007 | No change. |

2. Shipments

The shipments portion of the NIA spreadsheet is a model that uses historical data as a basis for projecting future shipments of the appliance products that are the subject of this rulemaking. In projecting shipments, DOE accounted for three market segments: (1) New construction, (2) existing buildings (*i.e.*, replacing failed products), and (3) early replacements. DOE used the early replacement market segment to calibrate the shipments model to historical shipments data. For purposes of estimating the impacts of prospective standards on product 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.4 summarizes the approach and data DOE used to derive the inputs to the shipments analysis for the October 2008 NOPR and the changes it made for today's final rule. A discussion of the inputs and the changes follows.

TABLE IV.4—APPROACH AND DATA USED TO DERIVE THE INPUTS TO THE SHIPMENTS ANALYSIS

| Inputs | October 2008 NOPR | Changes for the final rule |
|---|---|---|
| Number of Product Classes | Seven classes for conventional cooking products; one class for microwave ovens. | No change. |
| New Construction Shipments | Determined by multiplying housing forecasts by forecasted saturation of cooking products for new housing. Housing forecasts based on *AEO2008* projections. New housing product saturations based on EIA's 2001 RECS. Forecasted saturations maintained at 2001 levels. | No change in approach. Housing forecasts updated with EIA *AEO2009* Early Release forecasts for the Reference Case. *AEO2009* Early Release does not provide High-Growth and Low-Growth forecasts, Scaled *AEO2008* High-Growth and Low-Growth forecasts by the ratio of *AEO2009* and *AEO2008* Reference Case forecasts to estimate high-growth and low-growth housing trends. |
| Replacements | Determined by tracking total product 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. |
| Early Replacements | Used to calibrate Shipments Model to historical shipments data; 2 percent of the surviving stock per year is retired early. | No change. |
| Historical Shipments | Data sources include AHAM data submittal, AHAM *Fact Book*,[24] and *Appliance Magazine*. | No change. |
| Purchase Price, Operating Cost, and Household Income Impacts Due to Efficiency Standards. | For microwave ovens only, 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. | No change. |
| Fuel Switching | Not considered | No change. |

a. New Construction Shipments

To determine new construction shipments, DOE used a forecast of housing starts coupled with product market saturation data for new housing. For new housing completions and mobile home placements, DOE adopted the projections from EIA's *AEO2008* through 2030 for the October 2008 NOPR. For today's final rule, DOE used the projections from EIA's *AEO2009* Early Release Reference Case. Because EIA had not yet released the 2005 RECS when the analysis was performed, DOE continued to use the 2001 RECS to establish cooking product market saturations for new housing.

b. Replacements

DOE estimated replacements using product retirement functions developed from product lifetimes. For the October 2008 NOPR and today's final rule, DOE used retirement functions based on Weibull distributions.

To calibrate each shipments model against historical shipments, DOE established an early replacement market segment. For the October 2008 NOPR and today's final rule, DOE determined that 2 percent of the surviving stock per year was replaced early.

[24] Association of Home Appliance Manufacturers, *2005 Major Appliance Fact Book*. Available for purchase at *http://www.aham.org/ht/d/Product Details/sku/40471101603*.

c. Purchase Price, Operating Cost, and Household Income Impacts

To estimate the combined effects on microwave oven shipments of increases in product purchase price and decreases in product operating costs due to new efficiency standards, DOE conducted a literature review and a statistical analysis on appliance price, efficiency, and shipments data for the October 2008 NOPR. DOE used purchase price and efficiency data specific to residential refrigerators, clothes washers, and dishwashers between 1980 and 2002 from AHAM *Fact Books*[25] to conduct regression analyses. DOE chose this particular set of appliances because of the availability of data to determine a price elasticity. These data indicate that there has been a rise in appliance shipments and a decline in appliance purchase price and operating costs over the time period. Household income has also risen during this time. To simplify the analysis, DOE combined the available economic information into one variable, termed the ''relative price,'' and used this variable in an analysis of market trends and to conduct a regression analysis. DOE's regression analysis suggests that the relative short-run price elasticity of demand, averaged over the three appliances, is −0.34. For example, a relative price increase of 10 percent results in a shipments decrease of 3.4 percent. Because the relative price elasticity incorporates the impacts from three effects (*i.e.*, purchase price, operating cost, and household income), the impact from any single effect is mitigated by changes in the other two effects.

Because DOE's forecast of shipments and national impacts due to standards spans 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. For the October 2008 NOPR, DOE incorporated a 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 become less sensitive over time to the initial change in the product's relative price. As implemented in the modeling of shipments forecasts, DOE estimates that the initial increase in purchase price due to a standard will have a more significant impact on product shipments in the short term than over the long term (*i.e.*, fewer consumers will forego appliance purchases years after the standards have been in place than when the standards initially take effect.) DOE received no comments on its analysis to estimate the combined effects of increases in product purchase price and decreases in operating costs on microwave oven shipments and, therefore, retained the approach for the final rule.

In contrast, DOE determined that the combined market of conventional electric and gas cooking products (*i.e.*, other than microwave ovens) is completely saturated. Thus, DOE assumed for the October 2008 NOPR that the considered standard levels would neither affect shipments nor cause shifts in electric and gas conventional cooking product market shares. 73 FR 62034, 62071 (Oct. 17, 2008). Because DOE received no comments on its approach, it continued to use it for today's final rule.

d. Fuel Switching

In the October 2008 NOPR, DOE concluded that the probability that the considered standard levels would cause shifts in electric and gas conventional cooking product market shares was sufficiently low that it was not necessary to consider it. 73 FR 62034, 62071–72 (Oct. 17, 2008). DOE received no comments on this issue and, therefore, retained the approach for today's final rule.

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 products 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 October 2008 NOPR, DOE first determined the distribution of product efficiencies currently in the marketplace to develop a SWEF for each product 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 2012 (2012 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 product efficiencies). Because there are no historical data to indicate how product efficiencies have changed over time, DOE estimated that forecasted efficiencies would remain at the 2012 level until the end of the forecast period, with one exception. Because historical data indicates a declining trend in the percentage of gas standard ranges equipped with standing pilot lights, DOE did forecast a decline in the market share of gas standard ranges equipped with standing pilot lights both to 2012 and after 2012. DOE recognizes the possibility that product 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 product efficiencies may change. Thus, for the final rule, DOE maintained its forecast that efficiencies remain at the level estimated for 2012 for residential cooking products.

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 to establish the SWEF for 2012. DOE assumed that product efficiencies in the base case that do not meet the standard level under consideration would roll up to meet the new standard level. Also, DOE assumed that all product efficiencies in the base case that were above the standard level under consideration would not be affected by the standard. DOE made the same assumption regarding forecasted standards-case efficiencies as for the base case, namely, that forecasted efficiencies remained at the 2012 efficiency level until the end of the forecast period.

Again, DOE had 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 assumed no-change trends may not reflect what would happen to base-case and standards-case product 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 product efficiency. It is more important to accurately estimate the efficiency difference between the standards case and base case than to accurately estimate the actual product efficiencies in the standards and base cases. Therefore, DOE retained the approach used in the October 2008 NOPR for the final rule.

[25] DOE used average purchase price and efficiency data provided in the 1987, 1988, 1993, 1995, 2000, and 2003 Fact Books.

c. Annual Energy Consumption

The annual energy consumption per unit depends directly on product efficiency. 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 in section IV.D.2.c, DOE used a relative price elasticity to estimate standards-case shipments for microwave ovens, but not for conventional cooking products. As a result, shipments of microwave ovens forecasted under the standards cases are lower than under the base case. To avoid the inclusion of energy savings from reduced shipments of microwave ovens, DOE used the standards-case shipments projection and the standards-case stock to calculate the annual energy consumption for the standards cases.

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). In the case of electrical energy, primary consumption includes the energy required for generation, transmission, and distribution. For the October 2008 NOPR and today's final rule, DOE used annual site-to-source conversion factors based on the version of NEMS that corresponds to *AEO2008*. 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 beyond 2030, DOE used conversion factors that remain constant at the 2030 values throughout the remainder of the forecast.

e. 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, repair, and maintenance costs. DOE forecasted energy prices for the October 2008 NOPR based on *AEO2008*; it updated the forecasts for the final rule using data from *AEO2009* Early Release. For the October 2008 NOPR and today's final rule, DOE accounted for the repair and maintenance costs associated with the ignition systems in gas cooking products.

f. Discount Rates

DOE multiplies monetary values in future years by the discount factor to determine their present value. DOE estimated national impacts using 3- and 7-percent real discount rates, 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'').

The Joint Comment stated that DOE should use a 2- to 3-percent real discount rate for the national impact analyses. (Joint Comment, No. 44 at p. 11) It noted that societal discount rates are the subject of extensive academic research and the weight of academic opinion is that the appropriate societal discount rate is 3 percent or less. It urged DOE to give primary weight to results based on the lower of the discount rates recommended by OMB.

On this point, 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, 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 revised Circular A–94 in 1992 after extensive internal review and public comment. OMB 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.'' [26] 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. It concludes that ''for regulatory analysis, [agencies] should provide estimates of net benefits using both 3 percent and 7 percent.'' [27] DOE finds that the guidance from OMB is reasonable, and thus it did not give primary weight to results derived using a 3-percent discount rate.

The Joint Comment stated that DOE should not apply a discount rate to physical units of measure, such as tons of emissions or quads of energy. (Joint Comment, No. 44 at p. 11) Consistent with Executive Order 12866, ''Regulatory Planning and Review,'' 58 FR 51735, 51737 (Oct. 4, 1993), DOE discounts the monetized value of these emissions reductions using 3-percent and 7-percent discount rates in order to determine their present value for rulemaking purposes. Similarly, DOE discounts energy savings using 3-percent and 7-percent discount rates since the timing of the energy savings, like money saved, have value to consumers and the Nation. DOE recognizes that while financial investments can grow with time, physical quantities such as energy do not, so there are costs and benefits to the Nation associated with the timing of when of consuming the energy. In doing so, DOE follows the guidance of OMB regarding methodologies and procedures for regulatory impact analysis that affect more than one agency. Thus, DOE has reported both discounted and undiscounted values for the energy and environmental benefits from energy conservation standards.

g. 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 cooking products on natural gas and electricity prices. The analysis found that gas and electric demand reductions resulting from max-tech standards for residential cooking products 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 residential cooking

[26] OMB Circular A–4, ''Regulatory Analysis,'' Sept. 17, 2003, p. 33. Please see the following Web site for further information: *http://www.whitehouse.gov/omb/circulars/index.html.*

[27] OMB Circular A–4, ''Regulatory Analysis,'' Sept. 17, 2003, p. 34. Please see the following Web site for further information: *http://www.whitehouse.gov/omb/circulars/index.html.*

product standards will not provide additional economic benefits resulting from lower energy prices.

*E. Consumer Subgroup Analysis*

In analyzing the potential impact of new or amended standards on individual consumers, DOE evaluates the impact on identifiable subgroups of consumers that may be disproportionately affected by a national standard level. For the October 2008 NOPR, DOE used RECS data to analyze the potential effect of standards for residential cooking products on two consumer subgroups: (1) Households with low income levels, and (2) households comprised of seniors.

DOE also considered specific consumer subgroups that do not use or have access to electricity and could be affected by the elimination of standing pilot ignition systems, such as Amish and some Native American communities. DOE's market research for the October 2008 NOPR found that battery-powered electronic ignition systems have been implemented in other products, such as instantaneous gas water heaters, barbeques, and furnaces, and the use of such products is not expressly prohibited by applicable safety standards such as ANSI Z21.1. As noted in section III.C.2, DOE's research determined that, although there are currently no alternative ignition systems to standing pilots in gas cooking products that have been certified to ANSI Z21.1, DOE believes such certification could be attained and that gas cooking products suitable for households without electricity would likely be commercially available by the time these standards are in effect.

More details on the consumer subgroup analysis can be found in chapter 12 of the TSD accompanying this notice.

*F. Manufacturer Impact Analysis*

In determining whether a standard for cooking products is economically justified, the Secretary of Energy is required to consider ''the economic impact of the standard on the manufacturers and on the consumers of the products subject to such standard.'' (42 U.S.C. 6295(o)(2)(B)(i)(I)) The statute also calls for an assessment of the impact of any lessening of competition as determined by the Attorney General. (42 U.S.C. 6295(o)(2)(B)(i)(V)) DOE conducted the MIA to estimate the financial impact of higher efficiency standards on manufacturers of cooking products, and to assess the impact of such standards on employment and manufacturing capacity.

The MIA has both quantitative and qualitative aspects. The quantitative part of the MIA relies on the GRIM, an industry cash-flow model customized for this rulemaking. The GRIM inputs characterize the industry cost structure, shipments, and revenues. This includes information from many of the analyses described above, such as manufacturing costs and prices from the engineering analysis and shipments forecasts. The key GRIM output is the INPV, which estimates the value of the industry on the basis of cash flows, expenditures, and investment requirements as a function of TSLs. Different sets of assumptions (scenarios) will produce different results. The qualitative part of the MIA addresses factors such as product characteristics, characteristics of particular firms, and market and product trends, and it includes an assessment of the impacts of standards on subgroups of manufacturers that could be disproportionately affected by these standards.

For the October 2008 NOPR, DOE identified three manufacturers of gas-fired ovens, ranges, and cooktops with standing pilot lights. Two of the three are classified as small businesses under criteria prescribed by the Small Business Administration (SBA).[28] The SBA classifies a residential cooking appliance manufacturer as a small business if it has fewer than 750 employees. DOE categorized the two small businesses into their own subgroup as a result of their size and their concentration in the manufacture of residential cooking products. Each small manufacturer produces gas-fired cooking products with standing pilot ignition systems and derives over 25 percent of its total revenue from these appliances. Both small manufacturers produce only residential cooking appliances and have annual sales of $50 million to $60 million, whereas the third is a large, diversified appliance manufacturer. The two small cooking businesses are privately held and each company has fewer than 300 employees. 73 FR 62034, 62076 (Oct. 17, 2008). DOE interviewed one of these manufacturers, and also obtained from larger manufacturers information about the impacts of standards on these small manufacturers of conventional cooking products. 73 FR 62034, 62128 (Oct. 17, 2008). In addition, DOE received comments from one of the small manufacturers regarding the potential impacts of standards. (Peerless-Premier, No. 42 at pp. 1–2) See section VII.B for a discussion of DOE's determination of the economic impacts of today's final rule on small entities.

For the final rule, DOE updated the MIA results based on the total shipments and efficiency distributions estimated in the final rule NIA. For details of the MIA, see chapter 13 of the TSD accompanying this notice.

*G. Employment Impact Analysis*

Employment impacts include direct and indirect impacts. Direct employment impacts are changes in the number of employees for manufacturers of the appliance products that are subject to standards, their suppliers, and related service firms. The MIA addresses these impacts. Indirect employment impacts from standards consist of the 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, (2) reduced spending on new energy supply by the utility industry, (3) increased consumer spending on the purchase of new products, and (4) the effects of those three factors throughout the economy.

In developing the October 2008 NOPR and today's final rule, DOE estimated indirect national employment impacts using an input/output model of the U.S. economy called Impact of Sector Energy Technologies (ImSET). ImSET[29] is a spreadsheet model of the U.S. economy that focuses on 188 sectors most relevant to industrial, commercial, and residential building energy use. 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 the 188 sectors. ImSET's national economic I–O structure is based on a 1997 U.S. benchmark table, especially aggregated to those sectors. For further details, see chapter 15 of the TSD accompanying this notice.

The Joint Comment stated that when weighing the economic costs and benefits of stronger efficiency standards, DOE must consider that adopting standards will increase employment. (Joint Comment, No. 44 at p. 13) As described in section VI.C.3, DOE uses ImSet to consider indirect employment

[28] For more information, see *http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf.*

[29] Roop, J. M., M. J. Scott, and R. W. Schultz, *ImSET: Impact of Sector Energy Technologies* (PNNL–15273 Pacific Northwest National Laboratory) (2005). Available at *http://www.pnl.gov/main/publications/external/technical_reports/PNNL-15273.pdf.*

impacts when evaluating alternative standard levels. Direct employment impacts on the manufacturers that produce cooking products are analyzed in the manufacturer impact analysis, as discussed in section IV.F.

*H. Utility Impact Analysis*

The utility impact analysis determines the changes to energy supply and demand that result from the end-use energy savings due to standards. DOE calculated these changes using the NEMS–BT computer model.[30] The analysis output includes a forecast of the total electricity generation capacity at each TSL.

DOE obtained the energy savings inputs associated with electricity and natural gas consumption savings from the NIA. Chapter 14 of the TSD accompanying this notice presents details on the utility impact analysis.

*I. Environmental Assessment*

DOE prepared an environmental assessment (EA) pursuant to the National Environmental Policy Act and the requirements of 42 U.S.C. 6295(o)(2)(B)(i)(VI) to determine the environmental impacts of standards for cooking products. Specifically, DOE estimated the reduction in total emissions of $CO_2$ and $NO_X$ using the NEMS–BT computer model. DOE also calculated a range of estimates for reduction in mercury (Hg) emissions using power sector emission rates. DOE also 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. The EA does not include the estimated reduction in power sector impacts of sulfur dioxide ($SO_2$), because DOE has determined that any such reduction resulting from an energy conservation standard would not affect the overall level of $SO_2$ emissions in the United States due to the presence of national caps on $SO_2$ emissions. These topics are addressed further below; see chapter 16 of the TSD for additional detail.

NEMS–BT is run similarly to the *AEO2008* NEMS, except that cooking product energy use is reduced by the amount of energy saved (by fuel type) due to the trial standard levels. The inputs of national energy savings come from the NIA analysis. For the EA, the output is the forecasted physical emissions. The net benefit of a standard is the difference between emissions estimated by NEMS–BT and the *AEO2008* Reference Case. The NEMS–BT tracks $CO_2$ emissions using a detailed module that provides results with broad coverage of all sectors and inclusion of interactive effects.

The Clean Air Act Amendments of 1990 set an emissions cap on $SO_2$ for all power generation. The attainment of the emissions cap is flexible among generators and is enforced through the use of emissions allowances and tradable permits. Because $SO_2$ emissions allowances have value, they will almost certainly be used by generators, although not necessarily immediately or in the same year a standard is in place. In other words, with or without a standard, total cumulative $SO_2$ emissions will always be at or near the ceiling, and there may be some timing differences among yearly forecasts. Thus, it is unlikely that there will be reduced overall $SO_2$ emissions from standards as long as the emissions ceilings are enforced. Although there may be no actual reduction in $SO_2$ emissions, there still may be an economic benefit from reduced demand for $SO_2$ emission allowances. Electricity savings decrease the generation of $SO_2$ emissions from power production, which can lessen the need to purchase $SO_2$ emissions allowance credits, and thereby decrease the costs of complying with regulatory caps on emissions.

Future emissions of $NO_X$ would have been subject to emissions caps under the Clean Air Interstate Rule (CAIR) issued by the U.S. Environmental Protection Agency on March 10, 2005.[31] 70 FR 25162 (May 12, 2005). CAIR would have permanently capped emissions in 28 eastern States and the District of Columbia (D.C.). As with the $SO_2$ emissions cap, a cap on $NO_X$ emissions would have meant that energy conservation standards are not likely to have a physical effect on $NO_X$ emissions in States covered by the CAIR caps. However, prior to the publication of the October 2008 NOPR, the CAIR was vacated by the U.S. Court of Appeals for the District of Columbia Circuit (DC Circuit) in its July 11, 2008 decision in *North Carolina* v. *Environmental Protection Agency*.[32] Therefore, for the October 2008 NOPR, DOE established a range of $NO_X$ reductions based on low and high emission rates (in metric kilotons of $NO_X$ emitted per terawatt-hour (TWh) of electricity generated) derived from the *AEO2008*. However, on December 23, 2008, the DC Circuit decided to allow CAIR to remain in effect until it is replaced by a rule consistent with the court's earlier opinion.[33] As a result, DOE used the NEMS–BT model for today's final rule to estimate the $NO_X$ emissions reductions due to standards. For the 28 eastern States and DC where CAIR is in effect, no $NO_X$ emissions reductions will occur due to the permanent cap. Under caps, physical emissions reductions in those States would not result from the energy conservation standards under consideration by DOE, but standards might have produced an environmentally related economic impact in the form of lower prices for emissions allowance credits, if they were large enough. However, DOE determined that in the present case, such standards would not produce an environmentally related economic impact in the form of lower prices for emissions allowance credits, because the estimated reduction in $NO_X$ emissions or the corresponding allowance credits in States covered by the CAIR cap would be too small to affect allowance prices for $NO_X$ under the CAIR. In contrast, new or amended energy conservation standards would reduce $NO_X$ emissions in those 22 States that are not affected by CAIR. As a result, the NEMS–BT does forecast emission reductions from the cooking product standards considered in today's final rule.

Similar to $SO_2$ and $NO_X$, future emissions of Hg would have been subject to emissions caps under the Clean Air Mercury Rule[34] (CAMR), which would have permanently capped emissions of mercury for new and existing coal-fired plants in all States by 2010, but the CAMR was vacated by the D.C. Circuit in its decision in *New Jersey* v. *Environmental Protection Agency*[35] prior to publication of the October 2008 NOPR. However, the NEMS–BT model DOE used to estimate the changes in emissions for the proposed rule assumed that Hg emissions would be subject to CAMR emission caps. Because the emissions caps specified by CAMR would have applied to the entire country, DOE was unable to use the NEMS–BT model to estimate any changes in the quantity of mercury

[30] EIA approves the use of the name NEMS to describe only an official *AEO* version of the model without any modification to code or data. Because the present analysis entails some minor code modifications and runs the model under various policy scenarios that deviate from AEO assumptions, the name NEMS–BT refers to the model as used here. (''BT'' stands for DOE's Building Technologies Program.) For more information on NEMS, refer to ''The National Energy Modeling System: An Overview,'' DOE/EIA–0581 (98) (Feb. 1998). Available at *http://tonto.eia.doe.gov/ftproot/forecasting/058198.pdf.*

[31] See *http://www.epa.gov/cleanairinterstaterule/.*

[32] 531 F.3d 896 (D.C. Cir. 2008).

[33] *North Carolina* v. *EPA*, 550 F.3d 1176 (D.C. Cir. 2008).

[34] 70 FR 28606 (May 18, 2005).

[35] 517 F 3d 574 (D.C. Cir. 2008).

emissions that would result from standard levels it considered for the proposed rule. Instead, DOE used an Hg emission rate (in metric tons of Hg per energy produced) based on the *AEO2008*. Because virtually all mercury emitted from electricity generation is from coal-fired power plants, DOE based the emission rate on the metric tons of mercury emitted per TWh of coal-generated electricity. To estimate the reduction in mercury emissions, DOE multiplied the emission rate by the reduction in coal-generated electricity associated with the standards considered. Because the CAMR has been vacated, DOE continued to use the approach it used for the October 2008 NOPR to estimate the Hg emission reductions due to standards for today's final rule.

In addition to electricity, the operation of gas cooking products requires use of fossil fuels and 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. Natural gas was the only fossil fuel DOE accounted for in its analysis of standards for cooking products. Because natural gas combustion does not yield $SO_2$ emissions, DOE did not report the effect of the proposed standards on site emissions of $SO_2$.

For the October 2008 NOPR, 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 likely to result from reducing greenhouse gas emissions. Several parties provided comments regarding the economic valuation of $CO_2$ for the October 2008 NOPR. Whirlpool did not support an attempt to value those emissions as part of this rulemaking. (Whirlpool, No. 50 at p. 8) EEI commented that utilities have embedded the cost of complying with existing environmental legislation in their price for electricity, and a similar approach may be reasonable for valuing reduced $CO_2$ emissions. (EEI, Public Meeting Transcript, No. 40.5 at pp. 194–195) The Joint Comment stated that DOE's valuation of avoided $CO_2$ emissions should use EIA's analysis of the Climate Security Act; the core scenario of this analysis yields a $17 price per ton of $CO_2$, with an annual 7.4 percent increase. (Joint Comment, No. 44 at p. 12) As discussed in section VI.C.6, DOE has continued to use the approach described in the October 2008 NOPR (73 FR 62034, 62107 (Oct. 17, 2008)) for its monetization of environmental emissions reductions for today's rule.

Although this rulemaking does not affect $SO_2$ emissions or $NO_X$ emissions in the 28 eastern States and D.C. where CAIR is in effect, there are markets for $SO_2$ and $NO_X$ emissions allowances. The market clearing price of $SO_2$ and $NO_X$ emissions allowances is roughly the marginal cost of meeting the regulatory cap, not the marginal value of the cap itself. Further, because national $SO_2$ and $NO_X$ emissions are regulated by a cap-and-trade system, the cost of meeting these caps is included in the price of energy. Thus, the value of energy savings already includes the value of $SO_2$ and $NO_X$ control for those consumers experiencing energy savings. The economic cost savings associated with $SO_2$ and $NO_X$ emissions caps is approximately equal to the change in the price of traded allowances resulting from energy savings multiplied by the number of allowances that would be issued each year. That calculation is uncertain because the energy savings from new or amended standards for cooking products would be so small relative to the entire electricity generation market that the resulting emissions savings would have almost no impact on price formation in the allowances market. These savings would most likely be outweighed by uncertainties in the marginal costs of compliance with $SO_2$ and $NO_X$ emissions caps.

## V. Discussion of Other Comments

Since DOE opened the docket for this rulemaking, it has received more than 42 comments from a diverse set of parties, including manufacturers and their representatives, members of Congress, energy conservation advocates, private citizens, and electric and gas utilities. Comments on the analytic methodologies DOE used are discussed in section IV of this preamble. Other comments DOE received in response to the October 2008 NOPR, limited to those pertaining to standards for cooking products, are addressed in this section.

### *A. Burdens and Benefits*

#### 1. Consideration of the Value of Avoided Environmental Impacts

The Joint Comment stated that DOE has not incorporated the value of $CO_2$ emissions reductions into the LCC and NPV analyses. The Joint Comment argues that, because the value of $CO_2$ emissions reductions affects the economic justification of standards, DOE must incorporate these effects into the LCC and NPV analyses. (Joint Comment, No. 44 at p. 12)

After consideration of this comment, DOE decided to continue to report these benefits separately from the direct benefits of energy savings (*i.e.*, the NPV of consumer net benefits). Neither EPCA nor the National Environmental Policy Act (NEPA) requires that the economic value of emissions reductions be incorporated in the net present value analysis of energy savings. However, DOE believes that considering the value of environmental emissions reductions separately from other impacts, when weighing the benefits and burdens of standards, provides the Department with a more robust understanding of the potential impacts of standards.

Similarly, for other emissions currently not priced (Hg nationwide and $NO_X$ in those States not covered by CAIR), only ranges of estimated economic values based on environmental damage studies of varying quality and applicability are available. DOE has also weighed these values separately from the direct benefits of energy savings.

### *B. Other Comments*

#### 1. Proposed Standards for Conventional Cooking Products

The Joint Comment stated that TSL 3 should be adopted for conventional cooking products rather than TSL 1. The Joint Comment specifically calls attention to the standard level for electric standard ovens under TSL 3, and states that this standard level satisfies the rebuttable presumption payback period. As a result, the Joint Comment concluded that TSL 3 is presumptively economically justified. (Joint Comment, No. 44 at p. 11) Earthjustice also stated that TSL 3 should be adopted but on grounds that it provided consumers with an economic benefit greater than TSL 1. (Earthjustice, Public Meeting Transcript, No. 40.5, p. 200)

As described in section VI.A, TSL 3 for conventional cooking products consists of performance standards for electric standard ovens, gas self-cleaning ovens, and electric coil cooktops, in addition to the presciptive requirements in TSL 1 of eliminating standing pilots in gas cooktops and gas standard ovens. Although the performance standards for electric standard ovens and electric cooktops at TSL 3 satisfy the rebuttable presumption payback period, as noted in section IV.C.11, DOE considers the

full range of criteria including impacts on consumers, manufacturers, and the environment, when determining whether these standards are economically justisfied.

## VI. Analytical Results and Conclusions

### *A. Trial Standard Levels*

DOE analyzed the benefits and burdens of a number of TSLs for the cooking products that are the subject of today's final rule. 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. DOE received no comments on the composition of the TSLs. Accordingly, for today's final rule, DOE considered the same TSLs it considered for the October 2008 NOPR.

Table VI.1 shows the TSLs and the corresponding product class efficiencies for conventional cooking products. As discussed in section III.C, DOE determined the design options that are technologically feasible and can be considered as measures to improve product efficiency. However, as discussed in chapters 3 and 4 of the TSD accompanying this notice, there are few design options available for improving the efficiency of these cooking products due to physical limitations on energy transfer to the food being cooked. This is particularly true for all cooktop and self-cleaning oven product classes. For electric cooktops, DOE was able to identify only a single design change for analysis. For gas cooktops and electric self-cleaning ovens, DOE was able to identify two design options for analysis. For gas self-cleaning ovens, DOE was able to identify three design options for analysis. Although DOE considered several design options for standard ovens, none significantly increased product efficiency with the exception of eliminating standing pilots for gas standard ovens. Eliminating standing pilots reduces an oven's overall gas consumption by more than 50 percent, whereas all other design options reduce gas consumption by approximately 2 percent. Therefore, DOE gave further consideration to only four TSLs for conventional cooking products, as described below.

TSL 1 represents the elimination of standing pilot ignition systems from gas cooking products. All other product classes are unaffected by TSL 1, including gas self-cleaning ovens. EPCA does not allow gas self-cleaning ovens to use standing pilot ignition systems because they already use electricity and come equipped with power cords to enable the self-cleaning cycle. Under TSL 1, the current prescriptive standard that prohibits the use of standing pilot ignition systems in gas cooking pilots equipped with power cords would be extended to all gas cooking products, regardless of whether the appliance is equipped with a power cord. Under TSL 1, DOE would not regulate the EF of any of the conventional cooking product classes and only standing pilot ignition systems would be affected.

TSL 2 for conventional cooking products consists of the candidate standard levels from each of the product classes that provide an economic benefit to a majority of consumers who are affected by the standard. Based on this criterion, only electric coil cooktops and electric standard ovens have candidate standard levels that differ from those in TSL 1. For the remaining five product classes, the results indicate that no candidate standard level provides an economic benefit to a majority of consumers.

TSL 3 for conventional cooking products consists of the same candidate standard levels as TSL 2, with one exception: the gas self-cleaning oven product class. For these ovens, the design option that provides, on average, a small level of economic benefit to consumers is included.

TSL 4 is the maximum technologically feasible efficiency level.

TABLE VI.1—TRIAL STANDARD LEVELS FOR CONVENTIONAL COOKING PRODUCTS

| Product class | TSLs | | | |
|---|---|---|---|---|
| | TSL 1 | TSL 2 | TSL 3 | TSL 4 |
| Electric Coil Cooktops | No Standard | EF=0.769 | EF=0.769 | EF=0.769 |
| Electric Smooth Cooktops | No Standard | No Standard | No Standard | EF=0.753 |
| Gas Cooktops | No Pilot | No Pilot | No Pilot | EF=0.420 |
| Electric Standard Ovens | No Standard | EF=0.1163 | EF=0.1163 | EF=0.1209 |
| Electric Self-Cleaning Ovens | No Standard | No Standard | No Standard | EF=0.1123 |
| Gas Standard Ovens | No Pilot | No Pilot | No Pilot | EF=0.0600 |
| Gas Self-Cleaning Ovens | No Change to Existing Standard*. | No Change to Existing Standard*. | EF=0.0625 | EF=0.0632 |

* Existing Standard = No Pilot.

As discussed in section III.A, DOE has concluded that it is not technically feasible to combine cooking efficiency (or EF) into a new efficiency metric with standby power consumption in microwave ovens. For the October 2008 NOPR, DOE considered two sets of TSLs—one set comprised solely of EF levels and a second set comprised solely of standby power levels. As discussed in section II.B.3, DOE has decided to continue this rulemaking to further consider microwave oven energy conservation standards pertaining to standby power consumption. Therefore, for today's final rule, DOE is considering only EF standards for microwave ovens.

Table VI.2 shows the TSLs for the regulation of microwave oven cooking efficiency, which is expressed in terms of EF. The TSLs refer only to the EF and specify no standard regarding standby power use. TSL 4 corresponds to the maximum technologically feasible EF level.

TABLE VI.2—TRIAL STANDARD LEVELS FOR MICROWAVE OVEN ENERGY FACTOR

| | TSLs | | | |
|---|---|---|---|---|
| | TSL 1 | TSL 2 | TSL 3 | TSL 4 |
| EF | 0.586 | 0.588 | 0.597 | 0.602 |

*B. Significance of Energy Savings*

To estimate the energy savings through 2042 attributable to potential standards, DOE compared the energy consumption of cooking products under the base case (no standards) to energy consumption of these products under each standards case (each TSL, or set of new standards, that DOE has considered). Tables VI.3 and VI.4 show DOE's NES estimates for each TSL for conventional cooking products and microwave ovens, respectively. Chapter 11 of the TSD accompanying this notice describes these estimates in more detail. In the TSD, DOE reports both undiscounted and discounted values of energy savings. Discounted energy savings represent a policy perspective in which energy savings farther in the future are less significant than energy savings closer to the present.[36]

TABLE VI.3—CUMULATIVE NATIONAL ENERGY SAVINGS FOR CONVENTIONAL COOKING PRODUCTS

| TSL | National Energy Savings *quads* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Electric coil cooktops | Electric smooth cooktops | Gas cooktops | Electric standard ovens | Electric self-clean ovens | Gas standard ovens | Gas self-clean ovens | Total |
| 1 | 0.00 | 0.00 | 0.10 | 0.00 | 0.00 | 0.05 | 0.00 | 0.14 |
| 2 | 0.04 | 0.00 | 0.10 | 0.05 | 0.00 | 0.05 | 0.00 | 0.23 |
| 3 | 0.04 | 0.00 | 0.10 | 0.05 | 0.00 | 0.05 | 0.09 | 0.32 |
| 4 | 0.04 | 0.02 | 0.15 | 0.07 | 0.04 | 0.09 | 0.10 | 0.50 |

TABLE VI.4—CUMULATIVE NATIONAL ENERGY SAVINGS FOR MICROWAVE OVENS (ENERGY FACTOR)

| TSL | National Energy Savings *quads* |
|---|---|
| 1 | 0.18 |
| 2 | 0.19 |
| 3 | 0.23 |
| 4 | 0.25 |

*C. Economic Justification*

1. Economic Impact on Consumers

a. Life-Cycle Costs and Payback Period

Consumers affected by new or amended standards usually experience higher purchase prices and lower operating costs. Generally, these impacts are best captured by changes in life-cycle costs and payback period. Therefore, DOE calculated the LCC and PBP for the standard levels considered in this rulemaking. DOE's LCC and PBP analyses provided key outputs for each TSL, which are reported by product in Tables VI.5 through VI.12. In each table, the first three outputs are average LCC and its components (the average installed price and the average operating cost). The next four outputs are the average LCC savings along with the proportions of purchases of cooking products under three different scenarios in which purchasing a product that complies with the TSL would create (1) a net life-cycle cost, (2) no impact, or (3) a net life-cycle savings for the purchaser.

The last two outputs are the median and average PBP for the consumer purchasing a design that complies with the TSL. The PBP is the number of years it would take for the purchaser to recover, as a result of energy savings, the increased costs of higher efficiency products based on the operating cost savings from the first year of ownership. DOE based its complete PBP analysis for cooking products on energy consumption under conditions of actual use of each type of product by purchasers. However, as required by EPCA (42 U.S.C. 6295(o)(2)(B)(iii)), DOE based the rebuttable presumption PBP test on consumption as determined under conditions prescribed by the DOE test procedure. While DOE examined the rebuttable presumption criterion (see TSD chapter 8), it considered whether the standard levels considered for today's rule are economically justified through a more detailed analysis of the economic impacts of these levels pursuant to section 325(o)(2)(B)(i) of EPCA. (42 U.S.C. 6295(o)(2)(B)(i))

Tables VI.5, VI.6, and VI.7 show the LCC and PBP results for cooktops. To illustrate the role of the base-case forecast in the case of gas cooktops (Table VI.7), TSL 1 shows an average LCC savings of $15. The average savings are relatively low because 93.5 percent of the households in the base case already purchase a gas cooktop at the TSL 1 level, and thus have zero savings due to the standard. In this example, the base case includes a significant number of households that would not be affected by a standard set at TSL 1. DOE determined the median and average values of the PBPs shown below by excluding the households not affected by the standard.

[36] Consistent with Executive Order 12866, ''Regulatory Planning and Review,'' 58 FR 51735 (Oct. 4, 1993), DOE follows OMB guidance regarding methodologies and procedures for regulatory impact analysis that affect more than one agency. In reporting energy and environmental benefits from energy conservation standards, DOE will report both discounted and undiscounted (*i.e.*, zero discount rate) values.

TABLE VI.5—ELECTRIC COIL COOKTOPS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

| TSL | EF | 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 | | |
| Baseline | 0.737 | $272 | $183 | $455 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1 | 0.737 | 272 | 183 | 455 | No change from baseline | | | | | |
| 2, 3, 4 | 0.769 | 276 | 175 | 451 | $4 | 27.1% | 0.0% | 72.9% | 7.2 | 18.0 |

TABLE VI.6—ELECTRIC SMOOTH COOKTOPS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

| TSL | EF | 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 | | |
| Baseline | 0.742 | $309 | $183 | $492 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1, 2, 3 | 0.742 | 309 | 183 | 492 | No change from baseline | | | | | |
| 4 | 0.753 | 550 | 180 | 730 | −$238 | 100.0% | 0.0% | 0.0% | 1,498 | 3,736 |

TABLE VI.7—GAS COOKTOPS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

| TSL | EF | 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 | | |
| Baseline | 0.106 | $310 | $561 | $871 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1, 2, 3 | 0.399 | 332 | 240 | 572 | $15 | 0.1% | 93.5% | 6.4% | 4.3 | 3.3 |
| 4 | 0.420 | 361 | 234 | 595 | −8 | 93.5% | 0.0% | 6.5% | 73 | 258 |

Tables VI.8 through VI.11 show the LCC and PBP results for ovens (other than microwave ovens). For gas standard ovens, the base case includes a significant number of households that would not be affected by a standard at TSLs 1 through 3. DOE determined the median and average values of the PBPs shown below by excluding the percentage of households not affected by the standard. The large difference in the average and median values for TSL 4 for all ovens is due to households with excessively long PBPs in the distribution of results. The LCC analysis for TSL 4 yielded a few results with PBPs of thousands of years, leading to an average PBP that is very long. In these cases, the median PBP is a more representative value to gauge the length of the PBP.

TABLE VI.8—ELECTRIC STANDARD OVENS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

| TSL | EF | 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 | | |
| Baseline | 0.1066 | $414 | $231 | $645 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1 | 0.1066 | 414 | 231 | 645 | No change from baseline | | | | | |
| 2, 3 | 0.1163 | 421 | 213 | 634 | $11 | 42.7% | 0.0% | 57.3% | 8.0 | 309 |
| 4 | 0.1209 | 489 | 206 | 695 | −59 | 94.4% | 0.0% | 5.6% | 61 | 2,325 |

TABLE VI.9—ELECTRIC SELF-CLEANING OVENS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

| TSL | EF | 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 | | |
| Baseline | 0.1099 | $485 | $243 | $728 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1, 2, 3 | 0.1099 | 485 | 243 | 728 | No change from baseline | | | | | |

TABLE VI.9—ELECTRIC SELF-CLEANING OVENS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS—Continued

| TSL | EF | 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 | | |
| 4 | 0.1123 | 548 | 239 | 787 | −$143 | 78.5% | 0.0% | 21.5% | 236 | 1256 |

TABLE VI.10—GAS STANDARD OVENS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

| TSL | EF | 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 | | |
| Baseline | 0.0298 | $430 | $406 | $837 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1, 2, 3 | 0.0583 | 464 | 266 | 730 | $9 | 5.1% | 82.3% | 12.6% | 9.0 | 7.0 |
| 4 | 0.0600 | 507 | 484 | 991 | −81 | 93.2% | 0.0% | 6.8% | 25 | 368 |

TABLE VI.11—GAS SELF-CLEANING OVENS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS

| TSL | EF | 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 | | |
| Baseline | 0.0540 | $550 | $614 | $1,164 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1, 2 | 0.0540 | 550 | 614 | 1,164 | No change from baseline | | | | | |
| 3 | 0.0625 | 566 | 595 | 1,161 | $3 | 56.1% | 0.0% | 43.9% | 11 | 391 |
| 4 | 0.0632 | 574 | 593 | 1,168 | −4 | 65.0% | 0.0% | 35.0% | 16 | 461 |

Table VI.12 shows the LCC and PBP results for microwave ovens. Results are presented for TSLs pertaining to EF. Because DOE estimated that the entire market is at the baseline level, the average LCC savings reported for each of the four TSLs are equal to the average LCC of the TSL minus the average LCC of the baseline.

TABLE VI.12—MICROWAVE OVENS: LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS FOR EF

| TSL | EF | 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 | | |
| Baseline | 0.557 | $220 | $124 | $344 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1 | 0.586 | 232 | 119 | 351 | −$7 | 90.6% | 0.0% | 9.4% | 30 | 76 |
| 2 | 0.588 | 246 | 119 | 364 | −21 | 97.6% | 0.0% | 2.4% | 58 | 147 |
| 3 | 0.597 | 267 | 117 | 384 | −40 | 99.2% | 0.0% | 0.8% | 83 | 210 |
| 4 | 0.602 | 294 | 116 | 410 | −66 | 99.8% | 0.0% | 0.2% | 117 | 296 |

b. Consumer Subgroup Analysis

DOE estimated consumer subgroup impacts by determining the LCC impacts of the TSLs on low-income and senior-only households. DOE found that the LCC impacts on these subgroups and the payback periods are similar to the LCC impacts and payback periods on the full sample of residential consumers. Thus, the proposed standards would have an impact on low-income and senior-only households that would be similar to the impact on the general population of residential consumers. Chapter 12 of the TSD accompanying this notice presents the detailed results of that analysis.

2. Economic Impact on Manufacturers

DOE determined the economic impacts on manufacturers of the TSLs considered for today's rule, as described in the October 2008 NOPR. 73 FR 62034, 62075–81, 62091–62104, 62128–30 (Oct. 17, 2008). The results of these economic analyses are summarized below. For a more complete description of the anticipated economic impacts on manufacturers, see chapter 13 of the TSD accompanying this notice.

a. Industry Cash-Flow Analysis Results

Using two different markup scenarios—a preservation of gross margin [37] (percentage) scenario and a preservation of gross margin (in absolute dollars) scenario—DOE estimated the impact of potential new standards for conventional cooking products and for the cooking efficiency of microwave ovens on the INPV of the industries that manufacture these products. 73 FR 62034, 62077–78, 62092–99 (Oct. 17, 2008).

[37] ''Gross margin'' is defined as ''revenues minus cost of goods sold.'' On a unit basis, gross margin is selling price minus manufacturer production cost. In the GRIMs, markups determine the gross margin because various markups are applied to the manufacturer production costs to reach manufacturer selling price.

Under the preservation of gross margin scenario, DOE applied a single uniform ''gross margin percentage'' markup across all efficiency levels. As production cost increases with efficiency, this scenario implies that the absolute dollar markup will increase. In their interviews, all manufacturers stated that it is optimistic to assume that they would be able to maintain the same gross margin percentage markup as their production costs increase in response to an energy conservation standard. Therefore, DOE believes that this scenario represents a high bound to industry profitability under an energy conservation standard. In the ''preservation of gross margin (absolute dollars)'' scenario, gross margin is defined as ''revenues less cost of goods sold.'' The implicit assumption behind this markup scenario is that the industry will lower its markups in response to the standards to maintain only its gross margin (in absolute dollars).

The impact of new standards on INPV consists of the difference between the INPV in the base case and the INPV in the standards case. INPV is the primary metric used in the MIA and it represents one measure of the fair value of an industry in today's dollars. For each industry affected by today's rule, DOE calculated INPV by summing all of the net cash flows, discounted at the industry's cost of capital or discount rate.

For each type of product under consideration in this rulemaking, Tables VI.13 through VI.22 show the changes in INPV under both markup scenarios that DOE estimates would result from the TSLs considered for this final rule. The tables also present the product conversion costs and capital conversion costs that the industry would incur at each TSL. Product conversion costs include engineering, prototyping, testing, and marketing expenses incurred by a manufacturer as it prepares to come into compliance with a standard. Capital investments are the one-time outlays for equipment and buildings required for the industry to comply (*i.e.*, capital conversion costs).

TABLE VI.13—MANUFACTURER IMPACT ANALYSIS FOR ELECTRIC COOKTOPS UNDER THE PRESERVATION OF GROSS MARGIN PERCENTAGE MARKUP SCENARIO

[Preservation of gross margin percentage markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| INPV | 2006$ millions | 359 | 359 | 357 | 357 | 437 |
| Change in INPV | 2006$ millions | | 0 | (2) | (2) | 78 |
| | % | | 0 | −0.55 | −0.55 | 21.76 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 0 | 9.6 | 9.6 | 21.8 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 0 | 0 | 0 | 73.1 |
| Total Investment Required | 2006$ millions | | 0 | 9.6 | 9.6 | 94.9 |

Numbers in parentheses indicate negative values.

TABLE VI.14—MANUFACTURER IMPACT ANALYSIS FOR ELECTRIC COOKTOPS UNDER THE PRESERVATION OF GROSS MARGIN ABSOLUTE DOLLARS MARKUP SCENARIO

[Preservation of gross margin absolute dollars markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| INPV | 2006$ millions | 359 | 359 | 348 | 348 | (26) |
| Change in INPV | 2006$ millions | | 0 | (11) | (11) | (385) |
| | % | | 0 | −3.18 | −3.18 | −107.19 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 0 | 9.6 | 9.6 | 21.8 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 0 | 0 | 0 | 73.1 |
| Total Investment Required | 2006$ millions | | 0 | 9.6 | 9.6 | 94.9 |

Numbers in parentheses indicate negative values.

TABLE VI.15—MANUFACTURER IMPACT ANALYSIS FOR GAS COOKTOPS UNDER THE PRESERVATION OF GROSS MARGIN PERCENTAGE MARKUP SCENARIO

[Preservation of gross margin percentage markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| INPV | 2006$ millions | 288 | 283 | 283 | 283 | 316 |
| Change in INPV | 2006$ millions | | (5) | (5) | (5) | 28 |
| | % | | −1.73 | −1.73 | −1.73 | 9.88 |

TABLE VI.15—MANUFACTURER IMPACT ANALYSIS FOR GAS COOKTOPS UNDER THE PRESERVATION OF GROSS MARGIN PERCENTAGE MARKUP SCENARIO—Continued

[Preservation of gross margin percentage markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 9.4 | 9.4 | 9.4 | 20.8 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 2.2 | 2.2 | 2.2 | 3.3 |
| Total Investment Required | 2006$ millions | | 11.5 | 11.5 | 11.5 | 24.1 |

Numbers in parentheses indicate negative values.

TABLE VI.16—MANUFACTURER IMPACT ANALYSIS FOR GAS COOKTOPS UNDER THE PRESERVATION OF GROSS MARGIN ABSOLUTE DOLLARS MARKUP SCENARIO

[Preservation of gross margin absolute dollars markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| INPV | 2006$ millions | 288 | 276 | 276 | 276 | 146 |
| Change in INPV | 2006$ millions | | (12) | (12) | (12) | (99) |
| | % | | −4.11 | −4.11 | −4.11 | −34.45 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 9.4 | 9.4 | 9.4 | 20.8 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 2.2 | 2.2 | 2.2 | 3.3 |
| Total Investment Required | 2006$ millions | | 11.5 | 11.5 | 11.5 | 24.1 |

Numbers in parentheses indicate negative values.

TABLE VI.17—MANUFACTURER IMPACT ANALYSIS FOR ELECTRIC OVENS UNDER THE PRESERVATION OF GROSS MARGIN PERCENTAGE MARKUP SCENARIO

[Preservation of gross margin percentage markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| INPV | 2006$ millions | 797 | 797 | 789 | 789 | 788 |
| Change in INPV | 2006$ millions | | 0 | (8) | (8) | (9) |
| | % | | 0 | −0.98 | −0.98 | −1.17 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 0 | 20.8 | 20.8 | 67.6 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 0 | 0.8 | 0.8 | 179.8 |
| Total Investment Required | 2006$ millions | | 0 | 21.6 | 21.6 | 247.5 |

Numbers in parentheses indicate negative values.

TABLE VI.18—MANUFACTURER IMPACT ANALYSIS FOR ELECTRIC OVENS UNDER THE PRESERVATION OF GROSS MARGIN ABSOLUTE DOLLARS MARKUP SCENARIO

[Preservation of gross margin absolute dollars markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| INPV | 2006$ millions | 797 | 797 | 778 | 778 | 326 |
| Change in INPV | 2006$ millions | | 0 | (19) | (19) | (471) |
| | % | | 0.00 | −2.43 | −2.43 | −59.07 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 0.0 | 20.8 | 20.8 | 67.6 |

TABLE VI.18—MANUFACTURER IMPACT ANALYSIS FOR ELECTRIC OVENS UNDER THE PRESERVATION OF GROSS MARGIN ABSOLUTE DOLLARS MARKUP SCENARIO—Continued

[Preservation of gross margin absolute dollars markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 0.0 | 0.8 | 0.8 | 179.8 |
| Total Investment Required | 2006$ millions | | 0.0 | 21.6 | 21.6 | 247.5 |

Numbers in parentheses indicate negative values.

TABLE VI.19—MANUFACTURER IMPACT ANALYSIS FOR GAS OVENS UNDER THE PRESERVATION OF GROSS MARGIN PERCENTAGE MARKUP SCENARIO

[Preservation of gross margin percentage markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| INPV | 2006$ millions | 469 | 461 | 461 | 462 | 422 |
| Change in INPV | 2006$ millions | | (7) | (7) | (6) | (46) |
| | % | | −1.56 | −1.56 | −1.36 | −9.91 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 9.4 | 9.4 | 18.7 | 100.3 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 1.8 | 1.8 | 7.6 | 72.0 |
| Total Investment Required | 2006$ millions | | 11.1 | 11.1 | 26.4 | 172.3 |

Numbers in parentheses indicate negative values.

TABLE VI.20—MANUFACTURER IMPACT ANALYSIS FOR GAS OVENS UNDER THE PRESERVATION OF GROSS MARGIN ABSOLUTE DOLLARS MARKUP SCENARIO

[Preservation of gross margin absolute dollars markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| INPV | 2006$ millions | 469 | 459 | 459 | 428 | 287 |
| Change in INPV | 2006$ millions | | (10) | (10) | (41) | (182) |
| | % | | −2.10 | −2.10 | −8.68 | −38.74 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 9.4 | 9.4 | 18.7 | 100.3 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 1.8 | 1.8 | 7.6 | 72.0 |
| Total Investment Required | 2006$ millions | | 11.1 | 11.1 | 26.4 | 172.3 |

Numbers in parentheses indicate negative values.

TABLE VI.21—MANUFACTURER IMPACT ANALYSIS FOR MICROWAVE OVENS UNDER THE PRESERVATION OF GROSS MARGIN PERCENTAGE MARKUP SCENARIO (ENERGY FACTOR)

[Preservation of gross margin percentage markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1a | 2a | 3a | 4a |
| INPV | 2006$ millions | 1,456 | 1,501 | 1,575 | 1,695 | 1,726 |
| Change in INPV | 2006$ millions | | 45 | 118 | 238 | 270 |
| | % | | 3.06 | 8.11 | 16.37 | 18.53 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions | | 60.0 | 75.0 | 90.0 | 225.0 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions | | 0.0 | 0.0 | 0.0 | 75.0 |

TABLE VI.21—MANUFACTURER IMPACT ANALYSIS FOR MICROWAVE OVENS UNDER THE PRESERVATION OF GROSS MARGIN PERCENTAGE MARKUP SCENARIO (ENERGY FACTOR)—Continued

[Preservation of gross margin percentage markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1a | 2a | 3a | 4a |
| Total Investment Required .. | 2006$ millions ..... | ..... | 60.0 | 75.0 | 90.0 | 300.0 |

Numbers in parentheses indicate negative values.

TABLE VI.22—MANUFACTURER IMPACT ANALYSIS FOR MICROWAVE OVENS UNDER THE PRESERVATION OF GROSS MARGIN ABSOLUTE DOLLARS MARKUP SCENARIO (ENERGY FACTOR)

[Preservation of gross margin percentage markup scenario]

| | Units | Base case | TSL | | | |
|---|---|---|---|---|---|---|
| | | | 1a | 2a | 3a | 4a |
| INPV ..... | 2006$ millions ..... | 1,456 | 1,256 | 1,068 | 778 | 285 |
| Change in INPV ..... | 2006$ millions ..... | ..... | (200) | (388) | (679) | (1,171) |
| | % ..... | ..... | −13.75 | −26.64 | −46.60 | −80.42 |
| Amended Energy Conservation Standards Product Conversion Expenses. | 2006$ millions ..... | ..... | 60.0 | 75.0 | 90.0 | 225.0 |
| Amended Energy Conservation Standards Capital Investments. | 2006$ millions ..... | ..... | 0.0 | 0.0 | 0.0 | 75.0 |
| Total Investment Required .. | 2006$ millions ..... | ..... | 60.0 | 75.0 | 90.0 | 300.0 |

Numbers in parentheses indicate negative values.

As noted above, the October 2008 NOPR provides a detailed discussion of the estimated impact of new standards for cooking products on INPV. 73 FR 62034, 62091–99 (Oct. 17, 2008).

b. Impacts on Manufacturer Employment

As discussed in the October 2008 NOPR, DOE expects that employment by manufacturers would increase under all of the TSLs considered for today's rule, although this does not take into account any relocation of domestic jobs to countries with lower labor costs that might be influenced by the level of investment required by new standards. 73 FR 62034, 62100–03 (Oct. 17, 2008). For today's final rule, DOE estimates that the increase in the number of production employees in 2012 due to standards (depending on the TSL) could be 7 to 577 for conventional cooking product manufacturers and 16 to 97 for microwave oven manufacturers. Further support for these conclusions regarding direct employment impacts is provided in chapter 13 of the TSD. Indirect employment impacts from standards, consisting of the jobs created in or eliminated from the national economy other than in the manufacturing sector being regulated, are discussed in section IV.G.

c. Impacts on Manufacturers That Are Small Businesses

As discussed in section IV.F and in the October 2008 NOPR, DOE identified two small manufacturers of residential, conventional cooking products. Both manufacture gas-fired ovens, ranges, and cooktops with standing pilot lights, and these products comprise 25 percent or more of their production. 73 FR 62034, 62076, 62095, 62103 (Oct. 17, 2008). Impacts of today's standards on these two small businesses are discussed in section VII.B of this notice.

As explained in the October 2008 NOPR, there are no small businesses that manufacture microwave ovens. 73 FR 62034, 62130 (Oct. 17, 2008).

d. Cumulative Regulatory Burden

The October 2008 NOPR notes that one aspect of DOE's assessment of manufacturer burden is the cumulative impact of multiple DOE standards and other regulatory actions that affect manufacture of the same covered products and other equipment produced by the same manufacturers or their parent companies. 73 FR 62034, 62104 (Oct. 17, 2008). In addition to DOE's energy conservation regulations for cooking products, DOE identified other regulations that manufacturers face for cooking and other products and equipment they manufacture within 3 years before and 3 years after the anticipated effective date of the amended DOE regulations. *Id.* The most significant of these additional regulations include Federal standby power requirements, several additional Federal and State energy conservation standards, the Restriction of Hazardous Substance Directive (RoHS), State-by-State restrictions on mercury (which affect gas cooking appliances), and international energy conservation standards and test procedures. *Id.* As noted in the October 2008 NOPR, the last three of these requirements do not affect the standards DOE considered for today's final rule. Most manufacturers DOE interviewed stated that they already comply with the RoHS directive, and most gas cooking appliance manufacturers have already eliminated mercury switches or have plans to do so. In addition, although manufacturers may incur a substantial cost if there are overlapping testing and certification requirements in other markets besides the United States, DOE only accounts for domestic compliance costs in its calculation of product conversion expenses for products covered in this rulemaking. *Id.*

EISA 2007 directs DOE to publish final rules to modify its test procedures to measure and account for standby mode and off mode energy consumption for various products (including kitchen ranges and ovens and microwave ovens) by statutorily prescribed dates. 42 U.S.C. 6295(gg)(2)(B). In addition, EISA

2007 provides that any final rule prescribing amended or new energy conservation standards adopted after July 1, 2010 must account for standby mode and off mode energy use. 42 U.S.C 6295(gg)(3)(A). DOE has determined that some manufacturers of cooking products also produce other residential appliances that will be subject to EISA 2007 regulations on standby and off mode power. In interviews that DOE conducted for the October 2008 NOPR, manufacturers stated that these requirements will impose a heavy burden on their testing facilities going forward. In addition, manufacturers expressed a concern that EISA 2007's standby power requirements could create many overlapping regulatory compliance costs in the future.

In the analyses conducted for the October 2008 NOPR, DOE also identified numerous Federal and State energy conservation standards regulations that could affect cooking product manufacturers that produce other residential and commercial equipment. (See chapter 13 of the NOPR TSD.) Additional investments necessary to meet these potential standards could have significant impacts on manufacturers of the covered products.

Chapter 13 of the TSD accompanying this notice addresses in greater detail the issue of cumulative regulatory burden.

3. Net Present Value of Consumer Impacts and National Employment Impacts

The NPV analysis estimates the cumulative NPV to the Nation of total consumer costs and savings that would result from particular standard levels. Tables VI.23 and VI.24 provide an overview of the NPV results for each TSL considered for conventional cooking products and microwave ovens, respectively, using both a 7-percent and a 3-percent real discount rate. See chapter 11 of the TSD accompanying this notice for more detailed NPV results.

TABLE VI.23—CUMULATIVE NET PRESENT VALUE FOR CONVENTIONAL COOKING PRODUCTS

[Impacts for units sold from 2012 to 2042]

| TSL | NPV billion 2006$ | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Electric coil cooktops | | Electric smooth cooktops | | Gas cooktops | | Electric standard ovens | | Electric self-clean ovens | | Gas standard ovens | | Gas self-clean ovens | | Total | |
| | Discount rate | | Discount rate | | Discount rate | | Discount rate | | Discount rate | | Discount rate | | Discount rate | | Discount rate | |
| | 7% | 3% | 7% | 3% | 7% | 3% | 7% | 3% | 7% | 3% | 7% | 3% | 7% | 3% | 7% | 3% |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.56 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.14 | 0.00 | 0.00 | 0.25 | 0.71 |
| 2 | 0.09 | 0.30 | 0.00 | 0.00 | 0.22 | 0.56 | 0.13 | 0.43 | 0.00 | 0.00 | 0.03 | 0.14 | 0.00 | 0.00 | 0.48 | 1.43 |
| 3 | 0.09 | 0.30 | 0.00 | 0.00 | 0.22 | 0.56 | 0.13 | 0.43 | 0.00 | 0.00 | 0.03 | 0.14 | 0.01 | 0.25 | 0.49 | 1.68 |
| 4 | 0.09 | 0.30 | −7.30 | −13.95 | −0.69 | −1.01 | −0.78 | −1.26 | −2.77 | −5.18 | −0.89 | −1.72 | −0.11 | 0.03 | −12.46 | −22.79 |

TABLE VI.24—CUMULATIVE NET PRESENT VALUE FOR MICROWAVE OVEN ENERGY FACTOR

[Impacts for units sold from 2012 to 2042]

| TSL | NPV billion 2006$ | |
|---|---|---|
| | 7% Discount rate | 3% Discount rate |
| 1 | −1.23 | −2.06 |
| 2 | −3.33 | −6.05 |
| 3 | −6.32 | −11.68 |
| 4 | −10.05 | −18.70 |

DOE also estimated the national employment impacts that would result from each TSL. As Table VI.25 shows, DOE estimates that any net monetary savings from standards would be redirected to other forms of economic activity. DOE also expects these shifts in spending and economic activity would affect the demand for labor. DOE estimated that net indirect employment impacts from energy conservation standards for cooking products would be positive (see Table VI.25), but very small relative to total national employment. This increase would likely be sufficient to fully offset any adverse impacts on employment that might occur in the cooking products industries. For details on the employment impact analysis methods and results, see chapter 15 of the TSD accompanying this notice.

TABLE VI.25—NET NATIONAL CHANGE IN INDIRECT EMPLOYMENT, THOUSANDS OF JOBS IN 2042

| Thousands of jobs in 2042 | | | |
|---|---|---|---|
| Trial standard level | Conventional cooking products | Trial standard level | Microwave oven EF |
| 1 | 0.26 | 1 | 2.06 |
| 2 | 0.94 | 2 | 2.07 |
| 3 | 1.03 | 3 | 2.44 |
| 4 | 1.21 | 4 | 2.47 |

4. Impact on Utility or Performance of Products

As indicated in sections III.E.1.d and V.B.4 of the October 2008 NOPR, DOE has concluded that the TSLs it has considered for cooking products would not lessen the utility or performance of any cooking products. 73 FR 62034, 62046–47, 62107 (Oct. 17, 2008).

5. Impact of Any Lessening of Competition

As discussed in the October 2008 NOPR (73 FR 62034, 62047, 62107 (Oct. 17, 2008)) and in section III.D.1.e of this preamble, DOE considers any lessening of competition likely to result from proposed energy conservation standards. The Attorney General also provides DOE with a written determination of the impact, if any, of any such lessening of competition. DOE considers the Attorney General's determination when preparing the final rule for the standards rulemaking and publishes this written determination as an attachment to the final rule.

The DOJ concluded that the cooking products standards contained in the proposed rule could substantially limit consumer choice by eliminating the cooking appliance that most closely meets the needs of 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. The DOJ recommended that to maintain competition, DOE should 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. (DOJ, No. 53 at p. 2)

As discussed in section VI.D.2 above, DOE conducted additional research on battery-powered ignition systems for residential gas cooking products. DOE was able to identify a gas range for sale in the United Kingdom (U.K.) that incorporates a battery-powered ignition system that appears to meet the functional safety requirements of ANSI Z21.1 (*i.e.*, that the oven main burner is lit by an intermittent gas pilot that is in turn lit by a battery-powered spark igniter). This ignition system meets the requirements of ANSI Z21.1 in that it does not require the user to push a separate ''light'' button at the same time as the control knob is turned to allow pilot gas flow. However, this ignition system does not include a safety device to shut off the main gas valve in the event that no flame is detected, which is required by the ANSI standard.

However, DOE found that there are gas cooking products with battery-powered ignition for RV applications available in the United States that meet similar ANSI safety standards for RV gas cooking products and as found in ANSI safety standards for residential gas cooking products. Thus, DOE believes, that a battery-powered ignition system designed for an RV gas range could be integrated into a residential gas range that could meet ANSI Z21.1 requirements.

DOE next investigated the possibility that battery-powered ignition systems used in other indoor residential appliances in the United States could meet the requirements of ANSI Z21.1, even though they are not currently being incorporated in gas cooking products. DOE identified several such appliances, including a remote-controlled gas fireplace and instantaneous gas water heaters. For these products, the battery-powered ignition systems are required to meet the same or equivalent component-level ANSI safety standards as are required for automatic ignition systems in gas cooking products. DOE contacted several manufacturers of gas cooking products, fireplaces, and instantaneous water heaters, as well as ignition component suppliers, to investigate the technological feasibility of integrating these existing battery-powered ignition systems into gas cooking products that would meet ANSI Z21.1. None of these manufacturers could identify insurmountable technological impediments to the development of such a product. Based on its research, DOE determined that the primary barrier to commercialization of battery-powered ignition systems in gas cooking products has been lack of market demand and economic justification rather than technological feasibility. Therefore, DOE concludes that a gas range incorporating one of these ignition systems could meet ANSI Z21.1. In addition, DOE research suggests that the market niche for gas cooking products equipped with battery-powered ignition systems, which would be created by the proposed gas cooking product standards, would likely attract entrants among ignition component suppliers. Therefore, in consideration of the above, DOE concludes that technologically feasible alternative ignition systems to standing pilots in gas cooking products exist and that consumer choice will not be limited by eliminating pilot lights of gas ranges and ovens without electrical supply cords.

6. Need of the Nation to Conserve Energy

Improving the energy efficiency of cooking products, where economically justified, would likely improve the security of the Nation's energy system by reducing overall demand for energy, thus reducing the Nation's reliance on foreign sources of energy. Reduced demand would also likely improve the reliability of the electricity system, particularly during peak-load periods.

Energy savings from higher standards for cooking products would also produce environmental benefits in the form of reduced emissions of air pollutants and greenhouse gases associated with energy production, and with household and building use of fossil fuels at sites where gas cooking products are used. Table VI.26 provides DOE's estimate of cumulative $CO_2$, $NO_X$, and Hg emissions reductions that would result from the TSLs considered in this rulemaking. The expected energy savings from new standards for cooking products may also reduce the cost of maintaining nationwide emissions standards and constraints. In the environmental assessment (chapter 16 of the TSD accompanying this notice), DOE reports estimated annual changes in $CO_2$, $NO_X$, and Hg emissions attributable to each TSL.

TABLE VI.26—CUMULATIVE $CO_2$, AND OTHER EMISSIONS REDUCTIONS (CUMULATIVE REDUCTIONS FOR PRODUCTS SOLD FROM 2012 TO 2042)

| Emissions Reductions for Conventional Cooking Products | | | | |
|---|---|---|---|---|
| | TSL 1 | TSL 2 | TSL 3 | TSL 4 |
| $CO_2$ (Mt) | 13.74 | 15.46 | 23.39 | 34.96 |
| $NO_X$ (kt) | 6.71 | 6.88 | 10.82 | 16.07 |
| Hg (t) | 0 – 0.15 | 0 – 0.19 | 0 – 0.28 | 0 – 0.41 |
| **Emissions Reductions for Microwave Ovens Energy Factor** | | | | |
| | TSL 1 | TSL 2 | TSL 3 | TSL 4 |
| $CO_2$ (Mt) | 22.88 | 33.46 | 53.89 | 74.67 |
| $NO_X$ (kt) | 2.55 | 3.75 | 6.06 | 8.42 |
| Hg (t) | 0 – 0.46 | 0 – 0.68 | 0 – 1.10 | 0 – 1.52 |

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

As discussed in section IV.I of this final rule, DOE does not report $SO_2$ emissions reductions from power plants because reductions from an energy conservation standard would not affect the overall level of $SO_2$ emissions in the United States due to the emissions caps for $SO_2$.

For the October 2008 NOPR, DOE's NEMS–BT modeling assumed that $NO_X$ would be subject to the CAIR, issued by the U.S. Environmental Protection Agency on March 10, 2005. 70 FR 25162 (May 12, 2005). On July 11, 2008, the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit) issued its decision in *North Carolina* v. *Environmental Protection Agency*, in which the court vacated CAIR. 531 F.3d 896 (DC Cir. 2008). Because the NEMS–BT model could no longer be used to estimate $NO_X$ emissions, DOE estimated a range of $NO_X$ reductions that would result from the trial standard levels being considered for the October 2008 NOPR based on low and high $NO_X$ emission rates. DOE multiplied these emission rates by the reduction in electricity generation due to the potential amended energy conservation standards considered to calculate the expected reduction in $NO_X$ emissions. The October 2008 NOPR describes these calculations in greater detail. 73 FR 62034, 62108–09 (Oct. 17, 2008).

On December 23, 2008, after the publication of the October 2008 NOPR, the D.C. Circuit decided to allow CAIR to remain in effect until it is replaced by a rule consistent with the court's earlier opinion. *North Carolina* v. *EPA*, 550 F.3d 1176 (D.C. Cir. 2008) (remand of vacatur). As a result, for today's final rule, DOE was able to use the NEMS–BT model to estimate the $NO_X$ emissions reductions that standards would cause. CAIR permanently caps emissions of $NO_X$ for 28 eastern States and D.C. This means that any new or amended energy conservation standards for cooking products would be unlikely to result in any reduction of $NO_X$ emissions in those States covered by the CAIR caps. Under caps, physical emissions reductions in those States would not result from the energy conservation standards under consideration by DOE, but standards might have produced an environmentally related economic impact in the form of lower prices for emissions allowance credits, if large enough. However, DOE determined that in the present case, such standards would not produce an environmentally-related economic impact in the form of lower prices for emissions allowance credits, because the estimated reduction in $NO_X$ emissions or the corresponding allowance credits in States covered by the CAIR cap would be too small to affect allowance prices for $NO_X$ under the CAIR. In contrast, new or amended energy conservation standards would reduce $NO_X$ emissions in those 22 States that are not affected by CAIR. As a result, the NEMS–BT does forecast $NO_X$ emission reductions from energy sources in those 22 States from the cooking product standards considered in today's final rule.

As noted in section IV.I, DOE was able to estimate the changes in Hg emissions associated with an energy conservation standard as follows. DOE notes that the NEMS–BT model, used as an integral part of today's rulemaking, does not estimate Hg emission reductions due to new energy conservation standards, as it assumed that Hg emissions would be subject to EPA's CAMR.[38] CAMR would have permanently capped emissions of mercury for new and existing coal-fired plants in all States by 2010. As with $SO_2$ and $NO_X$, DOE assumed that under such a system, energy conservation standards would have resulted in no physical effect on these emissions, but might have resulted in an environmentally related economic benefit in the form of a lower price for emissions allowance credits if those credits were large enough. DOE estimated that the change in the Hg emissions from energy conservation standards would not be large enough to influence allowance prices under CAMR.

On February 8, 2008, the D.C. Circuit issued its decision in *New Jersey* v. *Environmental Protection Agency*[39] to vacate CAMR. In light of this development and because the NEMS–BT model could not be used to directly calculate Hg emission reductions, DOE used the Hg emission rates discussed above to calculate emissions reductions.

Therefore, rather than using the NEMS–BT model, DOE established a range of Hg rates to estimate the Hg emissions that could be reduced through standards. DOE's low estimate assumed that future standards would displace electrical generation only from natural gas-fired power plants, thereby resulting in an effective emission rate of zero. (Under this scenario, coal-fired power plant generation would remain unaffected.) The low-end emission rate is zero because natural gas-fired power plants have virtually zero Hg emissions associated with their operation.

DOE's high estimate, which assumed that standards would displace only coal-fired power plants, was based on a nationwide mercury emission rate from *AEO2008*. (Under this scenario, gas-fired power plant generation would remain unaffected.) Because power plant emission rates are a function of local regulation, scrubbers, and the mercury content of coal, it is extremely difficult to identify a precise high-end emission rate. Therefore, the most reasonable estimate is based on the assumption that all displaced coal generation would have been emitting at the average emission rate for coal generation as specified by *AEO2008*. As noted previously, because virtually all mercury emitted from electricity generation is from coal-fired power plants, DOE based the emission rate on the tons of mercury emitted per TWh of coal-generated electricity. Based on the emission rate for 2006, DOE derived a high-end emission rate of 0.0255 tons per TWh. To estimate the reduction in mercury emissions, DOE multiplied the emission rate by the reduction in coal-generated electricity due to the standards considered in the utility impact analysis. These changes in Hg emissions are extremely small, ranging from 0.03 to 0.27 percent of the national base-case emissions forecast by NEMS–BT, depending on the TSL.

In the October 2008 NOPR, DOE considered accounting for a monetary benefit of $CO_2$ emission reductions associated with standards. To put the potential monetary benefits from reduced $CO_2$ emissions into a form that would likely be most useful to decisionmakers and interested parties, DOE used the same methods it used to calculate the net present value of consumer cost savings. DOE converted the estimated yearly reductions in $CO_2$ emissions into monetary values, which were then discounted over the life of the affected equipment to the present using both 3-percent and 7-percent discount rates.

In the October 2008 NOPR, DOE proposed to use the range $0 to $20 per ton for the year 2007 in 2007$. 73 FR 62034, 62110 (Oct. 17, 2008). These estimates were based on a previous analysis that used a range of no benefit to an average benefit value reported by the Intergovernmental Panel on Climate Change (IPCC).[40] DOE derived the IPCC

[38] 70 FR 28606 (May 18, 2005).

[39] 517 F.3d 574 (D.C. Cir. 2008).

[40] During the preparation of its most recent review of the state of climate science, the IPCC identified various estimates of the present value of reducing $CO_2$ emissions by 1 ton over the life that these emissions would remain in the atmosphere. The estimates reviewed by the IPCC spanned a range of values. Absent a consensus on any single estimate of the monetary value of $CO_2$ emissions, DOE used the estimates identified by the study cited in ''Summary for Policymakers,'' prepared by Working Group II of the IPCC's ''Fourth Assessment Report,'' to estimate the potential monetary value of

estimate used as the upper bound value from an estimate of the mean value of worldwide impacts due to climate change and not just the effects likely to occur within the United States. This previous analysis assumed that the appropriate value should be restricted to a representation of those costs and benefits likely to be experienced in the United States. DOE explained in the October 2008 NOPR that it expects such domestic values would be lower than comparable global values; however, there currently are no consensus estimates for the U.S. benefits likely to result from $CO_2$ emission reductions. Because U.S.-specific estimates were unavailable and DOE did not receive any additional information that would help narrow the proposed range of domestic benefits, DOE used the global mean value as an upper bound U.S. value.

The Joint Comment asserted that DOE should use the EIA analysis of the Climate Security Act from April 2008, including future price escalation, to estimate the cost of avoiding $CO_2$ emissions. The core scenario of this analysis specifies a $17 price per ton of $CO_2$ with an annual 7.4 percent yearly increase forecast. (Joint Comment, No. 44 at p. 12) Whirlpool stated that the regulation of $CO_2$ should be restricted to the regulation of power plants and, therefore, does not support an attempt to value those emissions as part of this rulemaking. (Whirlpool, No. 50 at p. 8)

The Department of Energy, together with other Federal agencies, is currently reviewing various methodologies for estimating the monetary value of reductions in $CO_2$ and other greenhouse gas emissions. This 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, such as whether the appropriate values should represent domestic U.S. or global benefits (and costs). Given the complexity of the many issues involved, this review is ongoing. However, consistent with DOE's legal obligations, and taking into account the uncertainty involved with this particular issue, DOE has included in this rulemaking the values and analyses previously conducted.

Given the uncertainty surrounding estimates of the social cost of carbon, DOE previously concluded that relying on any single estimate may be inadvisable because that estimate will depend on many assumptions. Working Group II's contribution to the ''Fourth Assessment Report'' of the IPCC notes the following:

> The large ranges of SCC are due in the large part to differences in assumptions regarding climate sensitivity, response lags, the treatment of risk and equity, economic and non-economic impacts, the inclusion of potentially catastrophic losses, and discount rates.[41]

Because of this uncertainty, DOE previously used the SCC value from Tol (2005), which was presented in the IPCC's ''Fourth Assessment Report'' and provided a comprehensive meta-analysis of estimates for the value of SCC. Tol released an update of his 2005 meta-analysis in September 2007 that reported an increase in the mean estimate of SCC from $43 to $71 per ton carbon. Although the Tol study was updated in 2007, the IPCC has not adopted the update. As a result, DOE previously decided to continue to rely on the study cited by the IPCC. DOE notes that the conclusions of Tol in 2007 are similar to the conclusions of Tol in 2005. In 2007, Tol continues to indicate that there is no consensus regarding the monetary value of reducing $CO_2$ emissions by 1 ton. The broad range of values in both Tol studies are the result of significant differences in the methodologies used in the studies Tol summarized. According to Tol, all of the studies have shortcomings, largely because the subject is inherently complex and uncertain and requires broad multidisciplinary knowledge. Thus, it was not certain that the values reported in Tol in 2007 are more accurate or representative than the values reported in Tol in 2005.

For today's final rule, DOE continues to use the range of values proposed in the October 2008 NOPR, which was based on the values presented in Tol (2005) as proposed. Additionally, DOE applied an annual growth rate of 2.4 percent to the value of SCC, as suggested by the IPCC Working Group II (2007, p. 822). This growth rate is based on estimated increases in damage from future emissions that published studies have reported. Because the values in Tol (2005) were presented in 1995 dollars, DOE calculated more current values, assigning a range for SCC of $0 to $20 (2007$) per ton of $CO_2$ emissions.

The upper bound of the range DOE used is based on Tol (2005), which reviewed 103 estimates of SCC from 28 published studies. Tol concluded that when only peer-reviewed studies published in recognized journals are considered, ''climate change impacts may be very uncertain but [it] is unlikely that the marginal damage costs of carbon dioxide emissions exceed $50 per ton carbon [comparable to a 2007 value of $20 per ton carbon dioxide when expressed in 2007 U.S. dollars with a 2.4 percent growth rate].''

In setting a lower bound, DOE previous analysis agreed with the IPCC Working Group II (2007) report that ''significant warming across the globe and the locations of significant observed changes in many systems consistent with warming is very unlikely to be due solely to natural variability of temperatures or natural variability of the systems'' (p. 9), and thus tentatively concluded that a global value of zero for the SCC cannot be justified. However, DOE previously concluded that it is reasonable to allow for the possibility that the SCC for the United States may be quite low. In fact, some of the studies examined by Tol (2005) reported negative values for the SCC. As stated in the October 2008 NOPR, DOE assumed that it was most appropriate to use U.S. benefit values rather than world benefit values in its analysis, and U.S. values will likely be lower than the global values. As indicated above, DOE, together with other Federal agencies, is now reviewing whether this previous analysis should be modified. However, it is very unlikely that possible changes in this methodology would affect the conclusions reached in this rulemaking.

Table VI.27 presents the resulting estimates of the potential range of net present value benefits associated with reducing $CO_2$ emissions.

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$CO_2$ reductions likely to result from standards considered in this rulemaking. According to IPCC, the mean social cost of carbon (SCC) reported in studies published in peer-reviewed journals was $43 per ton of carbon. This translates into about $12 per ton of $CO_2$. The literature review (Tol 2005) from which this mean was derived did not report the year in which these dollars were denominated. However, DOE understands this estimate was for the year 1995 denominated in 1995$. Updating that estimate to 2007$ yields a SCC for the year 1995 of $15 per ton of $CO_2$.

[41] ''Climate Change 2007—Impacts, Adaptation and Vulnerability.'' Contribution of Working Group II to the ''Fourth Assessment Report'' of the IPCC, 17. Available at *http://www.ipcc.ch/ipccreports/ar4-wg2.htm* (last accessed Aug. 7, 2008).

TABLE VI.27—ESTIMATES OF VALUE OF $CO_2$ EMISSIONS REDUCTIONS UNDER TRIAL STANDARD LEVELS AT SEVEN-PERCENT AND THREE-PERCENT DISCOUNT RATES

| Conventional cooking product TSL | Estimated cumulative $CO_2$ emission reductions *Mt* | Value at 7% discount rate *million 2007$* | Value at 3% discount rate *million 2007$* |
|---|---|---|---|
| 1 | 13.74 | $0 to $109 | $0 to $241. |
| 2 | 15.46 | $0 to $122 | $0 to $270. |
| 3 | 23.39 | $0 to $182 | $0 to $408. |
| 4 | 34.96 | $0 to $269 | $0 to $610. |
| **Microwave oven energy factor TSL** | **Estimated cumulative $CO_2$ emission reductions *Mt*** | **Value at 7% discount rate *million 2007$*** | **Value at 3% discount rate *million 2007$*** |
| 1 | 22.88 | $0 to $192 | $0 to $404. |
| 2 | 33.46 | $0 to $277 | $0 to $589. |
| 3 | 53.89 | $0 to $443 | $0 to $948. |
| 4 | 74.67 | $0 to $612 | $0 to $1313. |

DOE also investigated the potential monetary benefit of reduced $SO_2$, $NO_X$, and Hg emissions from the TSLs it considered. As previously stated, DOE's initial analysis assumed the presence of nationwide emission caps on $SO_2$ and Hg, and caps on $NO_X$ emissions in the 28 States covered by CAIR. In the presence of these caps, DOE concluded that no physical reductions in power sector emissions would occur, but that the standards could put downward pressure on the prices of emissions allowances in cap-and-trade markets. Estimating this effect is very difficult because of factors such as credit banking, which can change the trajectory of prices. DOE has concluded that the effect from energy conservation standards on $SO_2$ allowance prices is likely to be negligible based on runs of the NEMS–BT model. See chapter 16 of the TSD accompanying this notice for further details.

Because the courts have decided to allow the CAIR rule to remain in effect, projected annual $NO_X$ allowances from NEMS–BT are relevant. As noted above, standards would not produce an economic impact in the form of lower prices for emissions allowance credits in the 28 eastern States and DC covered by the CAIR cap. New or amended energy conservation standards would reduce $NO_X$ emissions in those 22 States that are not affected by CAIR. For the area of the United States not covered by CAIR, 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 $421 per ton to $4,326 per ton in 2006$).[42]

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. DOE conducted research for today's final rule and determined that the impact of mercury emissions from power plants on humans is considered highly uncertain. However, DOE identified two estimates of the environmental damage of mercury based on two 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 is based on an estimate of the current aggregate cost of the loss of IQ in American children that results from exposure to mercury of U.S. power plant origin ($1.3 billion per year in year 2000$), which works out to $31.7 million per ton emitted per year (2006$).[43] The low-end estimate is $0.66 million per ton emitted (in 2004$) or $0.71 million per ton in 2006$. DOE derived this estimate from a published evaluation of mercury control using different methods and assumptions from the first study, but also based on the present value of the lifetime earnings of children exposed.[44] Table VI.28 and Table VI.29 present the resulting estimates of the potential range of present value benefits associated with reduced national $NO_X$ and Hg emissions from the TSLs DOE considered.

TABLE VI.28—ESTIMATES OF MONETARY VALUE OF REDUCTIONS OF HG AND $NO_X$ BY TRIAL STANDARD LEVEL AT A SEVEN-PERCENT DISCOUNT RATE

| Conventional cooking product TSL | Cumulative $NO_X$ emission reductions *kt* | Value of $NO_X$ emission reductions *million 2006$* | Estimated cumulative Hg emission reductions *t* | Value of estimated Hg emission reductions *million 2006$* |
|---|---|---|---|---|
| 1 | 6.71 | 0.7 to 7.3 | 0 to 0.15 | 0 to 1.3. |
| 2 | 6.88 | 0.7 to 7.5 | 0 to 0.19 | 0 to 1.6. |
| 3 | 10.82 | 1.1 to 11.5 | 0 to 0.28 | 0 to 2.2. |

[42] Office of Management and Budget 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 (2006).

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

[44] 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.

TABLE VI.28—ESTIMATES OF MONETARY VALUE OF REDUCTIONS OF HG AND $NO_X$ BY TRIAL STANDARD LEVEL AT A SEVEN-PERCENT DISCOUNT RATE—Continued

| Conventional cooking product TSL | Cumulative $NO_X$ emission reductions *kt* | Value of $NO_X$ emission reductions *million 2006$* | Estimated cumulative Hg emission reductions *t* | Value of estimated Hg emission reductions *million 2006$* |
|---|---|---|---|---|
| 4 | 16.07 | 1.6 to 16.8 | 0 to 0.41 | 0 to 3.3. |
| **Microwave oven energy factor TSL** | **Cumulative $NO_X$ emission reductions *kt*** | **Value of $NO_X$ emission reductions *million 2006$*** | **Estimated cumulative Hg emission reductions *t*** | **Value of estimated Hg emission reductions *million 2006$*** |
| 1 | 2.55 | 0.3 to 3.2 | 0 to 0.46 | 0 to 3.7 |
| 2 | 3.75 | 0.4 to 4.6 | 0 to 0.68 | 0 to 5.4 |
| 3 | 6.06 | 0.7 to 7.3 | 0 to 1.10 | 0 to 8.6 |
| 4 | 8.42 | 1.0 to 10.2 | 0 to 1.52 | 0 to 11.8 |

TABLE VI.29—ESTIMATES OF MONETARY VALUE OF REDUCTIONS OF HG AND $NO_X$ BY TRIAL STANDARD LEVEL AT A THREE-PERCENT DISCOUNT RATE

| Conventional cooking product TSL | Cumulative $NO_X$ emission reductions *kt* | Value of $NO_X$ emission reductions *million 2006$* | Estimated cumulative Hg emission reductions *t* | Value of estimated Hg emission reductions *million 2006$* |
|---|---|---|---|---|
| 1 | 6.71 | 1.5 to 15.4 | 0 to 0.15 | 0 to 2.6. |
| 2 | 6.88 | 1.5 to 15.7 | 0 to 0.19 | 0 to 3.3. |
| 3 | 10.82 | 2.4 to 24.5 | 0 to 0.28 | 0 to 4.6. |
| 4 | 16.07 | 3.5 to 36.1 | 0 to 0.41 | 0 to 6.9. |
| **Microwave oven energy factor TSL** | **Cumulative $NO_X$ emission reductions *kt*** | **Value of $NO_X$ emission reductions *million 2006$*** | **Estimated cumulative Hg emission reductions *t*** | **Value of estimated Hg emission reductions *million 2006$*** |
| 1 | 2.55 | 0.6 to 6.1 | 0 to 0.46 | 0 to 7.8. |
| 2 | 3.75 | 0.9 to 8.9 | 0 to 0.68 | 0 to 11.3. |
| 3 | 6.06 | 1.4 to 14.4 | 0 to 1.10 | 0 to 18.2. |
| 4 | 8.42 | 1.9 to 19.9 | 0 to 1.52 | 0 to 25.2. |

*D. Conclusion*

1. Overview

EPCA contains criteria for prescribing new or amended energy conservation standards. It provides that any such standard for a covered product 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)) In determining whether a standard is economically justified, the Secretary must determine whether the benefits of the standard exceed its burdens, to the greatest extent practicable, considering the seven factors previously discussed in section II.A of today's final rule. (42 U.S.C. 6295(o)(2)(B)(i)) 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 a new or 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))

In deciding whether to adopt amended or new energy conservation standards for conventional cooking products, and for the cooking efficiency of microwave ovens, respectively, DOE started by examining the maximum technologically feasible levels to determine whether those levels were economically justified. Upon finding that the maximum technologically feasible levels were not economically justified, DOE analyzed the next lower TSL to determine whether that level was economically justified. DOE follows this procedure until it identifies a TSL that is economically justified, or determines that no TSL is economically justified.

Below are tables that summarize the results of DOE's quantitative analysis for each of the TSLs it considered for today's final rule. These tables present the results for each TSL, and will aid the reader in the discussion of costs and benefits of each TSL. The range of values 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 considered other burdens and benefits that affect economic justification. In the case of conventional cooking products, DOE considered the burden on the industry associated with complying with performance standards. Currently, conventional cooking products are not rated for efficiency because DOE has promulgated only prescriptive standards for gas cooking products. Therefore, any proposed performance standards would require the industry to test, rate, and label these cooking products, a significant burden that the industry currently does not bear. In the specific case of gas cooking products, DOE also considered the safety and commercial availability of battery-powered ignition devices as a replacement for standing pilot ignition systems.

2. Conventional Cooking Products

Table VI.30 summarizes the results of DOE's quantitative analysis for the TSLs it considered for conventional cooking products for today's final rule. The impacts at each TSL are measured relative to a no-standards base case.

TABLE VI.30—SUMMARY OF QUANTITATIVE RESULTS FOR CONVENTIONAL COOKING PRODUCTS *

| Category | TSL 1 | TSL 2 | TSL 3 | TSL 4 |
|---|---|---|---|---|
| Primary Energy Saved (quads): | | | | |
| 0% Discount Rate | 0.14 | 0.23 | 0.32 | 0.50 |
| 7% Discount Rate | 0.04 | 0.06 | 0.08 | 0.12 |
| 3% Discount Rate | 0.08 | 0.12 | 0.17 | 0.26 |
| Generation Capacity Reduction (GW) ** | 0.062 | 0.081 | 0.120 | 0.184 |
| NPV of Consumer Impacts (2006$ billion): | | | | |
| 7% Discount Rate | 0.254 | 0.475 | 0.486 | (12.456) |
| 3% Discount Rate | 0.706 | 1.432 | 1.684 | (22.787) |
| Industry Impacts: | | | | |
| Gas Cooktops | | | | |
| Industry NPV (2006$ million) | (5)–(12) | (5)–(12) | (5)–(12) | 28–(99) |
| Industry NPV (% Change) | (2)–(4) | (2)–(4) | (2)–(4) | 10–(34) |
| Electric Cooktops | | | | |
| Industry NPV (2006$ million) | 0 | (2)–(11) | (2)–(11) | 78–(385) |
| Industry NPV (% Change) | 0 | (1)–(3) | (1)–(3) | 22–(107) |
| Gas Ovens | | | | |
| Industry NPV (2006$ million) | (7)–(10) | (7)–(10) | (6)–(41) | (46)–(182) |
| Industry NPV (% Change) | (2) | (2) | (1)–(9) | (10)–(39) |
| Electric Ovens | | | | |
| Industry NPV (2006$ million) | 0 | (8)–(19) | (8)–(19) | (9)–(471) |
| Industry NPV (% Change) | 0 | (1)–(2) | (1)–(2) | (1)–(59) |
| Cumulative Emissions Reductions: † | | | | |
| $CO_2$ (Mt) | 13.74 | 15.46 | 23.39 | 34.96 |
| $NO_X$ (kt) | 6.71 | 6.88 | 10.82 | 16.07 |
| Hg (t) | 0–0.15 | 0–0.19 | 0–0.28 | 0–0.41 |
| Value of Emissions Reductions: | | | | |
| $CO_2$ (2007$ million) | | | | |
| 7% Discount Rate | 0–109 | 0–122 | 0–182 | 0–269 |
| 3% Discount Rate | 0–241 | 0–270 | 0–408 | 0–610 |
| $NO_X$ (2006$ million) | | | | |
| 7% Discount Rate | 0.7–7.3 | 0.7–7.5 | 1.1–11.5 | 1.6–16.8 |
| 3% Discount Rate | 1.5–15.4 | 1.5–15.7 | 2.4–24.5 | 3.5–36.1 |
| Hg (2006$ million) | | | | |
| 7% Discount Rate | 0–1.3 | 0–1.6 | 0–2.2 | 0–3.3 |
| 3% Discount Rate | 0–2.6 | 0–3.3 | 0–4.6 | 0–6.9 |
| Mean LCC Savings * (2006$): | | | | |
| Gas Cooktop/Conventional Burners | 15 | 15 | 15 | (8) |
| Electric Cooktop/Low or High Wattage Open (Coil) Elements | ..... | 4 | 4 | 4 |
| Electric Cooktop/Smooth Elements | ..... | ..... | ..... | (238) |
| Gas Oven/Standard Oven with or w/o a Catalytic Line | 9 | 9 | 9 | (81) |
| Gas Oven/Self-Clean Oven | ..... | ..... | 3 | (4) |
| Electric Oven/Standard Oven with or w/o a Catalytic Line | ..... | 11 | 11 | (50) |
| Electric Oven/Self-Clean Oven | ..... | ..... | ..... | (143) |
| Median PBP (years): | | | | |
| Gas Cooktop/Conventional Burners | 4.3 | 4.3 | 4.3 | 73.0 |
| Electric Cooktop/Low or High Wattage Open (Coil) Elements | ..... | 7.2 | 7.2 | 7.2 |
| Electric Cooktop/Smooth Elements | ..... | ..... | ..... | 1,498 |
| Gas Oven/Standard Oven with or w/o a Catalytic Line | 9.0 | 9.0 | 9.0 | 25.3 |
| Gas Oven/Self-Clean Oven | ..... | ..... | 11.0 | 15.6 |
| Electric Oven/Standard Oven with or w/o a Catalytic Line | ..... | 8.0 | 8.0 | 60.7 |
| Electric Oven/Self-Clean Oven | ..... | ..... | ..... | 236 |
| LCC Consumer Impacts: | | | | |
| Gas Cooktop/Conventional Burners | | | | |
| Net Cost (%) | 0.1 | 0.1 | 0.1 | 93.5 |
| No Impact (%) | 93.5 | 93.5 | 93.5 | 0.0 |
| Net Benefit (%) | 6.4 | 6.4 | 6.4 | 6.5 |
| Electric Cooktop/Low or High Wattage Open (Coil) Elements | | | | |
| Net Cost (%) | ..... | 27.1 | 27.1 | 27.1 |
| No Impact (%) | ..... | 0.0 | 0.0 | 0.0 |
| Net Benefit (%) | ..... | 72.9 | 72.9 | *72.9 |
| Electric Cooktop/Smooth Elements | | | | |
| Net Cost (%) | ..... | ..... | ..... | 100.0 |
| No Impact (%) | ..... | ..... | ..... | 0.0 |
| Net Benefit (%) | ..... | ..... | ..... | 0.0 |
| Gas Oven/Standard Oven with or w/o a Catalytic Line | | | | |
| Net Cost (%) | 5.1 | 5.1 | 5.1 | 93.2 |
| No Impact (%) | 82.3 | 82.3 | 82.3 | 0.0 |
| Net Benefit (%) | 12.6 | 12.6 | 12.6 | 6.8 |
| Gas Oven/Self-Clean Oven | | | | |
| Net Cost (%) | ..... | ..... | 56.1 | 65.0 |
| No Impact (%) | ..... | ..... | 0.0 | 0.0 |
| Net Benefit (%) | ..... | ..... | 43.9 | 35.0 |

TABLE VI.30—SUMMARY OF QUANTITATIVE RESULTS FOR CONVENTIONAL COOKING PRODUCTS *—Continued

| Category | TSL 1 | TSL 2 | TSL 3 | TSL 4 |
|---|---|---|---|---|
| Electric Oven/Standard Oven with or w/o a Catalytic Line | | | | |
| Net Cost (%) | ..... | 42.7 | 42.7 | 94.4 |
| No Impact (%) | ..... | 0.0 | 0.0 | 0.0 |
| Net Benefit (%) | ..... | 57.3 | 57.3 | 5.6 |
| Electric Oven/Self-Clean Oven | | | | |
| Net Cost (%) | ..... | ..... | ..... | 78.5 |
| No Impact (%) | ..... | ..... | ..... | 0.0 |
| Net Benefit (%) | ..... | ..... | ..... | 21.5 |

* Parentheses indicate negative values. For LCCs, a negative value means an increase in LCC by the amount indicated.
** Changes in installed generation capacity in gigawatts (GW) by 2042 based on the *AEO2008* Reference Case.
† $CO_2$ emissions impacts include physical reductions at power plants and at households. $NO_X$ emissions impacts include physical reductions at power plants and at households.

First, DOE considered TSL 4, the max-tech level. TSL 4 would likely save 0.50 quads of energy through 2042, an amount DOE considers significant. Discounted at 7 percent, the projected energy savings through 2042 would be 0.12 quads. TSL 4 would result in a decrease of $12.5 billion in the NPV of consumer benefits, using a discount rate of 7 percent. The emissions reductions at TSL 4 are 34.96 Mt of $CO_2$, 16.07 kt of $NO_X$, and 0 t to 0.41 t of Hg with a corresponding value of $0 to $269 million for $CO_2$, $1.6 to $16.8 million for $NO_X$, and $0 to $3.3 million for Hg, using a discount rate of 7 percent. Total generating capacity in 2042 is estimated to decrease by 0.184 gigawatts (GW) under TSL 4.

At TSL 4, DOE projects that the average conventional cooking product consumer would experience an increase in LCC, with the exception of consumers of electric coil cooktops. In the case of the latter, the average consumer would save $4 in LCC. With the exception of electric coil cooktop consumers, DOE estimated LCC increases at TSL 4 for at least 65 percent of consumers in the Nation that purchase conventional cooking products. The median payback period of each product class, with the exception of electric coil cooktops and gas self-cleaning ovens, is projected to be substantially longer than the mean lifetime of the product.

DOE estimates that the technology needed to attain TSL 4 for electric cooktops (improved contact conductance) may not provide energy savings under field conditions. 73 FR 62034, 62115 (Oct. 17, 2008). Measured efficiency gains from improved contact conductance have been obtained under DOE test procedure conditions using an aluminum test block. To ensure consistent and repeatable testing, the aluminum test block is used to establish cooktop efficiency by measuring the increased heat content of the block during a test measurement. Because the test block is much flatter than actual cooking vessels and, thus, allows for a higher degree of thermal contact between the block and coil element, the efficiency gains with an actual cooking vessel likely may not be as large or may not even be achievable. Therefore, DOE doubts that electric cooktop consumers may actually realize savings with products at TSL 4.

DOE estimated the projected change in INPV at TSL 4 for each of the following four general categories of conventional cooking products: Gas cooktops, electric cooktops, gas ovens, and electric ovens. The projected change in INPV ranges from an increase of $28 million to a decrease of $99 million for gas cooktops, an increase of $78 million to a decrease of $385 million for electric cooktops, a decrease of $46 million to a decrease of $182 million for gas ovens, and a decrease of $9 million to a decrease of $471 million for electric ovens. At TSL 4, DOE recognizes the risk of very large negative impacts if manufacturers' expectations about reduced profit margins are realized. In particular, if the high end of the range of negative impacts is reached as DOE expects, TSL 4 could result in a net loss of 34 percent in INPV to gas cooktop manufacturers, a net loss of 107 percent in INPV to electric cooktop manufacturers, a net loss of 39 percent to gas oven manufacturers, and a net loss of 59 percent to electric oven manufacturers.

After carefully considering the analysis and weighing the benefits and burdens of TSL 4, DOE concludes that the potential benefits of energy savings and emissions reductions are outweighed by the potential multi-million dollar negative net economic cost to the Nation's consumers, the economic burden on many individual consumers, and the large capital conversion costs that could result in a reduction in INPV for manufacturers. In addition, because conventional cooking products are not rated for efficiency, TSL 4 would significantly impact the industry in terms of the added cost of testing, rating, and labeling these products. Consequently, DOE concludes that TSL 4 is not economically justified.

Next, DOE considered TSL 3, which yielded primary energy savings estimated at 0.32 quads of energy through 2042, an amount which DOE considers to be significant. Discounted at 7 percent, the energy savings through 2042 would be 0.08 quads. TSL 3 would result in an increase of $486 million in the NPV of consumer benefit, using a discount rate of 7 percent. The emissions reductions are projected to be 23.39 Mt of $CO_2$, 10.82 kt of $NO_X$, and 0 t to 0.28 t of Hg with a corresponding value of $0 to $182 million for $CO_2$, $1.1 to $11.5 million for $NO_X$, and $0 to $2.2 million for Hg, using a discount rate of 7 percent. Total generating capacity in 2042 under TSL 3 is estimated to decrease by 0.120 GW.

For electric smooth cooktops and electric self-cleaning ovens, TSL 3 does not alter the current absence of a standard because none of the candidate standard levels for these products provide economic savings to consumers. However, average gas and electric coil cooktop consumers would save $15 and $4 in LCC, respectively, at TSL 3. Average consumers of gas standard ovens, gas self-cleaning ovens, and electric standard ovens would realize LCC savings of $9, $3, and $11, respectively, at TSL 3. The median payback period of each product class impacted by TSL 3 is projected to be shorter than the mean lifetime of the products (19 years). For example, at TSL 3 the projected payback period is 4.3 years for average consumers of gas cooktops, whereas the projected payback period is 11.0 years for average consumers of gas self-cleaning ovens.

Although TSL 3 provides LCC savings to the average consumer, DOE estimates a significant percentage of consumers of gas self-cleaning ovens and electric standard ovens would be burdened by

the standard (*i.e.*, experience increases in their LCC). DOE estimates that 56 percent of consumers of gas self-cleaning ovens and 43 percent of consumers of electric standard ovens would be burdened by TSL 3. In the case of electric standard ovens, almost 50 percent of consumers would be burdened. In the case of gas cooktops, 94 percent of consumers are not impacted by TSL 3 (they already purchase cooktops at TSL 3). Of the remaining 6 percent of gas cooktop consumers who are impacted by TSL 3, nearly all would realize LCC savings. For gas standard ovens, 82 percent consumers are not impacted by TSL 3. Of the remaining 18 percent of gas standard oven consumers who are affected by TSL 3, two-thirds realize LCC savings. In the case of electric coil cooktops, more than 70 percent of consumers have a decrease in their LCC. However, the efficiency gain achieved at TSL 3 would be achieved through the same technological change as TSL 4 (improved contact conductance). As noted for TSL 4, DOE has significant doubt that electric cooktop consumers would actually realize economic savings at TSL 3.

At TSL 3, the projected change in INPV for each of the four general categories of conventional cooking products range from a decrease of $5 million to a decrease of $12 million for gas cooktops, a decrease of $2 million to a decrease of $11 million for electric cooktops, a decrease of $6 million to a decrease of $41 million for gas ovens, and a decrease of $8 million to a decrease of $19 million for electric ovens. At TSL 3, DOE recognizes the risk of negative impacts if manufacturers' expectations about reduced profit margins are realized. In particular, if the high end of the range of impacts is reached as DOE expects, TSL 3 could result in maximum net losses of up to 4 percent in INPV for gas cooktop manufacturers, 3 percent for electric cooktop manufacturers, 9 percent for gas oven manufacturers, and 2 percent for electric oven manufacturers.

Although DOE recognizes the economic benefits to the Nation's consumers that could result from TSL 3, DOE concludes that the benefits of a standard at TSL 3 would be outweighed by the economic burden on conventional cooking product consumers. The economic savings realized by average consumers are outweighed by the significant percentage of gas self-cleaning oven and electric standard oven consumers who are burdened by the standard. Considering that TSL 3 also adversely impacts manufacturers' INPV and would place a significant burden on manufacturers to comply with the standards, the benefits of energy savings and emissions reductions are not significant enough to outweigh the burdens of the standard. Consequently, DOE concludes that TSL 3 is not economically justified.

DOE next considered TSL 2. TSL 2 would save 0.23 quads of energy through 2042, an amount DOE considers significant. Discounted at 7 percent, the projected energy savings through 2042 would be 0.06 quads. DOE projects TSL 2 to yield an NPV of consumer benefit of $475 million, using a discount rate of 7 percent. The estimated emissions reductions are 15.46 Mt of $CO_2$, 6.88 kt to of $NO_X$, and 0 t to 0.19 t of Hg with a corresponding value of $0 to $122 million for $CO_2$, $0.7 to $7.5 million for $NO_X$, and $0 to $1.6 million for Hg, using a discount rate of 7 percent. Total generating capacity in 2042 under TSL 2 would likely decrease by 0.081 GW.

The candidate standard levels for each of the product classes that comprise TSL 2 are the same as TSL 3 except for gas self-cleaning ovens. DOE did not alter the current standard and establish an efficiency level for gas self-cleaning ovens for TSL 2 because, as described for TSL 3, efficiency levels that go beyond the baseline level do not yield LCC savings to a majority of gas self-cleaning consumers. For all other product classes, the impacts to consumers at TSL 3 are identical to those at TSL 2.

At TSL 2, the projected change in INPV for each of the four general categories of conventional cooking products range from a decrease of $5 million to a decrease of $12 million for gas cooktops, a decrease of $2 million to a decrease of $11 million for electric cooktops, a decrease of $7 million to a decrease of $10 million for gas ovens, and a decrease of $8 million to a decrease of $19 million for electric ovens. At TSL 2, DOE recognizes the risk of negative impacts if manufacturers' expectations about reduced profit margins are realized. In particular, if the high end of the range of impacts is reached as DOE expects, TSL 2 could result in a net loss of 4 percent in INPV to gas cooktop manufacturers, a net loss of 3 percent in INPV to electric cooktop manufacturers, a net loss of 2 percent to gas oven manufacturers, and a net loss of 2 percent to electric oven manufacturers.

Although DOE recognizes the economic benefits to the Nation's consumers that could result from TSL 2, DOE concludes that the benefits of a standard at TSL 2 would be outweighed by the economic burden that would be placed upon conventional cooking product consumers. The potential economic savings realized by average consumers are outweighed by the significant percentage of electric standard oven consumers who are burdened by the standard and by the significant risk that consumers of electric coil cooktops would not realize the savings projected for that product. TSL 2 would also adversely impact manufacturer INPV and would place a significant burden on manufacturers to comply with the standards. Consequently, the benefits of energy savings and emissions impacts of TSL 2 are not significant enough to outweigh the burdens that would be created by the standard. Consequently, DOE concludes that TSL 2 is not economically justified.

DOE next considered TSL 1. With TSL 1, only amended energy conservation standards consisting of prescriptive requirements to eliminate standing pilots for gas cooktops and gas standard ovens would be promulgated. DOE projects that TSL 1 would save 0.14 quads of energy through 2042, an amount DOE considers significant. Discounted at 7 percent, the projected energy savings through 2042 would be 0.04 quads. DOE projects TSL 1 to yield an NPV of consumer benefit of $254 million, using a discount rate of 7 percent. The estimated emissions reductions are 13.74 Mt of $CO_2$, 6.71 kt of $NO_X$, and 0 t to 0.15 t of Hg with a corresponding value of $0 to $109 million for $CO_2$, $0.7 to $7.3 million for $NO_X$, and $0 to $1.3 million for Hg, using a discount rate of 7 percent. Total generating capacity in 2042 under TSL 1 would decrease by 0.062 GW.

At TSL 1, average gas cooktop and gas standard oven consumers would save $13 and $6 in LCC, respectively. DOE estimates that 94 percent of gas cooktop consumers and 82 percent of gas standard oven consumers would not be affected at TSL 1. Of the remaining impacted consumers, DOE estimates that nearly all gas cooktop consumers and over 70 percent of gas standard oven consumers would realize LCC savings due to the elimination of standing pilots. The median payback period for the impacted consumers is 4.3 years for gas cooktop consumers and 9.0 years for gas standard oven consumers.

At TSL 1, the projected change in INPV ranges from a decrease of $5 million to a decrease of $12 million for gas cooktops and a decrease of $7 million to a decrease of $10 million for gas ovens. At TSL 1, DOE recognizes the risk of negative impacts if

manufacturers' expectations about reduced profit margins are realized. In particular, if the high end of the range of impacts is reached as DOE expects, TSL 1 could result in a net loss of 4 percent in INPV to gas cooktop manufacturers and a net loss of 2 percent to gas oven manufacturers. Although DOE estimates that TSL 1 would lead to some net loss in INPV to gas cooktop and gas oven manufacturers, because TSL 1 is comprised of prescriptive requirements, the industry would not face the additional costs associated with complying with performance requirements. Currently, only prescriptive standards for conventional cooking products are in effect requiring that gas cooking products with an electrical supply cord not be equipped with a constant burning pilot. As a result, conventional cooking product manufacturers are not currently subject to the costs of testing the rated performance of their products to label and comply with performance-based energy conservation standards. Because TSL 1 effectively extends the existing prescriptive requirement to all gas cooking products regardless of whether the products have an electrical supply cord, DOE avoids burdening manufacturers with testing, labeling, and compliance costs that they currently do not bear.

As stated in the October 2008 NOPR, DOE recognizes that there is a small subgroup of consumers that use gas cooking products but are without household electricity. 73 FR 62034, 62116 (Oct. 17, 2008). Under TSL 1, these consumers are likely to be affected because they would be required to use an electrical source for cooking products to operate the ignition system. For the October 2008 NOPR, DOE market research demonstrated that battery-powered electronic ignition systems have been implemented in other products, such as instantaneous gas water heaters, barbeques, and furnaces, and the use of such products is not expressly prohibited by applicable safety standards for gas cooking products. *Id.* Therefore, DOE tentatively concluded for the October 2008 NOPR that households that use gas for cooking and are without electricity would likely have technological options that would enable them to continue to use gas cooking if standing pilot ignition systems are eliminated. *Id.*

However, as detailed in section III.C.2 of today's final rule, numerous interested parties objected to the above conclusion, and in particular, commenters argued that there are currently no commercially available gas cooking products with battery-powered electronic ignition systems that have been certified to applicable U.S. safety standards. In response to these comments, DOE conducted additional research on battery-powered ignition systems for residential gas cooking products, which confirmed commenters' statements regarding the absence of any gas cooking products with battery-powered electronic ignition systems currently certified to applicable U.S. safety standards. However, DOE concludes that the primary barrier to commercialization of battery-powered ignition systems in gas cooking products has been lack of market demand and economic justification rather than technological feasibility. DOE further concludes that a gas range incorporating one of these ignition systems could meet the requirements of ANSI Z21.1. In addition, DOE research suggests that the market niche for gas cooking products equipped with battery-powered ignition systems, which would be created by a standard at TSL 1, would likely attract entrants among ignition component suppliers and, therefore, that technologically feasible alternative ignition systems to standing pilots in gas cooking products for households without electricity will likely be available by the time these energy conservation standards are effective.

Although DOE recognizes the economic impact that a standard at TSL 1 would have upon a small subgroup of consumers of gas cooking products, DOE concludes that the benefits to the significant majority of the Nation's consumers that could result from TSL 1 would outweigh the economic burden that would be placed upon this subgroup. Although TSL 1 would adversely impact manufacturer INPV, DOE has concluded that it would not place a significant burden on manufacturers to comply with the standards in terms of changes to existing manufacturing processes and certification testing. Therefore, the benefits of energy savings and emissions impacts of TSL 1 are significant enough to outweigh the burdens that would be created by the standard. Consequently, DOE concludes that TSL 1 is economically justified.

In sum, after carefully considering the analysis, the comments on the October 2008 NOPR, and the benefits and burdens of each of the TSLs DOE considered, the Secretary concludes that amended standards for cooking efficiency of conventional cooking products, consisting of a prohibition of constant burning pilots for all gas kitchen ranges and ovens, will save a significant amount of energy and are technologically feasible and economically justified. In addition, the Secretary also concludes that no amended cooking efficiency standard is both technologically feasible and economically justified for residential electric kitchen ranges and ovens. Therefore, DOE is not adopting any energy conservation standards for residential electric kitchen ranges and ovens.

3. Microwave Ovens

Table VI.31 presents a summary of the quantitative results for the microwave oven TSLs pertaining to cooking efficiency. The impacts at each TSL are measured relative to a no-standards base case.

TABLE VI.31—SUMMARY OF QUANTITATIVE RESULTS FOR MICROWAVE OVEN ENERGY FACTOR

| Category | TSL 1 | TSL 2 | TSL 3 | TSL 4 |
|---|---|---|---|---|
| Primary Energy Saved (quads): | | | | |
| 0% Discount Rate | 0.18 | 0.19 | 0.23 | 0.25 |
| 7% Discount Rate | 0.05 | 0.05 | 0.07 | 0.07 |
| 3% Discount Rate | 0.10 | 0.10 | 0.13 | 0.14 |
| Generation Capacity Reduction (GW) ** | 0.137 | 0.207 | 0.340 | 0.477 |
| NPV of Consumer Impacts (2006$ billion): | | | | |
| 7% Discount Rate | (1.23) | (3.33) | (6.32) | (10.05) |
| 3% Discount Rate | (2.06) | (6.05) | (11.68) | (18.70) |
| Industry Impacts: | | | | |
| Industry NPV (2006$ million) | 45–(200) | 118–(388) | 238–(679) | 270–(1171) |
| Industry NPV (% Change) | 3–(14) | 8–(27) | 16–(47) | 19–(80) |
| Cumulative Emissions Impacts: † | | | | |

TABLE VI.31—SUMMARY OF QUANTITATIVE RESULTS FOR MICROWAVE OVEN ENERGY FACTOR—Continued

| Category | TSL 1 | TSL 2 | TSL 3 | TSL 4 |
|---|---|---|---|---|
| $CO_2$ (Mt) | 22.88 | 33.46 | 53.89 | 74.67 |
| $NO_X$ (kt) | 2.55 | 3.75 | 6.06 | 8.42 |
| Hg (t) | 0–0.46 | 0–0.68 | 0–1.10 | 0–1.52 |
| Value of Emissions Reductions: | | | | |
| $CO_2$ (2007$ million) | | | | |
| 7% Discount Rate | 0–192 | 0–277 | 0–443 | 0–612 |
| 3% Discount Rate | 0–404 | 0–589 | 0–948 | 0–1313 |
| $NO_X$ (2006$ million) | | | | |
| 7% Discount Rate | 0.3–3.2 | 0.4–4.6 | 0.7–7.3 | 1.0–10.2 |
| 3% Discount Rate | 0.6–6.1 | 0.9–8.9 | 1.4–14.4 | 1.9–19.9 |
| Hg (2006$ million) | | | | |
| 7% Discount Rate | 0–3.7 | 0–5.4 | 0–8.6 | 0–11.8 |
| 3% Discount Rate | 0–7.8 | 0–11.3 | 0–18.2 | 0–25.2 |
| Mean LCC Savings * (2006$) | (7) | (21) | (40) | (66) |
| Median PBP (years) | 29.9 | 58.1 | 82.8 | 116.6 |
| LCC Consumer Impacts: | | | | |
| Net Cost (%) | 90.6 | 97.6 | 99.2 | 99.8 |
| No Impact (%) | 0.0 | 0.0 | 0.0 | 0.0 |
| Net Benefit (%) | 9.4 | 2.4 | 0.8 | 0.2 |

* Parentheses indicate negative values. For LCCs, a negative value means an increase in LCC by the amount indicated.
** Changes in installed generation capacity by 2042 based on the *AEO2008* Reference Case.
† $CO_2$ emissions impacts include physical reductions at power plants. $NO_X$ emissions impacts include physical reductions at power plants.

First, DOE considered TSL 4, the max-tech level for microwave oven cooking efficiency. TSL 4 would save 0.25 quads of energy through 2042, an amount DOE considers significant. Discounted at 7 percent, the projected energy savings through 2042 would be 0.07 quads. TSL 4 would result in a decrease of $10.05 billion in the NPV of consumer impacts, using a discount rate of 7 percent. The emissions reductions at TSL 4 are 74.67 Mt of $CO_2$, 8.42 kt of $NO_X$, and 0 t to 1.52 t of Hg with a corresponding value of $0 to $612 million for $CO_2$, $1.0 to $10.2 million for $NO_X$, and $0 to $11.8 million for Hg, using a discount rate of 7 percent. Total generating capacity in 2042 is estimated to decrease compared to the reference case by 0.477 GW.

At TSL 4, DOE projects that the average microwave oven consumer would experience an increase in LCC. The median payback period for the average consumer is projected to be substantially longer than the mean lifetime of the product.

DOE estimated the projected change in INPV ranges at TSL 4 from an increase of $270 million to a decrease of $1.171 billion. At TSL 4, DOE recognizes the risk of very large negative impacts if manufacturers' expectations about reduced profit margins are realized. In particular, if the high end of the range of negative impacts is reached, as DOE expects, TSL 4 could result in a net loss of 80 percent in INPV to microwave oven manufacturers.

After carefully considering the analysis and weighing the benefits and burdens of TSL 4, DOE concludes that the benefits of energy savings and emissions reductions would be outweighed by a large decrease in the NPV of consumer impacts, the economic burden on many consumers, and the large capital conversion costs that could result in a reduction in INPV for manufacturers. Consequently, DOE concludes that TSL 4 is not economically justified.

DOE next considered TSL 3. Primary energy savings are estimated at 0.23 quads of energy through 2042, which DOE considers significant. Discounted at 7 percent, the energy savings through 2042 would be 0.07 quads. TSL 3 would result in a decrease of $6.32 billion in the NPV of consumer benefit, using a discount rate of 7 percent. The emissions reductions are projected to be 53.89 Mt of $CO_2$, 6.06 kt of $NO_X$, and 0 t to 1.10 t of Hg with a corresponding value of $0 to $443 million for $CO_2$, $0.7 to $7.3 million for $NO_X$, and $0 to $8.6 million for Hg, using a discount rate of 7 percent. Total generating capacity in 2042 under TSL 3 is estimated to decrease by 0.340 GW.

At TSL 3, DOE projects that the average microwave oven consumer would experience an increase in LCC. The median payback period of the average consumer is projected to be substantially longer than the mean lifetime of the product.

DOE estimated the projected change in INPV ranges from an increase of $238 million to a decrease of $679 million. At TSL 3, DOE recognizes the risk of very large negative impacts if manufacturers' expectations about reduced profit margins are realized. In particular, if the high end of the range of negative impacts is reached, as DOE expects, TSL 3 could result in a net loss of 47 percent in INPV to microwave oven manufacturers.

After carefully considering the analysis and weighing the benefits and burdens of TSL 3, DOE concludes that the benefits of energy savings and emissions reductions would be outweighed by the large decrease in the NPV of consumer impacts, the economic burden on many consumers, and the large capital conversion costs that could result in a reduction in INPV for manufacturers. Consequently, DOE concludes that TSL 3 is not economically justified.

DOE next considered TSL 2. DOE projects that TSL 2 would save 0.19 quads of energy through 2042, an amount DOE considers significant. Discounted at 7 percent, the projected energy savings through 2042 would be 0.05 quads. DOE projects TSL 2 to result in a decrease in the NPV of consumer impacts of $3.33 billion. The estimated emissions reductions are 33.46 Mt of $CO_2$, 3.75 kt of $NO_X$, and 0 t to 0.68 t of Hg with a corresponding value of $0 to $227 million for $CO_2$, $0.4 to $4.6 million for $NO_X$, and $0 to $5.4 million for Hg, using a discount rate of 7 percent. Total generating capacity in 2042 under TSL 2 would likely decrease by 0.207 GW.

At TSL 2, DOE projects that the average microwave oven consumer would experience an increase in LCC. The median payback period of the average consumer is projected to be substantially longer than the mean lifetime of the product.

At TSL 2, the projected change in INPV ranges from an increase of $118 million to a decrease of $388 million. At

TSL 2, DOE recognizes the risk of negative impacts if manufacturers' expectations about reduced profit margins are realized. In particular, if the high end of the range of negative impacts is reached, as DOE expects, TSL 2 could result in a net loss of 27 percent in INPV to microwave oven manufacturers.

After carefully considering the analysis and weighing the benefits and burdens of TSL 2, DOE concludes that the benefits of energy savings and emissions reductions would be outweighed by the large decrease in the NPV of consumer impacts, the economic burden on many consumers, and the large capital conversion costs that could result in a reduction in INPV for manufacturers. Consequently, DOE concludes that TSL 2 is not economically justified.

DOE next considered TSL 1. DOE projects that TSL 1 would save 0.18 quads of energy through 2042, an amount DOE considers significant. Discounted at 7 percent, the projected energy savings through 2042 would be 0.05 quads. For the Nation as a whole, DOE projects TSL 1 to result in a decrease in the NPV of consumer impacts of $1.23 billion. The estimated emissions reductions are 22.88 Mt of $CO_2$, 2.55 kt of $NO_X$, and 0 t to 0.46 t of Hg with a corresponding value of $0 to $192 million for $CO_2$, $0.3 to $3.2 million for $NO_X$, and $0 to $3.7 million for Hg, using a discount rate of 7 percent. Total generating capacity in 2042 under TSL 1 would likely decrease by 0.137 GW.

At TSL 1, DOE projects that the average microwave oven consumer would experience an increase in LCC. The median payback period of the average consumer is projected to be substantially longer than the mean lifetime of the product.

At TSL 1, the projected change in INPV ranges from a decrease of $45 million to a decrease of $200 million. At TSL 1, DOE recognizes the risk of negative impacts if manufacturers' expectations about reduced profit margins are realized. In particular, if the high end of the range of impacts is reached, as DOE expects, TSL 1 could result in a net loss of 14 percent in INPV to microwave oven manufacturers.

After carefully considering the analysis and weighing the benefits and burdens of TSL 1, DOE concludes that the benefits of energy savings and emissions reductions would be outweighed by the large decrease in the NPV of consumer impacts, the economic burden on many consumers, and the large capital conversion costs that could result in a reduction in INPV for manufacturers. Consequently, DOE concludes that TSL 1 is not economically justified.

In sum, after carefully considering the analysis, the comments on the October 2008 NOPR, and the benefits and burdens of each of the TSLs DOE considered, the Secretary concludes that no amended standard is both technologically feasible and economically justified for microwave oven EF. Therefore, DOE is not adopting any energy conservation standard for microwave oven EF.

## VII. Procedural Issues and Regulatory Review

### *A. Review Under Executive Order 12866*

Today's regulatory action has been determined to be a ''significant regulatory action'' under section 3(f)(1) of Executive Order 12866, ''Regulatory Planning and Review.'' 58 FR 51735 (Oct. 4, 1993). Accordingly, this action was subject to review under the Executive Order by the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget.

The Executive Order requires each agency to identify in writing the specific market failure or other specific problem that it intends to address that warrants agency action, as well as to assess the significance of that problem in evaluating whether any new regulation is warranted. Executive Order 12866, section 1(b)(1).

The October 2008 NOPR evaluated the market failure that the proposed rule would address. 73 FR 62034, 62122–23 (Oct. 17, 2008). DOE's analysis for some residential gas cooking products explicitly quantifies and accounts for the percentage of consumers that already purchase more efficient equipment and takes these consumers into account when determining the national energy savings associated with various TSLs. The analysis suggests that accounting for the market value of energy savings alone (*i.e.*, excluding any possible additional ''externality'' benefits such as those noted below) would produce enough benefits to yield net benefits across a wide array of products and circumstances. In the October 2008 NOPR, DOE requested additional data (including the percentage of consumers purchasing more efficient cooking products and the extent to which consumers of all product types will continue to purchase more efficient equipment), in order to test the existence and extent of these consumer actions. 73 FR 62034, 62123 (Oct. 17, 2008). DOE received no such data from interested parties in response to the October 2008 NOPR.

DOE believes that there is a lack of consumer information and/or information processing capability about energy efficiency opportunities in the home appliance market. If this is the case, DOE would expect the energy efficiency for cooking products to be randomly distributed across key variables such as energy prices and usage levels. DOE has already identified the percentage of consumers that already purchase more efficient gas cooktops and gas standard ovens. However, DOE does not correlate the consumer's usage pattern and energy price with the efficiency of the purchased product. In the October 2008 NOPR, DOE sought data on the efficiency levels of existing cooking products by how often they are used (*e.g.*, how many times or hours the product is used) and their associated energy prices (and/or geographic regions of the country). *Id.* DOE received no such data from interested parties in response to the October 2008 NOPR. Therefore, DOE was unable to test for today's final rule the extent to which purchasers of cooking products behave as if they are unaware of the costs associated with their energy consumption.

A related issue is asymmetric information (one party to a transaction has more and better information than the other) and/or high transactions costs (costs of gathering information and effecting exchanges of goods and services). In many instances, the party responsible for an appliance purchase may not be the one who pays the cost to operate it. For example, home builders in large-scale developments often make decisions about appliances without input from home buyers and do not offer options to upgrade those appliances. Also, apartment owners normally make decisions about appliances, but renters often pay the utility bills. If there were no transactions costs, it would be in the home builders' and apartment owners' interest to install appliances that buyers and renters would choose. For example, one would expect that a renter who knowingly faces higher utility bills from low-efficiency appliances would be willing to pay less in rent, and the apartment owner would indirectly bear the higher utility cost. However, this information is not readily available, and it may not be in the renter's interest to take the time to develop it, or, in the case of the landlord who installs a high-efficiency appliance, to convey that information to the renter.

To the extent that asymmetric information and/or high transactions costs are problems, one would expect to find certain outcomes for appliance energy efficiency. For example, all things being equal, one would not expect to see higher rents for apartments with high-efficiency appliances. Conversely, if there were symmetric information, one would expect appliances with higher energy efficiency in rental units where the rent includes utilities compared to those where the renter pays the utility bills separately. Similarly, for single-family homes, one would expect higher energy efficiency levels for replacement units than for appliances installed in new construction. Within the new construction market, one would expect to see appliances with higher energy efficiency levels in custom-built homes (where the buyer has more say in appliance choices) than in comparable homes built in large-scale developments.

DOE received no data from interested parties in response to the October 2008 NOPR on the issue of asymmetric information and/or high transactions costs. Therefore, DOE was unable to determine for today's final rule the extent to which asymmetric information and/or high transaction costs are a market failure.

In addition, this rulemaking is likely to yield certain external benefits resulting from improved energy efficiency of cooking products that are not captured by the users of such equipment. These benefits include externalities related to environmental protection and energy security that are not reflected in energy prices, such as reduced emissions of greenhouse gases. The TSLs which 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.

DOE conducted an RIA and, under the Executive Order, was subject to review by the Office of Information and Regulatory Affairs (OIRA) in the OMB. DOE presented to OIRA the draft final rule and other documents prepared for this rulemaking, including the RIA, and has included these documents in the rulemaking record. They 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) 586–9127, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays.

The RIA is contained as chapter 17 in the TSD prepared for the rulemaking. 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. In today's final rule DOE is not adopting any standards for microwave ovens. Therefore, DOE performed an RIA solely for conventional cooking products for today's final rule.

The RIA calculates the effects of feasible policy alternatives to energy conservation standards for conventional cooking products and provides a quantitative comparison of the impacts of the alternatives. DOE evaluated each alternative in terms of its ability to achieve significant energy savings at reasonable costs, and compared it to the effectiveness of the proposed rule. DOE analyzed these alternatives using a series of regulatory scenarios as input to the NIA Spreadsheets for the two appliance products, which it modified to allow inputs for voluntary measures. For more details on how DOE modified the NIA spreadsheets to determine the impacts due to the various non-regulatory alternatives to standards, refer to chapter 17 of the TSD accompanying this notice.

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

- No new regulatory action;
- Financial incentives;
  - Consumer rebates;
  - Consumer tax credits;
  - Manufacturer tax credits;
- Voluntary energy efficiency targets;
- Bulk government purchases;
- Early replacement; and
- The proposed approach (national performance and prescriptive standards).

TABLE VII.1—NON-REGULATORY ALTERNATIVES TO STANDARDS FOR CONVENTIONAL COOKING PRODUCTS

| Policy alternatives | Energy savings* quads | Net present value** billion $ | |
|---|---|---|---|
| | | 7% Discount rate | 3% Discount rate |
| No New Regulatory Action | 0 | 0 | 0 |
| Consumer Rebates | 0.12 | 0.21 | 0.60 |
| Consumer Tax Credits | 0.05 | 0.08 | 0.27 |
| Manufacturer Tax Credits | 0.01 | 0.02 | 0.06 |
| Early Replacement | 0.01 | 0.07 | 0.12 |
| Today's Standards at TSL 1 | 0.14 | 0.25 | 0.71 |

* Energy savings are in source quads.

** Net present value is the value in the present of a time series of costs and savings. DOE determined the net present value from 2012 to 2042 in billions of 2006 dollars.

*** Voluntary energy efficiency target and bulk government purchase alternatives are not considered because the percentage of the market at TSL 1 (today's standard) 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 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. The following paragraphs discuss each of the policy alternatives listed in Table VII.1. (See the TSD accompanying this notice, chapter 17.)

*No New Regulatory Action*. The case in which no regulatory action is taken with regard to conventional cooking products constitutes the ''base case'' (or ''No Action'') scenario. In this case, between 2012 and 2042, conventional cooking products are expected to use 10.3 quads of primary energy. Since this

is the base case, energy savings and NPV are zero by definition.

*Consumer Rebates.* Consumer rebates cover a portion of the incremental installed cost difference between products meeting baseline efficiency levels and those meeting higher efficiency levels, which generally result in a higher percentage of consumers purchasing more efficient models. DOE utilized market penetration curves from a study that analyzed the potential of energy efficiency in California.[45] The penetration curves are a function of benefit-cost ratio (*i.e.*, lifetime operating costs savings divided by increased total installed costs) to estimate the increased market share of more efficient products given incentives by a rebate program. Using specific rebate amounts, DOE calculated, for each of the considered products, the benefit-cost ratio of the more efficient appliance with and without the rebate to project the increased market penetration of the product due to a rebate program.

For conventional cooking products meeting the efficiency levels in TSL 1 (*i.e.*, gas cooking products without constant burning pilot lights), DOE estimated that the annual increase in consumer purchases of these products due to consumer rebates would be 7.8 percent. DOE selected the portion of the incremental costs covered by the rebate (*i.e.*, 100 percent) using data from rebate programs conducted by 88 gas utilities, electric utilities, and other State government agencies.[46] DOE estimated that the impact of this policy would be to permanently transform the market so that the increased market share seen in the first year of the program would be maintained throughout the forecast period. At the estimated participation rates, consumer rebates would be expected to provide 0.12 quads of national energy savings and an NPV of $0.21 billion (at a 7-percent discount rate).

Although DOE estimated that consumer rebates would provide national benefits for conventional cooking products, these benefits would be smaller than the benefits resulting from national performance standards at the proposed levels. Thus, DOE rejected consumer rebates as a policy alternative to national performance standards.

*Consumer Tax Credits.* Consumer tax credits cover a percentage of the incremental installed cost difference between products meeting baseline efficiency levels and those with higher efficiencies. Consumer tax credits are considered a viable non-regulatory market transformation program as evidenced by the inclusion of Federal consumer tax credits in EPACT 2005 for various residential appliances. (Section 1333 of EPACT 2005; codified at 26 U.S.C. 25C) DOE reviewed the market impact of tax credits offered by the Oregon Department of Energy (ODOE) (ODOE, No. 35 at p. 1) and Montana Department of Revenue (MDR) (MDR, No. 36 at p. 1) to estimate the effect of a national tax credit program. To help estimate the impacts from such a program, DOE also reviewed analyses prepared for the California Public Utilities Commission,[47] the Northwest Energy Efficiency Alliance,[48] and the Energy Foundation/Hewlett Foundation.[49] For each of the appliance products considered for this rulemaking, DOE estimated that the market effect of a tax credit program would gradually increase over a time period until it reached its maximum impact. Once the tax credit program attained its maximum effect, DOE assumed the impact of the policy would be to permanently transform the market at this level.

For conventional cooking products, DOE estimated that the market share of efficient products meeting TSL 1 would increase by 0.7 percent in 2012 and increase over a 6-year period to an annual maximum of 2.8 percent in 2020. At these estimated participation rates, consumer tax credits would be expected to provide 0.05 quads of national energy savings and an NPV of $0.08 billion (at a 7-percent discount rate).[50]

DOE estimated that while consumer tax credits would yield national benefits for conventional cooking products, these benefits would be much smaller than the benefits from the proposed national performance standards. Thus, DOE rejected consumer tax credits as a policy alternative to national performance standards.

*Manufacturer Tax Credits.* Manufacturer tax credits are considered a viable non-regulatory market transformation program as evidenced by the inclusion of Federal tax credits in EPACT 2005 for manufacturers of residential appliances. (Section 1334 of EPACT 2005; codified at 26 U.S.C. 45M) Similar to consumer tax credits, manufacturer tax credits would effectively result in lower product prices to consumers by an amount that covered part of the incremental price difference between products meeting baseline efficiency levels and those meeting higher efficiency levels. Because these tax credits would go to manufacturers instead of consumers, research indicates that fewer consumers would be affected by a manufacturer tax credit program than by consumer tax credits.[51] [52] Although consumers would benefit from price reductions passed through to them by the manufacturers, research demonstrates that approximately half the consumers who would benefit from a consumer tax credit program would be aware of the economic benefits of more efficient technologies included in an appliance manufacturer tax credit program. In other words, research estimates that half of the effect from a consumer tax credit program is due to publicly available information or promotions announcing the benefits of the program. This effect, referred to as the ''announcement effect,'' is not part of a manufacturer tax credit program. Therefore, DOE estimated that the effect of a manufacturer tax credit program would be only half of the maximum impact of a consumer tax credit program.

For conventional cooking products, the percentage of consumers purchasing products meeting TSL 1 would be expected to increase by 0.6 percent due to a manufacturer tax credit program.[53] DOE assumed that the impact of the manufacturer tax credit policy would be to permanently transform the market so

[45] Rufo, M. and F. Coito, *California's Secret Energy Surplus: The Potential for Energy Efficiency* (prepared for The Energy Foundation and The Hewlett Foundation by Xenergy, Inc.) (2002).

[46] Because DOE was not able to identify consumer rebate programs specific to conventional cooking products, rebate amounts for another kitchen appliance, dishwashers, were used to estimate the impact from a rebate program providing incentives for more efficient cooking products.

[47] Itron and KEMA, *2004/2005 Statewide Residential Retrofit Single-Family Energy Efficiency Rebate Evaluation* (prepared for the California Public Utilities Commission, Pacific Gas And Electric Company, San Diego Gas and Electric Company, Southern California Edison, Southern California Gas Company, CPUC–ID# 1115–04) (2007).

[48] KEMA, *Consumer Product Market Progress Evaluation Report 3* (prepared for Northwest Energy Efficiency Alliance, Report #07–174) (2007).

[49] Rufo, M., and F. Coito, *op. cit.*

[50] Because DOE was not able to identify consumer tax credit programs specific to conventional cooking products, increased market penetrations for another kitchen appliance, dishwashers, were used to estimate the impact from a tax credit program providing incentives for more efficient conventional cooking products and microwave ovens.

[51] K. Train, *Customer Decision Study: Analysis of Residential Customer Equipment Purchase Decisions* (prepared for Southern California Edison by Cambridge Systematics, Pacific Consulting Services, The Technology Applications Group, and California Survey Research Services) (1994).

[52] Lawrence Berkeley National Laboratory, End-Use Forecasting Group. *Analysis of Tax Credits for Efficient Equipment (1997).* Available at *http://enduse.lbl.gov/Projects/TaxCredits.html.* (Last accessed April 24, 2008.)

[53] DOE assumed that the manufacturer tax credit program would affect only consumers of gas cooking products, who did not need electric outlets installed; therefore the increased percentage impact includes only those consumers.

that the increased market share seen in the first year of the program would be maintained throughout the forecast period.

At the above estimated participation rates, manufacturer tax credits would provide 0.01 quads of national energy savings and an NPV of $0.02 billion (at a 7-percent discount rate) for conventional cooking products.

DOE estimated that while manufacturer tax credits would yield national benefits for conventional cooking products, these benefits would be much smaller than the benefits from national performance standards. Thus, DOE rejected manufacturer tax credits as a policy alternative to the proposed national performance standards.

*Voluntary Energy Efficiency Targets.* DOE estimates the impact of voluntary energy efficiency targets by reviewing the historical and projected market transformation performance of past and current ENERGY STAR programs. However, DOE did not analyze the potential impacts of voluntary energy efficiency targets for conventional cooking products because over 85 percent of the gas range market already meets TSL 1. The ENERGY STAR program typically targets products where a maximum of approximately 25 percent of the existing market meets the target efficiency level.[54] Since the market for gas ranges are well above the 25-percent threshold, DOE did not consider this approach for conventional cooking products.

*Early Replacement.* The early replacement policy alternative envisions a program to replace old, inefficient units with models meeting efficiency levels higher than baseline equipment. Under an early replacement program, State governments or electric and gas utilities would provide financial incentives to consumers to retire the appliance early in order to hasten the adoption of more efficient products. For all of the considered products, DOE modeled this policy by applying a 4-percent increase in the replacement rate above the natural rate of replacement for failed equipment. DOE based this percentage increase on program experience with the early replacement of appliances in the State of Connecticut.[55] DOE assumed the program would continue for as long as it would take to ensure that the eligible existing stock in the year that the program began (2012) was completely replaced.

For conventional cooking products, this policy alternative would replace old, inefficient units with models meeting the efficiency levels in TSL 1. DOE estimated that such an early replacement program would be expected to provide 0.01 quads of national energy savings and an NPV of $0.07 billion (at a 7-percent discount rate).

Although DOE estimated that the above early replacement programs for each of the considered products would provide national benefits, they would be much smaller than the benefits resulting from national performance standards. Thus, DOE rejected early replacement incentives as a policy alternative to national performance standards.

*Bulk Government Purchases.* Under this policy alternative, the government sector would be encouraged to shift their purchases to products that meet the target efficiency levels above baseline levels. Aggregating public sector demand could provide a market signal to manufacturers and vendors that some of their largest customers sought suppliers with products that met an efficiency target at favorable prices. This program also could induce ''market pull'' impacts through manufacturers and vendors achieving economies of scale for high-efficiency products. Under such a program, DOE would assume that Federal, State, and local government agencies would administer it. At the Federal level, such a program would add more efficient products for which the Federal Energy Management Program (FEMP) has energy efficient procurement specifications.

However, DOE did not analyze the potential impacts of bulk government purchases for conventional cooking products because over 85 percent of the gas range market already meets TSL 1. FEMP procurement specifications typically promote products in the top 25 percent of the existing product offerings in terms of efficiency. Since most of the gas ranges sold in the base case already comply with such specifications, DOE was not able to consider this program as a source of data for conventional cooking products.

*National Performance Standards (TSL 1 for conventional cooking products).* As indicated in the paragraphs above, none of the alternatives DOE examined would save as much energy as the amended energy conservation standards. Therefore, DOE will adopt the efficiency levels listed in section VI.D.

*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 (August 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 the General Counsel's Web site: *http://www.gc.doe.gov*.

The Small Business Administration (SBA) classifies manufacturers of household cooking appliances as small businesses if they have 750 or fewer employees. DOE used these small business size standards, published at 61 FR 3286 (Jan. 31, 1996) and codified at 13 CFR part 121, to determine whether any small entities would be required to comply with today's rule. The size standards are listed by North American Industry Classification System (NAICS) code and industry description. Household cooking appliance manufacturing is classified under NAICS 335221.

Bearing in mind the relevant NAICS classification above, DOE determined that none of the manufacturers of microwave ovens sold in the U.S. are small businesses under these SBA classifications. 73 FR 62034, 62130 (Oct. 17, 2008). However, DOE identified two domestic manufacturers of conventional cooking appliances that meet the SBA small business definition and are affected by this rulemaking. *Id.* at 62128. DOE interviewed one of these manufacturers, and also obtained from larger manufacturers information about the impacts of standards on these small manufacturers of conventional cooking products. *Id.* DOE reviewed the proposed rule under the provisions of the Regulatory Flexibility Act and the

[54] Sanchez, M. and A. Fanara, ''New Product Development: The Pipeline for Future ENERGY STAR Growth,'' *Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings* (2000) Vol. 6, pp. 343–354.

[55] Nexus and RLW Analytics, *Impact, Process, and Market Study of the Connecticut Appliance Retirement Program: Overall Report, Final.* (Submitted to Northeast Utilities—Connecticut Light and Power and the United Illuminating Company by Nexus Market Research, Inc. and RLW Analytics, Inc.) (2005).

procedures and policies published on February 19, 2003. *Id.* On the basis of this review, DOE determined that it could not certify that its proposed standards for conventional cooking products (TSL 1), if promulgated, would have no significant economic impact on a substantial number of small entities. *Id.* at 62128–29. DOE made this determination due to the potential impact on manufacturers of gas cooking products generally, including small businesses, of the proposed standard's elimination of standing pilot lights. *Id.*

Because of these potential impacts on small manufacturers, DOE prepared an IRFA during the NOPR stage of this rulemaking. DOE provided the IRFA in its entirety in the October 2008 NOPR (73 FR 62034, 62129–30 (Oct. 17, 2008)), and also transmitted a copy to the Chief Counsel for Advocacy of the SBA for review. Chapter 13 of the TSD accompanying this notice contains more information about the impact of this rulemaking on manufacturers.

DOE has prepared a FRFA for this rulemaking, which is presented in the following discussion. DOE is transmitting a copy of this FRFA to the Chief Counsel for Advocacy of the SBA. The FRFA below is written in accordance with the requirements of the Regulatory Flexibility Act.

1. Reasons for the Final Rule

Title III of EPCA sets forth a variety of provisions designed to improve energy efficiency. Part A of Title III (42 U.S.C. 6291–6309) provides for the ''Energy Conservation Program for Consumer Products Other Than Automobiles.'' The program covers consumer products and certain commercial products (all of which are referred to hereafter as ''covered products''), including residential cooking products. (42 U.S.C. 6292(10)) DOE publishes today's final rule to amend energy conservation standards for conventional cooking appliances by eliminating standing pilot ignition systems.

2. Objectives of, and Legal Basis for, the Rule

EPCA provides criteria for prescribing new or amended standards for covered products and equipment. As indicated above, any new or amended standard for conventional cooking products 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)), although EPCA precludes DOE from adopting any standard that would not result in significant conservation of energy. (42 U.S.C. 6295(o)(3)(B)) Moreover, DOE may not prescribe a standard (1) for certain products, if no test procedure has been established for the product; or (2) if DOE determines by rule that the standard is not technologically feasible or economically justified. (42 U.S.C. 6295(o)(3)) The Act (42 U.S.C. 6295(o)(2)(B)(i)) also provides that, in deciding whether a standard is economically justified, 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, weighing seven factors as described in section II.A of the preamble. EPCA directs DOE to undertake energy conversation standards rulemakings for cooking products according to the schedules established in 42 U.S.C. 6295(h)(2).

3. Description and Estimated Number of Small Entities Regulated

Through market research, interviews with manufacturers of all sizes, and discussions with trade groups, DOE was able to identify two small businesses that manufacture conventional cooking appliances which would be affected by today's rule.

4. Description and Estimate of Compliance Requirements

Potential impacts on all manufacturers of conventional cooking appliances vary by TSL. Margins for all businesses could be impacted negatively by the adoption of any TSL, since all manufacturers have expressed an inability to pass on cost increases to retailers and consumers. The two small domestic businesses under discussion differ from their competitors in that they are focused on cooking appliances and are not diversified appliance manufacturers. Therefore, any rule affecting products manufactured by these small businesses will impact them disproportionately because of their size and their focus on cooking appliances. However, due to the low number of competitors that agreed to be interviewed, DOE was not able to characterize this industry segment with a separate cash-flow analysis due to concerns about maintaining confidentiality and uncertainty regarding the quantitative impact on revenues of a standing pilot ban.

At TSL 1 for gas ovens and gas cooktops, the elimination of standing pilot lights would eliminate one of the niches that these two small businesses serve in the cooking appliance industry. Both businesses also manufacture ovens and cooktops with electronic ignition systems, but the ignition source would no longer be a differentiator within the industry as it is today. The result would be a potential loss of market share since consumers would be able to choose from a wider variety of competitors, all of which operate at much higher production scales.

For all other TSLs concerning conventional cooking appliances (which have not been selected in today's final rule), the impact on small, focused business entities would be proportionately greater than for their competitors since these businesses lack the scale to afford significant R&D expenses, capital expansion budgets, and other resources when compared to larger entities. The exact extent to which smaller entities would be affected, however, is hard to gauge, because manufacturers did not respond to questions regarding all investment requirements by TSL during interviews. Notwithstanding this limitation, research associated with other small entities in prior rulemakings suggests that many costs associated with complying with rulemakings are fixed, regardless of production volume.

Since all domestic manufacturers already manufacture all of their conventional cooking appliances with electronic ignition modules as a standard feature or as an option for consumers, the cost of converting the remaining three domestic manufacturers exclusively to electronic ignition modules would be relatively modest. However, given their focus and scale, any conventional cooking appliance rule would affect these two domestic small businesses disproportionately compared to their larger and more diversified competitor.

5. Significant Issues Raised by Public Comments

Peerless-Premier commented in response to the October 2008 NOPR that it is a privately held company that employs about 300 people located at two manufacturing plants. Peerless-Premier focuses on the value segment of the market, with a large percentage of its business attributable to standing pilot ranges, which represent half of the gas ranges it produces. That company stated that DOE's proposed ban on standing pilot ranges would have a disastrous effect on Peerless-Premier's business. It commented that it has remained competitive largely because of niche positioning in the market, and that many customers choose its product line because of the standing pilot ranges. Without this ''sell benefit,'' Peerless-Premier believes much of its business could go elsewhere, which would ultimately result in significant job losses

at its two manufacturing sites. (Peerless-Premier, No. 42 at pp. 1–2; Peerless Letter, No. 55 at p. 1) AGA expressed concern that, in response to the November 2007 ANOPR, several manufacturers indicated they would be harmed if standing pilots were eliminated, but AGA felt that small business impacts were not adequately addressed. (AGA, Public Meeting Transcript, No. 40.5 at p. 17)

As described earlier, DOE contacted two small manufacturers of conventional cooking products to determine the extent that eliminating standing pilot lights would affect their businesses. Both companies stated they would experience material harm. However, because they did not provide supporting detail, DOE was not able to quantify the exact extent to which smaller entities would be affected. Therefore, DOE cannot verify their claims that they would be severely impacted by a standard that eliminates standing pilot lights. Furthermore, as discussed in section VI.D.2 above, DOE believes alternatives to standing pilot lights exist that would meet the standard in today's final rule, and the Department does not believe manufacturers will be more severely impacted than estimated in the Manufacturers Impact Analysis.

6. Steps DOE Has Taken To Minimize the Economic Impact on Small Manufacturers

In today's final rule, the only TSL under consideration for conventional cooking appliances is the elimination of standing pilot ignition systems for gas ovens and gas cooktops. All manufacturers of such appliances with standing pilot systems stated during interviews that there are no known alternatives on the market today that would allow their appliances to meet safety standards (such as ANSI Z21.1), while not using a line-powered ignition system or standing pilots. Although battery-powered ignition systems have found application in a few cooking products such as the outdoor gas barbeque market, none of such systems have yet to find application in indoor cooking appliances. During an MIA interview, one manufacturer expressed doubt that any third-party supplier would develop such a solution, given the small, and shrinking market that standing pilot-equipped ranges represent. Another manufacturer stated, however, that while the market share of gas cooking products with standing pilot ignition systems has been declining, a substantial market is still served by such appliances. DOE research suggests that battery-powered ignition systems could be incorporated by manufacturers at a modest cost if manufacturer's market research suggested that a substantial number of consumers found such a product attribute important, and that ignition system manufacturers may consider battery-powered ignitions systems a viable niche product when these standards are effective. DOE notes that such systems have been incorporated successfully in a range of related appliances, such as instantaneous water heaters and gas fireplaces. Further, DOE believes that there is nothing in the applicable safety standards that would prohibit such ignition systems from being implemented on gas cooking products. Therefore, DOE believes that households that use gas for cooking and are without electricity will likely have technological options that would enable them to continue to use gas cooking products without standing pilot ignition systems.

In addition to the TSL being considered, the TSD associated with this final rule includes a report referred to in section VII.A in the preamble as the RIA (discussed earlier in this report and in detail in chapter 17 of the TSD accompanying this notice). For conventional cooking appliances, this report discusses the following policy alternatives: (1) No standard, (2) consumer rebates, (3) consumer tax credits, (4) manufacturer tax credits, and (5) early replacement. With the exception of consumer rebates, the energy savings of these regulatory alternatives are at least three times smaller than those expected from the standard levels under consideration. The economic impacts mirror these regulatory alternatives.

The conventional cooking appliance industry is very competitive. The two small businesses differentiate their products from most of their larger competitors by offering their products in non-traditional sizes and with standing pilot ignition systems. Three primary consumer groups purchasing standing pilot-equipped products were identified by manufacturers in their MIA interviews: (1) Consumers without line power near the range (or in the house); (2) consumers who prefer appliances without line power for religious reasons; and (3) consumers seeking the lowest initial appliance cost. Manufacturers could not identify the size of the respective market segments, but demographics suggest that initial price is the primary reason that consumers are opting for standing pilot-equipped ranges. Consumer subgroups that eschew line power and homes without line power cannot alone explain why up to 18 percent of gas cooking appliances are bought with standing pilot ignition systems. Furthermore, all manufacturers already make gas ranges with electronic ignition, including the high-volume domestic manufacturer of conventional cooking appliances with standing pilots. Thus, the primary benefit of standing pilot ignition systems appears to be the differentiation of the small businesses from most higher-volume competitors. While the actual revenue benefit is hard to quantify, both small business manufacturers stated during interviews that the company would expect to experience material economic harm if standing pilot ignition systems were eliminated.

Due to the low number of small business respondents to DOE inquiries and the uncertainty regarding the potential impact of TSL 1 on small conventional cooking appliance manufacturers, DOE was not able to conduct a separate small business impact analysis.

As mentioned above, the other policy alternatives (no standard, consumer rebates, consumer tax credits, manufacturer tax credits, and early replacement) are described in section VII.A of the preamble and in the regulatory impact analysis (chapter 17 of the TSD accompanying this notice). Since the impacts of these policy alternatives are lower than the impacts described above for the proposed standard levels, DOE expects that the impacts to small manufacturers would also be less than the impacts described above for the proposed standard level.

DOE has reviewed today's final rule under the provisions of the Regulatory Flexibility Act and the policies and procedures published on February 19, 2003. The previous discussion describes how small business impacts entered into DOE's selection of today's standards for conventional cooking products. DOE made its decision regarding standards by beginning with the highest level considered (TSL 4) and successively eliminating TSLs until it found a TSL that is both technically feasible and economically justified, taking into account other EPCA criteria. As discussed previously, DOE did not receive detailed data from small manufacturers to quantify the impacts of today's standards on small manufacturers of conventional cooking products.

*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 (PRA) (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 and, as with the proposed rule, today's 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 the potential standards it considered for today's final rule which it has published as chapter 16 within the TSD for the final rule. DOE found the environmental effects associated with today's standard levels for conventional cooking products to be insignificant. Therefore, DOE is issuing a Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 *et seq.*), the regulations of the Council on Environmental Quality (40 CFR parts 1500–1508), and DOE's regulations for compliance with the NEPA (10 CFR part 1021). The FONSI is available in the docket for this rulemaking.

*E. Review Under Executive Order 13132*

Executive Order 13132, ''Federalism,'' 64 FR 43255 (August 4, 1999), imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. The Executive Order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735.

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, DOE examined the proposed rule and determined that the rule 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. 73 FR 62034, 62131 (Oct. 17, 2008). DOE received no comments on this issue in response to the October 2008 NOPR, and its conclusions on this issue are the same for the final rule as they were for the proposed rule. Therefore, DOE is taking 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, the final regulations meet the relevant standards of Executive Order 12988.

*G. Review Under the Unfunded Mandates Reform Act of 1995*

As indicated in the October 2008 NOPR, 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. 73 FR 62034, 62131 (Oct. 17, 2008). DOE concluded that, although the proposed rule would not contain an intergovernmental mandate, it might result in expenditure of $100 million or more in one year by the private sector. *Id.* Therefore, in the October 2008 NOPR, DOE addressed the UMRA requirements that it prepare a statement as to the basis, costs, benefits, and economic impacts of the proposed rule, and that it identify and consider regulatory alternatives to the proposed rule. *Id.* DOE received no comments concerning the UMRA in response to the October 2008 NOPR. However, as explained above, a number of products originally bundled in this rulemaking have either had standards set separately or will be subject to further rulemaking action. Consequently, this final rule will not result in the expenditure of $100 million or more in any one year. Therefore, DOE is taking no further action in today's final rule with respect to the UMRA.

*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 October 2008 NOPR, 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 the proposed 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, and, therefore, takes 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. OMB's 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 OIRA a Statement of Energy Effects for any significant energy action. DOE determined that the proposed rule was not a ''significant energy action'' within the meaning of Executive Order 13211. 73 FR 62034, 62132 (Oct. 17, 2008). Accordingly, it did not prepare a Statement of Energy Effects on the proposed rule. DOE received no comments on this issue in response to the October 2008 NOPR. As with the proposed rule, DOE has concluded that today's final rule is not a significant energy action within the meaning of Executive Order 13211, and has not prepared a Statement of Energy Effects on the 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), which was published in the **Federal Register** on January 14, 2005. 70 FR 2664. The purpose of the Bulletin is to enhance the quality and credibility of the Federal 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 October 2008 NOPR, this includes influential scientific information related to agency regulatory actions, such as the analyses in this rulemaking. 73 FR 62034, 62132 (Oct. 17, 2008).

As more fully set forth in the October 2008 NOPR, DOE held formal in-progress peer reviews of the types of analyses and processes that DOE has used in considering energy conservation standards as part of this rulemaking, and issued a report on these peer reviews. *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. The report will state that it has been determined that the rule is not a ''major rule'' as defined by 5 U.S.C. 804.

## 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 430

Administrative practice and procedure, Energy Conservation test procedures, Household appliances, Imports.

Issued in Washington, DC, on March 31, 2009.

**Steven G. Chalk,**

*Principal Deputy 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 430 is amended to read as set forth below:

## PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

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

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

■ 2. Section 430.32 of subpart C is amended by revising paragraph (j) to read as follows:

### § 430.32 Energy and water conservation standards and effective dates.

* * * * *

(j) *Cooking Products.* (1) Gas cooking products with an electrical supply cord shall not be equipped with a constant burning pilot light. This standard is effective on January 1, 1990.

(2) Gas cooking products without an electrical supply cord shall not be equipped with a constant burning pilot light. This standard is effective on April 9, 2012.

* * * * *

## 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**
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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(o)(2)(B)(i)(V) of the Energy Policy and Conservation Act, as amended, ("ECPA"), 42 U.S.C. § 6295(o)(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 Garza

Deborah A. Garza

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