[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 431

[Docket Number EERE-2014-BT-STD-0027]

RIN 1904-AD31

Energy Conservation Program: Energy Conservation Standards for Commercial Preninse Spray Valves

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

ACTION: Final rule.

SYNOPSIS: The Energy Policy and Conservation Act of 1975 (EPCA), as amended, prescribes energy conservation standards for various consumer products and certain commercial and industrial equipment, including commercial prerinse spray valves (CPSVs). EPCA also requires the U.S. Department of Energy (DOE) to periodically determine whether more-stringent standards would be technologically feasible and economically justified, and would save a significant amount of energy. In this final rule, DOE is adopting more-stringent energy conservation standards for commercial prerinse spray valves because DOE has determined that the amended energy conservation standards for these products would result in significant conservation of energy, and are technologically feasible and economically justified.

DATES: The effective date of this rule is **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Compliance with the amended standards established for commercial prerinse spray valves in this final rule is required on and after **[INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].**

ADDRESSES: The docket, which includes Federal Register notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at www.regulations.gov. All documents in the docket are listed in the www.regulations.gov index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

A link to the docket web page can be found at: www1.eere.energy.gov/buildings/appliance_standards/rulemaking.aspx?ruleid=100. The www.regulations.gov web page contains instructions on how to access all documents, including public comments, in the docket.

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SUPPLEMENTARY INFORMATION:

Table of Contents

I. Summary of the Final Rule

Title III of the Energy Policy and Conservation Act of 1975 (EPCA),[1] sets forth a variety of provisions designed to improve energy efficiency. Part B of title III established the "Energy Conservation Program for Consumer Products Other Than Automobiles." These products include commercial prerinse spray valves (CPSVs), the subject of this document.[2]

Pursuant to EPCA, any new or amended energy conservation standard must be designed to achieve the maximum improvement in energy efficiency that DOE determines is technologically feasible and economically justified. (42 U.S.C. 6295(o)(2)(A)) Furthermore, the new or amended standard must result in significant conservation of energy. (42 U.S.C. 6295(o)(3)(B)) EPCA also provides that not later than

[1] All references to EPCA in this document refer to the statute as amended through the Energy Efficiency Improvements Act of 2015, Pub. L. 114-11 (Apr. 30, 2015).
[2] Because Congress included commercial prerinse spray valves in Part B of Title III of EPCA, the consumer product provisions of Part B (not the industrial equipment provisions of Part C) apply to commercial prerinse spray valves. However, because commercial prerinse spray valves are commonly considered to be commercial equipment, as a matter of administrative convenience and to minimize confusion among interested parties, DOE placed the requirements for commercial prerinse spray valves into Subpart O of 10 CFR part 431. Part 431 contains DOE regulations for commercial and industrial equipment.

6 years after issuance of any final rule establishing or amending a standard, DOE must publish either a notice of determination that standards for the product do not need to be amended, or a notice of proposed rulemaking including new proposed energy conservation standards. (42 U.S.C. 6295(m)(1)) Not later than 2 years after such a notice is issued, DOE must publish a final rule amending the standard for the product. (42 U.S. C. 6295(m)(3)

In accordance with these and other statutory provisions discussed in this document, DOE is adopting amended energy conservation standards for commercial prerinse spray valves. The amended standards, which are expressed in terms of the flow rate (in gallons per minute, gpm) for each product class (defined by spray force in ounce-force, ozf), are shown in Table I.1. The amended standards will apply to all classes of commercial prerinse spray valves listed in Table I.1 that are manufactured in, or imported into, the United States on or after [INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

Table I.1. Amended Energy Conservation Standards for Commercial Prerinse Spray Valves

Product Class	**Maximum Flow Rate gpm**
1. Product Class 1 (≤5.0 ozf)	1.00
2. Product Class 2 (>5.0 ozf and ≤8.0 ozf)	1.20
3. Product Class 3 (>8.0 ozf)	1.28

A. Benefits and Costs to Consumers

Table I.2 presents DOE's evaluation of the economic impacts of the amended standards on commercial prerinse spray valves, as measured by the average life-cycle cost (LCC) savings and the simple payback period (PBP).[3] The average LCC savings are non-negative for all product classes. The PBP for all product classes is also less than the projected average CPSV lifetime of approximately 5 years.

Table I.2 Impacts of Amended Energy Conservation Standards on Consumers of Commercial Prerinse Spray Valves

Product Class	Average LCC Savings 2014$*	Simple Payback Period years**
1. Product Class 1 (≤5.0 ozf)	0	0.0
2. Product Class 2 (>5.0 ozf and ≤8.0 ozf)	0	0.0
3. Product Class 3 (>8.0 ozf)	547	0.0

* Product classes 1 and 2 have zero LCC savings because the no-new-standards case efficiency distribution (see section IV.F.9) shows the entire CPSV market at or above the amended standard for these product classes.
** For product classes 1 and 2, because there is no change in the market resulting from the standard, DOE represented these PBPs as zero. Additionally, in all product classes, because more efficient units do not cost more up front, consumers begin saving money as soon as a more efficient product is installed (the payback is immediate).

DOE's analysis of the impacts of the amended standards on consumers is described in more detail in section IV.F of this document.

B. Impact on Manufacturers

The industry net present value (INPV) is the sum of the discounted cash flows to the industry from the base year through the end of the analysis period (2015 through 2048). Using a real discount rate of 6.9 percent,[4] DOE estimates that the INPV for manufacturers of commercial prerinse spray valves in the case without amended standards (referred to as the no-new-standards case) is $8.6 million in 2014$. Under the amended standards adopted in this final rule, DOE expects that manufacturers may lose

[3] The average LCC savings are measured relative to the no-new-standards case efficiency distribution, which depicts the CPSV market in the compliance year (see section IV.F). The simple PBP, which is designed to compare specific efficiency levels, is measured relative to the baseline CPSV model (see section IV.C.1).
[4] The discount rate is an industry average discount rate, which was estimated using publically available industry financial data for companies that sell CPSVs in the U.S. Data sources are listed in section IV.J.

up to 13.1 percent of this INPV, which is equivalent to approximately $1.1 million. Additionally, based on its analysis of available information, DOE does not expect significant impacts on manufacturing capacity or loss of employment.

DOE's analysis of the impacts of the amended standards on manufacturers is described in more detail in section IV.J of this document.

C. National Benefits and Costs[5]

DOE's analyses indicate that the amended energy conservation standards for commercial prerinse spray valves would save a significant amount of energy and water. Relative to the no-new-standards case, the lifetime energy savings for commercial prerinse spray valves purchased in the 30-year period that begins in the compliance year (2019–2048) amounts to 0.10 quadrillion Btu (quads)[6] and 119.57 billion gallons of water. This represents a savings of 8 percent relative to the energy use of these products in the no-new-standards case. This also represents a savings of 8 percent relative to the water use of these products in the no-new-standards case.

The cumulative net present value (NPV) of total consumer costs and savings of the standards for commercial prerinse spray valves ranges from $0.72 billion (at a 7-percent discount rate) to $1.48 billion (at a 3-percent discount rate). This NPV expresses

[5] All monetary values in this section are expressed in 2014 dollars and, where appropriate, are discounted to 2015 unless explicitly stated otherwise. Energy savings in this section refer to the full-fuel-cycle savings (see section IV.H for discussion).

[6] A quad is equal to 10^{15} British thermal units (Btu). The quantity refers to full-fuel-cycle (FFC) energy savings. FFC energy savings includes the energy consumed in extracting, processing, and transporting primary fuels (i.e., coal, natural gas, petroleum fuels), and, thus, presents a more complete picture of the impacts of energy efficiency standards. For more information on the FFC metric, see section IV.H.1.

the estimated total value of future operating-cost savings minus the estimated increased product costs for commercial prerinse spray valves purchased in 2019–2048.

In addition, the standards for commercial prerinse spray valves are projected to yield significant environmental benefits. DOE estimates that the standards will result in cumulative emission reductions (from 2019–2048) of 5.87 million metric tons (Mt)[7] of carbon dioxide (CO_2), 1.79 thousand tons of sulfur dioxide (SO_2), 14.70 thousand tons of nitrogen oxides (NO_X), 47.37 thousand tons of methane (CH_4), 0.04 thousand tons of nitrous oxide (N_2O), and 0.01 tons of mercury (Hg).[8] The cumulative reduction in CO_2 emissions through 2030 amounts to 1.86 Mt, which is equivalent to the emissions resulting from the annual electricity use of about 255,000 homes.

The value of the CO_2 reductions is calculated using a range of values per metric ton of CO_2 (otherwise known as the Social Cost of Carbon, or SCC) developed by a recent Federal interagency working group.[9] The derivation of the SCC values is discussed in section IV.L of this document. Using discount rates appropriate for each set of SCC values, DOE estimates that the net present monetary value of the CO_2 emissions reduction (not including CO_2 equivalent emissions of other gases with global warming

[7] A metric ton is equivalent to 1.1 short tons. Results for NOx and Hg are presented in short tons.
[8] DOE calculated emissions reductions relative to the no-new-standards-case, which reflects key assumptions in the Annual Energy Outlook 2015 (AEO2015) Reference case, which generally represents current legislation and environmental regulations for which implementing regulations were available as of October 31, 2014.
[9] Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Carbon, United States Government (May 2013; revised July 2015) (Available at: http:// www.whitehouse.gov/sites/default/files/omb/inforeg/scc-tsd-final-july-2015.pdf).

potential) is between $0.04 billion and $0.59 billion. DOE also estimates that the net present monetary value of the NO_X emissions reduction is between $24 and $53 million at a 7-percent discount rate, and between $52 and $117 million at a 3-percent discount rate.[10]

Table I.3 summarizes the national economic benefits and costs expected to result from the amended standards for commercial prerinse spray valves.

[10] DOE estimated the monetized value of NOx emissions reductions using benefit per ton estimates from the Regulatory Impact Analysis titled, "Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants," published in June 2014 by EPA's Office of Air Quality Planning and Standards. (Available at: http://www3.epa.gov/ttnecas1/regdata/RIAs/111dproposalRIAfinal0602.pdf.) See section IV.L.2 for further discussion. Note that the agency is presenting a national benefit-per-ton estimate for particulate matter emitted from the Electricity Generating Unit sector based on an estimate of premature mortality derived from the ACS study (Krewski et al., 2009). If the benefit-per-ton estimates were based on the Six Cities study (Lepuele et al., 2011), the values would be nearly two-and-a-half times larger. Because of the sensitivity of the benefit-per-ton estimate to the geographical considerations of sources and receptors of emissions, DOE intends to investigate refinements to the agency's current approach of one national estimate by assessing the regional approach taken by EPA's Regulatory Impact Analysis for the Clean Power Plan Final Rule. Note that DOE is currently investigating valuation of avoided SO2 and Hg emissions.

Table I.3 Summary of National Economic Benefits and Costs of Amended Energy Conservation Standards for Commercial Prerinse Spray Valves*

Category	Present Value Million 2014$	Discount Rate
Benefits		
Operating Cost Savings	718	7%
	1,476	3%
CO_2 Reduction Monetized Value ($12.2/metric ton case)**	44	5%
CO_2 Reduction Monetized Value ($40.0/metric ton case)**	195	3%
CO_2 Reduction Monetized Value ($62.3/metric ton case)**	308	2.5%
CO_2 Reduction Monetized Value ($117/metric ton case)**	594	3%
NO_X Reduction Monetized Value†	24	7%
	52	3%
Total Benefits††	937	7%
	1,724	3%
Costs		
Manufacturer Conversion Costs‡	1 to 2	N/A
Total Net Benefits††		
Including Emissions Reduction Monetized Value	937	7%
	1,724	3%

* This table presents the costs and benefits associated with commercial prerinse spray valves shipped in 2019−2048. These results include benefits to consumers which accrue after 2048 from the products purchased in 2019−2048. The costs account for the incremental variable and fixed costs incurred by manufacturers due to the standard, some of which may be incurred in preparation for the rule.
** The CO_2 values represent global monetized values of the SCC, in 2014$, in 2015 under several scenarios of the updated SCC values. The first three cases use the averages of SCC distributions calculated using 5%, 3%, and 2.5% discount rates, respectively. The fourth case represents the 95th percentile of the SCC distribution calculated using a 3% discount rate. The SCC time series incorporate an escalation factor.
† The $/ton values used for NO_X are described in section IV.L. DOE estimated the monetized value of NO_X emissions reductions using benefit per ton estimates from the Regulatory Impact Analysis titled, "Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants," published in June 2014 by EPA's Office of Air Quality Planning and Standards. (Available at: http://www3.epa.gov/ttnecas1/regdata/RIAs/111dproposalRIAfinal0602.pdf). See section IV.L.2 for further discussion. DOE is presenting a national benefit-per-ton estimate for particulate matter emitted from the Electric Generating Unit sector based on an estimate of premature mortality derived from the ACS study (Krewski et al., 2009). If the benefit-per-ton estimates were based on the Six Cities study (Lepuele et al., 2011), the values would be nearly two-and-a-half times larger. Because of the sensitivity of the benefit-per-ton estimate to the geographical considerations of sources and receptors of emissions, DOE intends to investigate refinements to the current approach of one national estimate by assessing the regional approach taken by EPA's Regulatory Impact Analysis for the Clean Power Plan Final Rule.
†† Total Benefits for both the 3% and 7% cases are derived using the series corresponding to average SCC with 3-percent discount rate ($40.0/t case).

The benefits and costs of the amended standards, for commercial prerinse spray valves sold in 2019–2048, can also be expressed in terms of annualized values. The monetary values for the total annualized net benefits are the sum of: (1) the annualized national economic value of the benefits from consumer operation of products that meet the amended standards (consisting primarily of operating cost savings from using less energy and water, minus increases in product purchase and installation costs, which is another way of representing consumer NPV); and (2) the annualized monetary value of the benefits of CO_2 and NO_X emission reductions.[11]

Although the value of operating cost savings and CO_2 emission reductions are both important, two issues are relevant. First, the national operating cost savings are domestic U.S. consumer monetary savings that occur as a result of market transactions, whereas the value of CO_2 reductions is based on a global value. Second, the assessments of operating cost savings and CO_2 savings are performed with different methods that use different time frames for analysis. The national operating cost savings is measured for the lifetime of commercial prerinse spray valves shipped in 2019–2048. Because CO_2 emissions have a very long residence time in the atmosphere,[12] the SCC values in future years reflect future CO_2-emissions impacts that continue beyond 2100.

[11] To convert the time-series of costs and benefits into annualized values, DOE calculated a present value in 2015, the year used for discounting the NPV of total consumer costs and savings. For the benefits, DOE calculated a present value associated with each year's shipments in the year in which the shipments occur (e.g., 2020 or 2030), and then discounted the present value from each year to 2015. The calculation uses discount rates of 3 and 7 percent for all costs and benefits except for the value of CO_2 reductions, for which DOE used case-specific discount rates, as shown in Table I.3. Using the present value, DOE then calculated the fixed annual payment over a 30-year period, starting in the compliance year, that yields the same present value.

[12] The atmospheric lifetime of CO_2 is estimated of the order of 30–95 years. Jacobson, MZ, "Correction to 'Control of fossil-fuel particulate black carbon and organic matter, possibly the most effective method of slowing global warming,'" J. Geophys. Res. 110. pp. D14105 (2005).

Estimates of annualized benefits and costs of the amended standards are shown in Table I.4. Using a 7-percent discount rate for benefits and costs other than CO_2 reduction (for which DOE used a 3-percent discount rate, along with the average SCC series that has a value of $40.0 per metric ton in 2015), there are no increased product costs associated with the standards adopted in this final rule. The benefits under the 7% discount rate case are $71 million per year in reduced product operating costs, $11 million per year in CO_2 reductions, and $2 million to $5 million per year in reduced NO_X emissions. In this case, the net benefit amounts to approximately $84 million per year. Using a 3-percent discount rate for all benefits and costs as well as the average SCC series that has a value of $40.0 per metric ton in 2015, there are still no increased product costs associated with the amended standards in this rule, while the benefits are $82 million per year in reduced operating costs, $11 million in CO_2 reductions, and $3 million to $7 million in reduced NO_X emissions. In this case (3% discount rate), the net benefit amounts to approximately $96 million per year.

Table I.4 Annualized Benefits and Costs of Amended Standards for Commercial Prerinse Spray Valves*

	Discount Rate	**Primary Estimate***	**Low Net Benefits Estimate***	**High Net Benefits Estimate***
		Million 2014$/year		
Benefits				
Consumer Operating Cost Savings	7%	71	66	74
	3%	82	76	86
CO_2 Reduction at $12.2/t**	5%	3	3	3
CO_2 Reduction at $40.0/t**	3%	11	11	11
CO_2 Reduction at $62.3/t**	2.5%	16	16	16
CO_2 Reduction at $117/t**	3%	33	33	33
NO_X Reduction Monetized Value†	7%	2	2	5
	3%	3	3	7

	Discount Rate	Primary Estimate*	Low Net Benefits Estimate*	High Net Benefits Estimate*
		Million 2014$/year		
Total Benefits††	7% plus CO_2 range	77 to 106	71 to 101	82 to 112
	7%	84	79	90
	3% plus CO_2 range	89 to 118	82 to 112	96 to 126
	3%	96	89	104
Costs				
Manufacturer Conversion Costs†††	7%	0.08 to 0.13	0.08 to 0.13	0.08 to 0.13
	3%	0.05 to 0.08	0.05 to 0.08	0.05 to 0.08
Total Net Benefits				
Total††††	7% plus CO_2 range	77 to 106	71 to 101	82 to 112
	7%	84	79	90
	3% plus CO_2 range	89 to 118	82 to 112	96 to 126
	3%	96	89	104

* This table presents the annualized costs and benefits associated with commercial prerinse spray valves shipped in 2019−2048. These results include benefits to consumers which accrue after 2048 from the products purchased in 2019−2048. The results account for the incremental variable and fixed costs incurred by manufacturers due to the amended standard, some of which may be incurred in preparation for the rule. The primary, low benefits, and high benefits estimates utilize projections of energy prices from the Annual Energy Outlook 2015 (AEO2015) reference case, low estimate, and high estimate, respectively.
** The CO_2 values represent global monetized values of the SCC, in 2014$, in 2015 under several scenarios of the updated SCC values. The first three cases use the averages of SCC distributions calculated using 5 percent, 3 percent, and 2.5 percent discount rates, respectively. The fourth case represents the 95th percentile of the SCC distribution calculated using a 3 percent discount rate.
† The $/ton values used for NO_X are described in section IV.L. DOE estimated the monetized value of NO_X emissions reductions using benefit per ton estimates from the Regulatory Impact Analysis titled, "Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants," published in June 2014 by EPA's Office of Air Quality Planning and Standards. (Available at: http://www3.epa.gov/ttnecas1/regdata/RIAs/111dproposalRIAfinal0602.pdf) See section IV.L.2 for further discussion. For DOE's Primary Estimate and Low Net Benefits Estimate, the agency is presenting a national benefit-per-ton estimate for particulate matter emitted from the Electric Generating Unit sector based on an estimate of premature mortality derived from the ACS study (Krewski et al., 2009). For DOE's High Net Benefits Estimate, the benefit-per-ton estimates were based on the Six Cities study (Lepuele et al., 2011), which are nearly two-and-a-half times larger than those from the ACS study. Because of the sensitivity of the benefit-per-ton estimate to the geographical considerations of sources and receptors of emission, DOE intends to investigate refinements to the agency's current approach of one national estimate by assessing the regional approach taken by EPA's Regulatory Impact Analysis for the Clean Power Plan Final Rule.
†† Total benefits for both the 3-percent and 7-percent cases are derived using the series corresponding to the average SCC with a 3-percent discount rate ($40.0/metric ton case). In the rows labeled "7% plus CO_2 range" and "3% plus CO_2 range," the operating cost and NO_X benefits are calculated using the labeled discount rate, and those values are added to the full range of CO_2 values.
††† The lower value of the range represents costs associated with the Sourced Components conversion cost scenario. The upper value represents costs for the Fabricated Components scenario.
†††† Total benefits for both the 3 percent and 7 percent cases are derived using the series corresponding to the average SCC with 3 percent discount rate. In the rows labeled "7% plus CO2 range" and "3% plus CO2 range," the operating cost and NO_X benefits are calculated using the labeled discount rate, and those values are added to the full range of CO2 values. Manufacturer Conversion Costs are not included in the net benefits calculations.

DOE's analysis of the national impacts of the amended standards is described in sections IV.H, IV.K, and IV.L of this document.

D. Conclusion

Based on the analyses conducted for this final rule, DOE found the benefits to the nation of the standards (energy and water savings, consumer LCC savings, positive NPV of consumer benefit, and emission reductions) outweigh the burdens (loss of INPV). DOE has concluded that the standards in this final rule represent the maximum improvement in energy efficiency that is technologically feasible and economically justified, and would result in significant conservation of energy.

II. Introduction

The following sections briefly discusses the statutory authority underlying this final rule, as well as some of the relevant historical background related to the establishment of standards for commercial prerinse spray valves.

A. Authority

Title III, Part B of EPCA established the Energy Conservation Program for Consumer Products Other Than Automobiles. As part of this program, EPCA prescribed energy conservation standards for commercial prerinse spray valves, which are the subject of this rulemaking. (42 U.S.C. 6292(dd)) Under 42 U.S.C. 6295(m), DOE must periodically review its already established energy conservation standards for a covered product no later than 6 years from the issuance of a final rule establishing or amending a standard for the product. After publishing a notice of proposed rulemaking (NOPR) including new proposed standards, DOE must publish a final rule amending the standard for the product no later than 2 years after the NOPR is issued. (42 U.S.C. 6295(m)(3)(A) This final rule fulfills this statutory requirement.

Pursuant to EPCA, DOE's energy conservation program for covered products consists essentially of four parts: (1) testing, (2) labeling, (3) the establishment of Federal energy conservation standards, and (4) certification and enforcement procedures. The Secretary of Energy (Secretary) or the Federal Trade Commission (FTC), as appropriate, may prescribe labeling requirements for commercial prerinse spray valves. (42 U.S.C. 6294(a)(5)(A))

Subject to certain criteria and conditions, DOE is required to develop test procedures to measure the energy efficiency, energy use, or estimated annual operating cost of each covered product. (42 U.S.C. 6293(b)(3)) Manufacturers of covered products must use the prescribed DOE test procedure as the basis for certifying to DOE that their products comply with the applicable energy conservation standards adopted under EPCA and when making representations to the public regarding the energy use or efficiency of those products. (42 U.S.C. 6293(c) and 6295(s)) Similarly, DOE must use these test procedures to determine whether the products comply with standards adopted pursuant to EPCA. (42 U.S.C. 6295(s)) The DOE test procedure for commercial prerinse spray valves appears at title 10 of the Code of Federal Regulations (CFR) part 431, subpart O.

DOE released a pre-publication notice of the test procedure final rule for commercial prerinse spray valves (CPSV TP final rule) on December 18, 2015.[13]

DOE must follow specific statutory criteria for prescribing new or amended standards for covered products, including commercial prerinse spray valves. Any new or amended standard for a covered product 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)) Furthermore, DOE may not adopt any standard that would not result in the significant conservation of energy. (42 U.S.C. 6295(o)(3)(B)) Moreover, DOE may not prescribe a standard for certain products, including commercial prerinse spray valves, if no test procedure has been established for the product (42 U.S.C. 6295(o)(3)(A)) In deciding whether a proposed standard is economically justified, DOE must determine whether the benefits of the standard exceed its burdens. (42 U.S.C. 6295(o)(2)(B)(i)) DOE must make this determination after receiving comments on the proposed standard, and by considering, to the greatest extent practicable, the following seven statutory 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 the covered products in the type (or class) compared to any increase in the price,

[13] The pre-publication Federal Register notice of the CPSV TP final rule issued by DOE is available on DOE's website at http://energy.gov/sites/prod/files/2015/12/f27/CPSV%20TP%20Final%20Rule.pdf. Following publication in the Federal Register, the CPSV TP final rule will be available at www.regulations.gov under Docket # EERE-2014.BT-TP-0055.

initial charges, or maintenance expenses for the covered products that are likely to result from the standard;

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

(42 U.S.C. 6295(o)(2)(B)(i)(I)–(VII))

Further, EPCA, as codified, 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 water savings the consumer will receive during the first year that the standard applies, as calculated under the applicable test procedure. (42 U.S.C. 6295(o)(2)(B)(iii))

EPCA, as codified, also contains what is known as an “anti-backsliding” provision, which prevents the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6295(o)(1)) Also, 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 in any covered 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))

Additionally, EPCA specifies requirements when promulgating an energy conservation standard for a covered product that has two or more subcategories. DOE must specify a different standard level for a type or class of products that has the same function or intended use if DOE determines that products within such group: (1) consume a different kind of energy from that consumed by other covered products within such type (or class); or (2) 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. (42 U.S.C. 6295(q)(1)) In determining whether a performance-related feature justifies a different standard for a group of products, DOE shall consider such factors as the utility to the consumer of such a feature and other factors DOE deems appropriate. Id. Any rule prescribing such a standard must include an explanation of the basis on which such higher or lower level was established. (42 U.S.C. 6295(q)(2))

Federal energy conservation requirements generally supersede State laws or regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6297(a)–(c)) California, however, has a statutory exemption to preemption for commercial prerinse spray valve standards adopted by the California Energy Commission before January 1, 2005. (42 U.S.C. 6297(c)(7)) As a result, while federal commercial prerinse spray valve standards, including any amended standards that may result from this rulemaking, apply in California, California's commercial prerinse spray valve standards also apply as they are exempt from preemption. DOE may also grant waivers of Federal preemption for particular State laws or regulations, in accordance with the procedures and other provisions set forth under 42 U.S.C. 6297(d)).

Finally, pursuant to the amendments contained in the Energy Independence and Security Act of 2007 (EISA 2007), Pub. L. 110-140, any final rule for new or amended energy conservation standards promulgated after July 1, 2010, is required to address standby mode and off mode energy use. (42 U.S.C. 6295(gg)(3)) Specifically, when DOE adopts a standard for a covered product after that date, it must, if justified by the criteria for adoption of standards under EPCA (42 U.S.C. 6295(o)), incorporate standby mode and off mode energy use into a single standard, or, if that is not feasible, adopt a separate standard for such energy use for that product. (42 U.S.C. 6295(gg)(3)(A)-(B)) DOE's recently updated test procedures for commercial prerinse spray valves do not address standby mode and off mode energy use, because they are not applicable for this product. Accordingly, in this rulemaking, DOE only addresses active mode energy consumption because commercial prerinse spray valves only consume energy and water in active mode.

B. Background

1. Current Standards

In a final rule published on October 18, 2005 (2005 CPSV final rule), DOE codified the current energy conservation standard for commercial prerinse spray valves that was prescribed by the Energy Policy Act of 2005 (EPAct 2005), Pub. L. 109-58 (August 8, 2005). 70 FR 60407, 60410. The 2005 CPSV final rule established that all commercial prerinse spray valves manufactured on or after January 1, 2006, must have a flow rate of not more than 1.6 gpm. Id.

2. History of Standards Rulemaking for Commercial Prerinse Spray Valves

DOE initiated the current rulemaking on September 11, 2014, by issuing an analytical Framework document (2014 CPSV Framework document) that explained the issues, analyses, and analytical approaches that DOE anticipated using to develop energy conservation standards for commercial prerinse spray valves. 79 FR 54213. DOE held a public meeting on September 30, 2014 to discuss the 2014 CPSV Framework document, and solicited comments from interested parties regarding DOE’s analytical approach. DOE received comments that helped identify and resolve issues pertaining to the 2014 CPSV Framework document relevant to this rulemaking.

DOE published a NOPR for the CPSV energy conservation standards rulemaking on July 9, 2015 (CPSV NOPR). 80 FR 39486. DOE held a public meeting on July 28, 2015 to present the CPSV NOPR, which included the engineering analysis, downstream economic analyses, manufacturer impact analysis, and proposed standards. In the public meeting, DOE also sought comments from interested parties on these subjects, and facilitated interested parties’ involvement in the rulemaking. At the public meeting, and during the comment period, DOE received comments that helped DOE identify issues and refine the analyses presented in the CPSV NOPR for this final rule.

Based on the issues raised in response to the CPSV NOPR, DOE published a notice of data availability (NODA) for the CPSV energy conservation standards rulemaking on November 20, 2015 (CPSV NODA).[14] 80 FR 72608. In the CPSV NODA, DOE described revisions to its analyses of commercial prerinse spray valves in the following areas: (1) engineering, (2) manufacturer impacts, (3) LCC and PBP, and (4) national impacts. DOE also presented updated trial standard level (TSL) combinations. DOE sought comments on all aspects of the updated analyses. During the CPSV NODA comment period, DOE received comments in response to issues raised in the CPSV NODA.

This final rule responds to issues raised by commenters in response to the 2014 CPSV Framework document, CPSV NOPR, and CPSV NODA.

C. General Rulemaking Comments

In response to the CPSV NOPR, Alliance for Water Efficiency (AWE) recommended that this rulemaking be postponed until the stakeholders develop and agree upon a cleaning performance test that mimics ”real world” performance. (AWE, No. 28 at p. 6)[15] As discussed previously, under 42 U.S.C. 6295(m), the agency must periodically review its already established energy conservation standards for a covered

[14] DOE initially published the CPSV NODA on November 12, 2015. 80 FR 69888. Due to errors in the CPSV NODA, DOE withdrew the document and published a corrected NODA on November 20, 2015. 80 FR 72608.

[15] A notation in this form provides a reference for information that is in the docket of DOE’s rulemaking to amend energy conservation standards for commercial prerinse spray valves. (Docket No. EERE-2014-BT-STD-0027, which is maintained at www.regulations.gov). This particular notation refers to a comment: (1) submitted by AWE; (2) appearing in document number 28 of the docket; and (3) appearing on page 6 of that document.

product. DOE codified the current energy conservation standard for commercial prerinse spray valves in the 2005 CPSV final rule. Therefore, DOE is required to conduct a review of CPSV energy conservation standards, and cannot postpone this rulemaking further. A discussion of the CPSV test procedure is provided in section III.B of this document.

In response to the CPSV NODA, DOE received a comment from the Plumbing Manufacturers Institute (PMI) requesting the comment period for the CPSV NODA be extended. PMI cited the short duration of the comment period, as well as the Thanksgiving holiday to support their request for an extension. (PMI, No. 41 at p. 1) DOE chose to maintain the comment period at 14 days, which DOE believes is sufficient time to review the updated analyses and provide comment. Additionally, while input data was updated in response to comments received, the analytical framework remained unchanged.

PMI further commented that the process by which DOE obtained data to develop energy conservation standards lacked transparency. PMI stated that DOE should have formed a working group. (PMI, No. 43 at p. 1) DOE disagrees with PMI's comment that DOE's regular notice-and-comment rulemaking process lacks transparency with regards to data collection. DOE solicited comments and data from interested parties in response to the 2014 CPSV Framework document, the CPSV NOPR, and the CPSV NODA. Based on data obtained during these public comment periods, DOE revised its analyses and proposed standards.

III. General Discussion

A. Product Classes and Scope of Coverage

EPCA defines the term "commercial prerinse spray valve" as a "handheld device designed and marketed for use with commercial dishwashing and ware washing equipment that sprays water on dishes, flatware, and other food service items for the purpose of removing food residue before cleaning the items." (42 U.S.C. 6291(33)(A) In the CPSV TP final rule, DOE modified the CPSV definition to clarify the scope of coverage, and adopted the following definition: "Commercial prerinse spray valve" is defined as a handheld device that has a release to close valve and is suitable for removing food residue from food service items before cleaning them in commercial dishwashing and ware washing equipment. The analyses conducted for this final rule were based on the scope of coverage provided by this amended definition.

When evaluating and establishing energy conservation standards, DOE divides covered products into product classes by the type of energy used, or by capacity or other performance-related features that justify a different standard. In making a determination whether a performance-related feature justifies a different standard, DOE considers such factors as the utility of the feature to the consumer and other factors DOE determines are appropriate. (42 U.S.C. 6295(q))

Currently, all covered commercial prerinse spray valves are included in a single product class that is subject to a 1.6-gpm standard for maximum flow rate. 10 CFR 431.266. In the CPSV NOPR, DOE proposed three separate product classes based on spray force. DOE believes that spray force is a performance-related feature of commercial prerinse spray valves, and that each of the defined spray force ranges is associated with unique consumer utility for specific CPSV applications. (42 U.S.C. 6295(q)) DOE also requested comments from interested parties. See section IV.A.2 for more discussion on the product classes addressed in this final rule.

B. Test Procedure

In addition to establishing the current maximum flow rate for commercial prerinse spray valves, EPCA also prescribed that the test procedure for measuring flow rate for commercial prerinse spray valves be based on American Society for Testing and Materials (ASTM) Standard F2324, "Standard Test Method for Pre-Rinse Spray Valves." (42 U.S.C. 6293(b)(14)) In a final rule published December 8, 2006, DOE incorporated by reference ASTM Standard F2324-03 as the DOE test procedure for commercial prerinse spray valves. 71 FR 71340, 71374. In a final rule published on October 23, 2013, DOE incorporated by reference ASTM Standard F2324–03 (2009) for testing commercial prerinse spray valves, which reaffirmed the 2003 version. 78 FR 62970, 62980.

In 2013, ASTM amended Standard F2324–03 (2009) to replace the cleanability test with a spray force test, based on research conducted by the U.S. Environmental Protection Agency's (EPA) WaterSense® program.[16] The most current version of the ASTM industry standard is the version published in 2013, ASTM Standard F2324–13.

[16] EPA WaterSense program, WaterSense Specification for Commercial Prerinse Spray Valves Supporting Statement. Version 1.0 (Sept. 19, 2013). Available at: www.epa.gov/watersense/partners/prsv_final.html.

DOE published the NOPR for the CPSV test procedure on June 23, 2015 (CPSV TP NOPR). 80 FR 35874. In the CPSV TP NOPR, DOE proposed to incorporate by reference relevant portions of the amended ASTM Standard F2324–13, requiring spray force and flow rate to be measured in accordance with the industry standard. Additionally, DOE proposed a clarification to the definition of "commercial prerinse spray valve" as well as adding a new definition for "spray force." For commercial prerinse spray valves with multiple spray settings, DOE proposed that both flow rate and spray force be measured for each available spray setting. DOE also proposed modifications to the rounding requirements for flow rate and added rounding requirements for spray force. Finally, DOE proposed modification of the sampling plan to remove the provisions related to determining representative values where customers would favor higher values. DOE presented the CPSV TP NOPR in the public meeting on July 28, 2015.

DOE issued a pre-publication notice for the final rule for the CPSV TP on December 18, 2015. The final rule incorporates by reference relevant portions of the latest version of the industry testing standard from the ASTM Standard F2324–13, including the procedure for measuring spray force, revises the definitions of "commercial prerinse spray valve" and "basic model," clarifies the test procedure for products with multiple spray settings, establishes rounding requirements for flow rate and spray force measurements, and removes irrelevant portions of the statistical methods for certification, compliance, and enforcement of commercial prerinse spray valves. The amended standards adopted in this final rule were based on testing conducted in accordance with the amended test procedure adopted in the CPSV TP final rule.

C. Certification, Compliance, Enforcement and Labeling

This final rule establishes three separate product classes for commercial prerinse spray valves based on spray force. DOE recognizes that some commercial prerinse spray valves contain multiple spray settings and may fall into more than one product class. If the spray settings on a CPSV unit fall into multiple product classes, manufacturers must certify separate basic models for each product class and may only group individual spray settings into basic models within each product class. The tested spray force for each spray setting determines which product class definition applies to each spray setting. Therefore, a commercial prerinse spray valve that contains multiple spray settings, or is sold with multiple spray faces, may be classified as more than one product class. In this case, the commercial prerinse spray valve is required to meet the appropriate energy conservation standard for each product class.

With regards to labeling, in the CPSV NOPR public meeting, the Natural Resource Defense Council (NRDC) questioned whether the institution of product classes for commercial prerinse spray valves will affect product labeling, and more specifically, whether the product class in which a commercial prerinse spray valve is categorized needs to be represented on product literature. (NRDC, Public Meeting Transcript, No. 23 at p. 110) NRDC also requested guidance on how commercial prerinse spray valves will be labeled if the proposal of multiple product classes were adopted. (NRDC, Public Meeting Transcript, No. 23 at p. 110)

This final rule does not include labeling requirements for commercial prerinse spray valves. Accordingly, this final rule does not require manufacturers to include product class information on product labels. However, DOE notes that any representations of flow rate are required to be determined in accordance with the DOE test procedure and applicable sampling plans.

D. Technological Feasibility

1. General

In each energy conservation standards rulemaking, DOE conducts a screening analysis based on information gathered on all current technology options and prototype designs that could improve the efficiency of the products that are the subject of the rulemaking. As the first step in such an analysis, DOE develops a list of technology options for consideration in consultation with manufacturers, design engineers, and other interested parties. DOE then determines which of those means for improving efficiency are technologically feasible. DOE considers technologies incorporated in commercially available products or in working prototypes to be technologically feasible. 10 CFR part 430, subpart C, appendix A, section 4(a)(4)(i)

After DOE has determined that particular technology options are technologically feasible, it further evaluates each technology option in light of the following additional screening criteria: (1) practicability to manufacture, install, and service; (2) adverse impacts on product utility or availability; and (3) adverse impacts on health or safety. 10 CFR part 430, subpart C, appendix A, section 4(a)(4)(ii)-(iv) Additionally, it is DOE policy not to include in its analysis any proprietary technology that is a unique pathway to achieving a certain efficiency level (EL). Section IV.B of this document discusses the results of the screening analysis for commercial prerinse spray valves, particularly the technology options DOE considered, those it screened out, and those that are the basis for the standards considered in this rulemaking. For further details on the screening analysis for this rulemaking, see chapter 4 of the final rule technical support document (TSD).

2. Maximum Technologically Feasible Levels

When DOE adopts an amended standard for a type or class of covered product, it must determine the maximum improvement in energy efficiency or maximum reduction in energy use that is technologically feasible for such product. (42 U.S.C. 6295(p)(1)) Accordingly, in the engineering analysis, DOE determined the maximum technologically feasible (max-tech) improvements in efficiency for commercial prerinse spray valves using the design parameters for the most efficient products available on the market or in working prototypes. The max-tech levels that DOE determined for this rulemaking are described in section IV.C.3 of this document and in chapter 5 of the final rule TSD.

E. Energy Savings

1. Determination of Savings

For each TSL, DOE projected energy savings from the application of the TSL to commercial prerinse spray valves purchased in the 30-year period that begins in the year of compliance with any amended standards (2019–2048).[17] The savings are measured over the entire lifetime of products purchased in the 30-year analysis period. DOE quantified the energy savings attributable to each TSL as the difference in energy consumption between each standards case and the no-new-standards case. The no-new-

[17] DOE also presents a sensitivity analysis that considers impacts for products shipped in a 9-year period.

standards case represents a projection of energy consumption that reflects how the market for a product would likely evolve in the absence of amended energy conservation standards.

DOE used its national impact analysis (NIA) spreadsheet models to estimate energy savings from amended standards for commercial prerinse spray valves. The NIA spreadsheet model (described in section IV.H of this document) calculates savings in site energy, which is the energy directly consumed by products at the locations where they are used. DOE calculates national energy savings (NES) in terms of primary energy savings, which is the savings in energy that is used to generate and transmit the site energy, and also in terms of full-fuel-cycle (FFC) energy savings. The FFC metric includes the energy consumed in extracting, processing, and transporting primary fuels (i.e., coal, natural gas, petroleum fuels), and thus presents a more complete picture of the impacts of energy conservation standards.[18] DOE's approach is based on the calculation of an FFC multiplier for each of the energy types used by covered products. For more information on FFC energy savings, see section IV.H.1 of this document. For natural gas, the primary energy savings are considered to be equal to the site energy savings.

2. Significance of Savings

To adopt more stringent standards for commercial prerinse spray valves, DOE must determine that such action would result in "significant" energy savings. (42 U.S.C. 6295(o)(3)(B)) Although the term "significant" is not defined in EPCA, the U.S. Court of

[18] The FFC metric is discussed in DOE's statement of policy and notice of policy amendment. 76 FR 51282 (Aug. 18, 2011), as amended at 77 FR 49701 (Aug. 17, 2012).

Appeals for the District of Columbia Circuit in Natural Resources Defense Council v. Herrington, 768 F.2d 1355, 1373 (D.C. Cir. 1985), indicated that Congress intended "significant" energy savings in the context of EPCA to be savings that were not "genuinely trivial." The energy savings for all the TSLs considered in this rulemaking, including the amended standards, are nontrivial, and, therefore, DOE considers them "significant" within the meaning of section 325 of EPCA.

F. Economic Justification

1. Specific Criteria

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

a. Economic Impact on Manufacturers and Consumers

In determining the impacts of an amended standard on manufacturers, DOE conducts a manufacturer impact analysis (MIA), as discussed in section IV.J. DOE first uses an annual cash flow approach to determine the quantitative impacts. This step includes both a short-term assessment—based on the cost and capital requirements during the period between when a regulation is issued and when entities must comply with the regulation—and a long-term assessment over a 30-year period. The industry-wide impacts analyzed include (1) INPV, which values the industry on the basis of expected future cash flows; (2) cash flows by year; (3) changes in revenue and income; and (4) other measures of impact, as appropriate. Second, DOE analyzes and reports the impacts on different types of manufacturers, including impacts on small manufacturers. Third, DOE considers the impact of standards on domestic manufacturer employment and manufacturing capacity, as well as the potential for standards to result in plant closures and loss of capital investment. Finally, DOE takes into account cumulative impacts of various DOE regulations and other regulatory requirements on manufacturers.

For individual consumers, measures of economic impact include the changes in LCC and PBP associated with amended standards. These measures are discussed further in the following section. For consumers in the aggregate, DOE also calculates the national NPV of the economic impacts applicable to a particular rulemaking. DOE also evaluates the LCC impacts of potential standards on identifiable subgroups of consumers that may be affected disproportionately by a national standard.

b. Savings in Operating Costs Compared to Increase in Price (LCC and PBP)

EPCA requires DOE to consider the savings in operating costs throughout the estimated average life of the covered product in the type (or class) compared to any increase in the price of, or in the initial charges for, or maintenance expenses of, the covered product that are likely to result from a standard. (42 U.S.C. 6295(o)(2)(B)(i)(II)) DOE conducts this comparison in its LCC and PBP analysis.

The LCC is the sum of the purchase price of a product (including its installation) and the operating cost (including water, energy, maintenance, and repair expenditures) discounted over the lifetime of the product. The LCC analysis requires a variety of inputs, such as product prices; product energy and water consumption; energy and water and wastewater prices; maintenance and repair costs; product lifetime; and discount rates appropriate for consumers. To account for uncertainty and variability in specific inputs, such as product lifetime and discount rate, DOE uses a distribution of values, with probabilities attached to each value.

The PBP is the estimated amount of time (in years) it takes consumers to recover the increased purchase cost (including installation) of a more-efficient product through lower operating costs. DOE calculates the PBP by dividing the change in purchase cost due to a more-stringent standard by the change in annual operating cost for the year that standards are assumed to take effect.

For its LCC and PBP analysis, DOE assumes that consumers will purchase the covered products in the first year of compliance with amended standards. The LCC savings for the considered efficiency levels are calculated relative to the case that reflects projected market trends in the absence of amended standards. DOE's LCC and PBP analysis is discussed in further detail in section IV.F.

c. Energy and Water Savings

Although significant conservation of energy is a separate statutory requirement for adopting an energy conservation standard, EPCA requires DOE, in determining the economic justification of a standard, to consider the total projected energy and water savings that are expected to result directly from the standard. (42 U.S.C. 6295(o)(2)(B)(i)(III)) As discussed in section III.E, DOE uses the NIA spreadsheet models to project national energy and water savings.

d. Lessening of Utility or Performance of Products

In determining whether a proposed standard is economically justified, DOE evaluates any lessening of the utility or performance of the considered products. (42 U.S.C. 6295(o)(2)(B)(i)(IV)) Based on data available to DOE, the standards adopted in this final rule would not reduce the utility or performance of the products under consideration in this rulemaking.

e. Impact of Any Lessening of Competition

EPCA directs DOE to consider the impact of any lessening of competition, as determined in writing by the Attorney General of the United States (Attorney General), that is likely to result from a standard. (42 U.S.C. 6295(o)(2)(B)(i)(V)) DOE transmitted a copy of its proposed rule to the Attorney General with a request that the Department of Justice (DOJ) provide its determination to the Secretary within 60 days of the publication of a proposed rule, together with an analysis of the nature and extent of the impact. (42 U.S.C. 6295(o)(2)(B)(ii)). On September 4, 2015, DOJ provided its determination to DOE that the amended standards for commercial prerinse spray valves are unlikely to have a significant adverse impact on competition. DOE has included this determination from DOJ at the end of this final rule.

f. Need for National Energy Conservation

DOE also considers the need for national energy conservation in determining whether a new or amended standard is economically justified. (42 U.S.C. 6295(o)(2)(B)(i)(VI)) The energy savings from the amended standards are likely to provide improvements to the security and reliability of the nation's energy system.

Reductions in the demand for electricity also may result in reduced costs for maintaining the reliability of the nation's electricity system. DOE conducts a utility impact analysis to estimate how standards may affect the nation's needed power generation capacity, as discussed in section IV.M.

The amended standards are also likely to result in environmental benefits in the form of reduced emissions of air pollutants and greenhouse gases (GHGs) associated with energy production and use. DOE conducts an emissions analysis to estimate how standards may affect these emissions, as discussed in section IV.K. DOE also estimates the economic value of emissions reductions resulting from the considered TSLs, as discussed in section IV.L

g. Other Factors

EPCA allows the Secretary of Energy, in determining whether a standard is economically justified, to consider any other factors that the Secretary deems to be relevant. (42 U.S.C. 6295(o)(2)(B)(i)(VII)) No other factors were considered in this analysis.

2. Rebuttable Presumption

As set forth in 42 U.S.C. 6295(o)(2)(B)(iii), EPCA creates 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 is less than three times the value of the first year's energy and water savings resulting from the standard, as calculated under the applicable DOE test procedure. DOE's LCC and PBP analyses generate values used to calculate the effect the amended energy conservation standards would have on the PBP for consumers. These analyses include, but are not limited to, the 3-year PBP contemplated under the rebuttable-presumption test. In addition, DOE routinely conducts an economic analysis that considers the full range of impacts to consumers, manufacturers, the nation, and the environment, as required under 42 U.S.C. 6295(o)(2)(B)(i). The results of this analysis serve as the basis for DOE's evaluation of the economic justification for an amended standard level (thereby supporting or rebutting the results of any preliminary determination of economic justification). The rebuttable presumption payback calculation is discussed in section IV.F.11 of this document.

IV. Methodology and Discussion of Related Comments

This section addresses the analyses DOE has performed for this rulemaking with regard to commercial prerinse spray valves. Separate subsections address each component of DOE's analyses.

DOE used several analytical tools to estimate the impact of the standards considered in this document. The first tool is a spreadsheet that calculates the LCC savings and PBP of the amended energy conservation standards. The NIA uses a second spreadsheet set that provides shipments forecasts and calculates NES and NPV of total consumer costs and savings expected to result from amended energy conservation standards. DOE uses a third spreadsheet tool, the Government Regulatory Impact Model (GRIM), to assess manufacturer impacts of amended standards. These three spreadsheet tools are available on the DOE website for this rulemaking:

https://www1.eere.energy.gov/buildings/appliance_standards/rulemaking.aspx?ruleid=100.

Additionally, DOE used a version of the Energy Information Administration's (EIA) National Energy Modeling System (NEMS) for the emission and utility impact analyses. The NEMS model simulates the energy sector of the U.S. economy. EIA uses NEMS to prepare the AEO, a widely-known baseline energy forecast for the United States.[19]

The version of NEMS used for appliance standards analysis, which makes minor modifications to the AEO version, is called NEMS-BT.[20] NEMS-BT accounts for the interactions among the various energy supply and demand sectors and the economy as a whole.

A. Market and Technology Assessment

DOE develops information in the market and technology assessment that provides an overall picture of the market for commercial prerinse spray valves, including the purpose of the products, the industry structure, manufacturers, market characteristics, and technologies used in the products. This activity includes both quantitative and qualitative

[19] For more information on NEMS, refer to The National Energy Modeling System: An Overview 2009, DOE/EIA-0581 (Oct. 2009) (Available at: https://www.eia.gov/forecasts/aeo/info_nems_archive.cfm).

[20] EIA approves the use of the name "NEMS" to describe only an 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 Office.)

assessments, based primarily on publicly-available information. The subjects addressed in the market and technology assessment for this rulemaking include: (1) market assessment, (2) product classes, (3) technology assessment, and (4) impact on compliance, certification and enforcement. The key findings of DOE's market assessment are summarized in the following sections. See chapter 3 of the final rule TSD for further discussion of the market and technology assessment.

1. Market Assessment

As part of the market assessment, DOE examined manufacturers, trade associations, and the quantities and types of products sold and offered in the market. DOE reviewed relevant literature to develop an understanding of the CPSV industry in the United States, including market research data, government databases, retail listings, and industry publications (e.g., manufacturer catalogs). Using this information, DOE assessed the overall state of the industry, CPSV manufacturer model-based market shares, shipments, general technical information on commercial prerinse spray valves, and industry trends.

In comments to the CPSV NOPR, T&S Brass suggested that information and data acquired through the WaterSense program be considered, as the program set a reasonable efficiency goal and established the groundwork for a viable CPSV efficiency program. (T&S Brass, No. 33 at p. 3) AWE stated that the WaterSense research seems to be ignored by DOE. (AWE, No. 28 at p. 7)

For this rulemaking, DOE performed market research using various reports and databases, including the WaterSense database that lists the spray force of WaterSense labeled products. DOE used the spray force results from the WaterSense labeled products as input to the engineering analysis (see chapter 5 of the final rule TSD). Also, DOE used the WaterSense field study report: (1) to characterize the CPSV market; (2) to perform a sensitivity analysis of water pressure for testing commercial prerinse spray valves as part of the CPSV test procedure rulemaking;[21] and (3) as inputs to the energy and water use analysis (see chapter 7 of the final rule TSD).

To characterize the market, DOE analyzed the model-based market shares of major manufacturers based on the number of basic models[22] observed through the DOE Compliance Certification Management System (CCMS) database, WaterSense database, and web searches.[23] DOE concluded that the CPSV market includes 46 basic models from 13 manufacturers. Chapter 3 of the final rule TSD provides more details on the CPSV market.

Additionally, DOE also characterized the efficiency (flow rate) distribution of commercial prerinse spray valves currently on the market. DOE performed this analysis in the CPSV NOPR, and presented it during the CPSV NOPR public meeting. DOE's

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[21] The water pressure sensitivity analysis is available at www.regulations.gov under docket number EERE-2014-BT-TP-0055.

[22] Basic model means all units of a given type of covered product (or class thereof) manufactured by one manufacturer, having the same primary energy source, and having essentially identical electrical, physical, and functional (or hydraulic) characteristics that affect energy use, energy efficiency, water use, or water efficiency. 10 CFR 431.262.

[23] U.S. Department of Energy. Compliance Certification Database (available at http://www.regulations.doe.gov/certification-data/); U.S. EPA, Water Sense (available at www.epa.gov/watersense/product_search.html).

analysis indicated a wide range of CPSV flow rates on the market with rated flow rates between 0.59 and 1.60 gpm. DOE received a comment during the CPSV NOPR public meeting regarding the efficiency distribution. T&S Brass stated that consumer satisfaction was not represented in DOE’s analysis, and that consumer satisfaction is very high at the upper range of the market flow rate distribution. (T&S Brass, Public Meeting Transcript, No. 23 at p. 31) T&S Brass further commented that the showerhead-type commercial prerinse spray valves represent the majority of the market and highest level of customer satisfaction because these units prevent splash-back. (T&S Brass, Public Meeting Transcript, No. 23 at pp. 42-43)

While consumer satisfaction is not directly referenced in the efficiency distribution graph presented by DOE in the CPSV NOPR, DOE has acknowledged consumer satisfaction and consumer utility as important aspects to consider when establishing product classes for commercial prerinse spray valves. This is described further in the product class section of this document (section IV.A.2). Additionally, in response to comments from interested parties, DOE updated both its engineering analysis and downstream analysis to account for the shower-type commercial prerinse spray valves and its majority market shipments. The updated engineering analysis is presented in section IV.C of this document, and the updated shipments analysis is presented in section IV.G of this document.

2. Product Classes

When evaluating and establishing energy conservation standards, DOE considers dividing covered products into classes by (a) the type of energy used, (b) the capacity of the product, or (c) other performance-related features that justify different standard levels. (42 U.S.C. 6295(q)) Currently, DOE regulates all covered commercial prerinse spray valves as a single product class that is subject to a 1.6-gpm standard for flow rate. 10 CFR 431.266. DOE, however, has determined that spray force is a performance-related feature that justifies different standard levels. Consequently, this final rule establishes three product classes based on spray force ranges: (1) product class 1 (less than or equal to 5.0 ounce-force, or ozf), (2) product class 2 (greater than 5.0 ozf but less than or equal to 8.0 ozf), and (3) product class 3 (greater than 8.0 ozf). These are the same product classes that were proposed in the CPSV NOPR, but with a different naming convention.

a. Spray Force

In the CPSV NOPR and public meeting, DOE presented data indicating a strong correlation between spray force and flow rate, as described further in section IV.C.2 of this final rule and in chapter 5 of the TSD. Specifically, units with higher spray force have inherently higher flow rates, and units with lower spray force have inherently lower flow rates. This direct relationship provided justification for creating multiple product classes defined by ranges of spray force.

In the CPSV NOPR, DOE cited a WaterSense field study that found that low water pressure, or spray force, can be a source of user dissatisfaction for some applications.[24] DOE also received multiple comments in response to the 2014 CPSV

[24] EPA WaterSense, Prerinse Spray Valves Field Study Report, at 24-25 (Mar. 31, 2011) (Available at: www.epa.gov/watersense/docs/final_epa_prsv_study_report_033111v2_508.pdf).

Framework document stating that spray force is a performance related feature that could be used to define product classes. The Advocates commented that product classes must be considered to distinguish commercial prerinse spray valves, and that DOE could consider using spray force as one way to delineate separate product classes. (Advocates, No. 11 at p. 2) The CA IOUs urged DOE to consider user satisfaction when considering the efficiency metric, as some field surveys have shown that users that are dissatisfied with efficient commercial prerinse spray valves will substitute them with those that likely increase overall water consumption. Therefore, CA IOUs suggested either incorporating spray force into the efficiency metric, or alternatively, using spray force to establish product classes as a way to account for differentiating products. (CA IOUs, No. 14 at p. 1) T&S Brass commented that the applications of commercial prerinse spray valves could vary from rinsing to cleaning baked-on food, and that the different applications might require different spray forces. T&S Brass stated that it offers a variety of prerinse spray valves that have different design features based on end users' applications. (T&S Brass, Public Meeting Transcript, No. 6 at p. 40) In response to the CPSV NOPR, Chicago Faucets commented that spray force is useful for predicting customer satisfaction. (Chicago Faucets, No. 26 at p. 2)

Furthermore, DOE market research indicates three distinct categories of end-user applications for commercial prerinse spray valves, which require different levels of spray force: (1) cleaning delicate glassware and removing loose food particles from dishware (which requires the least amount of spray force); (2) cleaning wet foods; and (3) cleaning baked-on foods (which requires the greatest amount of spray force).

DOE also received general comments regarding the use of spray force to define separate product classes for commercial prerinse spray valves. T&S Brass recommended that the DOE establish the CPSV efficiency goal based only upon maximum flow rate, as this is directly related to water conservation. (T&S Brass, No. 33 at p. 3) Chicago Faucets commented that the addition of the spray force test into mandated Federal law is unnecessary and counterproductive. Chicago Faucets believes that the focus should be on water conservation. Chicago Faucets stated that the spray force test method has no bearing on water conservation and that it was intended as a tool for marketing and selling spray valves, and nothing more. (Chicago Faucets, No. 26 at p. 2) The North American Association of Food Equipment Manufacturers (NAFEM) stated that it appears to them that DOE is requiring manufacturers to design commercial prerinse spray valves to meet the classification system and spray force requirements which have been pre-determined by DOE. (NAFEM, PMI, No. 31 at p. 1)

AWE commented in response to the CPSV NOPR that there is no evidence that spray force is the only factor for consumer satisfaction and performance in cleaning dishware. (AWE, No. 28 at p. 3) AWE further commented that spray force should be excluded from the proposed rule as it is irrelevant to efficiency, and that the only measure of valve water efficiency is a volumetric measure, stated in gallons per minute. (AWE, No. 28 at p. 3) AWE also stated that high spray force can be a hindrance to performance for some operations due to excessive splash and aerosolizing water. (AWE, No. 28 at p. 4)

In comments received during the CPSV NOPR public meeting and through written submissions, the majority of the interested parties opposed DOE's product class structure based on spray force, and recommended that DOE maintain a single product class. (Chicago Faucets, No. 26 at pp. 1-2; PMI, No. 27 at p. 1; Fisher, No. 30 at p. 1; Appliance Standards Awareness Project (ASAP), Northwest Energy Efficiency Alliance (NEEA), NRDC, No. 32 at p. 1; Pacific Gas and Electric (PG&E), Southern California Edison (SCE), Southern California Gas Company (SCGC), San Diego Gas and Electric (SDG&E), No. 34 at pp. 1-2; AWE, No. 28 at p. 7; T&S Brass, No. 33 at p. 2) PMI, PG&E, SCE, SCGC, and SDG&E (collectively, the "CA IOUs") and, ASAP and NRDC reiterated their comments in favor of a single product class in response to the CPSV NODA. (PMI, No. 43 at p. 1; CA IOUs, No. 44 at pp. 1-2; ASAP and NRDC, No. 45 at p. 1)

On the other hand, several interested parties supported the consideration of spray force for the standard. Fisher stated that the standard should focus on flow rate and spray force, but allow the consumer to determine which of these performance factors will satisfy their requirements. (Fisher, No. 30 at p. 1) ASAP, NEEA, and NRDC (collectively, the "Advocates") and the CA IOUs commented that they support the proposal to add a requirement to measure and report spray force. The Advocates and CA IOUs believe that the addition of spray force will help stakeholders to better understand CPSV product performance and help inform the incorporation of this metric into a future rulemaking. Additionally, the Advocates stated that the collection of spray force product data will also inform the EPA WaterSense program and other efforts to improve water and energy efficiency in commercial kitchens. (Advocates, No. 32 at p. 2; CA IOUs, No. 34 at p. 3).

DOE acknowledges that some interested parties generally oppose the use of spray force to define separate product classes for commercial prerinse spray valves. However, DOE received no comments contradicting its conclusion that spray force is a performance-related feature related to consumer utility. DOE also acknowledges that there are other features that could also affect consumer utility of commercial prerinse spray valves, including spray shape and amount of splash back; however, these metrics are not as easily quantifiable as spray force, nor can they be easily tested or defined. Based on the WaterSense studies, the totality of comments received in response to the 2014 CPSV Framework document and CPSV NOPR, and additional market research, DOE concludes that spray force is a performance-related feature that justifies different standard levels. DOE is not establishing a minimum spray force requirement in this final rule; rather, spray force is used only to define the boundaries between the three product classes.

b. Number of Classes

To determine the number of product classes, DOE tested and analyzed a wide range of CPSV units on the market, spanning multiple manufacturers, flow rates, and spray shapes. DOE believes that the units analyzed for this rulemaking are representative of the entire CPSV market. DOE's test data and additional market research indicated three clusters of spray force data points, which DOE used as the basis for proposing three separate product classes. Additional details regarding this test data is provided in chapter 5 of the final rule TSD.

Product class 1 included units with spray force less than or equal to 5.0 ounce-force (ozf), product class 2 included units with spray force greater than 5.0 ozf but less than or equal to 8.0 ozf, and product class 3 included units with spray force greater than 8.0 ozf.

DOE received comments regarding the method behind how the product classes were established. Specifically, AWE stated that using a scatter graph of spray force from different models, then dividing into thirds, is not a scientific method to classify products. (AWE, No. 28 at p. 3) AWE recommended that the classification system not be implemented and believes that it is arbitrary, unjustified, and its effect on water use is unknown. (AWE, No. 28 at p. 6)

DOE selected 5.0 ozf as the spray force cut-off between product class 1 and product class 2 based on DOE's test data and market research, which clearly showed a cluster of CPSV units above and below that threshold. One cluster of CPSV units had spray force ranges between 4.1 and 4.8 ozf, and the other cluster was between 5.5 and 7.7 ozf. Additionally, in comments to the 2014 CPSV Framework document, T&S Brass suggested a flow rate cut-off of 0.80 gpm between the "ultra-low-flow" and "low-flow" commercial prerinse spray valves. (T&S Brass, No. 12 at p. 3) A flow rate of 0.80 gpm equates to 5.3 ozf using the flow rate-spray force linear relationship determined by DOE.

Based on these considerations, DOE established the threshold between the two classes at 5.0 ozf.

DOE selected 8.0 ozf as the spray force cut-off between product class 2 and product class 3 based on test results of commercial prerinse spray valves with shower-type spray shapes. Shower-type spray shapes provide the distinct utility of minimizing "splash back" which can be associated with nozzle-type designs at higher flow rates. In addition to the three clusters of data points in the flow rate-spray force plot, DOE testing showed that the upper range of the market, in terms of flow rate, predominantly includes shower-type units. DOE found that the lowest tested spray force of any shower-type unit was 8.1 ozf. Additionally, in comments to the 2014 CPSV Framework document, T&S Brass suggested a flow rate cut-off of 1.28 gpm between the "low-flow" and "standard" commercial prerinse spray valves. (T&S Brass, No. 12 at p. 3) A flow rate of 1.28 gpm equates to 8.5 ozf using the flow rate-spray force linear relationship determined by DOE. Based on these considerations, DOE selected 8.0 ozf to differentiate product class 3 units from other commercial prerinse spray valves available on the market.

As described in the CPSV NOPR, DOE believed that each of these defined spray force ranges is associated with unique consumer utility for specific CPSV applications. Specifically, product class 1 provides distinct utility for cleaning delicate glassware and removing loose food particles from dishware, product class 2 provides distinct utility for cleaning wet foods, and product class 3 provides distinct utility for cleaning baked-on foods. DOE believes that these categorizations appropriately reflect the various end uses of commercial prerinse spray valves and has defined the three product classes accordingly.

c. Other Comments

In response to the NOPR, interested parties commented that the proposed product classes would limit manufacturers' product designs and innovation, and create confusion to consumers. (T&S Brass, Public Meeting Transcript, No. 23 at pp. 51 – 52; Chicago Faucets, Public Meeting Transcript, No. 23 at pp. 49 – 51; NAFEM, PMI, No. 31 at p. 1; PMI, No. 27 at p. 1; Chicago Faucets, No. 26 at p. 2; T&S Brass, No. 33 at p. 2; AWE, No. 28 at p. 6; CA IOUs, No. 44 at p. 2) Specifically, AWE stated that the classifications could alter the market in a manner that deters the use of more efficient and better performing products. (AWE, No. 28 at p. 4)

By maintaining flow rate as the regulated efficiency metric and creating three product classes, DOE believes the product class structure would not prescribe or limit any particular design options for CPSV manufacturers. DOE's technology assessment and screening analysis identified multiple possible design options that manufacturers could implement to achieve reductions in flow rate, which apply to both shower-type and nozzle-type commercial prerinse spray valves. In addition, manufacturers would not be precluded from implementing other innovative design options that may be developed in the future.

Additionally, DOE does not expect the product class structure to create confusion for the consumer, because DOE market research indicates that CPSV marketing materials predominantly highlight the spray pattern shape (e.g., solid stream, shower, fan) and flow rate of CPSV models. The product class structure does not prescribe any changes to the type of information manufacturers can provide in CPSV marketing materials.

CA IOUs stated that different product classes are not marketed to consumers that would necessitate three different product standards based on spray force. According to the CA IOUs, commercial prerinse spray valves are marketed based on physical dimensions, and in some cases flow rate. (CA IOUs, No. 34 at pp. 1-2; CA IOUs, No. 44 at p. 2)

DOE also has not specified any labeling requirements in this final rule. DOE only requires that manufacturers provide the information contained in the certification reports when certifying that all applicable CPSV models are compliant with the standard. DOE is not requiring that the product classes be used to market commercial prerinse spray valves; the product classes are used to determine the applicable standard, and are used for certification, compliance, and enforcement purposes. See section III.C for more details on compliance, certification and enforcement. Therefore, DOE does not expect that the product class structure would alter the market and deter the use of higher-efficiency and better performing products, as the representation of the commercial prerinse spray valves will continue to be in terms of flow rate.

AWE commented that there is no evidence presented as to how a consumer should choose between the different classifications, and that consumer choice tends to gravitate towards "heavy-duty" under the false premise that bigger is better. (AWE, No.

28 at pp. 3-4) The Advocates stated that if DOE creates the three product classes, then it would drive the market to the "heavy-duty" class. The Advocates expressed concern that without the benefit of the current distribution of CPSV market shares based on flow rate, creating three product classes could increase the average flow rate of products sold in the market. (Advocates, No. 32 at p. 2; ASAP and NRDC, No. 45 at p. 1)

DOE realizes that consumers may switch between product classes, and the flow rate of commercial prerinse spray valves used by some consumers may increase instead of decrease due to energy conservation standards. DOE analyzed the effects of product class switching in the downstream analyses and evaluated the results of product class switching when setting a standard in section V.C.1. A detailed description of DOE's method to model product class switching is contained in chapter 9 of the final rule TSD.

DOE received comments on the naming convention used for the proposed product classes in the CPSV NOPR. T&S Brass recommended changing the product class names because the "heavy-duty" term is already widely used in the industry to represent products that last long. (T&S Brass, Public Meeting Transcript, No. 23 at pp. 110-111) During the public meeting, DOE requested that stakeholders provide an alternate naming convention for the product classes. Chicago Faucets stated that the proposed product class names, especially "light duty," may prevent customers from choosing the lower flow products. Users prefer durable, heavy duty products, particularly in commercial applications where commercial prerinse spray valves are most commonly used. Therefore, Chicago Faucets suggested using "Level 1", "Level 2", and "Level 3" instead. (Chicago Faucets, No. 26 at p. 3) Fisher stated that the terms "heavy duty", "standard duty", and "light duty" should not be used as the terminology for the different product classes. (Fisher, No. 30 at p. 1)

Based on feedback from interested parties, DOE has renamed the product classes in this final rule as product class 1, product class 2, and product class 3 instead of "light-duty," "standard-duty," and "heavy-duty," respectively. DOE also notes that the product class names defined by DOE do not restrict how manufacturers may refer to their products in marketing literature, provided that such products meet the appropriate standard based on DOE's defined product classes.

Finally, DOE also received comments regarding potential other product classes that could be considered in future rulemakings. The Advocates commented that there is some market differentiation between commercial prerinse spray valves intended for cleaning dishware before sanitizing in a commercial dishwasher, and commercial prerinse spray valves intended for pot and pan cleaning. The Advocates recommended that DOE may wish to consider product classes based on such existing market differentiation during the next update to the standards. (Advocates, No. 32 at p. 2) CA IOUs stated that the market appears to be moving towards different usage type, such as dining and pot cleaning spray valves. CA IOUs recommended when DOE begins the process of a new energy conservation standard in a future rulemaking, that DOE should consider separate standards for dining and pot and pan cleaning. (CA IOUs, No. 34 at p. 2; CA IOUs, No. 44 at p. 2)

3. Technology Assessment

In the CPSV NOPR technology assessment, DOE identified six technology options that would improve the efficiency of commercial prerinse spray valves, as measured by the CPSV DOE test procedure. These include the following: (1) addition of flow control insert, (2) smaller spray hole area, (3) aerators, (4) additional valves, (5) changing spray hole shape, and (6) venturi meter to orifice plate nozzle geometries.

DOE received one comment in support of the venturi meter to orifice plate nozzle geometry technology option. CA IOUs supported DOE's consideration of implementing an orifice plate nozzle design to produce a lower flow rather than a venturi meter nozzle with similar inlet and outlet dimensions. (CA IOUs, No. 34 at pp. 2-3) AWE, on the other hand, opposed design-restrictive requirements in a specification unless health and/or safety are at risk. Instead, AWE stated that it is appropriate to mandate an outcome (e.g., gallons per minute) directly related to water and energy efficiency, rather than pre-determine design parameters. Once the desired outcome is defined, manufacturers will innovate and develop products that yield the mandated outcomes. (AWE, No. 28, p. 7)

As part of its rulemaking analysis process, DOE analyzes technology options that can be implemented to improve the efficiency of a covered product. The technology options identified for commercial prerinse spray valves provide feasible means for decreasing flow rate (or increasing efficiency) to meet the amended standard. However, DOE does not mandate any technology options that can be used to meet the amended standard. Manufacturers can use all technologies available to them to meet the amended energy conservation standard. In addition, manufacturers would also not be precluded from implementing other innovative design options that may be developed in the future.

For this final rule, DOE analyzed the same six technology options that were described in the CPSV NOPR. Chapter 3 of the final rule TSD provides additional details on all the technology options identified by DOE as part of the technology assessment.

B. Screening Analysis

DOE uses the following four screening criteria to determine which technology options are suitable for further consideration in an energy conservation standards rulemaking:

1) Technological feasibility. Technologies that are not incorporated in commercial products or in working prototypes will not be considered further.
2) Practicability to manufacture, install, and service. If it is determined that mass production and reliable installation and servicing of a technology in commercial products could not be achieved on the scale necessary to serve the relevant market at the time of the projected compliance date of the standard, then that technology will not be considered further.
3) Impacts on product utility or product availability. If it is determined that a technology would have significant adverse impact on the utility of the product to significant subgroups of consumers or would result in the unavailability of any covered product type with performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the

same as products generally available in the United States at the time, it will not be considered further.

4) Adverse impacts on health or safety. If it is determined that a technology would have significant adverse impacts on health or safety, it will not be considered further.

10 CFR part 430, subpart C, appendix A, 4(a)(4) and 5(b)

If DOE determines that a technology, or a combination of technologies, fails to meet one or more of the previously mentioned four criteria, it will be excluded from further consideration in the engineering analysis. The reasons for eliminating any technology are discussed in the following sections.

The subsequent sections include comments from interested parties pertinent to the screening criteria, DOE's evaluation of each technology option against the screening analysis criteria, and whether DOE determined that a technology option should be excluded (screened out) based on the screening criteria.

In the CPSV NOPR, DOE screened out the following technology options: the addition of a flow control insert, aerators, and additional valves. DOE did not receive any comments regarding the design options that were screened out. The remaining technology options listed in section IV.A.3 met all four screening criteria and were analyzed in the CPSV NOPR. DOE did not receive any additional comments regarding these technology options. Therefore, DOE did not screen out the following technology options for the final rule analysis: (1) smaller spray hole area, (2) changing spray hole shape, and (3) venturi meter to orifice plate nozzle geometries.

DOE determined that these technology options are technologically feasible because they are being used or have previously been used in commercially available products or working prototypes. DOE also finds that all of the remaining technology options meet the other screening criteria (i.e., practicable to manufacture, install, and service and do not result in adverse impacts on consumer utility, product availability, health, or safety). For additional details, see chapter 4 of the final rule TSD.

C. Engineering Analysis

In the engineering analysis, DOE establishes the relationship between the manufacturer production cost (MPC) and improved CPSV efficiency. This relationship serves as the basis for cost-benefit calculations for individual consumers, manufacturers, and the nation. DOE typically structures the engineering analysis using one of three approaches: (1) design option, (2) efficiency level, or (3) reverse engineering (or cost assessment). The design-option approach involves adding the estimated cost and associated efficiency of various efficiency-improving design changes to the baseline to model different levels of efficiency. The efficiency-level approach uses estimates of costs and efficiencies of products available on the market at distinct efficiency levels to develop the cost-efficiency relationship. The reverse-engineering approach involves testing products for efficiency and determining cost from a detailed bill of materials (BOM) derived from reverse engineering representative products.

For this analysis, DOE structured its engineering analysis for commercial prerinse spray valves using a combination of the design option approach and the reverse-engineering approach. The analysis is performed in terms of incremental increases in efficiency (decreases in flow rate) due to the implementation of selected design options, while the estimated MPCs for each successive design option are based on product teardowns and a bottom-up manufacturing cost assessment. Using this hybrid approach, DOE developed the relationship between MPC and CPSV efficiency.

Chapter 5 of the final rule TSD discusses the baseline efficiencies for each product class (in terms of flow rate), the design options DOE considered, the methodology used to develop manufacturing production costs, and the cost-efficiency relationships. The LCC and PBP analysis uses the cost-efficiency relationships developed in the engineering analysis.

1. Engineering Approach

For each of the three adopted product classes, DOE selected a baseline efficiency (in terms of flow rate) as a reference point from which to measure changes resulting from each design option. DOE then developed separate cost-efficiency relationships for each product class analyzed. The following is a summary of the method DOE used to determine the cost-efficiency relationship for commercial prerinse spray valves:

1) Perform flow rate and spray force tests on a representative sample of commercial prerinse spray valves in every product class.

2) Develop a detailed BOM for the tested commercial prerinse spray valves through product teardowns, and construct a commercial prerinse spray valve cost model.
3) Use the test data and cost model to calculate the incremental increase in efficiency (i.e., decrease in flow rate) and cost increase of adding specific design options to a baseline model.

In response to the CPSV NOPR, NAFEM stated that DOE has not tested commercial prerinse spray valves in real life foodservice settings. NAFEM believes that consumer satisfaction is essential for the companies selling these products. (NAFEM, No. 31 at p. 1)

DOE has not performed testing in foodservice settings because DOE test procedures, not field performance, must be used to determine whether the products comply with standards adopted pursuant to EPCA. (42 U.S.C. 6295(s)) Instead, DOE conducted multiple commercial prerinse spray valve tests according to the amended DOE test procedure.

2. Linear Relationship Spray Force and Flow Rate

In the CPSV NOPR public meeting, DOE presented the relationship between spray force and flow rate. This relationship was determined using DOE test data for spray force and flow rate for a wide range of commercial prerinse valves. The tested units included the entire spectrum of available spray patterns and flow rates that DOE was aware of at the time of the analysis. In addition, DOE collected supplementary data from

DOE's CCMS, the U.S. EPA WaterSense program, and FSTC reports. DOE analyzed the collected data and found a strong linear relationship between flow rate and spray force.

DOE received several comments related to the spray force and flow rate relationship. NRDC requested that DOE consider identifying the configuration of the commercial prerinse spray valves in the spray force-flow rate relationship without revealing the individual model. (NRDC, Public Meeting Transcript, No. 23 at p. 45) DOE updated the flow rate-spray force plot in this final rule to identify commercial prerinse spray valves that have shower-type spray patterns. The updated relationship can be found in chapter 5 of the final rule TSD.

T&S Brass stated that the relationship between spray force and flow rate does not address consumer satisfaction. Instead, the relationship assumes that consumers are satisfied with all products. (T&S Brass, Public Meeting Transcript, No. 23 at p. 47)

DOE acknowledges that different CPSV products may provide different levels of consumer satisfaction. DOE believes, however, that the amended standards promulgated in this final rule for the three defined product classes will maintain the same variety of product features on the market as under the current standard. DOE's analysis indicates that the amended standards will not result in a loss of consumer utility compared to the current standards.

T&S Brass stated that while the flow rate values for the basic models are included in the relationship between spray force and flow rate, the impact of market share is not included. Therefore, if market share was included, there will be more data points on the higher end of flow rate. However, T&S Brass also commented that even with the additional data points, the linear relationship will not change. (T&S Brass, Public Meeting Transcript, No. 23 at pp. 48-49) Since publishing the CSPV NOPR, DOE tested additional units from product class 3, and added the test results for the units that were compliant with DOE's current CPSV standard (1.6 gpm) to the relationship shown in chapter 5 of the final rule TSD. The relationship continues to show flow rate varies linearly with spray force, irrespective of market share. However, based on the comment from T&S Brass, DOE has updated the assumption in the shipments analysis to account for more shipments in product class 3. This is presented in section IV.G of this document.

3. Baseline and Max-Tech Models

To analyze design options for energy efficiency improvements, DOE defined a baseline model for each product class. Typically, the baseline model is a model that meets current energy conservation standards. DOE defined the baseline efficiency for all product classes as the current Federal standard of 1.6 gpm.

DOE defined the market baseline for product classes 1 and 2 as the greater of (1) the highest flow rate in the class that meets the Federal standard, or (2) the flow rate at the upper spray force bound of the product class as predicted by the spray force-flow rate linear relationship described in chapter 5 of the TSD. The most consumptive unit that was tested in product class 1 had a flow rate of 0.97 gpm, which exceeds the 0.75 gpm predicted by the linear relationship between spray force and flow rate for the product class 1 upper spray force bound of 5.0 ozf. DOE rounded the market baseline flow rate of product class 1 to 1.00 gpm. The market baseline for product class 2, predicted by the spray force-flow rate linear relationship, is 1.20 gpm at the upper spray force bound of 8.0 ozf. DOE did not find any commercial prerinse spray valves in product class 2 that exceed this flow rate. For product class 3, the market baseline equals the Federal flow rate standard of 1.60 gpm.

The analysis also identified the lowest flow rate that is commercially available within each product class (i.e., the max-tech model). DOE determined the max-tech level as the least consumptive tested commercial prerinse spray valve in each product class. The max-tech levels for product classes 1, 2, and 3 are 0.62, 0.73, and 1.13 gpm, respectively. Finally, DOE also defined intermediate efficiency levels between the baseline and max-tech levels for each product class. Further information about DOE's efficiency level definitions is provided in chapter 5 of the final rule TSD. Table IV.1 through Table IV.3 provide the updated efficiency levels for all three product classes.

Table IV.1 Efficiency Levels for CPSV Product Class 1 (Spray Force ≤ 5.0 ozf)

Efficiency Level	Description	Flow Rate gpm
Baseline	Current Federal standard	1.60
Level 1	Market minimum	1.00
Level 2	15% improvement over market minimum	0.85
Level 3	25% improvement over market minimum	0.75
Level 4	Maximum technologically-feasible (max-tech)	0.62

Table IV.2 Efficiency Levels for CPSV Product Class 2 (5.0 ozf < Spray Force ≤ 8.0 ozf)

Efficiency Level	Description	Flow Rate gpm
Baseline	Current Federal standard	1.60
Level 1	Market minimum	1.20
Level 2	15% improvement over market minimum	1.02
Level 3	25% improvement over market minimum	0.90
Level 4	Maximum technologically-feasible (max-tech)	0.73

Table IV.3 Efficiency Levels for CPSV Product Class 3 (Spray Force > 8.0 ozf)

Efficiency Level	Description	Flow Rate gpm
Baseline	Current Federal standard	1.60
Level 1	10% improvement over baseline	1.44
Level 2	WaterSense level; 20% improvement over baseline	1.28
Level 3	Maximum technologically-feasible (max-tech)	1.13

In response to the updates to the engineering analysis in the CPSV NODA, CA IOUs stated that DOE should provide a reason for changing the efficiency level 2 for product class 3 from 1.24 gpm to 1.28 gpm. (CA IOUs, No. 44 at p. 2)

DOE notes that the flow rate for efficiency level 2 for product class 3 remains unchanged at 1.28 gpm since the CPSV NOPR. Instead, DOE has only updated the max-tech level of product class 3 since the CPSV NOPR. In the CPSV NOPR, the max-tech level for product class 3 was set at 1.24 gpm based on test results. After the CPSV NOPR, DOE performed additional testing and based on these test results, DOE identified a new max-tech level for product class 3. Therefore, DOE revised the max-tech level in product class 3 from 1.24 gpm to 1.13 gpm.

4. Proposed CPSV NOPR Standard Levels

In the CPSV NOPR, DOE proposed the standard levels to be 0.65, 0.97, and 1.24 gpm for light, standard, and heavy-duty product classes, respectively. 80 FR 39487. DOE received comments on the loss of product availability regarding the proposed standards as well as several other comments about the standard levels, which are addressed in the following sections.

a. Availability of Products

AWE commented that the CPSV NOPR proposal has design-restrictive requirements and will likely lead to less diverse products on the market. (AWE, No. 28 at pp. 6-7) AWE recommended that the rule include the use of WaterSense test criteria to determine compliance to any Federal minimum standard. (AWE, No. 28 at p. 4) AWE also stated that the proposed spray force criteria are in direct conflict with WaterSense criteria, and that only 3 of the 22 prerinse spray valves currently meeting WaterSense specifications also meet the minimum requirements proposed in this rulemaking. AWE commented that the remaining 19 products, together with the new WaterSense products about to be released, would no longer be compliant with the DOE standard. (AWE, No. 28 at p. 5)

Chicago Faucets expressed a similar concern that the levels proposed in the CPSV NOPR are too stringent, stating that 86 percent of the products certified to voluntary Federal EPA WaterSense requirements will be obsolete and the investments in the WaterSense program will not be recovered. Chicago Faucets stated that this might lead to limited resources in the future for this product. Additionally, Chicago Faucets stated that

60 percent of the models in the spray force and flow rate graph presented in the CPSV NOPR would not pass the new requirement. Chicago Faucets believes that the more stringent requirements could easily disrupt the free market, eliminating the majority of the products offered today and restricting competition by reducing the number of manufacturers of CPSV products. (Chicago Faucets, No. 26 at pp. 2-3) NAFEM also commented that the proposed standard will require the manufacturers to abandon current products and the investment they made. (NAFEM, No. 28 at p. 1)

T&S Brass commented that the proposed standard would eliminate multi-orifice showerhead-type spray valves. Single-orifice type spray valves could have applications where there is a lot of splash back. Therefore, customers will be forced into products that they will not be satisfied with. (T&S Brass, Public Meeting Transcript, No. 23 at p. 40)

CA IOUs disagreed with T&S Brass and stated that commercial prerinse spray valves with single orifice, multi orifice, or venturi meter nozzle designs would be able to meet the 1.24 gpm standard, based on their own testing results. Additionally, CA IOUs did not observe any splash back issues with a single orifice nozzle design, nor did they observe any concerns about splash back based upon customer interviews. (CA IOUs, No. 34 at pp. 2-3)

EPCA establishes that DOE may not prescribe an amended standard if interested persons have established by a preponderance of the evidence that the standard is likely to result in the unavailability in the United States in any covered 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. (42 U.S.C. 6295(o)(4)) In this final rule, DOE revised the efficiency level definitions and the analysis of the trial standard levels (TSL) based on feedback from interested parties. The amended standards adopted in this final rule are less stringent than those proposed in the CPSV NOPR for all three product classes. DOE notes that the amended standards adopted in this final rule are set at the market minimum for product class 1 and product class 2 at 1.00 gpm and 1.20 gpm respectively. The amended standards for these product classes have no impact on the current CPSV market, because all CPSV models in those product classes already meet the market minimum level. In product class 3, the amended standard is set at the WaterSense level of 1.28 gpm, and approximately 55 percent of CPSV units in product class 3 already meet this level. The 1.28 gpm level maintains the availability of multi-orifice shower-type units on the market, as described further in the following section. More discussion on the amended standard and the discussion on the TSL selections are provided in section IV.C.4.b, and section V.C.1 respectively.

b. Standard Levels

DOE also received comments about the standard levels that were proposed in the CPSV NOPR. Chicago Faucets expressed concern with the flow rate levels proposed in the CPSV NOPR and noted that the proposed flow rates are only hundredths of one gallon per minute lower than the common flow rates used in the plumbing industry of 1.00 gpm and 1.25 gpm. (Chicago Faucets, No. 26 at p. 3) Chicago Faucets also commented that if DOE were to move forward with the CPSV NOPR approach, DOE should use standard levels of 0.65 gpm, 1.00 gpm, and 1.25 gpm for light duty, standard duty, and heavy duty, respectively. (Chicago Faucets, No. 26 at p. 3)

The Advocates and CA IOUs recommended that DOE amend the standard to be a maximum flow rate of 1.24 gpm for all commercial prerinse spray valves. The Advocates and the CA IOUs recommended this flow rate, because they believe that 1.24 gpm is a technologically feasible efficiency level, and would realize significant water and energy savings and still maintain a positive LCC. (Advocates, No. 11 at p. 2) Additionally, CA IOUs stated that based on their testing, the 1.24 gpm level was feasible for equipment from different manufacturers, while also maintaining product performance. (CA IOUs, No. 34 at p. 2) In response to the CPSV NODA, the CA IOUs, ASAP and NRDC reiterated that DOE should adopt a single 1.24 gpm level for all product classes. (CA IOUs, No. 44 at p. 2; ASAP and NRDC, No. 45 at p. 2).

PMI recommended that DOE replace the proposed three product classes with a single product class that contains the 1.28 gpm WaterSense level. (PMI, No. 43 at p. 1) AWE stated that setting a Federal maximum at 1.28 gpm would prevent WaterSense from establishing a commercial prerinse spray valve program with a significantly lower water use threshold. (AWE, No. 28 at p. 7) T&S Brass stated if DOE ultimately decides to adopt the current EPA WaterSense specification at 1.28 gpm for commercial prerinse spray valves, that a reasonable transition period from the voluntary to mandatory status would be an effective date of January 2020. (T&S Brass, No. 12 at p. 3) Similarly, AWE urged DOE to postpone this rulemaking process for at least 2 years to prevent an industry-wide backlash against water efficiency. (AWE, No. 28 at pp. 7-8) AWE further recommended that DOE postpone this rulemaking by at least 2 years until additional data can be obtained through the WaterSense reporting process. (AWE, No. 28 at pp. 7 -8)

As presented in section I, DOE is adopting standard levels of 1.00 gpm, 1.20 gpm and 1.28 gpm for product classes 1, 2 and 3, respectively. The adopted standards are set at the market minimum level for product classes 1 and 2, and at the WaterSense level for product class 3. DOE believes that these flow rates are the minimum flow rates for each product class that would not induce consumers to switch product classes. DOE also notes that the 1.28 gpm standard for product class 3 alleviates many of the concerns expressed by interested parties because (1) the engineering analysis shows that the 1.28 gpm level is technologically feasible; (2) interested parties, including the trade organization PMI, certain efficiency advocates and a manufacturer, commented that 1.28 gpm would be an appropriate standard level that would not negatively impact consumer utility for the highest-flow product class, and (3) the 1.28 gpm level represents the WaterSense Program criteria, which was developed in a collaborative process between EPA and interested parties, including manufacturers. In addition, the amended standard standards for product classes 1 and 2 have no impact on the current CPSV market, because all CPSV models in those product classes already meet the market minimum level.

More discussion on this standard level is in sections V.A and V.C.1 of this document.

Regarding the compliance date of the amended standards, EPCA states that a manufacturer shall not be required to apply new standards to a product with respect to which other new standards have been required during the prior 6 year period. (EPCA U.S.C. 6295(m)(4)(B)) As described earlier in this document, the current standard became effective January 1, 2006. Manufacturers will have 3 years to comply with the amended standards after publication of this final rule. DOE believes that 3 years is sufficient time for manufacturers to transition products to the amended standard level. DOE also notes that the effective date of the amended standards in this final rule will be more than 6 years after the voluntary WaterSense specification date of September 19, 2013.

The standard levels set in this final rule also alleviate the concern about product class switching that was raised by CA IOUs. CA IOUs suggested using one product class, because one of the benefits is that it would not result in product class switching. (CA IOUs, No. 34 at p. 2) DOE does not expect product class switching to occur under the amended standards promulgated by this final rule, as the standard levels for product classes 1 and 2 do not move consumers from the current market minimums. A detailed description of DOE's method to model product class switching is contained in chapter 9 of the final rule TSD.

5. Manufacturing Cost Analysis

DOE estimated the manufacturing costs using a reverse-engineering approach, which involves a bottom-up manufacturing cost assessment based on a detailed BOM derived from teardowns of the product being analyzed. The detailed BOM includes labor costs, depreciation costs, utilities, maintenance, tax, and insurance costs, in addition to the individual component costs. These manufacturing costs are developed to be an industry average and do not take into account how efficiently a particular manufacturing facility operates.

To develop the relationship between cost and performance for commercial prerinse spray valves, DOE used a reverse-engineering analysis, or teardown analysis. DOE purchased off-the-shelf commercial prerinse spray valves available on the market and dismantled them component by component to determine what technologies and designs manufacturers use to decrease CPSV flow rate. DOE then used independent costing methods, along with component-supplier data, to estimate the costs of the components.

DOE derived detailed manufacturing cost estimate data based on its reverse engineering analysis, which included the cost of the product components, labor, purchased parts and materials, and investment.

A portion of DOE's test sample included four product series from four different manufacturers. Through testing, DOE found that the flow rates of the units varied within each series. However, based on the reverse-engineering analysis, the manufacturing costs for the units within each series were the same. Therefore, DOE concluded that there is no manufacturing cost difference for incremental efficiency improvements between models within the same series from the same manufacturer.

DOE also tested and performed a teardown analysis on commercial prerinse spray valves from additional manufacturers. These commercial prerinse spray valves represented a range of market baseline to max-tech units in each class. The testing and teardown results indicated that the manufacturing costs between different units from different manufacturers can vary based on the type of material, amount of material, and/or process used. However, DOE determined that these factors do not affect the efficiency of a commercial prerinse spray valve. Therefore, DOE did not include these cost differences in the engineering analysis. Chapter 5 of the final rule TSD provides further details on the teardown analysis, component costs, and costs that were developed as part of the cost-efficiency curves.

D. Markups Analysis

The purpose of the markups analysis is to translate the MPC derived from the engineering analysis into the final consumer purchase price by applying the appropriate markups. The first step in this process is converting the MPC into the manufacturer selling price (MSP) by applying the manufacturer markup. The manufacturer markup accounts for cost of sales, general and administrative expenses, research and development costs, other corporate expenses, and profit. As described further in chapter 6 of the final rule TSD, the manufacturer markup of 1.30 was calculated as the market share weighted average value for the industry. DOE developed this manufacturer markup by examining several major CPSV manufacturers' gross margin information from annual reports and Securities and Exchange Commission 10-K reports. Because the 10-K reports do not provide gross margin information at the subsidiary level, the estimated markups represent the average markups that the parent company applies over its entire range of product offerings, and does not necessarily represent the manufacturer markup of the subsidiary. Both the MPC and the MSP values are used in the MIA.

Next, DOE uses manufacturer-to-consumer markups to convert the MSP into a consumer purchase price, which is then used in the LCC and PBP analysis, as well as the

NIA. Consumer purchase prices are necessary for the baseline efficiency level and all other efficiency levels under consideration.

DOE recognizes that the consumer purchase price depends on the distribution channel (i.e., how the product is distributed from the manufacturer to the consumer) the consumer uses to purchase the product. DOE identified the following distribution channels for commercial prerinse spray valves:

A. Manufacturer → Final Consumer (Direct Sales)
B. Manufacturer → Authorized Distributor → Final Consumer
C. Manufacturer → Retailer → Final Consumer
D. Manufacturer → Service Company → Final Consumer

Baseline markups are multipliers that convert the MSP of products at the baseline efficiency level to consumer purchase price. Incremental markups are multipliers that convert the incremental increase in MSP for products at each higher efficiency level (compared to the MSP at the baseline efficiency level) to corresponding incremental increases in the consumer purchase price. Consistent with the CPSV NOPR, in the analysis in this final rule, DOE used only baseline markups to convert the MSP of products to the consumer purchase price. This is due to the fact that the engineering analysis indicated that there is no price increase with improvements in efficiency for commercial prerinse spray valves. Thus, incremental markups were not required. Chapter 6 of the final rule TSD provides further details on the distribution channels and calculated markups. No comments regarding the markups analysis or distribution chains were received from interested parties.

E. Energy and Water Use Analysis

The purpose of the energy and water use analysis is to determine the annual energy and water consumption of commercial prerinse spray valves to assess the associated energy and water savings potential of different product efficiencies. The energy and water use analysis estimates the range of energy and water use of commercial prerinse spray valves in the field (i.e., as they are actually used by consumers). To this end, DOE performed an energy and water use analysis that calculated energy and water use of commercial prerinse spray valves for each product class and efficiency level identified in the engineering analysis. The energy and water use analysis provides the basis for other analyses DOE performed, particularly assessments of the energy and water savings and the savings in consumer operating costs that could result from adoption of the amended standards.

In the CPSV NOPR analysis, DOE calculated the energy and water use by determining the representative daily operating time of the product by major building types that contain commercial kitchens found in the Commercial Building Energy Consumption Survey (CBECS).[25] The daily CPSV operating time was annualized based on operating schedules for each building type. Annual water use for each product class was determined by multiplying the annual operating time by the flow rate at an operating

[25] Survey data available at www.eia.gov/consumption/commercial/data/2003/index.cfm.

pressure of 60 psi, in accordance with the amended DOE test procedure, for each efficiency level.

Annual site energy use was calculated by multiplying the annual water use in gallons by the energy required to heat each gallon of water to an end-use temperature of 108 °F.[26] Cold water supply temperatures used in this calculation were derived for the nine U.S. census regions based on ambient air temperatures and the hot water supply temperature was assumed to be 140 °F based on American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 12-2000 regarding the appropriate hot water temperatures necessary to prevent legionellosis and other bacterial diseases.[27] The proportion of buildings which used natural gas or electricity for water heating found in the CBECS database were multiplied by the energy consumption of each kind of water heater, taking into account the efficiency level of the product, to obtain the total energy consumption of each product class and efficiency level of commercial prerinse spray valves.

In response to the CPSV NOPR, DOE received several comments related to the energy and water use analysis. Specifically, NRDC questioned how DOE derived the hot water ratio used in the energy and water use and why the hot water ratio was not consistent throughout the U.S. NRDC further inquired if the end use temperature of

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[26] End-use temperature was determined based on a review of several field studies. See chapter 7 of the CPSV NOPR TSD for a list of the field studies reviewed.

[27] ASHRAE Standard 12-2000: Minimizing the Risk of Legionellosis Associated with Building Water Systems, (February 2000).

108 °F was consistent throughout the analysis. (NRDC, Public Meeting Transcript, No. 23 at pp. 61-63)

The hot water ratio used in the CPSV NOPR and the final rule energy and water use analysis(see chapter 7 of the final rule TSD) calculates the proportion of hot water from the water heater that mixes with the incoming cold water from the local mains water at the commercial prerinse spray valve to deliver water at 108 °F. The cold water is derived regionally for each census division and building type where commercial prerinse spray valves are installed. The hot water ratio is not consistent throughout the United States because the mains water temperature is not consistent throughout the United States. As noted previously, end use temperature was calculated using data from the average end use temperature from CPSV field studies.

DOE also received comments in response to the CPSV NOPR related to the water pressure used in the energy and water use analysis. AWE commented that the representative range of water pressures in commercial kitchens should be determined in order to determine a reasonable range of both flow rate and spray force to be maintained by the valves. (AWE, No. 28 at p. 5) ASAP was concerned that not testing at different water pressures could affect the definition of the product classes, and make it difficult to ensure customer satisfaction. (ASAP, No. 23 at p. 27) AWE commented that spray force is largely dependent upon water pressure, and that the supplied water pressure can vary by at least 70 psi between different service areas. AWE stated that this can cause models to be classified differently in varying locales, and is not addressed in the proposal. (AWE, No. 28 at p. 3) AWE further stated that mandatory requirements demand a higher level of scrutiny, and recommended that DOE postpone the rulemaking until further research data is available on how water pressure affects performance in real life settings. (AWE, No. 28 at p. 5)

DOE is not establishing spray force requirements in this final rule; instead, spray force is used only to define the boundaries between product classes. DOE understands that the measured flow rate of commercial prerinse spray valves will vary as a function of water pressure. In evaluating the representative water pressure used in the CPSV test procedure, DOE performed a sensitivity analysis to determine typical water pressure values and their impact on measured flow rate, titled "Analysis of Water Pressure for Testing Commercial Prerinse Spray Valves Final Report.[28]" DOE concluded, as part of this analysis, that the representative water pressure for evaluating the energy and water use of commercial prerinse spray valves was 60 psi.

Chapter 7 of the final rule TSD provides details and the results of DOE's energy use analysis for commercial prerinse spray valves.

F. Life-Cycle Cost and Payback Period Analysis

DOE conducted the LCC and PBP analysis to evaluate the economic impacts on individual consumers of the amended energy conservation standards for commercial prerinse spray valves. The LCC is the total consumer expense over the life of the product, consisting of purchase and installation costs plus operating costs (expenses for energy

[28] The water pressure sensitivity analysis is available at regulations.gov under docket number EERE-2014-BT-TP-0055.

and water use, maintenance, and repair). To compute the operating costs, DOE discounts future operating costs to the time of purchase and sums them over the lifetime of the product. The PBP is the estimated amount of time (in years) it takes consumers to recover the potential increased purchase cost (including installation) of more efficient products through lower operating costs. DOE calculates the PBP by dividing the change in purchase cost at higher efficiency levels by the change in annual operating cost for the first year the amended standards are in effect (2019).[29]

For any given efficiency level, DOE measures the change in LCC relative to an estimate of the no-new-standards case product efficiency distribution. The no-new-standards case estimate reflects the market in the absence of amended energy conservation standards, including the market for products that exceed the current energy conservation standard. In contrast, the PBP for a given efficiency level is measured relative to the baseline product.

Inputs to the calculation of total installed cost include the cost of the product—which includes MSPs, distribution channel markups, and sales taxes—and installation costs. Inputs to the calculation of operating expenses include annual energy and water consumption, energy prices and price projections, combined water prices (which include water and wastewater prices) and price projections, repair and maintenance costs, product lifetimes, and discount rates. DOE created distributions of values for product lifetime,

[29] As compliance with the amended standards will be required at the very end of 2018, DOE used 2019 as the first year in the analysis period.

discount rates, energy and combined water prices, and sales taxes, with probabilities attached to each value to account for their uncertainty and variability.

The computer model DOE used to calculate the LCC and PBP, which incorporates Crystal Ball™ (a commercially available software program), relies on a Monte Carlo simulation to incorporate uncertainty and variability into the analysis. The Monte Carlo simulations randomly sample input values from the probability distributions and CPSV user samples. The model calculated the LCC and PBP for products at each efficiency level for 10,000 CPSV users per simulation run.

DOE calculated the LCC and PBP for all consumers as if each were to purchase a new commercial prerinse spray valve in 2019, the first year of the analysis period.

Table IV.4 summarizes the approach and data DOE used to derive inputs to the LCC and PBP calculations. The subsections that follow provide further discussion. Details of the spreadsheet model, and of all the inputs to the LCC and PBP analyses, are contained in chapter 8 and its appendices of the final rule TSD.

Table IV.4 Summary of Inputs and Methods for the LCC and PBP Analysis*

Inputs	Source/Method
Product Cost	Derived by multiplying MSPs by distribution channel markups and sales tax, as appropriate.
Installation Costs	Baseline installation cost determined with data from U.S. Department of Labor. Assumed no change with efficiency level.
Annual Energy and Water Use	Determined from the energy required to heat a gallon of water used at the prerinse spray valve multiplied by the average annual operating time and flow rate of each product class. Variability: By census region
Energy, Water and Wastewater Prices	Energy: Based on EIA's Form 826 data for 2014 Variability: By State Water: Based on 2012 AWWA Survey. Variability: By State
Energy and Water Price Trends	Energy: Forecasted using AEO2015 price forecasts. Water: Forecasted using Bureau of Labor Statistics (BLS) historic water price index information.
Maintenance and Repair Costs	Assumed no change with efficiency level.
Product Lifetime	DOE assumed an average lifetime of 5 years. Variability: Characterized using modified Weibull probability distributions.
Discount Rates	Estimated using the average cost of capital to commercial prerinse spray valve consumers. Cost of capital was found using information from the Federal reserve and from Damodaran online data.
First Year of Analysis Period	2019

* References for the data sources mentioned in this table are provided in the sections following the table or in chapter 8 of the final rule TSD.

1. Product Cost

To calculate consumer product costs, DOE multiplied the MSPs developed from the engineering analysis by the distribution channel markups described in section IV.D (along with sales taxes). DOE used baseline markups, but did not apply incremental markups, because the engineering analysis indicated that there is no price increase with improvements in efficiency for commercial prerinse spray valves. Product costs are assumed to remain constant over the analysis period.

2. Installation Cost

Installation cost includes labor, overhead, and any miscellaneous materials and parts needed to install the product. DOE used data from the U.S. Department of Labor to estimate the baseline installation cost for commercial prerinse spray valves.[30] DOE found no evidence and received no comments in the NOPR stage of this rulemaking that indicate installation costs will be impacted with increased efficiency levels.

3. Annual Energy and Water Consumption

Chapter 7 of the final rule TSD details DOE's analysis of CPSV annual energy and water use at various efficiency levels. For each sampled building type, DOE determined the energy and water consumption for a commercial prerinse spray valve at different efficiency levels using the approach described in section IV.E of this document.

4. Energy Prices

DOE derived energy prices from the EIA regional average energy price data for the commercial sectors. DOE used projections of these energy prices for commercial consumers to estimate future energy prices in the LCC and PBP analysis. AEO2015 was used as the default source of projections for future energy prices.

DOE developed estimates of commercial electricity and natural gas prices for each state and the District of Columbia (DC). DOE derived average regional energy prices from data that are published annually based on EIA Form 826.[31] DOE then used AEO2015 price projections to estimate commercial electricity and natural gas prices in future years. AEO2015 price projections have an end year of 2040. To estimate price

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[30] U.S. Department of Labor–Wage and Hour Division. Minimum Wage. http://www.dol.gov/whd/minimumwage.htm. Washington, DC.

[31] U.S. Department of Energy–Energy Information Administration. Form EIA-826 Database Monthly Electric Utility Sales and Revenue Data (EIA-826 Sales and Revenue Spreadsheets). 2015. http://www.eia.gov/electricity/data/eia826/. Washington, DC.

trends after 2040, DOE used the average annual rate of change in prices from 2030 to 2040. DOE assumed that 100 percent of installations were in commercial locations.

5. Water and Wastewater Prices

DOE obtained data on water and wastewater prices from the 2012 American Water Works Association (AWWA) surveys for this document.[32] For each state and the District of Columbia, DOE combined all individual utility observations within the state to develop one value for water and wastewater service. Because water and wastewater charges are frequently tied to the same metered commodity values, DOE combined the prices for water and wastewater into one total dollar per thousand gallons figure. This figure is referred to as the combined water price. DOE used the consumer price index (CPI) data for water related consumption (1970–2013) in developing a real growth rate for combined water price forecasts.[33]

Chapter 8 of the final rule TSD provides more detail about DOE's approach to developing water and wastewater prices.

6. Maintenance and Repair Costs

Repair costs are associated with repairing or replacing product components that have failed in the product; maintenance costs are associated with maintaining the operation of the product. Typically, small incremental increases in product efficiency

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[32] American Water Works Association. AWWA 2012 Water and Wastewater Rate Survey. http://www.awwa.org/resources-tools/water-and-wastewater-utility-management/water-wastewater-rates.aspx.

[33] U.S. Department of Labor–Bureau of Labor Statistics, 1970 - 2014 Tables 3A, 24. 2014. http://www.bls.gov/cpi/cpid1401.pdf.

produce no, or only minor, changes in repair and maintenance costs compared to baseline efficiency products.

Throughout this rulemaking process, DOE has requested information as to whether maintenance and repair costs are a function of efficiency level and product class. DOE did not receive comments during the CPSV NOPR public meeting or comment period regarding these costs. Thus, consistent with the analysis conducted at the NOPR stage of this rulemaking, DOE assumed that consumers would replace the commercial prerinse spray valve upon failure rather than repairing the product. Additionally, DOE modeled no changes in maintenance or repair costs between different efficiency levels.

7. Product Lifetime

Because product lifetime varies depending on utilization and other factors, DOE developed a distribution of product lifetimes. The use of a lifetime distribution helps account for the variability of product lifetimes.

DOE considered—but did not implement—the use of factors such as usage, water temperature, and pressure as means of determining the distribution of lifetimes of commercial prerinse spray valves in the analysis for this document. DOE developed a Weibull distribution with an average lifetime of 5 years and a maximum lifetime of 10 years. In the CPSV NOPR analysis, DOE modified the Weibull distribution to reflect 10 percent of commercial prerinse spray valves failing within the first year after installation, and maintained that characteristic for the final rule analysis. See chapter 8 of the final rule TSD for further details on the method and sources DOE used to develop CPSV lifetimes.

8. Discount Rates

In the calculation of LCC, DOE developed discount rates by estimating the average cost of capital to commercial prerinse spray valve consumers. DOE applies discount rates to commercial consumers to estimate the present value of future cash flows derived from a project or investment. Most companies use both debt and equity capital to fund investments, so the cost of capital is the weighted-average cost to the firm of equity and debt financing. See chapter 8 in the final rule TSD for further details on the development of consumer discount rates.

9. Efficiency Distribution in the No-New-Standards Case

To accurately estimate the share of consumers that will be affected by the amended energy conservation standard at a particular efficiency level, DOE's LCC and PBP analysis considered the projected distribution of product efficiencies that consumers purchase under the no-new-standards case. DOE refers to this distribution of product efficiencies as a no-new-standards case efficiency distribution.

To estimate the no-new-standards case efficiency distribution of commercial prerinse spray valves in 2019 (the first year of the analysis period), DOE relied on data from the Food Service Technology Center and DOE's CCMS Database for commercial prerinse spray valves.[34] Additionally, DOE conducted general internet searches and examined manufacturer literature to understand the characteristics of the spray valves currently offered on the market. DOE assumed that the no-new-standards case percentages in 2019 would stay the same through the analysis period. The no-new-standards case efficiency distribution is described in chapter 8 of the final rule TSD.

The estimated shares for the no-new-standards case efficiency distribution for commercial prerinse spray valves are shown in Table IV.5.

Table IV.5 Commercial Prerinse Spray Valve No-New-Standards Case Efficiency Distribution by Product Class in 2019

Efficiency Level	Product Class 1 % of Shipments	Product Class 2 % of Shipments	Product Class 3 % of Shipments
0	0	0	40
1	10	40	35
2	0	50	20
3	80	0	5
4	10	10	N/A

10. Payback Period Analysis

The payback period is the amount of time it takes the consumer to recover the additional installed cost of more-efficient products, compared to baseline products, through energy and water cost savings. Payback periods are expressed in years. Payback periods that exceed the life of the product mean that the increased total installed cost is not recovered in reduced operating expenses.

[34] The Food Service Technology Center test data for prerinse spray valves is available at www.fishnick.com/equipment/sprayvalves/. The DOE compliance certification data for commercial prerinse spray valves is available at www.regulations.doe.gov/certification-data/.

The inputs to the PBP calculation for each efficiency level are the change in total installed cost of the product and the change in the first year annual operating expenditures relative to the baseline. The PBP calculation uses the same inputs as the LCC analysis, except that discount rates are not needed. As explained in the engineering analysis (IV.C) there are no additional installed costs for more efficient commercial prerinse spray valves, making the PBPs in this analysis zero.

11. Rebuttable-Presumption Payback Period

EPCA, as amended, establishes a rebuttable presumption that a standard is economically justified if DOE 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 first year's energy (and, as applicable, water) savings resulting from the standard, as calculated under the test procedure in place for that standard. (42 U.S.C. 6295(o)(2)(B)(iii)) For each considered efficiency level, DOE determined the value of the first year's energy and water savings by calculating the quantity of those savings in accordance with the applicable DOE test procedure, and multiplying that amount by the average energy and combined water price forecast for the year in which compliance with the amended standard will be required. The results are summarized in V.B.1.c of this document.

G. Shipments Analysis

DOE uses projections of product shipments to calculate the national impacts of amended energy conservation standards on energy and water use, NPV, and future manufacturer cash flows. DOE develops shipment projections based on historic economic figures and an analysis of key market drivers for commercial prerinse spray valves. In DOE's shipments model, CPSV shipments are driven by both new construction and stock replacements. The shipments model takes an accounting approach, tracking market shares of each product class and the vintage of units in the existing stock. Stock accounting uses product shipments as inputs to estimate the age distribution of in-service product stocks for all years. The age distribution of in-service products is a key input to calculations of the NES, national water savings, and NPV, because operating costs for any year depend on the age distribution of the stock.

In the shipments analysis for this final rule, DOE gathered information pertaining to commercial prerinse spray valves for many building types besides restaurants from the Puget Sound Energy Program, EPA WaterSense Field Study, and other industry reports.[35,36]

In the CPSV NOPR analysis, DOE disaggregated total industry shipments into the three product classes. At the CPSV NOPR public meeting, T&S Brass commented that more shipments should be allocated to product class 3, which was the "heavy duty" product class in the CPSV NOPR. (T&S Brass, Public Meeting Transcript, No. 23 at p. 80) After considering the comment from T&S Brass, and with further study into the

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[35] U.S. Environmental Protection Agency WaterSense. Pre-Rinse Spray Valve Field Study Report. March 2011. Washington DC. Available at: http://www.epa.gov/watersense/partners/prsv_background.html#study.
[36] SBW Consulting, Inc. and Koeller and Company. Pre-Rinse Spray Valve Programs: How Are They Really Doing? December 2005. Seattle, WA. Available at: http://www.allianceforwaterefficiency.org/Commercial_Food_Service_Introduction.aspx.

CPSV market, DOE updated the allocation of total shipments by product class for the final rule, as shown in Table IV.6.

Table IV.6. NOPR vs. Final Rule Shipments Allocations by Product Class

	Product Class 1 %	Product Class 2 %	Product Class 3 %
NOPR	20	50	30
Final Rule	10	30	60

DOE based the retirement function (the time at which the product fails and is replaced) on the probability distribution for product lifetime that was developed in the LCC and PBP analysis. The shipments model assumes that no units are retired below a minimum product lifetime (one year of service) and that all units are retired before exceeding a maximum product lifetime (10 years of service).

DOE determined that a roll-up scenario is most appropriate to establish the distribution of efficiencies in the first year of compliance with the amended standards. Under the "roll-up" scenario, DOE assumes: (1) product efficiencies in the no-new-standards case that do not meet the standard level "roll-up" to meet the required standard levels for each standards case; and (2) product efficiencies above the standard level are not affected. The details of DOE's approach to forecast efficiency trends are described in chapter 8 of the final rule TSD.

The nature of the market for commercial prerinse spray valves makes it possible that consumers may, under examined TSLs and product classes, opt to switch product classes to a commercial prerinse spray valve that consumes more water and energy than their current product. In particular, if current choices of product flow rate correspond to consumers' optimal choice under the current regulatory environment, it is probable that some consumers would switch from product class 1 to product class 2, and from product class 2 to product class 3, in response to amended standards, given the lack of restrictions on doing so. DOE implemented a mechanism in the shipments model to estimate such consumer choices. The economics resulting from product class switching may result in lower optimal efficiency levels and reduced estimates of water and energy savings, as compared to the case without class switching. A detailed description of DOE's method to model product class switching is contained in chapter 9 of the final rule TSD.

1. Sensitivity Cases

In addition to a standard shipments scenario, DOE also developed two alternative shipments scenarios to help examine potential impacts in specific situations.

The first alternative shipments scenario, introduced in the CPSV NODA, alters standards-case shipments for product class 3. 80 FR 72608. In this shipments scenario, some consumers exit the CPSV market rather than comply with amended standards. Since the utility of single-orifice CPSV models may not be equivalent in some applications that previously used shower-type CPSV models, this alternative shipments scenario enables analysis of the case where, rather than accepting the decreased usability of a compliant CPSV model, consumers of shower-type units instead exit the CPSV market and purchase faucets that have a maximum flow rate of 2.2 gpm under the current Federal standard. Thus, shipments of compliant CPSV models are much lower under this scenario. With this scenario, DOE is able to account for the energy and water use of CPSV models that remain within the scope of this rule and also for the change in energy and water use for consumers that chose to exit the CPSV market, and instead purchase faucets, as a result of the standard.

The second alternative shipments scenario modifies the no-new-standards case for product classes 1 and 2. In the case of the first two product classes, EL 1 represents the market minimum level, while EL 0 represents a baseline at the Federal standard level of 1.6 gpm, as described in section IV.C.3. Although DOE did not observe any models at the baseline, DOE recognizes that it is possible that some shipments could occur at this level. In order to better understand the implications of moving the standard from EL 0 to EL 1, for this sensitivity case, 1 percent of no-new-standards case shipments in each of the first two product classes are assumed to fall into EL 0. These shipments were originally located at EL 1 in the default shipments scenario. Although additional product-class switching would possibly occur as a result of standards impacting these consumers, somewhat reducing any incremental savings, it was not considered in this sensitivity case.

Specific analyses undertaken with these alternative shipments scenarios are discussed in section V.A. Results of those analyses are provided in sections V.B.2 and V.B.3.

H. National Impact Analysis

The NIA assesses the NES, national water savings, and NPV of total consumer costs and savings that are expected to result from amended standards at specific efficiency levels. DOE calculates the NES, national water savings, and NPV based on projections of annual CPSV shipments, along with the annual energy and water consumption and total installed cost data from the energy and water use analysis, as well as the LCC and PBP analysis. DOE forecasted the energy and water savings, operating cost savings, product costs, and NPV of consumer benefits over the lifetime of commercial prerinse spray valves sold from 2019 through 2048.

DOE evaluates the impacts of amended standards by comparing a no-new-standards case with standards-case projections. The no-new-standards case characterizes energy and water use and consumer costs for each product class in the absence of new or amended energy conservation standards. For this projection, DOE considers historical trends in efficiency and various forces that are likely to affect the mix of efficiencies over time. DOE compares the no-new-standards case with projections characterizing the market for each product class if DOE adopted new or amended standards at specific efficiency levels (i.e., the TSLs or standards cases) for that class. For the standards cases, DOE considers how a given standard would likely affect the market shares of products with efficiencies greater than the standard.

DOE uses a spreadsheet model to calculate the energy and water savings, and the national consumer costs and savings for each TSL. Chapter 10 of the final rule TSD describes the models and how to use them; interested parties can review DOE's analyses by changing various input quantities within the spreadsheet. The NIA spreadsheet model uses typical or weighted-average mean values (as opposed to probability distributions) as inputs.

DOE used projections of energy and combined water prices as described in section IV.F.4 and 0, as well as chapter 8 of the final rule TSD. As part of the NIA, DOE analyzed scenarios that used inputs from the AEO2015 Low Economic Growth and High Economic Growth cases. Those cases have higher and lower energy price trends compared to the reference case. NIA results based on these cases are available via the NIA analysis spreadsheet.

Table IV.7 summarizes the inputs and methods DOE used for the NIA analysis for the final rule. Discussion of these inputs and methods follows the table. See chapter 10 of the final rule TSD for further details.

Table IV.7 Summary of Inputs and Methods for the National Impact Analysis

Inputs	Method
Shipments	Annual shipments from shipments model.
First Year of Analysis Period	2019
No-Standards Case Forecasted Efficiencies	Efficiency distributions are forecasted based on historical efficiency data.
Standards Case Forecasted Efficiencies	Used a “roll-up” scenario.
Annual Energy and Water Consumption per Unit	Annual weighted-average values are a function of energy and water use at each TSL.
Total Installed Cost per Unit	Annual weighted-average values are a function of cost at each TSL. Incorporates forecast of future product prices based on historical data.
Annual Energy and Combined Water Cost per Unit	Annual weighted-average values as a function of the annual energy and water consumption per unit, and energy, and combined water treatment prices.
Energy Prices	AEO2015 forecasts (to 2040) and extrapolation through 2058.
Energy Site-to-Source Conversion Factors	Varies yearly and is generated by NEMS-BT.
Discount Rate	3 and 7 percent real.
Present Year	Future expenses discounted to 2015, when the final rule will be published.

1. National Energy and Water Savings

The NES analysis involves a comparison of national energy and water consumption of the considered products in each TSL with consumption in the no-new-standards case with no amended energy and water conservation standards. DOE calculated the national energy and water consumption by multiplying the number of units (stock) of each product (by vintage or age) by the unit energy and water consumption (also by vintage). DOE calculated annual NES and national water savings based on the difference in national energy and water consumption for the no-new-standards case and for each higher efficiency standard. DOE estimated energy consumption and savings based on site energy and converted the electricity consumption and savings to primary energy (i.e., the energy consumed by power plants to generate site electricity) using annual conversion factors derived from AEO2015. Cumulative energy and water savings are the sum of the NES and national water savings for each year over the timeframe of the analysis. DOE has historically presented NES in terms of primary energy savings. In the case of electricity use and savings, this quantity includes the energy consumed by power plants to generate delivered (site) electricity.

In 2011, in response to the recommendations of a committee on “Point-of-Use and Full-Fuel-Cycle Measurement Approaches to Energy Efficiency Standards” appointed by the National Academy of Sciences, DOE announced its intention to use FFC measures of energy use and GHG and other emissions in the NIAs and emissions analyses included in future energy conservation standards rulemakings. 76 FR 51281 (August 18, 2011). After evaluating the approaches discussed in the August 18, 2011 notice, DOE published a statement of amended policy in which DOE explained its determination that EIA's NEMS is the most appropriate tool for its FFC analysis and its intention to use NEMS for that purpose. 77 FR 49701 (August 17, 2012). NEMS is a public domain, multi-sector, partial equilibrium model of the U.S. energy sector[37] that EIA uses to prepare its Annual Energy Outlook. The approach used for deriving FFC measures of energy use and emissions is described in appendix 10B of the final rule TSD.

In response to the CPSV NOPR, ASAP asked if DOE considered the energy required to treat and transport the water used by commercial prerinse spray valves in its energy analysis. (ASAP, Public Meeting Transcript, No. 23 at pp. 63-64)

DOE recognizes the important relationship between water and energy use. In June 2014, a DOE working group published a report on this relationship, which acknowledged the need for a more interconnected approach to energy and water use analysis.[38] The report also identified the need for data and an integrated water-energy analytical platform, which remains under development.

2. Net Present Value Analysis

The inputs for determining the NPV of the total costs and benefits experienced by consumers are (1) total annual installed cost, (2) total annual savings in operating costs, and (3) a discount factor to calculate the present value of costs and savings. DOE

[37] For more information on NEMS, refer to the Energy Information Administration. The National Energy Modeling System: An Overview 2009. October 2009. DOE/EIA–0581. https://www.eia.gov/forecasts/aeo/nems/overview/pdf/0581(2009).pdf.

[38] U.S. Department of Energy, The Water-Energy Nexus: Challenges and Opportunities (June 2014) (Available at:www.energy.gov/sites/prod/files/2014/06/f16/Water%20Energy%20Nexus%20Report%20June%202014.pdf).

calculates net savings each year as the difference between the no-new-standards case and each standards case in terms of total savings in operating costs versus total increases in installed costs. DOE calculates operating cost savings over the lifetime of each product shipped during the forecast period. The operating cost savings are energy and combined water cost savings.

In calculating the NPV, DOE multiplies the net savings in future years by a discount factor to determine their present value. For this final rule, DOE estimated the NPV of consumer benefits using both a 3-percent and a 7-percent real discount rate. DOE uses these discount rates in accordance with guidance provided by the Office of Management and Budget (OMB) to Federal agencies on the development of regulatory analysis.[39] The discount rates for the determination of NPV are in contrast to the discount rates used in the LCC analysis, which are designed to reflect a consumer's perspective. The 7-percent real value is an estimate of the average before-tax rate of return to private capital in the U.S. economy. The 3-percent real value represents the "social rate of time preference," which is the rate at which society discounts future consumption flows to their present value.

I. Consumer Subgroup Analysis

In analyzing the potential impact of new or amended standards on consumers, DOE evaluates the impact on identifiable subgroups of consumers that may be disproportionately affected by a new or amended national standard. DOE evaluated

[39] U.S. Office of Management and Budget. Circular A-4: Regulatory Analysis," (Sept. 17, 2003), section E (Available at: www.whitehouse.gov/omb/memoranda/m03-21.html).

impacts on particular subgroups of consumers by analyzing the LCC impacts and PBP for those particular consumers from alternative standard levels. For this final rule, DOE analyzed the impacts of the considered standard levels on single entities and limited service establishment end users.

In general, the higher the cost of capital and the lower the cost of energy and water, the more likely it is that an entity would be disproportionately affected by the requirement to purchase higher efficiency product. An example of a single entity would be a small, independent, or family-owned business that operates in a single location. Compared to large corporations and franchises, these single entities might be subjected to higher costs of capital.

The other subgroup DOE analyzed in the subgroup analysis is a limited service establishment. These consumers likely have significantly lower operating times than the average consumer. Lower operating times typically lead to lower operating cost savings over the lifetime of the product, making this subgroup of consumers disproportionately affected by amended efficiency standards. Chapter 11 of the final rule TSD describes the consumer subgroup analysis in greater detail.

J. Manufacturer Impact Analysis

1. Overview

DOE performed an MIA to estimate the financial impacts of amended energy conservation standards on manufacturers of commercial prerinse spray valves and to estimate the potential impacts of such standards on employment and manufacturing capacity. The MIA has both quantitative and qualitative aspects and includes analyses of forecasted industry cash flows, the INPV, investments in research and development (R&D) and manufacturing capital, and domestic manufacturing employment. Additionally, the MIA seeks to determine how amended energy conservation standards might affect manufacturing employment, capacity, and competition, as well as how standards contribute to overall regulatory burden. Finally, the MIA serves to identify any disproportionate impacts on manufacturer subgroups, including small business manufacturers.

The quantitative elements of the MIA rely on the GRIM, an industry cash flow model with inputs specific to this rulemaking. The key GRIM inputs include data on the industry cost structure, unit production costs, product shipments, manufacturer markups, and investments in R&D and manufacturing capital required to produce compliant products. The key GRIM outputs are the INPV, which is the sum of industry annual cash flows over the analysis period, discounted using the industry-weighted average cost of capital, and the impact to domestic manufacturing employment. The model uses standard accounting principles to estimate the impacts of more-stringent energy conservation standards on a given industry by comparing changes in INPV and domestic manufacturing employment between a no-new-standards case and the various TSLs. To capture the uncertainty relating to manufacturer pricing strategy following amended standards, the GRIM estimates a range of possible impacts under different markup scenarios.

The qualitative part of the MIA addresses manufacturer characteristics and market trends. Specifically, the MIA considers such factors as manufacturing capacity, competition within the industry, the cumulative impact of other DOE and non-DOE regulations, and impacts on manufacturer subgroups. The complete MIA is outlined in chapter 12 of the final rule TSD.

DOE conducted the MIA for this rulemaking in three phases. In Phase 1 of the MIA, DOE prepared a profile of the CPSV manufacturing industry based on the market and technology assessment, information on the present and past market structure and characteristics of the industry, product attributes, product shipments, manufacturer markups, and the cost structure for various manufacturers.

The profile also included an analysis of manufacturers in the industry using Security and Exchange Commission 10-K filings, Standard & Poor's stock reports, and corporate annual reports released by publicly held companies.[40] DOE used this and other publicly available information to derive preliminary financial inputs for the GRIM, including an industry discount rate, manufacturer markup, cost of goods sold and depreciation, selling, general, and administrative (SG&A) expenses, and R&D expenses.

In Phase 2 of the MIA, DOE prepared the GRIM, an industry cash flow analysis, to quantify the impacts of potential amended energy conservation standards on the industry as a whole. In general, energy conservation standards can affect manufacturer

[40] SEC Form 10-K filings are available at www.sec.gov/edgar.shtml. Stock reports are available at www.standardandpoors.com.

cash flow in three distinct ways: (1) create a need for increased investment, (2) raise production costs per unit, and (3) alter revenue due to higher per-unit prices and changes in sales volumes. DOE used the GRIM to model these effects in a cash flow analysis of the CPSV manufacturing industry. In performing this analysis, DOE used the financial parameters developed in Phase 1, the cost-efficiency curves from the engineering analysis, and the shipment assumptions from the NIA.

In Phase 3, DOE evaluated subgroups of manufacturers that may be disproportionately impacted by standards or that may not be accurately represented by the average cost assumptions used to develop the industry cash flow analysis. For example, small businesses, manufacturers of niche products, or companies exhibiting a cost structure that differs significantly from the industry average could be more negatively affected. While DOE did not identify any other subgroup of manufacturers of commercial prerinse spray valves that would warrant a separate analysis, DOE specifically investigated impacts on small business manufacturers. See section V.B.2.d and section VI.B of this document for more information.

In Phase 3, the MIA also addresses the direct impact on employment tied to the manufacturing of commercial prerinse spray valves, as well as impacts on manufacturing capacity. Additionally, the MIA explores the cumulative regulatory burdens facing CPSV manufacturers. See section V.B.2.b of this document and chapter 12 of the final rule TSD for more information on the impacts of amended energy conservation standards for commercial prerinse spray valves on direct employment, manufacturing capacity, and cumulative regulatory burdens.

2. Government Regulatory Impact Model

DOE uses the GRIM to quantify the changes in cash flow that result in a higher or lower industry value due to energy conservation standards. The GRIM is a standard, discounted cash-flow model that incorporates manufacturer costs, markups, shipments, and industry financial information as inputs, and models changes in manufacturing costs, shipments, investments, and margins that may result from amended energy conservation standards. The GRIM uses these inputs to arrive at a series of annual cash flows, beginning with the base year of the analysis, 2015, and continuing through 2048. DOE uses the industry-average weighted average cost of capital (WACC) of 6.9 percent, as this represents the minimum rate of return necessary to cover the debt and equity obligations manufacturers use to finance operations.

DOE used the GRIM to compare INPV in the no-new-standards case with INPV at each TSL (the standards case). The difference in INPV between the no-new-standards and standards cases represents the financial impact of the amended standard on manufacturers. Additional details about the GRIM can be found in chapter 12 of the final rule TSD.

a. GRIM Key Inputs

Manufacturer Production Costs

Manufacturer production costs are the costs to the manufacturer to produce a commercial prerinse spray valve. These costs include materials, labor, overhead, and depreciation. Changes in the MPCs of commercial prerinse spray valves can affect revenues, gross margins, and cash flow of the industry, making product cost data key inputs for DOE's analysis. DOE estimated the MPCs for the three CPSV product classes at the baseline and higher efficiency levels, as described in section IV.C.5 of this document. The cost model also disaggregated the MPCs into the cost of materials, labor, overhead, and depreciation. DOE used the MPCs and cost breakdowns, as described in chapter 5 of the final rule TSD, for each efficiency level analyzed in the GRIM.

No-New-Standards Case Shipments Forecast

The GRIM estimates manufacturer revenues in each year of the forecast based in part on total unit shipments and the distribution of these values by efficiency level and product class. Generally, changes in the efficiency mix and total shipments at each standard level affect manufacturer finances. The GRIM uses the NIA shipments forecasts from 2015 through 2048, the end of the analysis period.

To calculate shipments, DOE developed a shipments model for each product class based on an analysis of key market drivers for commercial prerinse spray valves. For greater detail on the shipments analysis, see section IV.G of this document and chapter 9 of the final rule TSD.

Product and Capital Conversion Costs

Amended energy conservation standards may cause manufacturers to incur conversion costs to make necessary changes to their production facilities and bring product designs into compliance. For the MIA, DOE classified these costs into two major groups: (1) product conversion costs and (2) capital conversion costs. Product conversion costs are investments in R&D, testing, marketing, and other non-capitalized costs focused on making product designs comply with the amended energy conservation standard. Capital conversion costs are investments in property, plant, and equipment to adapt or change existing production facilities so that new product designs can be fabricated and assembled.

DOE contacted manufacturers of commercial prerinse spray valves for the purpose of conducting interviews. However, no manufacturer agreed to participate in an interview. In the absence of information from manufacturers, DOE created estimates of industry capital and product conversion costs using the engineering cost model and information gained during product teardowns. DOE requested comments on the estimates of industry capital and product conversion costs provided in the CPSV NOPR. Since, no interested parties provided comments, DOE used the same methodology to estimate industry product and capital conversion costs in this final rule. DOE’s estimates of the product and capital conversion costs for the CPSV manufacturing industry can be found in section V.B.2.a of this document and in chapter 12 of the final rule TSD.

b. GRIM Scenarios

Standards Case Shipments Forecasts

The MIA results presented in section V.B.2 of this document use shipments from the NIA. For standards case shipments, DOE assumed that CPSV consumers would choose to buy the commercial prerinse spray valve that has the flow rate that is closest to the flow rate of the product they currently use and that complies with the new standard (and, accordingly, manufacturers would choose to produce products with the closest flow rate to those they currently produce). Due to the structure of the product classes and efficiency levels for this rule, in certain instances, product class switching is predicted to occur, wherein consumers choose to buy the product with the flow rate that is closest to their current product's flow rate even if it has a higher spray force (putting those products into a different product class). Where product class switching does not occur, no-new-standards case shipments of products that did not meet the new standard would roll up to meet the standard starting in the compliance year. See section IV.F.9 of this document for a description of the standards case efficiency distributions. See section IV.G of this document for further detail relating to the shipments analysis.

The NIA also used historical data to derive a price scaling index to forecast product costs. The MPCs and MSPs in the GRIM use the default price forecast for all scenarios, which assumes constant pricing. See section IV.H of this document for a discussion of DOE's price forecasting methodology.

Markup Scenarios

MSP is equal to MPC times a manufacturer markup. The MSP includes direct manufacturing production costs (i.e., labor, material, depreciation, and overhead estimated in DOE's MPCs) and all non-production costs (i.e., SG&A, R&D, and interest), along with profit.

DOE used the baseline manufacturer markup of 1.30, developed during Phase 1 and subsequently revised, for all products when modeling the no-new-standards case in the GRIM. For the standards case in the GRIM, DOE modeled the preservation of gross margin as a percentage of revenues markup scenario markup scenario. For this scenario, DOE placed no premium on higher efficiency products. This is based on the assumption that efficiency is not the primary factor influencing purchasing decisions for CPSV consumers.

The preservation of gross margin as a percentage of revenues markup scenario assumes that the baseline markup of 1.30 is maintained for all products in the standards case. This scenario corresponds with the assumption that manufacturers are able to pass additional production costs due to amended standards through to their consumers.

Capital Conversion Cost Scenarios

DOE developed two capital conversion costs scenarios to estimate an upper and lower bound of industry profitability as a result of amended energy conservation standards for commercial prerinse spray valves. The assumption underlying both scenarios is that capital conversion costs associated with increasing the efficiency of commercial prerinse spray valves are exclusively related to the fabrication of plastic nozzles, as manufacturers would have to redesign nozzle molds to produce a nozzle with fewer or smaller spray holes. DOE does not believe there will be capital conversion costs associated with the in-house fabrication of metal nozzles. A more detailed discussion of capital conversion cost assumptions is provided in chapter 12 of the final rule TSD.

One capital conversion cost scenario, representing the upper bound of industry profitability, assumes that the majority of CPSV manufacturers source components (including the nozzle) from component suppliers and simply assemble the commercial prerinse spray valves (i.e., Sourced Components Scenario). The second scenario, representing the lower bound of industry profitability, assumes that all of the CPSV manufacturers currently selling products with plastic spray nozzles fabricate these nozzles in-house (i.e., Fabricated Components Scenario). More detail regarding these capital conversion cost scenarios is provided in chapter 12 of the final rule TSD.

3. Discussion of Comments

During the CPSV NOPR public meeting and in public comments submitted in response to the CPSV NOPR, manufacturers, trade organizations, and advocacy groups provided several comments on the potential impact of amended energy conservation standards on manufacturers. These comments are outlined in the following text. DOE notes that these comments helped to update the analysis reflected in this final rule.

In response to the CPSV NOPR, several stakeholders expressed concerns relating to the overlapping effects of the EPA's WaterSense program and the potential amended DOE energy conservation standards on CPSV manufacturers. AWE stated that any update to DOE test criteria will place an unreasonable burden on the manufacturers who participated in WaterSense. (AWE, No. 28 at p. 3) Any amendment to current DOE standards will require manufacturers to abandon current products and again invest the capital and time to meet criteria that is entirely different than the WaterSense criteria. (AWE, No. 28 at p. 7) Similarly, T&S Brass commented that cumulative regulatory burden is a key issue for manufacturers, and that compliance with EPA's WaterSense required a significant financial investment in product redesigns. Two manufacturers chose to invest in developing, certifying, and promoting high efficiency products through

WaterSense last year, and are now faced with a more stringent regulatory requirement and the associated costs of development and certification. (T&S Brass, No. 33 at pp. 2-3)

Fisher also stated that compliance with WaterSense standards required Fisher to devote substantial resources to product development, testing, certification, updating literature, packaging, catalogs, websites, labeling, markings, marketing, and consumer education. Fisher believes DOE's proposed standards will require duplicative efforts and expenses and will jeopardize the WaterSense program. (Fisher, No. 30 at p. 1)

PMI and NAFEM echoed these concerns. PMI stated that the proposed standards puts a strain its members, T&S Brass and Fisher Manufacturing, who have recently invested capital in redesigning and reengineering their products to comply with the EPA WaterSense specification. (PMI, No. 27 at p. 1) Additionally, NAFEM believes that the collaborative process used to develop WaterSense would be wasted as a result of DOE's amended standards. (NAFEM, No. 31 at p. 1)

DOE acknowledges the existence of the voluntary WaterSense program and that three manufacturers, T&S Brass, Fisher Manufacturing, and Chicago Faucets, are currently participating in the WaterSense program. At the time of the CPSV NOPR, DOE had proposed standard levels of 0.65 gpm, 0.97 gpm, and 1.24 gpm for light-, standard-, and heavy-duty product classes, respectively (since the CPSV NOPR, DOE updated the product class names from light-, standard-, and heavy-duty to product class 1, 2, and 3). DOE has updated its proposal for this final rule to standard levels of 1.00 gpm and 1.20 gpm for product class 1 and product class 2, and at the WaterSense level (1.28 gpm) for product class 3. All products certified to WaterSense currently meet the standard levels described in this final rule. Therefore, DOE expects the cumulative regulatory burdens due to the amended energy conservation standards, relative to the WaterSense program, to be limited. DOE investigates cumulative regulatory burden impacts associated with this rulemaking in more detail in section V.B.2.e of this document, and in chapter 12 of the final rule TSD.

Next, Chicago Faucets stated that current commercial prerinse spray valves are rated for 1.00 or 1.25 gpm, and that the new proposed levels (i.e., as proposed in the CPSV NOPR; 0.65 gpm, 0.97 gpm and 1.24 gpm for light-, standard-, and heavy-duty product classes, respectively) will require spray valves to be retested and recertified at great expense to manufacturers. (Chicago Faucets, No. 26 at p. 3)

In the MIA, DOE classifies retesting and recertification costs as product conversion costs. For the CPSV NOPR, DOE used the engineering analysis as a basis for estimating total conversion costs that are expected to be incurred by the industry at each efficiency level. DOE requested comment and additional information relating to industry product and capital conversion cost estimates. DOE did not receive any comment and therefore continues to use the same methodology for estimating conversion costs in this final rule. More information on conversion costs can be found in section V.B.2 of this document and chapter 12 of the final rule TSD.

Finally, relating to DOE's CPSV NOPR finding that the average small manufacturer would likely have to reinvest between 81 and 120 percent of operating profit per year over the conversion period to comply with proposed amended energy conservation standards, T&S Brass commented that since eight of 11 CPSV manufacturers are small businesses, and concentrated in commercial prerinse spray valves and related products, amended standards would be a major financial strain on the majority of the industry. (T&S Brass, No. 33 at p. 2)

DOE acknowledges that small businesses manufacturers may be disproportionately impacted by energy conservation standards relative to larger, more diversified manufacturers. In this document, DOE provides an updated analysis of disproportionate impacts, based on the revised engineering analysis and standard levels. The impacts of amended energy conservation standards on small business manufacturers are detailed in section VI.B of this document and in chapter 12 of the final rule TSD.

K. Emissions Analysis

The emissions analysis consists of two components. The first component estimates the effect of amended energy conservation standards on power sector and site (where applicable) combustion emissions of CO_2, NO_X, SO_2, and Hg. The second component estimates the impacts of amended standards on emissions of two additional GHGs, CH_4 and N_2O, as well as the reductions to emissions of all species due to "upstream" activities in the fuel production chain. These upstream activities comprise extraction, processing, and transporting fuels to the site of combustion. The associated emissions are referred to as upstream emissions.

The analysis of power sector emissions uses marginal emissions factors calculated using a methodology based on results published for the AEO2015 reference case and a set of side cases that implement a variety of efficiency-related policies. The methodology is described in chapter 15 of the final rule TSD.

Combustion emissions of CH_4 and N_2O are estimated using emissions intensity factors published by the EPA, GHG Emissions Factors Hub.[41] The FFC upstream emissions are estimated based on the methodology described in chapter 15 of the final rule TSD. The upstream emissions include both emissions from fuel combustion during extraction, processing, and transportation of fuel, and "fugitive" emissions (direct leakage to the atmosphere) of CH_4 and CO_2.

The emissions intensity factors are expressed in terms of physical units per MWh or MMBtu of site energy savings. Total emissions reductions are estimated using the energy savings calculated in the NIA.

For CH_4 and N_2O, DOE calculated emissions reduction in tons and also in terms of units of carbon dioxide equivalent (CO_2eq). Gases are converted to CO_2eq by multiplying each ton of gas by the gas' global warming potential (GWP) over a 100-year

[41] Available at: http://www.epa.gov/climateleadership/inventory/ghg-emissions.html.

time horizon. Based on the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,[42] DOE used GWP values of 28 for CH_4 and 265 for N_2O.

The AEO2015 projections incorporate the projected impacts of existing air quality regulations on emissions. AEO2015 generally represents current legislation and environmental regulations, including recent government actions, for which implementing regulations were available as of October 31, 2014. DOE's estimation of impacts accounts for the presence of the emissions control programs discussed in the following paragraphs.

SO_2 emissions from affected electric generating units (EGUs) are subject to nationwide and regional emissions cap-and-trade programs. Title IV of the Clean Air Act sets an annual emissions cap on SO_2 for affected EGUs in the 48 contiguous States and the District of Columbia. (42 U.S.C. 7651 et seq.) SO_2 emissions from 28 eastern States and the District of Columbia were also limited under the Clean Air Interstate Rule (CAIR). 70 FR 25162 (May 12, 2005). CAIR created an allowance-based trading program that operates along with the Title IV program. In 2008, CAIR was remanded to EPA by the U.S. Court of Appeals for the District of Columbia Circuit, but it remained in effect.[43] In 2011, EPA issued a replacement for CAIR, the Cross-State Air Pollution Rule (CSAPR). 76 FR 48208 (August 8, 2011). On August 21, 2012, the D.C. Circuit issued a

[42] IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Chapter 8.
[43] See North Carolina v. EPA, 550 F.3d 1176 (D.C. Cir. 2008); North Carolina v. EPA, 531 F.3d 896 (D.C. Cir. 2008).

decision to vacate CSAPR,[44] and the court ordered EPA to continue administering CAIR. On April 29, 2014, the U.S. Supreme Court reversed the judgment of the D.C. Circuit and remanded the case for further proceedings consistent with the Supreme Court's opinion.[45] On October 23, 2014, the D.C. Circuit lifted the stay of CSAPR. [46] Pursuant to this action, CSAPR went into effect (and CAIR ceased to be in effect) as of January 1, 2015.

EIA was not able to incorporate CSAPR into AEO2015, so it assumes implementation of CAIR. Although DOE's analysis used emissions factors that assume that CAIR, not CSAPR, is the regulation in force, the difference between CAIR and CSAPR is not relevant for the purpose of DOE's analysis of emissions impacts from energy conservation standards.

The attainment of emissions caps is typically flexible among EGUs and is enforced through the use of emissions allowances and tradable permits. Under existing EPA regulations, any excess SO_2 emissions allowances resulting from the lower electricity demand caused by the adoption of an efficiency standard could be used to permit offsetting increases in SO_2 emissions by any regulated EGU. In past rulemakings, DOE recognized that there was uncertainty about the effects of efficiency standards on

[44] See EME Homer City Generation, LP v. EPA, 696 F.3d 7, 38 (D.C. Cir. 2012), cert. granted, 81 U.S.L.W. 3567, 81 U.S.L.W. 3696, 81 U.S.L.W. 3702 (U.S. June 24, 2013) (No. 12-1182).
[45] See EPA v. EME Homer City Generation, 134 S.Ct. 1584, 1610 (U.S. 2014). The Supreme Court held in part that EPA's methodology for quantifying emissions that must be eliminated in certain States due to their impacts in other downwind States was based on a permissible, workable, and equitable interpretation of the Clean Air Act provision that provides statutory authority for CSAPR.
[46] See Georgia v. EPA, Order (D. C. Cir. filed October 23, 2014) (No. 11-1302),

SO_2 emissions covered by the existing cap-and-trade system, but it concluded that negligible reductions in power sector SO_2 emissions would occur as a result of standards.

Beginning in 2016, however, SO_2 emissions will fall as a result of the Mercury and Air Toxics Standards (MATS) for power plants. 77 FR 9304 (Feb. 16, 2012). In the MATS rule, EPA established a standard for hydrogen chloride as a surrogate for acid gas hazardous air pollutants (HAP), and also established a standard for SO_2 (a non-HAP acid gas) as an alternative equivalent surrogate standard for acid gas HAP. The same controls are used to reduce HAP and non-HAP acid gas; thus, SO_2 emissions will be reduced as a result of the control technologies installed on coal-fired power plants to comply with the MATS requirements for acid gas. AEO2015 assumes that, in order to continue operating, coal plants must have either flue gas desulfurization or dry sorbent injection systems installed by 2016. Both technologies, which are used to reduce acid gas emissions, also reduce SO_2 emissions. Under the MATS, emissions will be far below the cap established by CAIR, so it is unlikely that excess SO_2 emissions allowances resulting from the lower electricity demand will be needed or used to permit offsetting increases in SO_2 emissions by any regulated EGU.[47] Therefore, DOE believes that energy conservation standards will generally reduce SO_2 emissions in 2016 and beyond.

[47] DOE notes that the Supreme Court recently remanded EPA's 2012 rule regarding national emission standards for hazardous air pollutants from certain electric utility steam generating units. See Michigan v. EPA (Case No. 14–46, 2015). DOE has tentatively determined that the remand of the MATS rule does not change the assumptions regarding the impact of energy efficiency standards on SO2 emissions. Further, while the remand of the MATS rule may have an impact on the overall amount of mercury emitted by power plants, it does not change the impact of the energy efficiency standards on mercury emissions. DOE will continue to monitor developments related to this case and respond to them as appropriate.

CAIR established a cap on NO_X emissions in 28 eastern States and the District of Columbia.[48] Energy conservation standards are expected to have little effect on NO_X emissions in those States covered by CAIR because excess NO_X emissions allowances resulting from the lower electricity demand could be used to permit offsetting increases in NO_X emissions from other facilities. However, standards are expected to reduce NO_X emissions in the States not affected by the caps, so DOE estimated NO_X emissions reductions from the standards in this final rule for these States.

The MATS limit mercury emissions from power plants, but they do not include emissions caps and, therefore, DOE's energy conservation standards would likely reduce Hg emissions. DOE estimated mercury emissions reduction using emissions factors based on AEO2015, which incorporates the MATS.

L. Monetizing Carbon Dioxide and Other Emissions Impacts

As part of the development of this rule, DOE considered the estimated monetary benefits from the reduced emissions of CO_2 and NO_X that are expected to result from each of the TSLs considered. In order to make this calculation analogous to the calculation of the NPV of consumer benefit, DOE considered the reduced emissions expected to result over the lifetime of products shipped in the forecast period for each TSL. This section summarizes the basis for the monetary values used for each of these emissions and presents the values considered in this final rule.

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[48] CSAPR also applies to NO_X and it would supersede the regulation of NO_X under CAIR. As stated previously, the current analysis assumes that CAIR, not CSAPR, is the regulation in force. The difference between CAIR and CSAPR with regard to DOE's analysis of NO_X emissions is slight.

For this final rule, DOE relied on a set of values for the SCC that was developed by a Federal interagency process. The basis for these values is summarized in the next section, and a more detailed description of the methodologies used is provided as an appendix to chapter 14 of the final rule TSD.

1. Social Cost of Carbon

SCC is an estimate of the monetized damages associated with an incremental increase in carbon emissions in a given year. It is intended to include (but is not limited to) climate-change-related changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services. Estimates of the SCC are provided in dollars per metric ton of CO_2. A domestic SCC value is meant to reflect the value of damages in the United States resulting from a unit change in CO_2 emissions, while a global SCC value is meant to reflect the value of damages worldwide.

Under section 1(b) of Executive Order 12866, "Regulatory Planning and Review," 58 FR 51735 (Oct. 4, 1993), agencies must, to the extent permitted by law, "assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs." The purpose of the SCC estimates presented here is to allow agencies to incorporate the monetized social benefits of reducing CO_2 emissions into cost-benefit analyses of regulatory actions. The estimates are presented with an acknowledgement of the many uncertainties involved and with a clear understanding that they should be updated over time to reflect increasing knowledge of the science and economics of climate impacts.

In conducting the interagency process that developed the SCC values, technical experts from numerous agencies met on a regular basis to consider public comments, explore the technical literature in relevant fields, and discuss key model inputs and assumptions. Key uncertainties and model differences transparently and consistently inform the range of SCC estimates. These uncertainties and model differences are discussed in the interagency working group's reports, which are reproduced in appendix 14A and 14B of the TSD, as are the major assumptions. The 2010 SCC values have been used in a number of Federal rulemakings upon which the public had opportunity to comment. In November 2013, the OMB announced a new opportunity for public comment on the TSD underlying the revised SCC estimates. See 78 FR 70586 (Nov. 26, 2013). In July 2015, OMB published a detailed summary and formal response to the many comments that were received.[49] In the response, the interagency working group continued to recommend the use of the SCC estimates as they represent the best scientific information on the impacts of climate change in a form appropriate for incorporating the damages from incremental CO_2 emissions changes into regulatory analyses.[50] DOE stands ready to work with OMB and the other members of the interagency working group on further review and revision of the SCC estimates as appropriate.

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[49] Available at https://www.whitehouse.gov/blog/2015/07/02/estimating-benefits-carbon-dioxide-emissions-reductions.

[50] Interagency Working Group on Social Cost of Carbon, U.S. Government, Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, at 5 (July 2015).

a. Monetizing Carbon Dioxide Emissions

When attempting to assess the incremental economic impacts of CO_2 emissions, the analyst faces a number of challenges. A report from the National Research Council[51] points out that any assessment will suffer from uncertainty, speculation, and lack of information about (1) future emissions of GHGs, (2) the effects of past and future emissions on the climate system, (3) the impact of changes in climate on the physical and biological environment, and (4) the translation of these environmental impacts into economic damages. As a result, any effort to quantify and monetize the harms associated with climate change will raise questions of science, economics, and ethics, and should be viewed as provisional.

Despite the limits of both quantification and monetization, SCC estimates can be useful in estimating the social benefits of reducing CO_2 emissions. The agency can estimate the benefits from reduced (or costs from increased) emissions in any future year by multiplying the change in emissions in that year by the SCC values appropriate for that year. The NPV of the benefits can then be calculated by multiplying each of these future benefits by an appropriate discount factor and summing across all affected years.

It is important to emphasize that the interagency process is committed to updating these estimates as the science and economic understanding of climate change and its impacts on society improves over time. In the meantime, the interagency group will

[51] National Research Council, Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use, National Academies Press: Washington, DC (2009).

continue to explore the issues raised by this analysis and will consider public comments as part of the ongoing interagency process.

b. Development of Social Cost of Carbon Values

In 2009, an interagency process was initiated to offer a preliminary assessment of how best to quantify the benefits from reducing CO_2 emissions. To ensure consistency in how benefits are evaluated across Federal agencies, the Administration sought to develop a transparent and defensible method, specifically designed for the rulemaking process, to quantify avoided climate change damages from reduced CO_2 emissions. The interagency group did not undertake any original analysis. Instead, it combined SCC estimates from the existing literature to use as interim values until a more comprehensive analysis could be conducted. The outcome of the preliminary assessment by the interagency group was a set of five interim values—global SCC estimates for 2007 (in 2006$) of $55, $33, $19, $10, and $5 per metric ton of CO_2. These interim values represented the first sustained interagency effort within the U.S. government to develop an SCC for use in regulatory analysis. The results of this preliminary effort were presented in several proposed and final rules.

c. Current Approach and Key Assumptions

After the release of the interim values, the interagency group reconvened on a regular basis to generate improved SCC estimates. Specifically, the group considered public comments and further explored the technical literature in relevant fields. The interagency group relied on three integrated assessment models commonly used to estimate the SCC—the FUND, DICE, and PAGE models. These models are frequently cited in the peer-reviewed literature and were used in the last assessment of the Intergovernmental Panel on Climate Change (IPCC). Each model was given equal weight in the SCC values that were developed.

Each model takes a slightly different approach in modeling how changes in emissions result in changes in economic damages. A key objective of the interagency process was to enable a consistent exploration of the three models, while respecting the different approaches to quantifying damages taken by the key modelers in the field. An extensive review of the literature was conducted to select three sets of input parameters for these models—climate sensitivity, socio-economic and emissions trajectories, and discount rates. A probability distribution for climate sensitivity was specified as an input into all three models. In addition, the interagency group used a range of scenarios for the socio-economic parameters and a range of values for the discount rate. All other model features were left unchanged, relying on the model developers' best estimates and judgments.

In 2010, the interagency group selected four sets of SCC values for use in regulatory analyses. Three sets of values are based on the average SCC from the three integrated assessment models, at discount rates of 2.5, 3, and 5 percent. The fourth set, which represents the 95th percentile SCC estimate across all three models at a 3-percent discount rate, was included to represent higher-than-expected impacts from climate change further out in the tails of the SCC distribution. The values grow in real terms over time. Additionally, the interagency group determined that a range of values from 7 percent to 23 percent should be used to adjust the global SCC to calculate domestic effects,[52] although preference is given to consideration of the global benefits of reducing CO_2 emissions. Table IV.8 presents the values in the 2010 interagency group report,[53] which is reproduced in appendix 14A of the final rule TSD.

Table IV.8 Annual SCC Values from 2010 Interagency Report, 2010–2050 (2007$ per metric ton CO_2)

Year	Discount Rate			
	5%	3%	2.5%	3%
	Average	Average	Average	95th percentile
2010	4.7	21.4	35.1	64.9
2015	5.7	23.8	38.4	72.8
2020	6.8	26.3	41.7	80.7
2025	8.2	29.6	45.9	90.4
2030	9.7	32.8	50.0	100.0
2035	11.2	36.0	54.2	109.7
2040	12.7	39.2	58.4	119.3
2045	14.2	42.1	61.7	127.8
2050	15.7	44.9	65.0	136.2

The SCC values used for this document were generated using the most recent versions of the three integrated assessment models that have been published in the peer-reviewed literature, as described in the 2013 update from the interagency working group (revised July 2015).[54]

Table IV.9 shows the updated sets of SCC estimates from the 2013 interagency update in 5-year increments from 2010 to 2050. The full set of annual SCC estimates

[52] It is recognized that this calculation for domestic values is approximate, provisional, and highly speculative. There is no a priori reason why domestic benefits should be a constant fraction of net global damages over time.

[53] Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866. Interagency Working Group on Social Cost of Carbon, U.S. Government (February 2010) (Available at: www.whitehouse.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf).

[54] Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Carbon, United States Government (May 2013; revised July 2015) (Available at: http://www.whitehouse.gov/sites/default/files/omb/inforeg/scc-tsd-final-july-2015.pdf).

between 2010 and 2050 is reported in appendix 14B of the final rule TSD. The central value that emerges is the average SCC across models at the 3-percent discount rate. However, for purposes of capturing the uncertainties involved in regulatory impact analysis, the interagency group emphasizes the importance of including all four sets of SCC values.

Table IV.9 Annual SCC Values from 2013 Interagency Report (Revised July 2015), 2010–2050 (2007$ per metric ton CO_2)

Year	Discount Rate			
	5%	3%	2.5%	3%
	Average	Average	Average	95th percentile
2010	10	31	50	86
2015	11	36	56	105
2020	12	42	62	123
2025	14	46	68	138
2030	16	50	73	152
2035	18	55	78	168
2040	21	60	84	183
2045	23	64	89	197
2050	26	69	95	212

It is important to recognize that a number of key uncertainties remain, and that current SCC estimates should be treated as provisional and revisable because they will evolve with improved scientific and economic understanding. The interagency group also recognizes that the existing models are imperfect and incomplete. The 2009 National Research Council report points out that there is tension between the goal of producing quantified estimates of the economic damages from an incremental ton of carbon and the limits of existing efforts to model these effects. There are a number of analytical challenges that are being addressed by the research community, including research programs housed in many of the Federal agencies participating in the interagency process to estimate the SCC. The interagency group intends to periodically review and reconsider those estimates to reflect increasing knowledge of the science and economics of climate impacts, as well as improvements in modeling.

In summary, in considering the potential global benefits resulting from reduced CO_2 emissions, DOE used the values from the 2013 interagency report (revised July 2015), adjusted to 2014$ using the implicit price deflator for gross domestic product (GDP) from the Bureau of Economic Analysis. For each of the four sets of SCC cases specified, the values for emissions in 2015 were $12.2, $40.0, $62.3, and $117 per metric ton avoided (values expressed in 2014$). DOE derived values after 2050 using the relevant growth rates for the 2040–2050 period in the interagency update.

DOE multiplied the CO_2 emissions reduction estimated for each year by the SCC value for that year in each of the four cases. To calculate a present value of the stream of monetary values, DOE discounted the values in each of the four cases using the specific discount rate that had been used to obtain the SCC values in each case.

2. Social Cost of Other Air Pollutants

As noted previously, DOE has estimated how the considered energy conservation standards would reduce site NO_X emissions nationwide and decrease power sector NO_X emissions in those 22 States not affected by the CAIR.

DOE estimated the monetized value of NO_X emissions reductions using benefit per ton estimates from the Regulatory Impact Analysis titled, "Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and

Reconstructed Power Plants," published in June 2014 by EPA's Office of Air Quality Planning and Standards. The report includes high and low values for NO_X (as PM2.5) for 2020, 2025, and 2030 discounted at 3 percent and 7 percent,[55] which are presented in chapter 14 of the final rule TSD. DOE assigned values for 2021-2024 and 2026-2029 using, respectively, the values for 2020 and 2025. DOE assigned values after 2030 using the value for 2030.

DOE multiplied the emissions reduction (tons) in each year by the associated $/ton values, and then discounted each series using discount rates of 3 percent and 7 percent as appropriate. DOE will continue for evaluate the monetization of avoided NO_X emissions and will make any appropriate updates in energy conservation standards rulemakings.

DOE is evaluating appropriate monetization of avoided SO2 and Hg emissions in energy conservation standards rulemakings. DOE has not included monetization of those emissions in the current analysis.

3. Comments

In response to the CPSV NOPR, DOE received two comments regarding the use of SCC. In a comment submitted by the U.S. Chamber of Commerce along with the

[55] For the monetized NOx benefits associated with PM2.5, the related benefits (derived from benefit-per-ton values) are based on an estimate of premature mortality derived from the ACS study (Krewski et al., 2009), which is the lower of the two EPA central tendencies. Using the lower value is more conservative when making the policy decision concerning whether a particular standard level is economically justified so using the higher value would also be justified. If the benefit-per-ton estimates were based on the Six Cities study (Lepuele et al., 2012), the values would be nearly two-and-a-half times larger. (See chapter 14 of the final rule TSD for further description of the studies mentioned here.)

American Chemistry Council, the American Coke and Coal Chemicals Institute, the American Forest & Paper Association, the American Fuel & Petrochemical Manufacturers, the American Petroleum Institute, the Brick Industry Association, the Council of Industrial Boiler Owners, the National Association of Manufacturers, the National Mining Association, the National Oilseed Processors Association, and the Portland Cement Association (collectively, "the Associations"), the commenters objected to DOE's continued use of SCC in the cost-benefit analysis and stated their belief that SCC should be withdrawn as a basis for the rule. The Associations further stated that the SCC calculation should not be used in any rulemaking or policymaking until it undergoes a more rigorous notice, review, and comment process. (The Associations, No. 29, at p. 4) DOE also received a comment from a group consisting of the Environmental Defense Fund, Institute for Policy Integrity at New York University School of Law, Natural Resources Defense Council, and Union of Concerned Scientists (collectively, "Joint Commenters") that supported DOE's current use of the Interagency Working Group's SCC estimate. The Joint Commenters further indicated that DOE should also include a qualitative assessment of all significant climate effects that are not currently quantified in the monetized estimate. (Joint Commenters, No. 21, at p. 19)

DOE appreciates the comments and acknowledges the many uncertainties involved with monetizing the social benefits of reducing CO_2 emissions. However, DOE reiterates that the use of the SCC estimates, as recommended by the working group, represent the best scientific information on the impacts of climate change in a form appropriate for incorporating into regulatory analyses.

M. Utility Impact Analysis

The utility impact analysis estimates several effects on the electric power industry that would result from the adoption of new or amended energy conservation standards. The utility impact analysis estimates the changes in installed electrical capacity and generation that would result for each TSL. The analysis is based on published output from the NEMS associated with AEO2015. NEMS produced the AEO Reference case, as well as a number of side cases that estimate the economy-wide impacts of changes to energy supply and demand. DOE uses published side cases that incorporate efficiency-related policies to estimate the marginal impacts of reduced energy demand on the utility sector. The output of this analysis is a set of time-dependent coefficients that capture the change in electricity generation, primary fuel consumption, installed capacity, and power sector emissions due to a unit reduction in demand for a given end use. These coefficients are multiplied by the stream of electricity savings calculated in the NIA to provide estimates of selected utility impacts of new or amended energy conservation standards.

Chapter 15 of the final rule TSD describes the utility impact analysis in further detail.

N. Employment Impact Analysis

DOE considers employment impacts in the domestic economy as one factor in selecting a standard. Employment impacts from new or amended energy conservation standards include both direct and indirect impacts. Direct employment impacts are any changes in the number of employees of manufacturers of the products subject to standards, their suppliers, and related service firms. The MIA addresses the direct employment impacts. Indirect employment impacts are changes in national employment that occur due to the shift in expenditures and capital investment caused by the purchase and operation of more-efficient appliances. Indirect employment impacts from standards consist of the net jobs created or eliminated in the national economy, other than in the manufacturing sector being regulated, caused by (1) reduced spending by end users on energy, (2) reduced spending on new energy supply by the utility industry, (3) increased consumer spending on new products to which the new standards apply, and (4) the effects of those three factors throughout the economy.

One method for assessing the possible effects on the demand for labor of such shifts in economic activity is to compare sector employment statistics developed by the Labor Department's Bureau of Labor Statistics (BLS).[56] BLS regularly publishes its estimates of the number of jobs per million dollars of economic activity in different sectors of the economy, as well as the jobs created elsewhere in the economy by this same economic activity. Data from BLS indicate that expenditures in the utility sector generally create fewer jobs (both directly and indirectly) than expenditures in other sectors of the economy.[57] There are many reasons for these differences, including wage differences and the fact that the utility sector is more capital-intensive and less labor-intensive than other sectors. Energy conservation standards have the effect of reducing consumer utility bills. Because reduced consumer expenditures for energy likely lead to increased expenditures in other sectors of the economy, the general effect of efficiency

[56] Data on industry employment, hours, labor compensation, value of production, and the implicit price deflator for output for these industries are available upon request by calling the Division of Industry Productivity Studies (202-691-5618) or by sending a request by e-mail to dipsweb@bls.gov.
[57] See Bureau of Economic Analysis, Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II), U.S. Department of Commerce (1992).

standards is to shift economic activity from a less labor-intensive sector (i.e., the utility sector) to more labor-intensive sectors (e.g., the retail and service sectors). Thus, based on the BLS data alone, DOE believes net national employment may increase due to shifts in economic activity resulting from amended standards for commercial prerinse spray valves.

DOE estimated indirect national employment impacts for the standard levels considered in this final rule using an input/output model of the U.S. economy called Impact of Sector Energy Technologies version 4.0 (ImSET).[58] ImSET is a special-purpose version of the "U.S. Benchmark National Input-Output" (I–O) model, which was designed to estimate the national employment and income effects of energy-saving technologies. The ImSET software includes a computer-based I–O model having structural coefficients that characterize economic flows among 187 sectors most relevant to industrial, commercial, and residential building energy use.

DOE notes that ImSET is not a general equilibrium forecasting model, and understands the uncertainties involved in projecting employment impacts, especially changes in the later years of the analysis. Because ImSET does not incorporate price changes, the employment effects predicted by ImSET may over-estimate actual job impacts over the long run for this rule. Therefore, DOE generated results for near-term

[58] Livingston OV, SR Bender, MJ Scott, and RW Schultz. 2015. ImSET 4.0: Impact of Sector Energy Technologies Model Description and User's Guide. PNNL-24563, Pacific Northwest National Laboratory, Richland, WA. (2015).

timeframes, where these uncertainties are reduced. For more details on the employment impact analysis, see chapter 16 of the final rule TSD.

V. Analytical Results and Conclusions

The following section addresses the results from DOE's analyses with respect to the considered energy conservation standards for commercial prerinse spray valves. It addresses the TSLs examined by DOE, the projected impacts of each of these levels if adopted as energy conservation standards for commercial prerinse spray valves, and the standards levels that DOE is adopting in this final rule. Additional details regarding DOE's analyses are contained in the final rule TSD supporting this document.

A. Trial Standard Levels

DOE analyzed the benefits and burdens of four TSLs for commercial prerinse spray valves. These TSLs were developed by combining specific efficiency levels for each of the product classes analyzed by DOE. DOE also analyzed two additional TSLs that utilized the alternative shipments scenarios discussed in section IV.G.1. DOE presents the results for each of the TSLs in this document, while the engineering analysis results for all efficiency levels that DOE analyzed are in the final rule TSD.

Table V.1 presents the TSLs and the corresponding efficiency levels for commercial prerinse spray valves. These TSLs were chosen based on the following criteria:

- TSL 1 represents the first EL above the market minimum for each product class. That is, for product classes 1 and 2, TSL 1 represents EL 2 which is a 15 percent increase in efficiency above the market minimum. For product class 3, TSL 1 represents EL 1 which is a 10 percent increase in efficiency above the market minimum.

- TSL 2 represents the second EL above market minimum for each product class. That is, for product classes 1 and 2, TSL 2 represents EL 3 which is a 25 percent increase in efficiency above the market minimum. For product class 3, TSL 3 represents the WaterSense level, or 20 percent increase in efficiency above the market minimum.

- TSL 3 represents the minimum flow rates for each product class that: (1) would not induce consumers to switch product classes as a result of a standard at those flow rates (as discussed in the CPSV NOPR); and (2) retains shower-type designs.

- TSL 3a is a sensitivity-case variant of TSL 3, utilizing the second alternative shipments scenario described in section IV.G.1. This shipments scenario permits examination of the potential for additional savings if one percent of the shipments are assumed to fall into EL 0, rather than at EL 1, in the no-new-standards case for product classes 1 and 2. NIA results were generated for this case.

- TSL 4 represents max-tech for all product classes under the default shipments scenario, which assumes the total volume of shipments does not change as a function of the standard level selected. Consumers in product classes 1 and 2 would purchase a compliant CPSV model with flow rates most similar to the flow rate they would purchase in the absence of a standard. This TSL assumes that purchasers of shower-type commercial prerinse spray valves would transition to single-orifice CPSV models.

- TSL 4a represents a sensitivity-case max-tech for all product classes under an alternative shipments scenario, as described in section IV.G.1. Since the utility of single-orifice CPSV models may not be equivalent to shower-type CPSV models for some applications, this alternative shipments scenario assumes consumers of shower-type units exit the CPSV market and purchase faucets, which have a maximum flow rate of 2.2 gpm under the current Federal standard. Thus, shipments of compliant CPSV models are much lower under this TSL and water consumption is higher due to increased faucet shipments. Both MIA and NIA results were developed for this case.

Table V.1 Trial Standard Levels for Commercial Prerinse Spray Valves

TSL	Product Class 1	Product Class 2	Product Class 3	Shipments Scenario
	EL	EL	EL	
1	2	2	1	Default
2	3	3	2	Default
3	1	1	2	Default
3a	1	1	2	Alternate
4	4	4	3	Default
4a	4	4	3	Alternate

B. Economic Justification and Energy Savings

1. Economic Impacts on Individual Consumers

DOE analyzed the economic impacts on commercial prerinse spray valve consumers by looking at the effects the amended standards at each TSL would have on the LCC and PBP analysis. DOE also examined the impacts of amended standards on consumer subgroups. These analyses are discussed in the following sections.

a. Life-Cycle Cost and Payback Period

To evaluate the net economic impact of the amended energy conservation standards on consumers of commercial prerinse spray valves, DOE conducted an LCC and PBP analysis for each TSL. In general, higher-efficiency products affect consumers in two ways: (1) purchase price increases; and (2) annual operating cost decreases. Because DOE did not find that the purchase price of commercial prerinse spray valves increased with increasing efficiency, the only effect of higher-efficiency products to consumers is decreased operating costs. Inputs used for calculating the LCC and PBP include: (1) total installed costs (i.e., product price plus installation costs); and (2) operating costs (i.e., annual energy use, energy prices, energy price trends, repair costs, and maintenance costs). The LCC calculation also uses product lifetime and a discount rate. Chapter 8 of the final rule TSD provides detailed information on the LCC and PBP analyses.

Table V.2 through Table V.7 show the LCC and PBP results for the TSLs considered for each product class. In the first of each pair of tables, the simple PBP is measured relative to the baseline product. In the second of each pair of tables, the LCC savings are measured relative to the average LCC in the no-new-standards case in the compliance year (see section IV.F.10 of this document). No impacts occur when the no-new-standards case efficiency for a specific consumer equals or exceeds the efficiency at a given TSL. In this situation, a standard would have no effect because the product installed would be at or above that standard level without amended standards. For commercial prerinse spray valves, DOE determined that there was no increase in purchase price with increasing EL within each product class. Therefore, LCC and PBP results instead reflect differences in operating costs due to decreased energy and water use for each EL.

Table V.2 Average LCC and PBP Results by Efficiency Level for Product Class 1 (≤5.0 ozf) Commercial Prerinse Spray Valves

TSL	EL	Average Costs 2014$				Simple Payback Years	Average Lifetime Years
		Installed Cost	First Year's Operating Cost	Lifetime Operating Cost	LCC		
---	0	76	780	3,556	3,643	---	4.9
3	1	76	487	2,229	2,305	0.0	4.9
1	2	76	414	1,895	1,971	0.0	4.9
2	3	76	366	1,672	1,748	0.0	4.9
4	4	76	302	1,382	1,458	0.0	4.9

Note: The results for each TSL are calculated assuming that all consumers use products at that efficiency level. The PBP is measured relative to the baseline product.

Table V.3 Average LCC Savings Relative to the No-New-Standards Case Efficiency Distribution for Product Class 1 (≤5.0 ozf) Commercial Prerinse Spray Valves

TSL	EL	Life-Cycle Cost Savings	
		% of Consumers that Experience	Average Savings*
		Net Cost	2014$
---	0	---	---

TSL	EL	Life-Cycle Cost Savings	
		% of Consumers that Experience	Average Savings*
		Net Cost	2014$
3	1	0	0**
1	2	0	334
2	3	0	557
4	4	0	352

* Note: The calculation includes consumers with zero LCC savings (no impact).
** At TSL 3, the average LCC impact is a savings of $0 for CPSV models in product classes 1 and 2 because the market minimums are the standard for those classes. Because no consumers in the no-new-standards case purchase products with a higher flow rate than the respective market minimums, no consumers are affected by a standard set at EL 1 (market minimum) in product classes 1 and 2.

Table V.4 Average LCC and PBP Results by Efficiency Level for Product Class 2 (>5.0 ozf and ≤8.0 ozf) Commercial Prerinse Spray Valves

TSL	EL	Average Costs 2014$				Simple Payback Years	Average Lifetime Years
		Installed Cost	First Year's Operating Cost	Lifetime Operating Cost	LCC		
---	0	76	780	3,556	3,643	---	4.9
3	1	76	585	2,675	2,751	0.0	4.9
1	2	76	497	2,274	2,350	0.0	4.9
2	3	76	439	2,006	2,082	0.0	4.9
4	4	76	356	1,627	1,704	0.0	4.9

Note: The results for each TSL are calculated assuming that all consumers use products at that efficiency level. The PBP is measured relative to the baseline product.

Table V.5 Average LCC Savings Relative to the No-New-Standards Case Efficiency Distribution for Product Class 2 (>5.0 ozf and ≤8.0 ozf) Commercial Prerinse Spray Valves

TSL	EL	Life-Cycle Cost Savings	
		% of Consumers that Experience	Average Savings*
		Net Cost	2014$
---	0	---	---
3	1	0	0**
1	2	0	401
2	3	0	446
4	4	0	825

* Note: The calculation includes consumers with zero LCC savings (no impact).
** At TSL 3, the average LCC impact is a savings of $0 for CPSV models in product classes 1 and 2 because the market minimums are the standard for those classes. Because no consumers in the no-new-standards case purchase products with a higher flow rate than the respective market minimums, no consumers are affected by a standard set at EL 1 (market minimum) in product classes 1 and 2.

Table V.6 Average LCC and PBP Results by Efficiency Level for Product Class 3 (>8.0 ozf) Commercial Prerinse Spray Valves

TSL	EL	Average Costs 2014$				Simple Payback Years	Average Lifetime Years
		Installed Cost	First Year's Operating Cost	Lifetime Operating Cost	LCC		
---	0	76	780	3,566	3,643	---	4.9
1	1	76	702	3,210	3,286	0.0	4.9
2 , 3	2	76	624	2,853	2,929	0.0	4.9
4	3	76	551	2,519	2,595	0.0	4.9

Note: The results for each TSL are calculated assuming that all consumers use products at that efficiency level. The PBP is measured relative to the baseline product.

Table V.7 Average LCC Savings Relative to the No-New-Standards Case Efficiency Distribution for Product Class 3 (>8.0 ozf) Commercial Prerinse Spray Valves

TSL	EL	Life-Cycle Cost Savings	
		% of Consumers that Experience Net Cost	Average Savings* 2014$
---	0	---	---
1	1	0	357
2 , 3	2	0	547
4	3	0	766

Note: The calculation includes consumers with zero LCC savings (no impact).

b. Consumer Subgroup Analysis

In the consumer subgroup analysis, DOE estimated the impact of the considered TSLs on small businesses and limited service establishments. Table V.8 through Table V.10 compare the average LCC savings at each efficiency level for the two consumer subgroups, along with the average LCC savings for the entire sample for each product class for commercial prerinse spray valves. The average LCC savings for single entities and limited service establishments at the considered ELs are not substantially different from the average for all consumers. Chapter 11 of the final rule TSD presents the complete LCC and PBP results for the subgroups.

Table V.8 Product Class 1 (≤5.0 ozf) Commercial Prerinse Spray Valves: Comparison of Average LCC Savings for Consumer Subgroups and All Consumers

	Average Life-Cycle Cost Savings 2014$			Simple Payback Period years		
TSL	**Single Entities**	**Limited Service Establishments**	**All Consumers**	**Single Entities**	**Limited Service Establishments**	**All Consumers**
1	317	267	334	0.0	0.0	0.0
2	529	446	557	0.0	0.0	0.0
3	0*	0*	0*	0.0	0.0	0.0
4	334	281	352	0.0	0.0	0.0

* At TSL 3, the average LCC impact is a savings of $0 for CPSV models in product classes 1 and 2 because the market minimums are the standard for those classes. Because no consumers in the no-new-standards case purchase products with a higher flow rate than the respective market minimums, no consumers are affected by a standard set at EL 1 (market minimum) in product classes 1 and 2.

Table V.9 Product Class 2 (>5.0 ozf and ≤8.0 ozf) Commercial Prerinse Spray Valves: Comparison of Average LCC Savings for Consumer Subgroups and All Consumers

	Average Life-Cycle Cost Savings 2014$			Simple Payback Period years		
TSL	**Single Entities**	**Limited Service Establishments**	**All Consumers**	**Single Entities**	**Limited Service Establishments**	**All Consumers**
1	381	321	401	0.0	0.0	0.0
2	423	357	446	0.0	0.0	0.0
3	0*	0*	0*	0.0	0.0	0.0
4	782	660	825	0.0	0.0	0.0

* At TSL 3, the average LCC impact is a savings of $0 for CPSV models in product classes 1 and 2 because the market minimums are the standard for those classes. Because no consumers in the no-new-standards case purchase products with a higher flow rate than the respective market minimums, no consumers are affected by a standard set at EL 1 (market minimum) in product classes 1 and 2.

Table V.10 Product Class 3 (>8.0 ozf) Commercial Prerinse Spray Valves: Comparison of Average LCC Savings for Consumer Subgroups and All Consumers

	Average Life-Cycle Cost Savings 2014$			Simple Payback Period years		
TSL	**Single Entities**	**Limited Service Establishments**	**All Consumers**	**Single Entities**	**Limited Service Establishments**	**All Consumers**
1	338	285	357	0.0	0.0	0.0
2	519	437	547	0.0	0.0	0.0
3	519	437	547	0.0	0.0	0.0
4	727	613	766	0.0	0.0	0.0

c. Rebuttable Presumption Payback

As discussed in section IV.F.11, EPCA establishes a rebuttable presumption that an energy conservation standard is economically justified if the increased purchase cost for a product that meets the standard is less than three times the value of the first year energy and water savings resulting from the standard. In calculating a rebuttable presumption PBP for each of the considered TSLs, DOE used discrete values, and, as required by EPCA, based the energy and water use calculation on the DOE test procedure for commercial prerinse spray valves. Table V.11 presents the rebuttable-presumption PBPs for the considered TSLs. In addition to examining the rebuttable-presumption criterion, DOE also considered whether the standard levels are economically justified through a more detailed analysis of the economic impacts of those levels that considers the full range of impacts to the consumer, manufacturer, nation, and environment. (42 U.S.C. 6295(o)(2)(B)(i) The results of that 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. As indicated in the engineering analysis, there is no increased purchase cost for products that meets the standard, so the rebuttable PBP for each considered TSL is zero.

Table V.11 Commercial Prerinse Spray Valves: Rebuttable PBPs

Product Class	Rebuttable Payback Period for Trial Standard Level years			
	1	2	3	4
Product Class 1 (≤5.0 ozf)	0.0	0.0	0.0	0.0
Product Class 2 (>5.0 ozf and ≤8.0 ozf)	0.0	0.0	0.0	0.0
Product Class 3 (>8.0 ozf)	0.0	0.0	0.0	0.0

2. Economic Impacts on Manufacturers

DOE performed an MIA to estimate the impact of amended energy conservation standards on manufacturers of commercial prerinse spray valves. Section V.B.2.a describes the expected impacts on manufacturers at each TSL. Chapter 12 of the final rule TSD explains the analysis in further detail.

a. Industry Cash Flow Analysis Results

DOE modeled two scenarios using different conversion cost assumptions to evaluate the range of cash flow impacts on the CPSV manufacturing industry from amended energy conservation standards. Each scenario results in a unique set of cash flows and corresponding industry value at each TSL. These assumptions correspond to the bounds of a range of capital conversion costs that DOE anticipates could occur in response to amended standards. The following tables illustrate the financial impacts (represented by changes in INPV) of amended energy conservation standards on manufacturers of commercial prerinse spray valves, as well as the conversion costs that DOE estimates manufacturers would incur for each product class at each TSL.

DOE also conducted a sensitivity MIA (reflected in TSL 4a) based on an alternative shipments scenario described in section IV.G.1. DOE assumed that a percentage of consumers currently using product class 3 commercial prerinse spray valves will switch to using faucets at higher flow rates. DOE did not include faucet shipments in its shipments analysis. Therefore, overall shipments decrease in the alternative shipments scenario. The alternative shipments scenario is described in more detail in section IV.G.1. The results for the sensitivity MIA are presented in Table V.12 and Table V.13 as well as in chapter 12 of the final rule TSD.

The INPV results refer to the difference in industry value between the no-new-standards case and the standards case, which DOE calculated by summing the discounted industry cash flows from the base year (2015) through the end of the analysis period (2048). The discussion also notes the difference in cash flow between the no-new-standards case and the standards case in the year before the compliance date of amended energy conservation standards.

Table V.12 Manufacturer Impact Analysis for Commercial Prerinse Spray Valves – with the Sourced Components Capital Conversion Costs Scenario

	Units	No-New-Standards Case	Trial Standard Level				
			1	2	3	4	4a
INPV	2014$ MM	8.6	7.7	7.5	8.0	7.1	5.5
Change in INPV ($)	2014$ MM	-	(0.8)	(1.1)	(0.6)	(1.5)	(3.1)
Change in INPV (%)	%	-	(9.9)	(12.8)	(6.5)	(17.4)	(36.3)
Product Conversion Costs	2014$ MM	-	1.5	1.8	0.8	2.4	1.9
Capital Conversion Costs	2014$ MM	-	0.1	0.2	0.2	0.2	0.0
Total Investment Required	2014$ MM	-	1.6	2.0	1.0	2.6	1.9

* Parentheses indicate negative values.

Table V.13 Manufacturer Impact Analysis for Commercial Prerinse Spray Valves – with the Fabricated Components Capital Conversion Costs Scenario

	Units	No-New-Standards Case	Trial Standard Level				
			1	2	3	4	4a
INPV	2014$ MM	8.6	7.1	6.7	7.4	6.2	4.8
Change in INPV ($)	2014$ MM	-	(1.5)	(1.8)	(1.1)	(2.4)	(3.8)
Change in INPV (%)	%	-	(17.5)	(21.4)	(13.1)	(28.0)	(44.4)
Product Conversion Costs	2014$ MM	-	1.5	1.8	0.8	2.4	1.9
Capital Conversion Costs	2014$ MM	-	0.8	1.0	0.8	1.2	0.8
Total Investment Required	2014$ MM	-	2.3	2.8	1.6	3.6	2.7

* Parentheses indicate negative values.

At TSL 1, DOE estimates impacts on INPV to range from -$1.5 million to -$0.8 million, or a change in INPV of -17.5 percent to -9.9 percent for the Fabricated Components and Sourced Components Capital Conversion Costs scenarios, respectively. At this level, industry free cash flow is estimated to decrease by as much as 165.6 percent to -$0.3 million, compared to the no-new-standards case value of $0.5 million in the year leading up to the amended energy conservation standards. As DOE forecasts that approximately 63 percent of commercial prerinse spray valves shipments in the no-new-standards case will meet TSL 1 in the first year that standards are in effect (2019), 37 percent of the market shipments are affected at this standard level. The impact on INPV at TSL 1 stems exclusively from the conversion costs associated with the conversion of baseline units to those meeting the standards set at TSL 1. Product and capital conversion costs are estimated to be approximately $1.2 million for the Sourced Components Capital Conversion Costs scenario and $2.0 million for the Fabricated Components Capital Conversion Costs scenario.

At TSL 2, DOE estimates impacts on INPV to range from -$1.8 million to -$1.1 million, or a change in INPV of -21.4 percent to -12.8 percent for the Fabricated

Components and Sourced Components Capital Conversion Costs scenarios, respectively. At this level, industry free cash flow is estimated to decrease by as much as 202.7 percent to -$0.5 million, compared to the no-new-standards case value of $0.5 million in the year leading up to the amended energy conservation standards. As it is estimated that only approximately 27 percent of commercial prerinse spray valves shipments will meet the efficiency levels specified at TSL 2 in the first year that standards are in effect (2019), 73 percent of the market shipments are affected at this standard level. As with TSL 1, the impact on INPV at TSL 2 stems exclusively from the conversion costs associated with the conversion of lower efficiency units to those meeting the standards set at TSL 2. Since the majority of commercial prerinse spray valves will have to be updated to reach the standard level, product and capital conversion costs are estimated to be approximately $2.0 million for the Sourced Components Capital Conversion Costs scenario and $2.8 million for the Fabricated Components Capital Conversion Costs scenario.

At TSL 3, DOE estimates impacts on INPV to range from -$1.1 million to -$0.6 million, or a change in INPV of -13.1 percent to -6.5 percent for the Fabricated Components and Sourced Components Capital Conversion Cost scenarios, respectively. At this level, industry free cash flow is estimated to decrease by as much as 124.4 percent to -$0.1 million, compared to the no-new-standards case value of $0.5 million in the year leading up to the amended energy conservation standards. It is estimated that 55 percent of commercial prerinse spray valves shipments will meet the efficiency levels specified at TSL 3 in the first year that standards are in effect (2019); 45 percent of market shipments are affected at this standard level. Again, the impact on INPV at TSL 3 stems exclusively from the conversion costs associated with the conversion of lower efficiency units to those meeting the standards set at TSL 3. Since the majority of commercial prerinse spray valves already meet the standard level, product and capital conversion costs are estimated to be approximately $1.0 million for the Sourced Components Capital Conversion Costs scenario and $1.6 million for the Fabricated Components Capital Conversion Costs model.

At TSL 4, DOE estimates impacts on INPV to range from -$2.4 million to -$1.5 million, or a change in INPV of -28.0 percent to -17.4 percent for the Fabricated Components and Sourced Components Capital Conversion Cost scenarios, respectively. At this level, industry free cash flow is estimated to decrease by as much as 275.3 percent to -$0.8 million, compared to the no-new-standards case value of $0.5 million in the year leading up to the amended energy conservation standards. It is estimated that just 7 percent of commercial prerinse spray valves shipments will meet the efficiency levels specified at TSL 4 in the first year that standards are in effect (2019). Again, the impact on INPV at TSL 4 stems exclusively from the conversion costs associated with the conversion of lower efficiency units to those meeting the standards set at TSL 4. Since the majority of commercial prerinse spray valves will have to be updated to reach the standard level, product and capital conversion costs are estimated to be approximately $2.6 million for the Sourced Components Capital Conversion Costs scenario and $3.6 million for the Fabricated Components Capital Conversion Costs scenario.

Finally, at TSL 4a, DOE estimates impacts on INPV to range from -$3.8 million to -$3.1 million, or a change in INPV of -44.4 percent to -36.3 percent for the Fabricated Components and Sourced Components Capital Conversion Cost scenarios, respectively.

At this level, industry free cash flow is estimated to decrease by as much as 189.4 percent to -$0.4 million, compared to the no-new-standards case value of $0.5 million in the year leading up to the amended energy conservation standards. It is estimated that just 7 percent of commercial prerinse spray valves will meet the efficiency levels specified at TSL 4a in the first year that standards are in effect (2019). The impact on INPV at TSL 4a stems from the conversion costs associated with the conversion of lower efficiency units to those meeting the standards set at TSL 4a, and from a reduction in shipments in product class 3 by 46 percent. Since the majority of commercial prerinse spray valves will have to be updated to reach the standard level, product and capital conversion costs are estimated to be approximately $1.9 million for the Sourced Components Capital Conversion Costs scenario and $2.7 million for the Fabricated Components Capital Conversion Costs scenario.

b. Impacts on Employment

DOE used the GRIM to estimate the domestic labor expenditures and number of domestic production workers in the no-new-standards case and at each TSL from 2014 through 2048. DOE used the labor content of each product and the MPCs from the engineering analysis to estimate the total annual labor expenditures associated with commercial prerinse spray valves sold in the United States. Using statistical data from the U.S. Census Bureau's 2013 "Annual Survey of Manufactures" (2013 ASM) as well as market research, DOE estimates that 100 percent of commercial prerinse spray valves sold in the United States are assembled domestically, and hence that portion of total labor expenditures is attributable to domestic labor.[59] Labor expenditures for the manufacturing of products are a function of the labor intensity of the product, the sales volume, and an assumption that wages in real terms remain constant.

Using the GRIM, DOE forecasts the domestic labor expenditure for commercial prerinse spray valve production labor in 2019 will be approximately $1.9 million. Using the $20.51 hourly wage rate including fringe benefits and 2,019 production hours per year per employee found in the 2013 ASM, DOE estimates there will be approximately 46 domestic production workers involved in assembling and, to a lesser extent, fabricating components for commercial prerinse spray valves in 2019, the year in which the amended standards go into effect. In addition, DOE estimates that 21 non-production employees in the United States will support commercial prerinse spray valve production. The employment spreadsheet of the commercial prerinse spray valve GRIM shows the annual domestic employment impacts in further detail.[60]

The production worker estimates in this section cover workers only up to the line-supervisor level who are directly involved in fabricating and assembling commercial prerinse spray valves within an original equipment manufacturer (OEM) facility. Workers performing services that are closely associated with production operations, such as material handling with a forklift, are also included as production labor. Additionally,

[59] U.S. Census Bureau. *U.S. Census Bureau Annual Survey of Manufacturers 2013*. 2013. Available at http://www.census.gov/manufacturing/asm/historical_data/index.html.

[60] The employment spreadsheet is available in the GRIM at www.regulations.gov under docket number EERE-2014-BT-STD-0027.

the employment impacts shown are independent of the employment impacts from the broader U.S. economy, which are documented in chapter 12 of the final rule TSD.

Table V.14 depicts the potential levels of production employment that could result following amended energy conservation standards as calculated by the GRIM. The employment levels shown reflect the scenario in which manufacturers continue to produce the same scope of covered products in domestic facilities and domestic production is not shifted to lower-labor-cost countries. The following discussion includes a qualitative evaluation of the likelihood of negative domestic production employment impacts at the various TSLs.

Table V.14 Total Number of Domestic Commercial Prerinse Spray Valve Production Workers in 2019

	No-New-Standards Case	Trial Standard Level				
		1	2	3	4	4a
Total Number of Domestic Production Workers in 2019 (without changes in production locations)	46	46	46	46	46	27

The design options specified for achieving greater efficiency levels (i.e., reducing the spray hole area, changing spray hole shape, or changing the nozzle geometry from a venturi meter to an orifice plate) do not increase the labor content (measured in dollars) of commercial prerinse spray valves at any EL, nor do they increase total MPC. Except for TSL 4a, the total industry shipments are forecasted to be constant across TSLs. Therefore, DOE predicts no change in domestic manufacturing employment levels, provided manufacturers do not relocate production facilities outside of the United States, at TSLs 1 to 4. At TSL 4a, the total number of production workers for commercial prerinse spray valves in the United States is expected to decrease to 27 due to a reduction in industry shipments.

c. Impacts on Manufacturing Capacity

Approximately 55 percent of CPSV shipments already comply with the amended energy conservation standards adopted in this rulemaking. The majority of manufacturers already offer products that meet the amended energy conservation standards for commercial prerinse spray valves. Therefore, DOE does not foresee any impact on manufacturing capacity during the period leading up to the compliance date.

d. Impacts on Subgroups of Manufacturers

Using average cost assumptions to develop an industry cash-flow estimate may not be adequate for assessing differential impacts among manufacturer subgroups. Small manufacturers, niche product manufacturers, and manufacturers exhibiting a cost structure substantially different from the industry average could be affected disproportionately. DOE examined the potential for disproportionate impacts on small business manufacturers in section VI.B of this document. DOE did not identify any other manufacturer subgroups for this rulemaking.

e. Cumulative Regulatory Burden

While any one regulation may not impose a significant burden on manufacturers, the combined effects of several impending regulations may have serious consequences for some manufacturers, groups of manufacturers, or an entire industry. Assessing the impact of a single regulation may overlook this cumulative regulatory burden. In addition to energy conservation standards, other regulations can significantly affect manufacturers' financial operations. Multiple regulations affecting the same manufacturer can strain profits and can lead companies to abandon product lines or markets with lower expected future returns than competing products. For these reasons, DOE conducts an analysis of cumulative regulatory burden as part of its energy conservation standards rulemakings.

For the cumulative regulatory burden, DOE considers other DOE regulations that could affect commercial prerinse spray valve manufacturers that will take effect approximately 3 years before or after the compliance date for the amended energy conservation standards. The compliance years and expected industry conversion costs of energy conservation standards that may also impact commercial prerinse spray valve manufacturers are indicated in Table V.15.

Table V.15 Compliance Dates and Expected Conversion Expenses of Federal Energy Conservation Standards Affecting Commercial Prerinse Spray Valve Manufacturers

Regulation	Compliance Date	Estimated Conversion Costs
Commercial Refrigerators, Freezers and Refrigerator-Freezers 79 FR 17725 (March 28, 2014)	3/27/2017	$43.1 million

Industry and State-Level Standards

In addition to DOE's energy conservation regulations for commercial prerinse spray valves and other products also sold by commercial prerinse spray valve manufacturers, several other existing and pending regulations apply to commercial prerinse spray valves, including third-party and international industry standards and certification programs (e.g., ASME A112.18.1/CSA B125.1, ASTM Standard F2324) and state water efficiency regulations (e.g., California, Texas, and Massachusetts).

Additionally, in response to the CPSV NOPR, DOE received several comments related to the substantial cumulative burden associated with compliance with the EPA WaterSense specification. DOE summarized these comments in section IV.J.3 of this document. See chapter 12 of the final rule TSD for the results of DOE's analysis of the cumulative regulatory burden.

3. National Impact Analysis

a. Significance of Energy Savings

To estimate the energy and water savings attributable to amended standards for commercial prerinse spray valves, DOE compared the energy consumption of those products under the no-new-standards case to their anticipated energy consumption under each TSL. The savings are measured over the entire lifetime of products purchased in the 30-year period that begins in the first year of compliance with the amended standards (2019–2048). Table V.16 presents DOE's projections of the NES for each TSL considered for commercial prerinse spray valves. The savings were calculated using the approach described in section IV.H.1 of this document.

Table V.16 Commercial Prerinse Spray Valves: Cumulative National Energy and Water Savings for Products Shipped in 2019–2048

TSL	Product Class	National Energy Savings <u>quads</u>		National Water Savings <u>billion gal</u>
		Primary	**FFC**	
1	1 (≤5.0 ozf)	0.008	0.009	10.831
	2 (>5.0 ozf and ≤8.0 ozf)	0.113	0.123	144.916
	3 (>8.0 ozf)	(0.082)	(0.089)	(105.275)
	TOTAL TSL 1	**0.039**	**0.043**	**50.471**
2	1 (≤5.0 ozf)	0.008	0.009	10.831
	2 (>5.0 ozf and ≤8.0 ozf)	0.244	0.264	311.926
	3 (>8.0 ozf)	(0.165)	(0.179)	(210.875)
	TOTAL TSL 2	**0.087**	**0.095**	**111.882**
3	1 (≤5.0 ozf)	0.000	0.000	0.000
	2 (>5.0 ozf and ≤8.0 ozf)	0.000	0.000	0.000
	3 (>8.0 ozf)	0.093	0.101	11 9.572
	TOTAL TSL 3	**0.093**	**0.101**	**119.572**
3a	1 (≤5.0 ozf)	0.001	0.001	0.650
	2 (>5.0 ozf and ≤8.0 ozf)	0.001	0.001	1.300
	3 (>8.0 ozf)	0.093	0.101	119.572
	TOTAL TSL 3a	**0.095**	**0.103**	**121.521**
4	1 (≤5.0 ozf)	0.059	0.064	75.815
	2 (>5.0 ozf and ≤8.0 ozf)	0.196	0.212	250.516
	3 (>8.0 ozf)	(0.092)	(0.100)	(118.272)
	TOTAL TSL 4	**0.163**	**0.176**	**208.059**
4a	1 (≤5.0 ozf)	0.059	0.064	75.815
	2 (>5.0 ozf and ≤8.0 ozf)	0.196	0.212	250.516
	3 (>8.0 ozf)	(0.463)	(0.503)	(593.418)
	TOTAL TSL 4a	**(0.209)**	**(0.226)**	**(267.087)**

OMB Circular A-4[61] requires agencies to present analytical results, including separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs. Circular A-4 also directs agencies to consider the variability of key elements underlying the estimates of benefits and costs. For this rulemaking, DOE undertook a sensitivity analysis using 9, rather than 30, years of product shipments. The choice of a 9-year period is a proxy for the timeline in EPCA for the review of certain energy conservation standards and potential revision of and compliance with such revised standards.[62] The review timeframe established in EPCA is generally not synchronized with the product lifetime, product manufacturing cycles, or other factors specific to CPSV equipment. Thus, such results are presented for informational purposes only and are not indicative of any change in DOE's analytical methodology. Table V.17 reports cumulative national energy and water savings associated with this shorter analysis period of 2019–2027. The impacts are counted over the lifetime of products purchased during this period.

[61] U.S. Office of Management and Budget, "Circular A-4: Regulatory Analysis" (Sept. 17, 2003) (Available at: http://www.whitehouse.gov/omb/circulars_a004_a-4/).
[62] Section 325(m) of EPCA requires DOE to review its standards at least once every 6 years, and requires, for certain products, a 3-year period after any new standard is promulgated before compliance is required, except that in no case may any new standards be required within 6 years of the compliance date of the previous standards. While adding a 6-year review to the 3-year compliance period adds up to 9 years, DOE notes that it may undertake reviews at any time within the 6 year period and that the 3-year compliance date may yield to the 6-year backstop. A 9-year analysis period may not be appropriate given the variability that occurs in the timing of standards reviews and the fact that for some consumer products, the compliance period is 5 years rather than 3 years.

Table V.17 Commercial Prerinse Spray Valves: Cumulative National Energy and Water Savings for Products Shipped in 2019–2027

TSL	Product Class	National Energy Savings quads		National Water Savings billion gal
		Primary	FFC	
1	1 (≤5.0 ozf)	0.002	0.003	2.917
	2 (>5.0 ozf and ≤8.0 ozf)	0.031	0.034	39.030
	3 (>8.0 ozf)	(0.023)	(0.025)	(28.353)
	TOTAL TSL 1	**0.011**	**0.012**	**13.593**
2	1 (≤5.0 ozf)	0.002	0.003	2.917
	2 (>5.0 ozf and ≤8.0 ozf)	0.068	0.073	84.010
	3 (>8.0 ozf)	(0.046)	(0.050)	(56.794)
	TOTAL TSL 2	**0.024**	**0.026**	**30.133**
3	1 (≤5.0 ozf)	0.000	0.000	0.000
	2 (>5.0 ozf and ≤8.0 ozf)	0.000	0.000	0.000
	3 (>8.0 ozf)	0.026	0.028	32.204
	TOTAL TSL 3	**0.026**	**0.028**	**32.204**
3a	1 (≤5.0 ozf)	0.000	0.000	0.175
	2 (>5.0 ozf and ≤8.0 ozf)	0.000	0.000	0.350
	3 (>8.0 ozf)	0.026	0.028	32.204
	TOTAL TSL 3a	**0.026**	**0.029**	**32.729**
4	1 (≤5.0 ozf)	0.016	0.018	20.419
	2 (>5.0 ozf and ≤8.0 ozf)	0.054	0.059	67.471
	3 (>8.0 ozf)	(0.026)	(0.028)	(31.854)
	TOTAL TSL 4	**0.045**	**0.049**	**56.036**
4a	1 (≤5.0 ozf)	0.016	0.018	20.419
	2 (>5.0 ozf and ≤8.0 ozf)	0.054	0.059	67.471
	3 (>8.0 ozf)	(0.129)	(0.140)	(159.824)
	TOTAL TSL 4a	**(0.058)**	**(0.063)**	**(71.934)**

b. Net Present Value of Consumer Costs and Benefits

DOE estimated the cumulative NPV to the nation of the total costs and savings for consumers that would result from particular standard levels for commercial prerinse spray valves. In accordance with OMB's guidelines on regulatory analysis,[63] DOE calculated NPV using both a 7-percent and a 3-percent real discount rate.

Table V.18 shows the consumer NPV results for each TSL DOE considered for commercial prerinse spray valves. The impacts are counted over the lifetime of products purchased in 2019–2048.

Table V.18 Commercial Prerinse Spray Valves: Cumulative Net Present Value of Consumer Benefits for Product Shipped in 2019–2048

TSL	Product Class	Net Present Value billion $2014	
		7-Percent Discount Rate	3-Percent Discount Rate
1	1 (≤5.0 ozf)	$0.067	$0.137
	2 (>5.0 ozf and ≤8.0 ozf)	$0.892	$1.828
	3 (>8.0 ozf)	($0.656)	($1.342)
	TOTAL TSL 1	**$0.303**	**$0.623**
2	1 (≤5.0 ozf)	$0.067	$0.137
	2 (>5.0 ozf and ≤8.0 ozf)	$1.924	$3.943
	3 (>8.0 ozf)	($1.319)	($2.699)
	TOTAL TSL 2	**$0.672**	**$1.381**
3	1 (≤5.0 ozf)	$0.000	$0.000
	2 (>5.0 ozf and ≤8.0 ozf)	$0.000	$0.000
	3 (>8.0 ozf)	$0.718	$1.476
	TOTAL TSL 3	**$0.718**	**$1.476**

[63] U.S. Office of Management and Budget, "Circular A-4: Regulatory Analysis, section E," (Sept. 17, 2003) (Available at: http://www.whitehouse.gov/omb/circulars_a004_a-4/).

TSL	Product Class	Net Present Value billion $2014	
		7-Percent Discount Rate	3-Percent Discount Rate
3a	1 (≤5.0 ozf)	$0.004	$0.008
	2 (>5.0 ozf and ≤8.0 ozf)	$0.008	$0.016
	3 (>8.0 ozf)	$0.718	$1.476
	TOTAL TSL 3a	**$0.730**	**$1.500**
4	1 (≤5.0 ozf)	$0.473	$0.968
	2 (>5.0 ozf and ≤8.0 ozf)	$1.539	$3.156
	3 (>8.0 ozf)	($0.763)	($1.557)
	TOTAL TSL 4	**$1.249**	**$2.568**
4a*	1 (≤5.0 ozf)	$0.473	$0.968
	2 (>5.0 ozf and ≤8.0 ozf)	$1.539	$3.156
	3 (>8.0 ozf)	($3.616)	($7.421)
	TOTAL TSL 4a	**($1.603)**	**($3.296)**

*In TSL 4a, DOE assumed that the installed costs for faucets and commercial prerinse spray valves are equal.

DOE also determined financial impacts for a sensitivity case utilizing a 9-year analysis period. Table V.19 reports NPV results associated with this shorter analysis period. The impacts are counted over the lifetime of products purchased in 2019–2027. This information is presented for informational purposes only, and is not indicative of any change in DOE’s analytical methodology or decision criteria.

Table V.19 Commercial Prerinse Spray Valves: Cumulative Net Present Value of Customer Benefits for Equipment Shipped in 2019–2027

TSL	Product Class	Net Present Value billion $2014	
		7-Percent Discount Rate	3-Percent Discount Rate
1	1 (≤5.0 ozf)	$0.030	$0.044
	2 (>5.0 ozf and ≤8.0 ozf)	$0.397	$0.580
	3 (>8.0 ozf)	($0.293)	($0.427)
	TOTAL TSL 1	**$0.135**	**$0.197**
2	1 (≤5.0 ozf)	$0.030	$0.044
	2 (>5.0 ozf and ≤8.0 ozf)	$0.858	$1.252
	3 (>8.0 ozf)	($0.589)	($0.859)
	TOTAL TSL 2	**$0.299**	**$0.437**
3	1 (≤5.0 ozf)	$0.000	$0.000
	2 (>5.0 ozf and ≤8.0 ozf)	$0.000	$0.000
	3 (>8.0 ozf)	$0.319	$0.467
	TOTAL TSL 3	**$0.319**	**$0.467**
3a	1 (≤5.0 ozf)	$0.002	$0.003
	2 (>5.0 ozf and ≤8.0 ozf)	$0.003	$0.005
	3 (>8.0 ozf)	$0.319	$0.467
	TOTAL TSL 3a	**$0.324**	**$0.474**
4	1 (≤5.0 ozf)	$0.211	$0.308
	2 (>5.0 ozf and ≤8.0 ozf)	$0.686	$1.002
	3 (>8.0 ozf)	($0.342)	($0.497)
	TOTAL TSL 4	**$0.555**	**$0.812**
4a*	1 (≤5.0 ozf)	$0.211	$0.308
	2 (>5.0 ozf and ≤8.0 ozf)	$0.686	$1.002
	3 (>8.0 ozf)	($1.610)	($2.352)
	TOTAL TSL 4a	**($0.713)**	**($1.043)**

*In TSL 4a, DOE assumed that the installed costs for faucets and commercial prerinse spray valves are equal.

c. Indirect Impacts on Employment

DOE expects amended energy conservation standards for commercial prerinse spray valves to reduce energy bills for consumers of those products, with the resulting net savings being redirected to other forms of economic activity. These expected shifts in spending and economic activity could affect the demand for labor. Thus, indirect employment impacts may result from expenditures shifting between goods (the substitution effect) and changes in income and overall expenditures (the income effect). As described in section IV.N of this document, DOE used an input/output model of the U.S. economy to estimate indirect employment impacts of the TSLs that DOE considered in this rulemaking. DOE understands that there are uncertainties involved in projecting employment impacts, especially changes in the later years of the analysis. Therefore, DOE generated results for near-term timeframes (2020–2025), where these uncertainties are reduced.

The results suggest that the amended standards are likely to have a negligible impact on the net demand for labor in the economy. All TSLs increase net demand for labor by fewer than 500 jobs. The net change in jobs is so small that it would be imperceptible in national labor statistics, and it might be offset by other, unanticipated effects on employment. Chapter 16 of the final rule TSD presents detailed results regarding indirect employment impacts. As shown in Table V.20, DOE estimates that net indirect employment impacts from a CPSV amended standard are small relative to the national economy.

Table V.20 Net Short- Term Change in Employment (Jobs)

Trial Standard Level	2020	2025
1	36	103
2	80	229
3	86	244
4	149	425

4. Impact on Utility or Performance of Products

Based on testing conducted in support of this rulemaking, discussed in section IV.C.4.b of this document, DOE has concluded that the amended standards in this final rule would not reduce the utility or performance of the commercial prerinse spray valves under consideration in this rulemaking. Manufacturers of these products currently offer units that meet or exceed the amended standards.

5. Impact of Any Lessening of Competition

As discussed in section III.F.1.e, the Attorney General determines the impact, if any, of any lessening of competition likely to result from a proposed standard and transmits such determination in writing to the Secretary within 60 days of the publication of a proposed rule, along with an analysis of the nature and extent of the impact. To assist the Attorney General in making such determination, DOE provided the DOJ with copies of the CPSV NOPR and TSD for review. In its assessment letter responding to DOE, DOJ concluded that the amended energy conservation standards for commercial prerinse spray valves are unlikely to have a significant adverse impact on competition. DOE is publishing the Attorney General's assessment at the end of this document.

6. Need of the Nation to Conserve Energy

Enhanced energy efficiency, where economically justified, improves the nation's energy security, strengthens the economy, and reduces the environmental impacts (costs) of energy production. Reduced electricity demand due to energy conservation standards is also likely to reduce the cost of maintaining the reliability of the electricity system, particularly during peak-load periods. As a measure of this reduced demand, chapter 15 in the final rule TSD presents the estimated reduction in generating capacity, relative to the no-new-standards case, for the TSLs that DOE considered in this rulemaking.

Energy conservation from amended standards for commercial prerinse spray valves is expected to yield environmental benefits in the form of reduced emissions of air pollutants and GHGs. Table V.21 provides DOE's estimate of cumulative emissions reductions expected to result from the TSLs considered in this rulemaking. The table includes both power sector emissions and upstream emissions. The emissions were calculated using the multipliers discussed in section IV.K. DOE reports annual emissions reductions for each TSL in chapter 13 of the final rule TSD.

Table V.21 Cumulative Emissions Reduction Estimated for Commercial Prerinse Spray Valves Trial Standard Levels for Products Shipped in 2019–2048

	TSL			
	1	**2**	**3**	**4**
Power Sector and Site Emissions				
CO_2 (million metric tons)	2.26	5.00	5.35	9.31
NO_X (thousand tons)	2.82	6.24	6.67	11.61
Hg (tons)	0.00	0.01	0.01	0.01
N_2O (thousand tons)	0.02	0.04	0.04	0.07
CH_4 (thousand tons)	0.13	0.28	0.30	0.52
SO_2 (thousand tons)	0.74	1.64	1.75	3.05

	TSL			
	1	**2**	**3**	**4**
Upstream Emissions				
CO_2 (million metric tons)	0.22	0.48	0.52	0.90
NO_X (thousand tons)	3.39	7.51	8.03	13.97
Hg (tons)	0.00	0.00	0.00	0.00
N_2O (thousand tons)	0.00	0.00	0.00	0.00
CH_4 (thousand tons)	19.87	44.04	47.07	81.90
SO_2 (thousand tons)	0.01	0.03	0.03	0.05
Total Emissions				
CO_2 (million metric tons)	2.48	5.49	5.87	10.21
NO_X (thousand tons)	6.20	13.75	14.70	25.57
Hg (tons)	0.00	0.01	0.01	0.01
N_2O (thousand tons)	0.02	0.04	0.04	0.07
N_2O (thousand tons CO_2eq)	4.75	10.53	11.25	19.57
CH_4 (thousand tons)	19.99	44.32	47.37	82.42
CH_4 (thousand tons CO_2eq))	559.83	1,241.00	1,326.29	2,307.80
SO_2 (thousand tons)	0.75	1.67	1.79	3.11

* CO_2eq is the quantity of CO_2 that would have the same GWP.

As part of the analysis for this rule, DOE estimated monetary benefits likely to result from the reduced emissions of CO_2 and NO_X that DOE estimated for each of the considered TSLs for commercial prerinse spray valves. As discussed in section IV.L of this document, for CO_2, DOE used the most recent values for the SCC developed by an interagency process. The four sets of SCC values for CO_2 emissions reductions in 2015 resulting from that process (expressed in 2014$) are represented by $12.2/metric ton (the average value from a distribution that uses a 5-percent discount rate), $40.0/metric ton (the average value from a distribution that uses a 3-percent discount rate), $62.3/metric ton (the average value from a distribution that uses a 2.5-percent discount rate), and $117/metric ton (the 95th-percentile value from a distribution that uses a 3-percent discount rate). The values for later years are higher due to increasing damages (public health, economic, and environmental) as the projected magnitude of climate change increases.

Table V.22 presents the global value of CO_2 emissions reductions at each TSL. For each of the four cases, DOE calculated a present value of the stream of annual values using the same discount rate as was used in the studies upon which the dollar-per-ton values are based. DOE calculated domestic values as a range from 7 percent to 23 percent of the global values; these results are presented in chapter 14 of the final rule TSD.

Table V.22 Estimates of Global Present Value of CO_2 Emissions Reduction for Commercial Prerinse Spray Valves TSLs Shipped in 2019–2048

TSL	**SCC Case***			
	5% discount rate, average*	**3% discount rate, average***	**2.5% discount rate, average***	**3% discount rate, 95th percentile***
	Million 2014$			
Primary Energy Emissions				
1	17	75	119	229
2	38	167	263	507
3	40	178	281	541
4	70	310	489	942
Upstream Emissions				
1	2	7	11	22
2	4	16	25	49
3	4	17	27	52
4	7	30	47	91
Total Emissions				
1	19	82	130	251
2	41	183	288	555
3	44	195	308	594
4	77	340	536	1,033

* For each of the four cases, the corresponding SCC value for emissions in 2015 is $12.2, $40.0, $62.3, and $117 per metric ton (2014$). The values are for CO_2 only (i.e., not CO_{2eq} of other greenhouse gases).

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

DOE also estimated the cumulative monetary value of the economic benefits associated with NO_X emissions reductions anticipated to result from the considered TSLs for commercial prerinse spray valves. The dollar-per-ton value that DOE used is discussed in section IV.L of this document. Table V.23 presents the cumulative present values for NO_X emissions for each TSL calculated using 7-percent and 3-percent discount rates.

Table V.23 Estimates of Present Value of NO_X Emissions Reduction under Commercial Prerinse Spray Valves Trial Standard Levels

TSL	**3% discount rate**	**7% discount rate**
	Million 2014$	
Power Sector Emissions		
1	10	5
2	22	10

TSL	3% discount rate	7% discount rate
	Million 2014$	
3	24	11
4	42	19
Upstream Emissions		
1	12	5
2	27	12
3	29	13
4	50	22
Total Emissions		
1	22	10
2	49	22
3	52	24
4	91	42

7. Other Factors

The Secretary of Energy, in determining whether a standard is economically justified, may consider any other factors that the Secretary deems to be relevant. (42 U.S.C. 6295(o)(2)(B)(i)(VII)) No other factors were considered in this analysis.

8. Summary of National Economic Impacts

The NPV of the monetized benefits associated with emissions reductions can be viewed as a complement to the NPV of the consumer savings calculated for each TSL considered in this rulemaking. Table V.24 presents the NPV values that result from adding the estimates of the potential economic benefits resulting from reduced CO_2 and NO_X emissions in each of four valuation scenarios to the NPV of consumer savings calculated for each TSL considered in this rulemaking, at both a 7-percent and 3-percent discount rate. The CO_2 values used in the columns of each table correspond to the four sets of SCC values discussed in section V.B.6.

Table V.24 Net Present Value of Consumer Savings Combined with Present Value of Monetized Benefits from CO_2 and NO_X Emissions Reductions

TSL	Consumer NPV at 3% Discount Rate added with:			
	SCC Value of $12.2/metric ton CO_2* and Medium Value for NO_X**	**SCC Value of $40.0/metric ton CO_2* and Medium Value for NO_X****	**SCC Value of $62.3/metric ton CO_2* and Medium Value for NO_X****	**SCC Value of $117/metric ton CO_2* and Medium Value for NO_X****
	Billion 2014$			
1	0.664	0.728	0.775	0.896
2	1.471	1.613	1.718	1.985
3	1.572	1.724	1.836	2.122
4	2.736	2.999	3.195	3.692
TSL	**Consumer NPV at 7% Discount Rate added with:**			
	SCC Value of $12.2/metric ton CO2* and Medium Value for NO_X**	**SCC Value of $40.0/metric ton CO2* and Medium Value for NO_X****	**SCC Value of $62.3/metric ton CO2* and Medium Value for NO_X****	**SCC Value of $117/metric ton CO2* and Medium Value for NO_X****
	Billion 2014$			
1	0.332	0.396	0.443	0.564
2	0.735	0.877	0.982	1.249
3	0.786	0.937	1.050	1.335
4	1.367	1.630	1.826	2.323

* For each of the four cases, the corresponding SCC value for emissions in 2015 is $12.2, $40.0, $62.3, and $117 per metric ton (2014$).
** The medium value for NO_X is $2,723 per short ton (2014$)

In considering the results discussed previously, two issues are relevant. First, the national operating cost savings are domestic U.S. monetary savings that occur as a result of market transactions, while the value of CO_2 reductions is based on a global value. Second, the assessments of operating cost savings and the SCC are performed with different methods that use different time frames for analysis. The national operating cost savings is measured for the lifetime of products shipped in 2019 through 2048. Because

CO_2 emissions have a very long residence time in the atmosphere,[64] the SCC values in future years reflect future climate-related impacts that continue beyond 2100.

C. Conclusion

Any new or amended energy conservation standards that DOE adopts for any type (or class) of 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 by, to the greatest extent practicable, considering the seven statutory factors discussed previously. (42 U.S.C. 6295(o)(2)(B)(i)) The new or amended standard must also result in significant conservation of energy. (42 U.S.C. 6295(o)(3)(B))

For this final rule, DOE considered the impacts of amended standards for commercial prerinse spray valves at each TSL, beginning with the max-tech level, to determine whether that level was economically justified. Where the max-tech level was not justified, DOE then considered the next most efficient level and undertook the same evaluation until it reached the highest efficiency level that is both technologically feasible and economically justified and saves a significant amount of energy.

Tables in the following section present a summary of the results of DOE's quantitative analysis for each TSL. In addition to the quantitative results presented in the

[64] The atmospheric lifetime of CO_2 is estimated of the order of 30–95 years. Jacobson, MZ, "Correction to 'Control of fossil-fuel particulate black carbon and organic matter, possibly the most effective method of slowing global warming,'" J. Geophys. Res. 110. pp. D14105 (2005).

tables, DOE also considers other burdens and benefits that affect economic justification. These include the impacts on identifiable subgroups of consumers who may be disproportionately affected by a national standard and impacts on employment.

DOE also notes that the economics literature provides a wide-ranging discussion of how consumers trade off upfront costs and energy savings in the absence of government intervention. Much of this literature attempts to explain why consumers appear to undervalue energy efficiency improvements. There is evidence that consumers undervalue future energy savings as a result of: (1) a lack of information; (2) a lack of sufficient salience of the long-term or aggregate benefits; (3) a lack of sufficient savings to warrant delaying or altering purchases; (4) excessive focus on the short term, in the form of inconsistent weighting of future energy cost savings relative to available returns on other investments; (5) computational or other difficulties associated with the evaluation of relevant tradeoffs; and (6) a divergence in incentives (for example, between renters and owners, or builders and purchasers). Having less than perfect foresight and a high degree of uncertainty about the future, consumers may trade off these types of investments at a higher than expected rate between current consumption and uncertain future energy cost savings.

In DOE's current regulatory analysis, potential changes in the benefits and costs of a regulation due to changes in consumer purchase decisions are included in two ways. First, if consumers forego the purchase of a product in the standards case, this decreases sales for product manufacturers, and the impact on manufacturers attributed to lost revenue is included in the MIA. Second, DOE accounts for energy savings attributable only to products actually used by consumers in the standards case; if a regulatory option decreases the number of products purchased by consumers, this decreases the potential energy savings from an energy conservation standard. DOE provides estimates of shipments and changes in the volume of product purchases in chapter 9 of the final rule TSD. However, DOE's current analysis does not explicitly control for heterogeneity in consumer preferences, preferences across subcategories of products or specific features, or consumer price sensitivity variation according to household income.[65]

While DOE is not prepared at present to provide a fuller quantifiable framework for estimating the benefits and costs of changes in consumer purchase decisions due to an energy conservation standard, DOE is committed to developing a framework that can support empirical quantitative tools for improved assessment of the consumer welfare impacts of appliance standards. DOE has posted a paper that discusses the issue of consumer welfare impacts of appliance energy conservation standards, and potential enhancements to the methodology by which these impacts are defined and estimated in the regulatory process.[66]

1. Benefits and Burdens of TSLs Considered for Commercial Prerinse Spray Valve Standards

Table V.25 and Table V.26 summarize the quantitative impacts estimated for each TSL for commercial prerinse spray valves. The national impacts are measured over the

[65] P.C. Reiss and M.W. White, Household Electricity Demand, Revisited, Review of Economic Studies 72, 853–883 (2005).
[66] Alan Sanstad, Notes on the Economics of Household Energy Consumption and Technology Choice. Lawrence Berkeley National Laboratory (2010) (Available online at: https://www1.eere.energy.gov/buildings/appliance_standards/pdfs/consumer_ee_theory.pdf).

lifetime of commercial prerinse spray valves purchased in the 30-year period that begins in the first year of compliance with amended standards (2019–2048). The energy savings, emissions reductions, and value of emissions reductions refer to full-fuel-cycle results. The efficiency levels contained in each TSL are described in section V.A of this document. Note that the tables in this section report the results only for the standard TSLs that utilize the default shipments scenario. Results for the two sensitivity-case TSLs are reported in sections V.B.2 and V.B.3.

Table V.25 Summary of Analytical Results for Commercial Prerinse Spray Valve Trial Standard Levels: National Impacts

Category	TSL 1	TSL 2	TSL 3	TSL 4
Cumulative FFC Energy Savings quads				
	0.04	0.10	0.10	0.18
Cumulative Water Savings billion gal				
	50.47	111.88	119.57	208.06
NPV of Consumer Benefits 2014$ billion				
3% discount rate	0.62	1.38	1.48	2.57
7% discount rate	0.30	0.67	0.72	1.25
Cumulative FFC Emissions Reduction				
CO_2 million metric tons	2.48	5.49	5.87	10.21
NO_X thousand tons	6.20	13.75	14.70	25.57
Hg tons	0.00	0.01	0.01	0.01
N_2O thousand tons	0.02	0.04	0.04	0.07
N_2O thousand tons CO_2eq*	4.75	10.53	11.25	19.57
CH_4 thousand tons	19.99	44.32	47.37	82.42
CH_4 thousand tons CO_2eq*	559.83	1,241.00	1,326.29	2,307.80
SO_2 thousand tons	0.75	1.67	1.79	3.11
Value of Emissions Reduction				
CO_2 2014$ million**	19 to 251	41 to 555	44 to 594	77 to 1033
NO_X – 3% discount rate 2014$ million	22 to 50	49 to 110	52 to 117	91 to 204
NO_X – 7% discount rate 2014$ million	10 to 22	22 to 50	24 to 53	42 to 92

* CO_2eq is the quantity of CO_2 that would have the same GWP.

** Range of the economic value of CO_2 reductions is based on estimates of the global benefit of reduced CO_2 emissions.

Table V.26 Summary of Analytical Results for Commercial Prerinse Spray Valve Trial Standard Levels: Manufacturer and Consumer Impacts

Category	TSL 1*	TSL 2*	TSL 3*	TSL 4*
Manufacturer Impacts				
Industry NPV Relative to a No-New-Standards Case Value of 8.6 (2014$ million, 6.9% discount rate)	7.1 – 7.7	6.7 – 7.5	7.4 – 8.0	6.2 – 7.1
Industry NPV (% change)	(17.5) – (9.9)	(21.4) – (12.8)	(13.1) – (6.5)	(28.0) – (17.4)
Direct Employment Impacts				
Potential Increase in Domestic Production Workers in 2019	0	0	0	0
Consumer Average LCC Savings (2014$)				
Product Class 1 (≤5.0 ozf)	334	557	N/A	352
Product Class 2 (>5.0 and ≤8.0 ozf)	401	446	N/A	825
Product Class 3 (>8.0 ozf)	357	547	547	766
Consumer Simple PBP (years)				
Product Class 1 (≤5.0 ozf)	0.0	0.0	0.0	0.0
Product Class 2 (>5.0 and ≤8.0 ozf)	0.0	0.0	0.0	0.0
Product Class 3 (>8.0 ozf)	0.0	0.0	0.0	0.0
Distribution of Consumer LCC Impacts – Net Cost (%)				
Product Class 1 (≤5.0 ozf)	0%	0%	0%	0%
Product Class 2 (>5.0 and ≤8.0 ozf)	0%	0%	0%	0%
Product Class 3 (>8.0 ozf)	0%	0%	0%	0%

* Parentheses indicate negative (-) values. The entry "N/A" means not applicable because there is no change in the standard at certain TSLs.

DOE first considered TSL 4, which represents the max-tech efficiency levels. TSL 4 would save 0.18 quads of energy and 208.06 billion gallons of water. Under TSL 4, the NPV of consumer benefit would be $1.25 billion using a discount rate of 7 percent, and $2.57 billion using a discount rate of 3 percent.

The cumulative emissions reductions at TSL 4 are 10.21 Mt of CO_2, 25.57 thousand tons of NO_X, 3.11 thousand tons of SO_2, 0.01 tons of Hg, 0.07 thousand tons of

N_2O, and 82.42 thousand tons of CH_4. The estimated monetary value of the CO_2 emissions reductions at TSL 4 ranges from $77 million to $1,033 million.

At TSL 4, the average LCC impact is a savings of $357 for CPSV models in product class 1, $825 for CPSV models in product class 2, and $766 for CPSV models in product class 3. The simple PBP is 0.0 years for all CPSV models because there are no incremental equipment costs for more efficient products. The fraction of consumers experiencing an LCC net cost is 0 percent for all CPSV models.

At TSL 4, the projected change in INPV ranges from a decrease of $2.4 million to a decrease of $1.5 million. If the lower bound of the range of impacts is reached, TSL 4 could result in a net loss of up to 28.0 percent in INPV for manufacturers.

Although TSL 4 for commercial prerinse spray valves provides positive LCC savings and a positive total NPV of consumer benefits, the estimated industry losses are large. Moreover, the studied sensitivity case of TSL 4a indicated that the outcomes of setting a standard at TSL 4 could be far less favorable, including sufficient loss of utility to drive consumers from the CPSV market to another product.

TSL 4a would <u>increase</u> energy use by 0.23 quads of energy, and <u>increase</u> water use by 267.08 billion gallons of water. Under TSL 4a, the NPV of consumer benefit would be -$1.60 billion using a discount rate of 7 percent, and -$3.30 billion using a discount rate of 3 percent.

At TSL 4a, the projected change in INPV ranges from a decrease of $3.8 million to a decrease of $3.1 million. If the lower bound of the range of impacts is reached, TSL 4 could result in a net loss of up to 44.4 percent in INPV for manufacturers.

Therefore, the Secretary concludes that at TSL 4 the benefits of energy savings, positive NPV of consumer benefits, emission reductions, and the estimated monetary value of the emissions reductions would be outweighed by the reduction in manufacturer industry value. Consequently, the Secretary has concluded that TSL 4 is not economically justified.

DOE then considered TSL 3, which saves an estimated total of 0.10 quads of energy and 119.57 billion gallons of water. TSL 3 has an estimated NPV of consumer benefit of $0.72 billion using a 7-percent discount rate, and $1.48 billion using a 3-percent discount rate.

TSL 3 represents the minimum flow rate for each product class that would not induce consumers to switch product classes as a result of a standard at those flow rates, and retains shower-type designs. Therefore, unlike TSL 4, TSL 3 maintains consumer utility and the availability of all types of products currently in the marketplace.

The cumulative emissions reductions at TSL 3 are 5.87 Mt of CO_2, 14.70 thousand tons of NO_X, 1.79 thousand tons of SO_2, 0.01 tons of Hg, and 47.37 thousand tons of CH_4. The estimated monetary value of the CO_2 emissions reductions at TSL 3 ranges from $44 million to $594 million.

At TSL 3, the average LCC impact is a savings of $0 for CPSV models in product classes 1 and 2 because the market minimums are the standard for those classes. Because no consumers in the no-new-standards case purchase products with a higher flow rate than the respective market minimums, no consumers are affected by a standard set at EL 1 (market minimum) in product classes 1 and 2. Consumers of CPSV models in product class 3 save an average of $547 over a product's lifetime. The simple payback period is 0.0 years for all CPSV models. The fraction of consumers experiencing an LCC net cost is 0 percent for all CPSV models.

At TSL 3, the projected change in INPV ranges from a decrease of $1.1 million to a decrease of $0.6 million. If the lower bound of the range of impacts is reached, TSL 3 could result in a net loss of up to 13.1 percent in INPV for manufacturers. Moreover, the studied sensitivity case of TSL 3a indicated that the outcomes of setting a standard at TSL 3 could provide an opportunity for incremental savings for product classes 1 and 2, if some products exist at the current minimum standard level. These additional savings enable TSL 3a to save an estimated total of 0.10 quads of energy and 121.52 billion gallons of water. TSL 3a has an estimated NPV of consumer benefit of $0.73 billion using a 7-percent discount rate, and $1.50 billion using a 3-percent discount rate.

DOE concludes that at TSL 3 for commercial prerinse spray valves, the benefits of energy savings, water savings, positive NPV of consumer benefits, emission reductions, and the estimated monetary value of the CO_2 emissions reductions would outweigh the negative impacts on manufacturers, including the conversion costs that could result in a reduction in INPV for manufacturers.

After considering the analysis and the benefits and burdens of TSL 3, DOE concludes that this TSL will offer the maximum improvement in efficiency that is technologically feasible and economically justified, and will result in the significant conservation of energy and water. Therefore, DOE adopts TSL 3 for commercial prerinse spray valves. The amended energy conservation standards for commercial prerinse spray valves, which are described in terms of flow rate, are shown in Table V.27.

Table V.27 Amended Energy Conservation Standards for Commercial Prerinse Spray Valves

Product Class	**Flow Rate gpm**
Product Class1 (≤5.0 ozf)	1.00
Product Class2 (>5.0 ozf and ≤8.0 ozf)	1.20
Product Class 3(>8.0 ozf)	1.28

2. Summary of Annualized Benefits and Costs of the Amended Standards

The benefits and costs of the amended standards can also be expressed in terms of annualized values. The annualized net benefit is the sum of (1) the annualized national economic value (expressed in 2014$) of the benefits from operating products that meet the amended standards (consisting primarily of operating cost savings from using less energy and water, minus increases in product purchase costs) and (2) the annualized monetary value of the benefits of CO_2 and NO_X emission reductions.[67]

[67] To convert the time-series of costs and benefits into annualized values, DOE calculated a present value in 2014, the year used for discounting the NPV of total consumer costs and savings. For the benefits, DOE calculated a present value associated with each year's shipments in the year in which the shipments occur (2020, 2030, etc.), and then discounted the present value from each year to 2015. The calculation uses discount rates of 3 and 7 percent for all costs and benefits except for the value of CO_2 reductions, for which DOE used case-specific discount rates. Using the present value, DOE then calculated the fixed annual payment over a 30-year period, starting in the compliance year that yields the same present value.

Table V.28 shows the annualized values for commercial prerinse spray valves under TSL 3, expressed in 2014$. Using a 7-percent discount rate for benefits and costs other than CO_2 reduction (for which DOE used a 3-percent discount rate, along with the SCC series that has a value of $40.0 per metric ton in 2015), there are no increased product costs associated with the standards described in this rule, while the benefits are $69.90 million per year in reduced product operating costs, $10.94 million per year in CO_2 reductions, and $1.00 million per year in reduced NO_X emissions. In this case, the net benefit amounts to $81.85 million per year.

Using a 3-percent discount rate for all benefits and costs as well as the average SCC series that has a value of $40.0 per metric ton in 2015, there are no increased product costs associated with the standards described in this rule, while the benefits are $81.32 million per year in reduced operating costs, $10.94 million in CO_2 reductions, and $1.11 million in reduced NO_X emissions. In this case, the net benefit amounts to $93.37 million per year.

Table V.28 Annualized Benefits and Costs of Amended Standards (TSL 3) for Commercial Prerinse Spray Valves Sold in 2019–2048

	Discount Rate	Primary Estimate*	Low Net Benefits Estimate*	High Net Benefits Estimate*
		Million 2014$/year		
Benefits				
Consumer Operating Cost Savings	7%	71	66	74
	3%	82	76	86
CO_2 Reduction at $12.0/t**	5%	3	3	3
CO_2 Reduction at $40.5/t**	3%	11	11	11
CO_2 Reduction at $62.4/t**	2.5%	16	16	16
CO_2 Reduction at $119/t**	3%	33	33	33

	Discount Rate	Primary Estimate*	Low Net Benefits Estimate*	High Net Benefits Estimate*
		Million 2014$/year		
NO_X Reduction Monetized Value†	7%	2	2	5
	3%	3	3	7
Total Benefits††	7% plus CO_2 range	77 to 106	71 to 101	82 to 112
	7%	84	79	90
	3% plus CO_2 range	89 to 118	82 to 112	96 to 126
	3%	96	89	104
Costs				
Manufacturer Conversion Costs†††	7%	0.08 to 0.13	0.08 to 0.13	0.08 to 0.13
	3%	0.05 to 0.08	0.05 to 0.08	0.05 to 0.08
Total Net Benefits				
Total†††	7% plus CO_2 range	77 to 106	71 to 101	82 to 112
	7%	84	79	90
	3% plus CO_2 range	89 to 118	82 to 112	96 to 126
	3%	96	89	104

* This table presents the annualized costs and benefits associated with commercial prerinse spray valves shipped in 2019−2048. These results include benefits to consumers which accrue after 2048 from the products purchased in 2019−2048. The results account for the incremental variable and fixed costs incurred by manufacturers due to the amended standard, some of which may be incurred in preparation for the rule. The primary, low benefits, and high benefits estimates utilize projections of energy prices from the AEO2015 reference case, low estimate, and high estimate, respectively.
** The CO_2 values represent global monetized values of the SCC, in 2014$, in 2015 under several scenarios of the updated SCC values. The first three cases use the averages of SCC distributions calculated using 5 percent, 3 percent, and 2.5 percent discount rates, respectively. The fourth case represents the 95th percentile of the SCC distribution calculated using a 3 percent discount rate.
† The $/ton values used for NO_X are described in section IV.L. The Primary and Low Benefits Estimates used the values at the low end of the ranges estimated by EPA, while the High Benefits Estimate uses the values at the high end of the ranges.
†† Total benefits for both the 3-percent and 7-percent cases are derived using the series corresponding to the average SCC with a 3-percent discount rate ($40.0/metric ton case). In the rows labeled "7% plus CO_2 range" and "3% plus CO_2 range," the operating cost and NO_X benefits are calculated using the labeled discount rate, and those values are added to the full range of CO_2 values.
††† The lower value of the range represents costs associated with the Sourced Components conversion cost scenario. The upper value represents costs for the Fabricated Components scenario.
†††† Total benefits for both the 3 percent and 7 percent cases are derived using the series corresponding to the average SCC with 3 percent discount rate. In the rows labeled "7% plus CO2 range" and "3% plus CO2 range," the operating cost and NOx benefits are calculated using the labeled discount rate, and those values are added to the full range of CO2 values. Manufacturer Conversion Costs are not included in the net benefits calculations.

VI. Procedural Issues and Regulatory Review

A. Review Under Executive Orders 12866 and 13563

Section 1(b)(1) of Executive Order 12866, "Regulatory Planning and Review," 58 FR 51735 (Oct. 4, 1993), requires each agency to identify the problem that it intends to address, including, where applicable, the failures of private markets or public institutions that warrant new agency action, as well as to assess the significance of that problem. The problems that the amended standards for commercial prerinse spray valves are intended to address are as follows:

1) Insufficient information and the high costs of gathering and analyzing relevant information leads some consumers to miss opportunities to make cost-effective investments in energy efficiency.
2) In some cases the benefits of more efficient products are not realized due to misaligned incentives between purchasers and users. An example of such a case is when the product purchase decision is made by a building contractor or building owner who does not pay the energy costs.
3) There are external benefits resulting from improved energy efficiency of commercial prerinse spray valves that are not captured by the users of such products. These benefits include externalities related to public health, environmental protection and national energy security that are not reflected in energy prices, such as reduced emissions of air pollutants and greenhouse gases that impact human health and global warming. DOE attempts to qualify some of the external benefits through use of social cost of carbon values.

The Administrator of the Office of Information and Regulatory Affairs (OIRA) in the OMB has determined that this regulatory action is not a significant regulatory action under section (3)(f) of Executive Order 12866. Section 6(a)(3)(A) of the Executive Order states that absent a material change in the development of the planned regulatory action, regulatory action not designated as significant will not be subject to review under section 6(a)(3) unless, within 10 working days of receipt of DOE's list of planned regulatory actions, the Administrator of OIRA notifies the agency that OIRA has determined that a planned regulation is a significant regulatory action within the meaning of the Executive order. Accordingly, DOE is not submitting this final rule for review by OIRA.

In addition, the Administrator of OIRA has determined that this regulatory action is not an "economically" significant regulatory action under section (3)(f)(1) of Executive Order 12866. Accordingly, pursuant to section 6(a)(3)(C) of the Order, DOE has provided to OIRA an assessment, including the underlying analysis, of benefits and costs anticipated from the regulatory action, together with, to the extent feasible, a quantification of those costs; and an assessment, including the underlying analysis, of costs and benefits of potentially effective and reasonably feasible alternatives to the planned regulation, and an explanation why the planned regulatory action is preferable to the identified potential alternatives. These assessments can be found in the technical support document for this rulemaking.DOE has also reviewed this regulation pursuant to Executive Order 13563, issued on January 18, 2011. 76 FR 3281 (Jan. 21, 2011). Executive Order 13563 is supplemental to and explicitly reaffirms the principles, structures, and definitions governing regulatory review established in Executive Order 12866. To the extent permitted by law, agencies are required by Executive Order 13563 to: (1) propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs (recognizing that some benefits and costs are difficult to quantify); (2) tailor regulations to impose the least burden on society, consistent with obtaining regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations; (3) select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity); (4) to the extent feasible, specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt; and (5) identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public.

DOE emphasizes as well that Executive Order 13563 requires agencies to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. In its guidance, OIRA has emphasized that such techniques may include identifying changing future compliance costs that might result from technological innovation or anticipated behavioral changes. For the reasons stated in the preamble, DOE believes that this final rule is consistent with these principles, including the requirement that, to the extent permitted by law, benefits justify costs and that net benefits are maximized.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 et seq.) requires preparation of an final regulatory flexibility analysis (FRFA) for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. 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 website (http://energy.gov/gc/office-general-counsel). DOE has prepared the following FRFA for the products that are the subject of this rulemaking.

For manufacturers of commercial prerinse spray valves, the Small Business Administration (SBA) has set a size threshold, which defines those entities classified as "small businesses" for the purposes of the statute. DOE used the SBA's small business size standards to determine whether any small entities would be subject to the requirements of the rule. See 13 CFR part 121. The size standards are listed by North American Industry Classification System (NAICS) code and industry description and are available at http://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf. Manufacturing of commercial prerinse spray valves is classified under NAICS 332919, "Other Metal Valve and Pipe Fitting Manufacturing." The SBA sets a threshold of 500 employees or less for an entity to be considered as a small business for this category.

1. Statement of the Need for, and Objectives of, the Rule

A statement of the need for, and objectives of, the rule is stated elsewhere in the preamble and not repeated here.

2. Statement of the Significant Issues Raised by Public Comments

DOE received no comments specifically on the initial regulatory flexibility analysis prepared for this rulemaking. Comments on the economic impacts of the rule are discussed elsewhere in the preamble and did not necessitate changes to the analysis required by the Regulatory Flexibility Act.

3. Response to Comments Submitted by the Small Business Administration

The Small Business Administration did not file any comments on the proposed rule.

4. Description on Estimated Number of Small Entities Regulated

To estimate the number of small businesses that could be impacted by the amended energy conservation standards, DOE conducted a market survey using public information to identify potential small manufacturers. DOE reviewed the DOE's CCMS database, EPA's WaterSense program database, individual company websites, and various marketing research tools (e.g., Hoover's reports) to create a list of companies that import, assemble, or otherwise manufacture commercial prerinse spray valves covered by this rulemaking. DOE screened out companies that do not offer products covered by this rulemaking, do not meet the definition of a “small business,” or are foreign-owned and operated.

DOE identified 13 commercial spray valve manufacturers selling commercial prerinse spray valves in the United States, 9 of which are small businesses.

5. Description and Estimate of Compliance Requirements

The nine small domestic commercial prerinse spray valve manufacturers account for approximately 83 percent of commercial spray valve basic models currently on the market. The remaining 17 percent of commercial spray valve spray basic models currently on the market are offered by four large manufacturers.

Using basic model counts, DOE estimated the distribution of industry conversion costs between small manufacturers and large manufacturers. Using its count of manufacturers, DOE calculated capital conversion costs (under both capital conversion costs scenarios, Table VI.1) and product conversion costs (Table VI.2) for an average small manufacturer versus an average large manufacturer. To provide context, DOE presents the conversion costs relative to annual revenue and annual operating profit under the standard level for the two capital conversion cost scenarios considered in the MIA, as shown in Table VI.3 and

Table VI.4. The current annual revenue and annual operating profit estimates are derived from the GRIM’s industry revenue calculations and the market share breakdowns of small versus large manufacturers. Due to the lack of direct market share data for individual manufacturers, DOE used basic model counts as a percent of total basic models currently available on the market as a proxy for market share.

Table VI.1 Comparison of Typical Small and Large Manufacturer's Capital Conversion Costs*

Trial Standard Level	Sourced Components Capital Conversion Costs Scenario		Fabricated Components Capital Conversion Costs Scenario	
	Capital Conversion Costs for Typical Small Manufacturer	Capital Conversion Costs for Typical Large Manufacturer	Capital Conversion Costs for Typical Small Manufacturer	Capital Conversion Costs for Typical Large Manufacturer
	2014$ millions	2014$ millions	2014$ millions	2014$ millions
TSL 1	$0.05	$0.02	$0.07	$0.03
TSL 2	$0.06	$0.03	$0.09	$0.03
TSL 3	$0.03	$0.02	$0.05	$0.02
TSL 4	$0.08	$0.03	$0.12	$0.04
TSL 4a	$0.06	$0.02	$0.09	$0.03

*Capital conversion costs are the capital investments made during the 3-year period between the publication of the final rule and the first year of compliance with the amended standard.

Table VI.2 Comparison of Typical Small and Large Manufacturer's Product Conversion Costs*

Trial Standard Level	Product Conversion Costs for Typical Small Manufacturer 2014$ millions	Product Conversion Costs for Typical Large Manufacturer 2014$ millions
TSL 1	$0.14	$0.07
TSL 2	$0.17	$0.08
TSL 3	$0.07	$0.05
TSL 4	$0.22	$0.10
TSL 4a	$0.18	$0.07

*Product conversion costs are the R&D and other product development investments made during the 3-year period between the publication of the final rule and the first year of compliance with the amended standard.

Table VI.3 Comparison of Conversion Costs for an Average Small and an Average Large Manufacturer at TSL 3 – Sourced Components Capital Conversion Costs Scenario

	Capital Conversion Cost 2014$ millions	Product Conversion Cost 2014$ millions	Conversion Costs / Conversion Period Revenue*	Conversion Costs / Conversion Period Operating Profit*
Small Manufacturer	$0.03	$0.07	4%	39%
Large Manufacturer	$0.02	$0.05	5%	47%

* The conversion period, the time between the final rule publication year and the first year of compliance for this rulemaking, is 3 years.

Table VI.4 Comparison of Conversion Costs for an Average Small and an Average Large Manufacturer at TSL 3 – Fabricated Components Capital Conversion Costs Scenario

	Capital Conversion Cost 2014$ millions	Product Conversion Cost 2014$ millions	Conversion Costs / Conversion Period Revenue*	Conversion Costs / Conversion Period Operating Profit*
Small Manufacturer	$0.05	$0.07	7%	70%
Large Manufacturer	$0.02	$0.05	6%	58%

* The conversion period, the time between the final rule publication year and the first year of compliance for this rulemaking, is 3 years.

At the established standard level, depending on the capital conversion cost scenario, DOE estimates total conversion costs for an average small manufacturer to range from $30,000 to $50,000 for the Sourced Components Capital Conversion Costs scenario and the Fabricated Components Capital Conversion Costs scenario, respectively. This suggests that an average small manufacturer would need to reinvest roughly 39 percent to 70 percent of its operating profit per year over the conversion period to comply with standards. Depending on the capital conversion cost scenario, the total conversion costs for an average large manufacturer range from $16,000 to $19,000 for the Sourced Components Capital Conversion Costs scenario and the Fabricated Components Capital Conversion Costs scenario, respectively. This suggests that an average large manufacturer would need to reinvest roughly 47 percent to 58 percent of its commercial prerinse spray valve-related operating profit per year over the 3-year conversion period.

6. Description of Steps to Minimize Impacts to Small Businesses.

The discussion in the previous section analyzes impacts on small businesses that would result from DOE's final rule, represented by TSL 3. In reviewing alternatives to the final rule, DOE examined energy conservation standards set at both higher and lower efficiency levels.

With respect to TSL 4, DOE estimated that while there would be significant consumer benefits from the projected energy savings of 0.18 quads of energy and 208.06 billion gallons of water (ranging from $1.25 billion using a 7-percent discount rate to $2.57 billion using a 3-percent discount rate), along with emissions reductions and positive LCC savings, the standards could result in an INPV reduction of $2.4 million to $1.5 million. DOE determined that this INPV reduction would outweigh the potential benefits. (See also the description of DOE's sensitivity case of TSL4a in section V.C.)

With respect to TSL 1 and TSL 2, EPCA requires DOE to establish standards at the level that would achieve the maximum improvement in energy efficiency that is technologically feasible and economically justified. Based on its analysis, DOE concluded that TSL 3 achieves the maximum improvement in energy efficiency that is technologically feasible and economically justified. Therefore, DOE did not establish standards at the levels considered at TSL 1 and TSL 2 because DOE determined that higher levels were technologically feasible and economically justified. DOE's analysis also shows that TSL 1 and TSL 2 would not reduce the impacts on small business manufacturers because there are more products that require redesign at TSL 1 and TSL 2 than at TSL 3. Therefore, TSL 3 results in lower impacts on small businesses than TSL 1 and TSL 2.

In summary, DOE concluded that establishing standards at TSL 3 balances the benefits of the energy savings and the NPV benefits to consumers at TSL 3 with the potential burdens placed on manufacturers, including small business manufacturers. . Accordingly, DOE is declining to adopt the other TSLs considered in the analysis, or the other policy alternatives detailed as part of the regulatory impacts analysis included in chapter 17 of the final rule TSD.

Additional compliance flexibilities may be available through other means. For example, individual manufacturers may petition for a waiver of the applicable test procedure. 10 CFR 431.401 Further, EPCA provides that a manufacturer whose annual gross revenue from all of its operations does not exceed $8 million may apply for an exemption from all or part of an energy conservation standard for a period not longer than 24 months after the effective date of a final rule establishing the standard. Additionally, Section 504 of the Department of Energy Organization Act, 42 U.S.C. 7194, provides authority for the Secretary to adjust a rule issued under EPCA in order to prevent "special hardship, inequity, or unfair distribution of burdens" that may be imposed on that manufacturer as a result of such rule. Manufacturers should refer to 10 CFR part 430, subpart E, and part 1003 for additional details.

C. Review Under the Paperwork Reduction Act

Manufacturers of commercial prerinse spray valves must certify to DOE that their products comply with any applicable energy conservation standards. In certifying compliance, manufacturers must test their products according to the DOE test procedures for commercial prerinse spray valves, including any amendments adopted for those test procedures. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including commercial prerinse spray valves. 76 FR 12422 (March 7, 2011); 80 FR 5099 (Jan. 30, 2015). The collection of information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement has been approved by OMB under OMB Control Number 1910-1400. Public reporting burden for the certification is estimated to average 30 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB Control Number.

D. Review Under the National Environmental Policy Act of 1969

Pursuant to the National Environmental Policy Act (NEPA) of 1969, DOE has determined that the rule fits within the category of actions included in Categorical

Exclusion (CX) B5.1 and otherwise meets the requirements for application of a CX. See 10 CFR Part 1021, appendix B, B5.1(b); 1021.410(b) and appendix B, B(1)-(5. The rule fits within this category of actions because it is a rulemaking that establishes energy conservation standards for consumer products or industrial equipment, and for which none of the exceptions identified in CX B5.1(b) apply. Therefore, DOE has made a CX determination for this rulemaking, and DOE does not need to prepare an Environmental Assessment or Environmental Impact Statement for this rule. DOE's CX determination for this rule is available at http://cxnepa.energy.gov/.

E. Review Under Executive Order 13132

Executive Order 13132, "Federalism." 64 FR 43255 (Aug. 10, 1999) imposes certain requirements on Federal 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. DOE has examined this rule and has determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the products that are the subject of this final rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297) Therefore, no further action is required by 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," 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; (3) provide a clear legal standard for affected conduct rather than a general standard; and (4) promote simplification and burden reduction. 61 FR 4729 (Feb. 7, 1996). 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, this final rule meets the relevant standards of Executive Order 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector (Pub. L. 104-4, sec. 201, codified at 2 U.S.C. 1531). For a regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a "significant intergovernmental mandate," and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820. DOE's policy statement is also available at http://energy.gov/sites/prod/files/gcprod/documents/umra_97.pdf.

DOE has concluded that this final rule will not require expenditures of $100 million or more in any one year in the private sector.

Section 202 of UMRA authorizes a Federal agency to respond to the content requirements of UMRA in any other statement or analysis that accompanies the final rule. (2 U.S.C. 1532(c)) The content requirements of section 202(b) of UMRA relevant to a private sector mandate substantially overlap the economic analysis requirements that apply under section 325(o) of EPCA and Executive Order 12866. The **SUPPLEMENTARY INFORMATION** section of this document and the final rule TSD chapter 17, the "Regulatory Impact Analysis," for this final rule respond to those requirements.

Under section 205 of UMRA, the Department is obligated to identify and consider a reasonable number of regulatory alternatives before promulgating a rule for which a written statement under section 202 is required. (2 U.S.C. 1535(a)) DOE is required to select from those alternatives the most cost-effective and least burdensome alternative that achieves the objectives of the rule unless DOE publishes an explanation for doing otherwise, or the selection of such an alternative is inconsistent with law. As required by 42 U.S.C. 6295(o) and (dd), this final rule would establish amended energy conservation standards for commercial prerinse spray valves that are designed to achieve the maximum improvement in energy efficiency that DOE has determined to be both technologically feasible and economically justified. A full discussion of the alternatives considered by DOE is presented in chapter 17 of the final rule TSD, "Regulatory Impact Analysis."

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

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

Pursuant to Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights" 53 FR 8859 (March 18, 1988), DOE has determined that this rule would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

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 Federal agencies to review most disseminations of information to the public under information quality 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 this 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 at OMB, a Statement of Energy Effects for any significant energy action. A "significant energy action" is defined as any action by an agency that promulgates or is expected to lead to promulgation of a final rule, and that: (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

DOE has concluded that this regulatory action, which sets forth amended energy conservation standards for commercial prerinse spray valves, is not a significant energy action because the standards are not likely to have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as such by the Administrator at OIRA. Accordingly, DOE has not prepared a Statement of Energy Effects on this final rule.

L. Review Under the Information Quality Bulletin for Peer Review

On December 16, 2004, OMB, in consultation with the Office of Science and Technology Policy (OSTP), issued its Final Information Quality Bulletin for Peer Review (the Bulletin). 70 FR 2664 (Jan. 14, 2005). The Bulletin establishes that certain scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal Government, including influential scientific information related to agency regulatory actions. The purpose of the bulletin is to enhance the quality and credibility of the Government's scientific information. Under the Bulletin, the energy conservation standards rulemaking analyses are "influential scientific information," which the Bulletin defines as "scientific information the agency reasonably can determine will have, or does have, a clear and substantial impact on important public policies or private sector decisions." Id. at FR 2667.

In response to OMB's Bulletin, DOE conducted formal in-progress peer reviews of the energy conservation standards development process and analyses and has prepared a Peer Review Report pertaining to the energy conservation standards rulemaking analyses. Generation of this report involved a rigorous, formal, and documented evaluation using objective criteria and qualified and independent reviewers to make a judgment as to the technical/scientific/business merit, the actual or anticipated results, and the productivity and management effectiveness of programs and/or projects. The "Energy Conservation Standards Rulemaking Peer Review Report" dated February 2007 has been disseminated and is available at the following web site: www1.eere.energy.gov/buildings/appliance_standards/peer_review.html.

M. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of this rule prior to its effective date. 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(2).

VII. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this final rule.

List of Subjects in 10 CFR part 429

Administrative practice and procedure, Confidential business information, Energy conservation, Household appliances, Reporting and recordkeeping requirements.

List of Subjects in 10 CFR part 431

Administrative practice and procedure, Confidential business information, Energy conservation test procedures, Incorporation by reference, and Reporting and recordkeeping requirements.

Issued in Washington, DC, on December 29, 2015.

David J. Friedman
Principal Deputy Assistant Secretary
Energy Efficiency and Renewable Energy

For the reasons stated in the preamble, DOE amends parts 429 and 431 of chapter II of Title 10, Code of Federal Regulations as set forth below.

PART 429 --- CERTIFICATION, COMPLIANCE, AND ENFORCEMENT FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT

1. The authority citation for part 429 continues to read as follows:

Authority: 42 U.S.C.6291-6317.

2. Section 429.51(b) is revised to read as follows:

§429.51 Commercial prerinse spray valves.

* * * * *

(b) Certification reports. (1) The requirements of §429.12 are applicable to commercial prerinse spray valves; and

(2) Pursuant to §429.12(b)(13), a certification report must include the following public product-specific information: The flow rate, in gallons per minute (gpm), rounded to the nearest 0.01 gpm, and the corresponding spray force, in ounce-force (ozf), rounded to the nearest 0.1 ozf.

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

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

Authority: 42 U.S.C.6291–6317.

4. Section 431.266 is revised to read as follows:

§431.266 Energy conservation standards and their effective dates.

(a) Commercial prerinse spray valves manufactured on or after January 1, 2006 and before **[INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, shall have a flow rate of not more than 1.6 gallons per minute. For the purposes of this standard, a commercial prerinse spray valve is a handheld device designed and marketed for use with commercial dishwashing and ware washing equipment that sprays water on dishes, flatware, and other food service items for the purpose of removing food residue before cleaning the items.

(b) Commercial prerinse spray valves manufactured on or after [**INSERT DATE 3 YEARS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**] shall have a flow rate that does not exceed the following:

Product Class (spray force in ounce-force, ozf)	**Flow Rate gallons per minute, gpm**
Product Class 1 (≤5.0 ozf)	1.00
Product Class 2 (>5.0 ozf and ≤8.0 ozf)	1.20
Product Class 3 (>8.0 ozf)	1.28

(1) For the purposes of this standard, the definition of commercial prerinse spray valve in §431.262 applies.

(2) Reserved

Note: The following letter will not appear in the Code of Federal Regulations.

U.S. Department of Justice
Antitrust Division
William J. Baer
Assistant Attorney General
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September 4, 2015

Anne Harkavy, Esq.
Deputy General Counsel for Litigation
1000 Independence Ave. S.W.
U.S. Department of Energy Washington, DC 20585

Re: Energy Conservation Standards for Commercial Prerinse Spray Valves Doc. No. EERE-2014-BT-STD-0027

Dear Deputy General Counsel Harkavy:

I am responding to your July 9, 2015, letter seeking the views of the Attorney General about the potential impact on competition of proposed energy standards for commercial prerinse spray valves.

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)(2)(B)(i)(V), which required 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 our analysis, the Antitrust Division examines whether a proposed standard may lessen competition, for example, by substantially limiting consumer choice or increasing industry concentration. A lessening of competition could result in higher prices to manufacturers and consumers.

We have reviewed the proposed standards contained in the Notice of Proposed Rulemaking (80 Fed. Reg. 39,486-39,539, July 9, 2015) and the related Technical

Support Documents. We have also listened to, and reviewed materials from, the public meeting held on July 28, 201 5. Further, we have talked to various industry representatives to determine their position regarding the proposed standards potential effect on competition. Based on this review, our conclusion is that the proposed energy conservation standards for commercial prerinse spray valves are unlikely to have a significant adverse impact on competition.

Sincerely,

William J. Baer