

CHAPTER 1. INTRODUCTION

TABLE OF CONTENTS

1.1	PURPOSE OF THE DOCUMENT	1-1
1.2	OVERVIEW OF COMMERCIAL EQUIPMENT STANDARDS.....	1-1
1.3	OVERVIEW OF BEVERAGE VENDING MACHINE STANDARDS.....	1-3
1.4	STRUCTURE OF THE DOCUMENT.....	1-6

LIST OF TABLES

Table 1.3.1	Beverage Vending Machine Analyses.....	1-5
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CHAPTER 1. INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This technical support document (TSD) is a stand-alone report that documents the technical analyses and results in support of the information presented in the Advance Notice of Proposed Rulemaking (ANOPR) for establishing energy conservation standards for beverage vending machines (BVM).

1.2 OVERVIEW OF COMMERCIAL EQUIPMENT STANDARDS

Part B of Title III of the Energy Policy and Conservation Act (EPCA) sets forth provisions designed to improve the energy efficiency of various products and equipment. Part B of Title III provides for the “Energy Conservation Program for Consumer Products Other Than Automobiles.” (42 U.S.C. 6291–6309)

The National Energy Conservation Policy Act (NECPA) amended EPCA to add Part C of Title III (42 U.S.C. 6311-6317), which established an energy conservation program for certain industrial equipment. Part C provides for a program similar to Part B. The Energy Policy Act of 1992 (EPACT 1992), Public Law 102-486, included amendments to EPCA that expanded Title III to include additional commercial equipment. The Energy Policy Act of 2005 (EPACT 2005), Public Law 109-58, updates several existing standards and test procedures; prescribes definitions, standards, and test procedures for certain new covered products and commercial equipment; and mandates that the Secretary of Energy (the Secretary) commence rulemakings to develop test procedures and standards for certain new covered products and commercial equipment.

Due to what appears to be an error in legislative drafting, EPACT 2005 includes provisions dealing with definitions, test procedures, and energy conservation standards relating to several types of commercial equipment, including beverage vending machines, in a section that amends sections 321, 323, and 325 of Part B of Title III of EPCA (42 U.S.C. 6291, 6293, and 6295, respectively) for consumer products. DOE anticipates that this error will be corrected through legislation, and that the provisions will become amendments to Part C of Title III of EPCA for “Certain Industrial Equipment.” 70 FR 60407 (October 18, 2005). Consistent with its previous action to incorporate the EPACT 2005 requirements for commercial equipment into Title 10 of the Code of Federal Regulations (CFR), Part 431, which covers that type of equipment, DOE intends to place the new requirements for beverage vending machines in Part 431.

Section 135(c)(4) of EPACT 2005 amends section 325 of EPCA by adding, in part, new subsections 325(v)(2), (3), and (4) (42 U.S.C. 6295(v)(2), (3) and (4)), which direct the Secretary to issue by rule, no later than August 8, 2009, energy conservation standards for refrigerated bottled or canned beverage vending machines. Such standards shall apply to beverage vending machines manufactured three years after the date of publication of a final rule that establishes energy conservation standards for that equipment.

Under EPCA, when the U.S. Department of Energy (DOE) studies new or amended standards, it must consider, to the greatest extent practicable:

- (1) the economic impact of the standard on the manufacturers and consumers of the affected products;
- (2) the savings in operating costs throughout the estimated average life of the product compared to any increases in the initial cost or maintenance expense;
- (3) the total projected amount of energy savings likely to result directly from the imposition of the standard;
- (4) any lessening of the utility or the performance of the products likely to result from the imposition of the standard;
- (5) the impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the imposition of the standard;
- (6) the need for national energy conservation; and
- (7) other factors the Secretary considers relevant (42 U.S.C. 6295 (o)(2)(B)(i) and 42 U.S.C. 6316(e), added by section 136(h)(3) of EPACT 2005).

Other statutory requirements are set forth in 42 U.S.C. 6295 (o)(1)–(2)(A), (2)(B)(ii)–(iii), and (3)–(4) and 42 U.S.C. 6316(a)(1)–(3), and (e).

DOE considers stakeholder participation to be a very important part of the process for setting energy conservation standards. DOE actively encourages the participation and interaction of all stakeholders during the comment period in each stage of the rulemaking. Beginning with the Framework Document and during subsequent comment periods, interaction among stakeholders provides a balanced discussion of the information that is required for the standards rulemaking.

In conducting the energy conservation standards rulemakings, DOE involves stakeholders through formal public notifications (i.e., *Federal Register* notices). For this BVM energy conservation standards rulemaking, DOE will employ the procedures set forth in DOE's Process Rule (Procedures for Consideration of New or Revised Energy Conservation Standards for Consumer Products, 61 FR 36974, July 15, 1996, 10 CFR Part 430, Subpart C, Appendix A) to the extent they are appropriate for developing energy conservation standards for the BVM equipment covered under this rulemaking.

Although the Process Rule specifically applies only to the development of energy-efficiency standards for consumer products, DOE has decided to apply its procedures to the development of energy conservation standards for commercial and industrial equipment such as the BVMs as well. See appendix A to subpart C of Title 10 of the Code of Federal Regulations, Part 430 (10 CFR Part 430).

Before DOE determines whether to adopt a proposed energy conservation standard, it must first solicit comments on the proposed standard. Any new or amended standard must be designed to achieve significant additional conservation of energy and be technologically feasible and economically justified. (42 U.S.C. 6295(o)(3)(B) as directed by 42 U.S.C. 6316(a)(1) through (3)) To determine whether economic justification exists, DOE must review comments on the proposal and determine that the benefits of the proposed standard exceed its burdens to the greatest extent practicable, weighing the seven factors listed above.

Subsequent to the publication of the Framework Document, the standards rulemaking process involves three additional public notices, which are published in the *Federal Register*. The first of the rulemaking notices is an ANOPR, which is designed to publicly vet the models and tools used in the rulemaking and to facilitate public participation before the proposed rule stage. The second notice is a Notice of Proposed Rulemaking (NOPR), which presents a discussion of comments received in response to the ANOPR; analysis of the impacts of standards on customers, manufacturers, and the Nation; DOE's weighing of the impacts; and the proposed standards. The third notice is the Final Rule, which presents a discussion of comments received in response to the NOPR; the revised analysis of the impacts of standards; DOE's weighing of the impacts; the standards adopted by DOE; and the effective dates of the standards.

1.3 OVERVIEW OF BEVERAGE VENDING MACHINE STANDARDS

As mentioned above, EPACT 2005 amends section 325 of EPCA by adding subsections that direct the Secretary to issue energy conservation standards for refrigerated bottled or canned beverage vending machines. Such standards shall apply to beverage vending machines manufactured three years after the date of publication of a final rule that establishes energy conservation standards for that equipment.

Additionally, section 135(b) of EPACT 2005 amends section 323 of EPCA by adding, in part, new subsections 323(b)(15) (42 U.S.C. 6293(b)(15)) and 323(f) (42 U.S.C. 6293(f)), which, respectively, state that the test procedure for refrigerated bottled or canned beverage vending machines shall be based on American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 32.1-2004, "Methods of Testing for Rating Vending Machines for Bottled, Canned or Other Sealed Beverages," and that the Secretary has until August 8, 2007, to prescribe that new test procedure.

Section 135(a)(3) of EPACT 2005 amends section 321 of EPCA by adding, in part, new subsection 321(40) (42 U.S.C. 6291(40)), which establishes the following definition:

The term "refrigerated bottled or canned beverage vending machine" means a commercial refrigerator that cools bottled or canned beverages and dispenses the bottled or canned beverages on payment.

In addition, section 136(a)(3) of EPACT 2005 amends section 340 of EPCA by replacing subsection 340(9) (42 U.S.C. 6311(9)) with, in part, definitions for the following terms relating to commercial refrigeration equipment that are relevant to beverage vending machines:

“(9)(A) The term ‘commercial refrigerator, freezer, and refrigerator-freezer’ means refrigeration equipment that—

“(i) is not a consumer product (as defined in section 321);

“(ii) is not designed and marketed exclusively for medical, scientific, or research purposes;

“(iii) operates at a chilled, frozen, combination chilled and frozen, or variable temperature;

“(iv) displays or stores merchandise and other perishable materials horizontally, semivertically, or vertically;

“(v) has transparent or solid doors, sliding or hinged doors, a combination of hinged, sliding, transparent, or solid doors, or no doors;

“(vi) is designed for pull-down temperature applications or holding temperature applications; and

“(vii) is connected to a self-contained condensing unit or to a remote condensing unit.

“(B) The term ‘holding temperature application’ means a use of commercial refrigeration equipment other than a pull-down temperature application, except a blast chiller or freezer.

* * *

“(D) The term ‘pull-down temperature application’ means a commercial refrigerator with doors that, when fully loaded with 12 ounce beverage cans at 90 degrees F, can cool those beverages to an average stable temperature of 38 degrees F in 12 hours or less.

“(E) The term ‘remote condensing unit’ means a factory-made assembly of refrigerating components designed to compress and liquefy a specific refrigerant that is remotely located from the refrigerated equipment and consists of one or more refrigerant compressors, refrigerant condensers, condenser fans and motors, and factory supplied accessories.

“(F) The term ‘self-contained condensing unit’ means a factory-made assembly of refrigerating components designed to compress and liquefy a specific refrigerant that is an integral part of the refrigerated equipment and consists of one or more refrigerant compressors, refrigerant condensers, condenser fans and motors, and factory supplied accessories.”

In June 2006, DOE published a *Rulemaking Framework for Refrigerated Bottled or Canned Beverage Vending Machines* describing the procedural and analytical approaches DOE anticipated using to evaluate the establishment of energy conservation standards for BVMs. This document is available at http://www.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/vending_machines_framework.pdf.

DOE held a public meeting on July 11, 2006, to discuss procedural and analytical approaches to the rulemaking and to facilitate stakeholder involvement in the rulemaking process. The analytical framework presented at the public meeting described different analyses, such as the engineering analysis and the life-cycle cost (LCC) and payback period (PBP) analyses, the methods proposed for conducting them, and the relationships among the various analyses. See Table 1.3.1 for all the analyses discussed at the public meeting to be undertaken in each of the formal public rulemaking documents.

Table 1.3.1 Beverage Vending Machine Analyses

ANOPR	NOPR	Final Rule*
Market and technology assessment	Revised ANOPR analyses	Revised NOPR analyses
Screening analysis	Life-cycle cost sub-group analysis	
Engineering analysis	Manufacturer impact analysis	
Energy use characterization	Utility impact analysis	
Markups to determine equipment price	Employment impact analysis	
Life-cycle cost and payback period analyses	Environmental assessment	
Shipments analysis	Regulatory impact analysis	
National impact analysis		
Preliminary manufacturer impact analysis		

* During the Final Rule phase, DOE considers the comments submitted by the U.S. Department of Justice in the NOPR phase concerning the impact of any lessening of competition that is likely to result from the imposition of the standard. (42 U.S.C. 6295(o)(2)(B)(v))

During the July 11, 2006, public meeting, stakeholders discussed their concerns regarding the BVM rulemaking. Stakeholder comments submitted during the Framework Document comment period elaborated upon the issues raised at the public meeting. DOE worked with its contractors to address these issues in the analyses.

As part of the information gathering and sharing process, DOE organized and held interviews with BVM manufacturers. DOE had four objectives for these interviews: (1) solicit feedback on the draft engineering analysis (including methodology, production costs, manufacturing processes, and findings); (2) solicit feedback on topics related to the preliminary manufacturer impact analysis; (3) provide an early opportunity to express specific concerns to DOE; and (4) foster cooperation between the manufacturers and DOE.

Six topics related to the preliminary manufacturer impact analysis were discussed during the interviews: (1) general key issues, (2) BVM shipment projections, (3) capital conversion costs, (4) product mix and profitability, (5) market shares and industry consolidation, and (6) cumulative regulatory burden.

DOE incorporated the information gathered at the meetings into its engineering analysis (see Chapter 5) and the preliminary manufacturer impact analysis (see Chapter 12). Following the publication of the ANOPR and the ANOPR public meeting, DOE intends to hold additional

meetings with manufacturers as part of the consultative process for the manufacturer impact analysis conducted during the NOPR phase.

DOE conducted the LCC and PBP analyses based on an approach that establishes an annual energy expense using electric utility tariffs. Under this approach, LCC results are based on the assumption that manufacturing plants and commercial building customers in the future will face electricity rates similar to those in today's electricity markets.

DOE developed spreadsheets for the LCC, PBP, and national impact analyses to meet the objectives of the Process Rule. A spreadsheet tool that demonstrates the calculation of annual energy expenses based on commercial and industrial electric utility tariffs accompanies the LCC spreadsheet. DOE developed a national impact analysis spreadsheet that calculates the national energy savings (NES) and national net present values (NPVs) at various energy-efficiency levels. This spreadsheet includes a model that forecasts the impacts of energy-efficiency standards at various levels of BVM shipments.

DOE reviewed the recommendations made on April 21, 1998, by the Advisory Committee on Appliance Energy Efficiency Standards. (Advisory Committee, No. 96)^a These recommendations related to (1) using the full range of consumer marginal energy rates (CMERs) in the LCC analysis (replacing the use of national average energy prices), (2) defining a range of energy price futures for each fuel used in the economic analyses, and (3) defining a range of primary energy conversion factors and associated emission reductions based on the generation of energy and emissions that would be displaced by energy-efficiency standards for each rulemaking. As discussed above, DOE conducted the LCC analysis with electricity prices based on electric utility tariffs to capture the full range of CMERs. Thus, DOE incorporated the use of consumer marginal energy rates into the analysis. Also, DOE incorporated a range of future energy prices in the analysis.

1.4 STRUCTURE OF THE DOCUMENT

This ANOPR TSD outlines the analytical approaches used in this rulemaking. The TSD consists of 14 chapters, an environmental assessment, a regulatory impact analysis, and appendices.

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| Chapter 1 | Introduction: provides an overview of the appliance and equipment standards program and how it applies to the beverage vending machine rulemaking, and outlines the structure of the document. |
| Chapter 2 | Analytical Framework: describes the rulemaking process step by step. |

^a Advisory Committee, No. 96 refers to the recommendations of the Advisory Committee on Energy Efficiency Standards and is available for inspection at the U.S. Department of Energy, Forrestal Building, Room 1J-018 (Resource Room of the Building Technologies Program) in the file under "Energy Conservation Program for Consumer Products: Procedures for Consideration of New or Revised Energy Conservation Standards for Consumer Products," RIN [1904-AA83], as document number 96.

- Chapter 3 Market and Technology Assessment: characterizes the beverage vending machine market and the technologies available for increasing equipment efficiency.
- Chapter 4 Screening Analysis: determines which technology design options are viable for consideration in the engineering analysis.
- Chapter 5 Engineering Analysis: discusses the methods used for developing the relationship between increased manufacturer price and increased efficiency.
- Chapter 6 Markups to Determine Equipment Price: discusses the methods used for establishing markups for converting manufacturer prices to customer equipment prices.
- Chapter 7 Energy Use Characterization: discusses the process used for generating energy use estimates of beverage vending machines for a variety of equipment classes, climate locations, and standard levels.
- Chapter 8 Life-Cycle Cost and Payback Period Analyses: discusses the effects of standards on individual customers and users of the equipment and compares the LCC and PBP of equipment with and without higher efficiency standards.
- Chapter 9 Shipments Analysis: discusses the methods used for forecasting shipments with and without higher efficiency standards, including how equipment purchase decisions are economically influenced and modeled with econometric equations.
- Chapter 10 National Impact Analysis: discusses the methods used for forecasting national energy consumption and national economic impacts based on estimates of future equipment efficiency distributions and annual equipment shipments in the absence and presence of higher efficiency standards.
- Chapter 11 Life-Cycle Cost Sub-Group Analysis: discusses the effects of standards on a subgroup of beverage vending machine customers and compares the LCC and PBP of equipment with and without higher efficiency standards for these customers.
- Chapter 12 Manufacturer Impact Analysis: discusses the effects of standards on the finances and profitability of equipment manufacturers.
- Chapter 13 Utility Impact Analysis: discusses the effects of standards on the installed generation capacity of electric utilities.
- Chapter 14 Employment Impact Analysis: discusses the effects of standards on national employment.

Environmental Assessment for Beverage Vending Machines: discusses the effects of standards on airborne emissions of electric utilities.

Regulatory Impact Analysis for Beverage Vending Machines: discusses the impact of the present regulatory actions and of non-regulatory alternatives to setting energy-efficiency standards.

Appendix A Instructions for Using the Engineering Analysis Spreadsheet: accompanies Chapter 5, Engineering Analysis.

Appendix B Engineering Data: accompanies Chapter 5, Engineering Analysis.

Appendix C Detailed Data for Equipment Price Markups: accompanies Chapter 6, Markups for Equipment Price Determination.

Appendix D Methodology for developing the weighting factors for Beverage Vending Machines: accompanies Chapter 7, Energy Use Characterization.

Appendix E User Instructions for Life-Cycle Cost Spreadsheet: accompanies Chapter 8, Life-Cycle Cost and Payback Period Analyses.

Appendix F Detailed Life-Cycle Cost Output: accompanies Chapter 8, Life-Cycle Cost and Payback Period Analyses.

Appendix G User Instructions for National Energy Savings and Net Present Value Spreadsheet: accompanies Chapter 10, National Impact Analysis.

Appendix H Detailed National Energy Savings and National Net Present Value Output: accompanies Chapter 10, National Impact Analysis.