

## AGENCY

Office of Energy Efficiency and Renewable Energy,  
 Department of Energy

*Rule title*

Energy Conservation Program: Energy Conservation Standards for  
 Commercial Refrigeration Equipment

RIN	1904-AC19
Publication Date	September 11, 2013
Comment Period Closing Date	November 12, 2013
Stage	Proposed rule

## REGULATORY SCORING

	SCORE
<b>1. Systemic Problem:</b> How well does the analysis identify and demonstrate the existence of a market failure or other systemic problem the regulation is supposed to solve?	2/5
<b>2. Alternatives:</b> How well does the analysis assess the effectiveness of alternative approaches?	4/5
<b>3. Benefits (or Other Outcomes):</b> How well does the analysis identify the benefits or other desired outcomes and demonstrate that the regulation will achieve them? <sup>1</sup>	3/5
<b>4. Costs:</b> How well does the analysis assess costs?	4/5
<b>5. Use of Analysis:</b> Does the proposed rule or the RIA present evidence that the agency used the Regulatory Impact Analysis in any decisions?	4/5
<b>6. Cognizance of Net Benefits:</b> Did the agency maximize net benefits or explain why it chose another alternative?	5/5
<b>Total Score</b>	<b>22/30</b>

## SUMMARY

Under the authority of the Energy Policy and Conservation Act of 1975 (EPCA), the Department of Energy (DOE) is proposing new energy conservation standards for commercial refrigeration equipment, such as ice-cream freezers; self-contained commercial refrigerators, freezers, and refrigerator-freezers without doors; and remote condensing commercial refrigerators, freezers, and refrigerator-freezers. According to the DOE, these new, more stringent standards will lower energy use. This reduction in energy use will lower the costs of operating commercial refrigeration equipment and reduce the emissions of pollutants, such as carbon dioxide, sulfur dioxide, and mercury, which are generated in the production of electricity.

Unfortunately, the DOE's use of the Capital Asset Pricing Model assumes the risks and returns associated with refrigeration units is equal to the average risk and returns associated with all capital expenditures. By assuming the depreciation rate associated with refrigeration units is equal to the average depreciation rate of all capital, the DOE likely underestimates the discount rate on refrigeration equipment and therefore overestimates the private expected benefits of this rule. This error is the reason the DOE believes purchasers of refrigeration equipment are behaving irrationally when they are not. Because the estimated private benefits represent anywhere from 56 to 93 percent of the total benefits provided by the proposed rule, correcting this measurement error has the potential to result in a net negative welfare effect on users of refrigeration equipment.

1. Systemic Problem: How well does the analysis identify and demonstrate the existence of a market failure or other systemic problem the regulation is supposed to solve?	2		
Does the analysis identify a market failure or other systemic problem?	3	1A	According to the proposed rule, these new standards address the following failures of the private market: (1) lack of consumer information, (2) asymmetric information, and (3) externalities. There is no serious discussion on these points (NMPR, 55981).
Does the analysis outline a coherent and testable theory that explains why the problem (associated with the outcome above) is systemic rather than anecdotal?	3	1B	The theory is testable: lack of information and the costs of emissions not paid by either producers or consumers results in the use of refrigeration equipment that is less than efficient than would otherwise be the case. But the irrationality theory is questionable since the beneficiaries are profit-maximizing firms rather than fallible consumers.
Does the analysis present credible empirical support for the theory?	2	1C	There is little to no evidence that lack of information or asymmetric information is playing a role. Using FUND, DICE, and PAGE models, the agency presents evidence that emissions may be higher, but much of this evidence lacks a complete understanding of the risks faced by operators. The DOE is mostly interested in updating energy efficiency, as it has authority to do so.
Does the analysis adequately address the baseline? That is, what the state of the world is likely to be in the absence of federal intervention not just now but in the future?	2	1D	Since this regulation comes closely at the heels of another regulation issued in January 2009, the full impact of the regulation has not been felt by industry. Hence the baseline is assumed to be the same as the one for the 2009 regulation. However, there has been an expansion of the equipment classes (RIA, 5-4). If no new regulatory action is produced, zero net benefits are expected. This suggests a lack of understanding on how equipment operators will respond to expected future increases in energy prices (NMPR, 55976).
Does the analysis adequately assess uncertainty about the existence or size of the problem?	2	1E	Multiple values for the social cost of carbon reflect uncertainty about the size of the problem. There is no estimation on just how big the information gap is or the magnitude of asymmetric information. The analysis assumes the problem is large.
2. Alternatives: How well does the analysis assess alternative approaches?	4		
Does the analysis enumerate other alternatives to address the problem?	5	2A	Yes, the DOE enumerates three non-regulatory policy alternatives (one of which is no new regulatory action) and also lists alternative energy efficiency standards (trial standard levels).
Is the range of alternatives considered narrow (e.g., some exemptions to a regulation) or broad (e.g., performance-based regulation vs. command and control, market mechanisms, nonbinding guidance, information disclosure, addressing any government failures that caused the original problem)?	4	2B	The proposed rule assesses five different trial standard levels (TSLs) for each type of equipment. However, for all but the commercial refrigeration equipment, these proposed rules are command-and-control regulations with no consideration of other, market- or information-based alternatives. For commercial refrigeration equipment, however, the RIA discusses the following policy alternatives: (1) no change in standard, (2) customer rebates, (3) customer tax credits, (4) manufacturer tax credits, and (5) early replacement.

Does the analysis evaluate how alternative approaches would affect the amount of benefits or other outcome achieved?	5	2C	The proposed rule and the RIA provide great detail in their analysis of each trial standard level alternative. Estimates for all energy efficiency standards assume full compliance and provide net benefit figures. For nonregulatory alternatives, the DOE assumes 100 percent compliance is unlikely and energy savings and net present value are shown.
Does the analysis identify and quantify incremental costs of all alternatives considered?	3	2D	The proposed rule provides detailed information on the benefits and costs associated with each alternative, and thus the incremental costs can be calculated moving from one alternative to the next. The engineering analysis also looks at the incremental increases in equipment costs.
Does the analysis identify the alternative that maximizes net benefits?	5	2E	Yes, the “DOE contrasted the benefits and burdens of TSL 4 with those of TSL 3 because even though TSL 4 has higher energy savings than TSL 3, the customer NPV values at TSL 3 are higher than at TSL 4. The estimated energy savings at TSL 3 is 0.920 quads of energy, whereas at TSL 4 the energy savings are higher by about 9 percent at 1.001 quads. At TSL 3, DOE projects an increase in customer NPV of \$1.705 billion at a 7-percent discount rate, whereas at TSL 4 the customer NPV is lower by about 6 percent at \$1.606 billion, with the actual difference amounting to approximately \$99 million” (NPRM, 55981).
Does the analysis identify the cost-effectiveness of each alternative considered?	4	2F	Yes, a cost-effectiveness calculation using a life-cycle cost model is estimated for all TSLs and alternative polices for commercial refrigeration equipment.
<b>3. Benefits (or other Outcomes): How well does the analysis identify the benefits or other desired outcomes and demonstrate that the regulation will achieve them?</b>	<b>3</b>		
Does the analysis clearly identify ultimate outcomes that affect citizens’ quality of life?	4	3A	Principal benefits are customer cost savings and environmental benefits of reduced emissions. The DOE estimates lower energy use, which will lower electricity bills, and lower CO <sub>2</sub> emissions, which will reduce the estimated negative effects in “eight market and nonmarket sectors: agriculture, forestry, water, energy (based on heating and cooling demand), sea level rise (based on the value of land lost and the cost of protection), ecosystems, human health (diarrhea, vector-borne diseases, and cardiovascular and respiratory mortality), and extreme weather” (RIA, 14A-8).
Does the analysis identify how these outcomes are to be measured?	4	3B	Customer cost savings are calculated as the monetary value of energy savings. The value of reduced carbon emissions is calculated using estimates of the social cost of carbon. Nitrogen oxide emissions are also calculated. Reduction in other gases (sulfur dioxide, mercury, methane, and nitrous dioxide) are quantified but not monetized.
Does the analysis provide a coherent and testable theory showing how the regulation will produce the desired outcomes?	3	3C	By requiring firms to invest in more efficient—and costly—equipment upfront, operators will use less energy when operating the equipment. Since commercial refrigeration equipment operates 24 hours a day, the rebound effect is unlikely to be present.
Does the analysis present credible empirical support for the theory?	2	3D	The DOE’s RIA provides detailed evidence of lower energy use and emissions with the new equipment. Many assumptions are based on interviews with manufacturers. Experts between agencies and in the field were also consulted. Since customers are mostly firms, the DOE does not provide a strong price analysis. The DOE does not do any analysis of past regulations. The agency also does not discuss how behavior may change.

Does the analysis adequately assess uncertainty about the outcomes?	4	3E	Yes, the analysis addresses uncertainty by using different energy use values. The DOE uses a software package called “Crystal Ball” to generate probability distribution of life-cycle cost based on variability in key input parameters. Three different price forecasts, different economic growth scenarios, and different value of emission scenarios are used. Sensitivity analysis is also completed with a shorter time horizon of nine years.
Does the analysis identify all parties who would receive benefits and assess the incidence of benefits?	2	3F	The agency assesses how much of the higher initial cost of producing new refrigeration equipment will be passed on through markups to operators. There is very little discussion on how higher overall costs will be passed on to consumers. This might be ignored because TSLs 1, 2, and 3 all result in lower costs for operators, while TSL 4 and TSL 5 result in higher overall costs for operators.
<b>4. Costs: How well does the analysis assess costs of the regulation?</b>	<b>4</b>		
Does the analysis identify all expenditures likely to arise as a result of the regulation?	4	4A	The DOE calculates the cost of materials, cost of labor, and overhead costs for each level. The effects on industry cash flow are estimated. Teardown analysis is completed. Operating costs and installed costs are also considered.
Does the analysis identify how the regulation would likely affect the prices of goods and services?	3	4B	The DOE estimates the higher costs faced by producers buying the equipment and the ability of these producers to pass these costs on to consumers. The DOE also looks at the costs faced by large and small producers and large and small users of commercial refrigeration equipment. The agency also looks at the effects of each standard on employment.
Does the analysis examine costs that stem from changes in human behavior as consumers and producers respond to the regulation?	3	4C	The DOE only assesses how the higher priced equipment might be shared by consumers and supplies of refrigerated products. There is a dearth of analysis of how operators of refrigeration equipment might delay their purchases of new, higher-cost equipment. The impacts on employment were obtained from interviews with manufacturers. The DOE notes that the worst case scenario would be if all production moved offshore; otherwise, only TSL 5 sees an increase in employment in the production side. ImSET analysis suggests higher overall employment in the short run. There is some discussion on new and emerging technologies, especially LED technology, which will affect producers.
If costs are uncertain, does the analysis present a range of estimates and/or perform a sensitivity analysis?	4	4D	The DOE performs a Monte Carlo simulation with a range of values and probability distributions to account for the ranges of values that may be typically associated with the respective input values, such as construction costs, repair costs, and future food shipments. A sensitivity analysis is also completed in the area of emissions. Between zero to 41 percent of customers would experience a net cost.

<p>Does the analysis identify all parties who would bear costs and assess the incidence of costs?</p>	<p>4</p>	<p>4E</p>	<p>Yes, the “DOE analyzed variability in the LCC and PBP results by performing the LCC and PBP calculations for seven types of businesses: (1) supermarkets; (2) wholesaler/multi-line retail stores, such as ‘big-box stores,’ ‘warehouses,’ and ‘supercenters’; (3) convenience and small specialty stores, such as meat markets and wine, beer, and liquor stores; (4) convenience stores associated with gasoline stations; (5) full-service restaurants; (6) limited service restaurants; and (7) other foodservice businesses, such as caterers and cafeterias” (NPRM, 55927). One area where the agency fails to provide any analysis is how this regulation would affect consumers.</p>
<p>5. Use of Analysis: Does the proposed rule or the RIA present evidence that the agency used the analysis in any decisions?</p>	<p>4</p>	<p>5</p>	<p>The NPRM walks through the results of the analysis and chooses TSL 4 as the regulation that is technologically feasible and economically justifiable. The nonregulatory methods are dismissed as not achieving as many benefits as the regulatory approach. Energy savings and emission reduction benefits outweigh the costs.</p>
<p>6. Net Benefits: Did the agency maximize net benefits or explain why it chose another alternative?</p>	<p>5</p>	<p>6</p>	<p>The DOE provides a summary of their reasons for choosing TSL 4. The highest customer net present value comes from TSL 3, closely followed by TSL 4. However, when including emission reduction benefits, TSL 4 comes out ahead. The DOE chooses TSL 4 because this is where energy savings are maximized, technologically feasible, and economically justifiable.</p>