

CHAPTER 1. INTRODUCTION

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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 final rule for establishing energy conservation standards for beverage vending machines.

1.2 OVERVIEW OF COMMERCIAL EQUIPMENT STANDARDS

Title III of EPCA sets forth a variety of provisions designed to improve energy efficiency. Part A of Title III (42 U.S.C. 6291-6309) provides for the Energy Conservation Program for Consumer Products Other Than Automobiles. The amendments to EPCA contained in the Energy Policy Act of 2005 (EPACT 2005), Pub. L. 109-58, include new or amended energy conservation standards and test procedures for some of these products, and direct DOE to undertake rulemakings to promulgate such requirements. In particular, section 135(c)(4) of EPACT 2005 amends EPCA to direct DOE to prescribe energy conservation standards for beverage vending machines. (42 U.S.C. 6295(v))

Because of its placement in Part A of Title III of EPCA, the rulemaking for beverage vending machine energy conservation standards is bound by the requirements of 42 U.S.C. 6295. However, since beverage vending machines are commercial equipment, DOE intends to place the new requirements for beverage vending machines in Title 10 of the Code of Federal Regulations (CFR), Part 431 (“Energy Efficiency Program for Certain Commercial and Industrial Equipment”), which is consistent with DOE’s previous action to incorporate the EPACT 2005 requirements for commercial equipment. The location of the provisions within the CFR does not affect either their substance or applicable procedure, so DOE is placing them in the appropriate CFR part based on their nature or type and will refer to beverage vending machines as “equipment” throughout the rulemaking. Because of their placement into 10 CFR 431, beverage vending machines will be referred to as “equipment” throughout this rulemaking. The test procedures for beverage vending machines appear at Title 10 CFR sections 431.293 and 431.294.

EPCA provides criteria for prescribing new or amended standards for covered equipment. As indicated above, any new or amended standard for beverage vending machines must be designed to achieve the maximum improvement in energy efficiency that is technologically feasible and economically justified. (42 U.S.C. 6295(o)(2)(A) and (v)) However, EPCA precludes DOE from adopting any standard that would not result in significant conservation of energy. (42 U.S.C. 6295(o)(3) and (v)) Moreover, DOE may not prescribe a standard for certain equipment if no test procedure has been established for that equipment. (42 U.S.C. 6295(o)(3) and (v)) EPCA also provides that, in deciding whether a standard is economically justified, DOE must determine whether the benefits of the standard exceed its burdens after receiving comments on the proposed standard. (42 U.S.C. 6295(o)(2)(B)(i) and (v)) To the greatest extent practicable, DOE must consider the following seven factors:

1. The economic impact of the standard on manufacturers and consumers of the equipment subject to the standard;

2. The savings in operating costs throughout the estimated average life of the covered equipment in the type (or class) compared to any increase in the price, or in the initial charges for or maintenance expenses of the equipment likely to result from the imposition of the standard;
3. The total projected amount of energy savings likely to result directly from the imposition of the standard;
4. Any lessening of the utility or the performance of the covered equipment likely to result from the imposition of the standard;
5. The impact of any lessening of competition, as determined in writing by the Attorney General likely to result from the imposition of the standard;
6. The need for national energy conservation; and
7. Other factors the Secretary considers relevant.

DOE considers stakeholder participation to be a very important part of the process for setting energy conservation standards. Therefore, before DOE determines whether to adopt an energy conservation standard, it must first solicit comments on the proposed standard. Since any new or amended standard must be designed to achieve significant additional conservation of energy and be technologically feasible and economically justified, DOE must review comments on the proposal and determine that the benefits of the 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 advance notice of proposed rulemaking (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 NOPR, which presents a discussion of comments received in response to the ANOPR; analysis of the impacts of the energy conservation standard 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, EPCACT 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 EPCACT 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/American Society of Heating,

Refrigerating and Air-Conditioning Engineers 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 beverage vending machines. This document is available at 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, interested parties discussed their concerns regarding the beverage vending machine 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 beverage vending machine 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.

During the initial manufacturer interviews, six main topics related to the manufacturer impact analysis were discussed: (1) general key issues; (2) beverage vending machine 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 (chapter 5 of the TSD) and the manufacturer impact analysis (chapter 12 of the TSD).

Following the publication of the ANOPR, DOE scheduled additional interviews with manufacturers. These interviews contained follow-up questions on the ANOPR analyses and also contained topics related to the potential impact of energy conservation standards on manufacturers. Appendix J contains the questions used to conduct the manufacturer interviews that took place following the publication of the ANOPR. Following the publication of the NOPR and the NOPR public meeting, DOE intends to continue to solicit comments from manufacturers and other interested parties.

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. 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 conservation standards at various levels of beverage vending machine shipments.

DOE reviewed the recommendations made on April 21, 1998 by the Advisory Committee on Appliance Energy Efficiency Standards (Advisory Committee, No. 96), which 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. 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 conservation 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 final rule TSD outlines the analytical approaches used in this rulemaking. The TSD consists of 14 chapters, an environmental assessment, a regulatory impact analysis, and appendices.

- 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.
- 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 selling prices and increased efficiency.
- Chapter 6 Markups to Determine Equipment Price: Discusses 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 energy conservation standards on individual customers and users of the equipment and compares the LCC and PBP of equipment with and without higher energy conservation standards.
- Chapter 9 Trial Standard Levels: Discusses the trial standard levels and methods used to derive the energy consumption equations corresponding to the final energy conservation standards.
- Chapter 10 Shipments Analysis: Discusses the methods used for forecasting shipments with and without higher energy conservation standards, including how equipment purchase decisions are economically influenced and modeled with econometric equations.

- Chapter 11 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 energy conservation standards.
- Chapter 12 Life-Cycle Cost Sub-Group Analysis: Discusses the effects of energy conservation standards on a subgroup of beverage vending machine customers and compares the LCC and PBP of equipment with and without higher energy conservation standards for these customers.
- Chapter 13 Manufacturer Impact Analysis: Discusses the effects of energy conservation standards on the finances and profitability of equipment manufacturers.
- Chapter 14 Utility Impact Analysis: Discusses the effects of energy conservation standards on the installed generation capacity of electric utilities.
- Chapter 15 Employment Impact Analysis: Discusses the effects of energy conservation standards on national employment.
- Chapter 16 Environmental Assessment for Beverage Vending Machines: Discusses the effects of energy conservation standards on airborne emissions of electric utilities.
- Chapter 17 Regulatory Impact Analysis: Discusses the impact of the present regulatory actions and of non-regulatory alternatives to setting energy conservation 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.
- Appendix I Site-to-source Conversion: Accompanies chapter 11, National Impact Analysis.
- Appendix J Manufacturer Impact Analysis Interview Guides and Government Regulatory Impact Model: Accompanies chapter 13, Manufacturer Impact Analysis.
- Appendix K Utility Impacts: Accompanies chapter 14, Utilities Impact Analysis.