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Public Interest Comment[1] on

The Department of Energy's Proposed Rule

Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment

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The George Washington University Regulatory Studies Center strives to improve regulatory policy through research, education, and outreach. As part of its mission, the Center conducts careful and independent analyses to assess rulemaking proposals from the perspective of the public interest. This comment on the Department of Energy's proposed rule setting energy efficiency standards for commercial refrigeration equipment does not represent the views of any particular affected party or special interest, but is designed to evaluate the effect of DOE's proposal on overall consumer welfare.

Introduction

The Department of Energy's proposed rule, *Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment*, prescribes standards for 49 different types of commercial refrigeration equipment, setting maximum allowable energy usage standards as a function of either refrigerated volume or total display area for each separate equipment class. The standards will increase appliance prices for commercial customers such as

[1] This comment reflects the views of the author, and does not represent an official position of the GW Regulatory Studies Center or the George Washington University. The Center's policy on research integrity is available at http://research.columbian.gwu.edu/regulatorystudies/research/integrity.

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restaurants, supermarkets, warehouse stores, and convenience stores. DOE expects that the proposed standards will go into effect in 2017.

For the differing equipment classes, DOE estimates the life-cycle cost savings (LCC) resulting from the standards will range from $0 to $1,493.72, with median payback periods (PBP) of up to 6.4 years. In total, DOE expects the standards to result in $379 million in annualized benefits and $97 million in annualized costs through the year 2046. At DOE's proposed trial standard level (TSL) 4, "the percentage of customers who experience net benefits or no impacts ranges from 59 to 100 percent, and customers experiencing a net cost range from 0 to 41 percent," according to DOE's analysis.[3] DOE also expects manufacturers of commercial refrigeration equipment to incur about $87.5 million in total conversion costs. These standards are intended to reduce American energy consumption, decrease global greenhouse gas emissions, and lower American consumers' energy bills long-term.

Statutory Authority

When issuing energy efficiency standards for commercial appliances DOE is statutorily required by the Energy Policy and Conservation Act of 1975 (EPCA) to achieve the maximum improvement in energy efficiency that is both technologically feasible and economically justified, while also resulting in a "significant conservation of energy." This statutory language gives the Department important guidelines when issuing energy efficiency standards.

Of primary importance is the requirement that these efficiency standards be economically justified. Naturally, regulations and bans will incur costs—but it is necessary to consider the magnitude of the accompanying benefits when judging whether a rule is economically justified. The language of the EPCA reads:

> Any new or amended energy conservation standard prescribed by the Secretary under this section for any type (or class) of covered product shall be designed to achieve the maximum improvement in energy efficiency…which the Secretary determines is technologically feasible and economically justified.[4]

The statute continues to explain that, in determining whether a standard is economically justified, the Secretary shall determine whether the benefits of the standard exceed its burdens after considering the comments submitted on the proposed rule. In making this determination, the Secretary shall consider: 1) the economic impact of the standard on both the manufacturers and the consumers; and 2) the savings in operating costs throughout the estimated average life of the

[3] *Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment*. 78 FR 55892

[4] 42 USC Chapter 77 § 6295(o)(2)(A): Energy conservation standards. http://www.law.cornell.edu/uscode/text/42/6295

covered product in the type (or class) compared to any cost increase resulting from the rule, in addition to other considerations such as projected water and energy savings resulting from the rule.[5]

Compliance with Regulatory Analysis Requirements

As the Department notes in its supporting documents, Executive Order 12866 requires executive branch agencies to measure both the costs and the benefits of proposed rules:

> Under section 1(b)(6) 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."[6]

The Department is required both statutorily and under Executive Order 12866 to issue rules that are justified economically, which would mean under EO 12866 that the benefits of the rule justify the costs. To allow for an examination of whether the costs of this rule are justified by the purported benefits, DOE provides a technical support document (TSD) outlining the anticipated costs and benefits of the proposed rule.

Executive Orders 12866 and 13563

Section 1(a) of Executive Order 12866, which was reinforced by President Obama's Executive Order 13563, instructs regulatory agencies to identify the compelling public need that a new regulation seeks to address:

> Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating.[7]

The language of EO 12866 clearly indicates that an agency should not promulgate a regulation that is not made necessary by a failure of the private market unless it is statutorily required. DOE

[5] 42 USC Chapter 77 § 6295(o)(2)(B)(i)(I) – (VII): Energy conservation standards. http://www.law.cornell.edu/uscode/text/42/6295
[6] Technical Support Document for the Proposed Rule, *Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment*. Page 14-1.
[7] Exec. Order No. 12866, Regulatory Planning and Review, §1(a).

is required by statute to promulgate an energy efficiency standard for commercial refrigerators; however, it is important to note that the standards being promulgated do not address a material failure of the private market.

Pursuant to EOs 12866 and 13563, DOE lists the factors that necessitate the energy efficiency standards in its proposed rule:

> The problems that today's standards address are as follows:
>
> 1. There is a lack of consumer information and/or information processing capability about energy efficiency opportunities in the commercial refrigeration equipment market.
>
> 2. There is asymmetric information (one party to a transaction has more and better information than the other) and/or high transactions costs (costs of gathering information and effecting exchanges of goods and services).
>
> 3. There are external benefits resulting from improved energy efficiency of commercial refrigeration equipment that are not captured by the users of such equipment. These benefits include externalities related to environmental protection and energy security that are not reflected in energy prices, such as reduced emissions of [greenhouse gases].[8]

The types of market failure that necessitate government intervention typically fall into one of the following categories: Externalities, monopoly power, and asymmetric information. As DOE explains in its proposed rule, two types of market failure could potentially be addressed by setting energy efficiency standards for commercial refrigeration equipment.

First, energy use related to commercial refrigeration results in some greenhouse gas emissions. Because the social cost of greenhouse gas emissions may not be fully represented in the price of energy, these emissions are externalities which regulatory policies could address. Second, consumers are currently purchasing commercial refrigerators with higher long-term energy costs, which may indicate that they do not have sufficient information about the energy cost savings that higher-efficiency products make possible. This asymmetric information, if it exists, could be remedied by improved labeling or other types of consumer education campaigns.

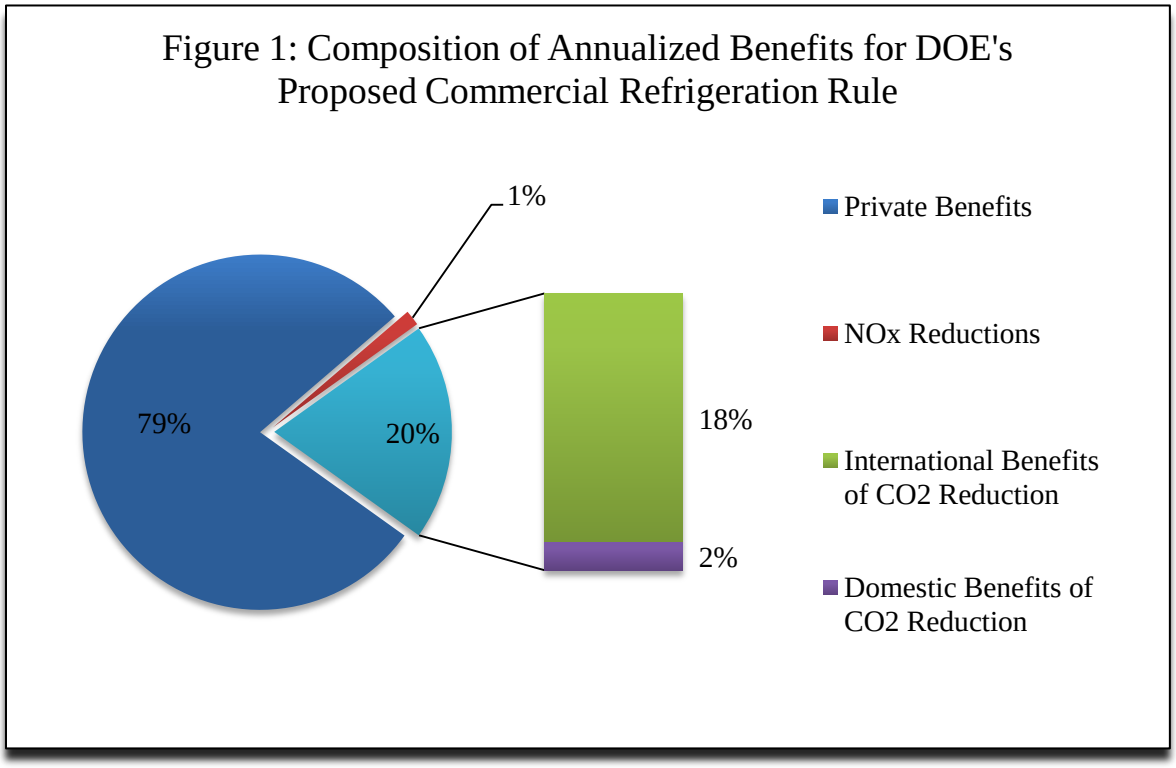
However, neither of the potential market failures cited by DOE is solved by its proposed energy efficiency standards. DOE estimates global externality benefits of the proposed standard at $80 million, compared to costs to US citizens of $97 million. Further, as described below, DOE expects only 3% of the annualized externality benefits of carbon reductions to accrue to Americans. Thus, the annualized costs to American citizens outweigh the social benefits of the standard by 7 to 1.

[8] *Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment*. 78 FR 55981.

Additionally, DOE does not explain why sophisticated, profit-motivated purchasers of commercial refrigeration would suffer from either informational deficits or cognitive biases that would cause them to purchase products with high lifetime costs without demanding higher-price, higher-efficiency products. Even if DOE could show that it has superior information on how these commercial entities could save money, its proposal does not address information asymmetry by sharing that information: instead, the proposal bans certain products from the marketplace.

Regulatory Benefits Uncertain

The benefits expected to result from these standards fall into two categories: consumer savings from reduced appliance operating costs, and the global monetized value of reduced carbon emissions. As can be seen in Figure 1, these two benefit categories comprise 97% of the total benefits of the proposed rule.



Source: Department of Energy's Technical Support Document for the Proposed Rule, *Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment*. Page 1-3.

According to the TSD, the Department expects its proposal to save 1.001 quadrillion British thermal units (Btu's) from the year 2017 through 2046, a 30-year window. By this measure, the proposed standards will conserve over 30 trillion Btu's of energy annually, resulting in benefits both in consumer savings on energy bills (or "private benefits") and in reduced CO_2 emissions.

Because the Department relies almost completely on these two benefits to justify its proposal, consumer savings and international benefits should be closely examined both for validity and for the appropriateness of their use in this analysis.

International Benefits

While the annualized benefits of reducing these emissions tally $75 million, the vast majority (between 77 – 93%) of these benefits are experienced by the rest of the world, and not by American consumers who must adhere to the standards. By comparison, only 2% of the rule's total benefits—and about 10% of the benefits of CO_2 reduction—are benefits to the United States for reductions in CO_2 emissions (see Figure 1).

In calculating the benefits anticipated to result from this rule, DOE monetizes the reduction in carbon emissions using the social cost of carbon (SCC),[9] which places a value on the benefit of reduced carbon dioxide emissions. DOE estimates that its proposed standards will reduce carbon dioxide emissions by 54.88 million cumulative metric tons over the next 30 years, a net present value of between $0.31 and $4.55 billion.

These benefits are monetized using the global value of reducing domestic emissions. While the costs of the standards will be borne by the American consumers and businesses that are directly affected by the rule, the reduction in carbon emissions resulting from this rule is monetized based on its global, rather than domestic, value. That is, the Department weighs not only domestic but international benefits from this rule against entirely domestic costs, which swings the analysis in favor of stricter efficiency standards. As DOE explains in its TSD:

> Because of the distinctive nature of the climate change problem, we center our current attention on a global measure of SCC. This approach is the same as that taken for the interim values, but it otherwise represents a departure from past practices, which tended to put greater emphasis on a domestic measure of SCC (limited to impacts of climate change experienced within U.S. borders). As a matter of law, consideration of both global and domestic values is generally permissible; the relevant statutory provisions are usually ambiguous and allow selection of either measure.[10]

This appears to violate the directive in OMB Circular A-4, reinforced in the Regulatory Impact Analysis Primer, which states: "The analysis should focus on benefits and costs that accrue to citizens and residents of the United States. Where the agency chooses to evaluate a regulation

[9] This SCC was not subject to peer review or public comment, as discussed here: Public Interest Comment on Reconsideration of the Department of Energy's Final Rule: Energy Conservation Standards for Standby Mode and Off Mode for Microwave Ovens, Susan E. Dudley, Sofie E. Miller & Brian F. Mannix, September 6, 2013

[10] Technical Support Document for the Proposed Rule, *Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment*. Page 14A-11.

that is likely to have effects beyond the borders of the United States, these effects should be reported separately."[11]

While the Department was able to calculate domestic benefits from the reduction of carbon emissions expected to result from this rule, it buried its findings in chapter 14 of the TSD. Tables 14.4.1 and 14.4.2 below show the global and domestic benefit estimates, respectively (with emissions values associated with the Department's proposed TSL 4 highlighted):

Table 14.4.1 Estimates of Global Present Value of CO_2 Emissions Reduction under Commercial Refrigeration Equipment Trial Standard Levels

TSL	SCC Case*			
	5% discount rate, average	3% discount rate, average	2.5% discount rate, average	3% discount rate, 95th percentile
	Million 2012$			
Primary Energy Emissions				
1	68.6	335.1	546.1	1,013.7
2	122.6	598.7	975.6	1,811.1
3	266.9	1,304.1	2,124.9	3,944.8
4	290.6	1,419.8	2,313.4	4,294.8
5	370.7	1,811.2	2,951.2	5,478.8

Table 14.4.2 Estimates of Domestic Present Value of CO_2 Emissions Reduction under Commercial Refrigeration Equipment Trial Standard Levels

TSL	SCC Case*			
	5% discount rate, average	3% discount rate, average	2.5% discount rate, average	3% discount rate, 95th percentile
	Million 2012$			
Primary Energy Emissions				
1	4.8 to 15.8	23.5 to 77.1	38.2 to 125.6	71.0 to 233.2
2	8.6 to 28.2	41.9 to 137.7	68.3 to 224.4	126.8 to 416.6
3	18.7 to 61.4	91.3 to 299.9	148.7 to 488.7	276.1 to 907.3
4	20.3 to 66.8	99.4 to 326.5	161.9 to 532.1	300.6 to 987.8
5	26.0 to 85.3	126.8 to 416.6	206.6 to 678.8	383.5 to 1260.1

In each case, the domestic benefits expected to result are about 7 – 23% of the worldwide values DOE emphasizes in its proposal. This is because, relying on an integrated assessment model (the FUND model), DOE would expect the direct benefit to the U.S. to be between 7 – 10% of the global benefit of CO_2 reductions. The 23% value is derived assuming that benefits to the U.S. are proportional to the domestic share of global GDP, resulting in an overall 7 – 23% range.[12]

[11] United States. Office of Management and Budget. Circular A-4, "Regulatory Impact Analysis: A Primer" (August 15, 2011) [Washington, D.C.]

[12] United States Government. Interagency Working Group on Social Cost of Carbon. *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*. http://www.epa.gov/OMS/climate/regulations/scc-tsd.pdf

Instead of focusing on domestic benefits and separately reporting any international effects, the Department focused on much-larger global benefits in the text of the proposed rule and separately reported the (much smaller) domestic effects in a final chapter of the technical support document. Using domestic estimates for the final analysis, as instructed in the OMB Circular A-4, the annualized benefits of emission reductions resulting from this rule shrink from $75 million to between $5.25 million and $17.25 million, a reduction of between 77 and 93%.

Private Benefits and Commercial Purchaser Irrationality

Many regulations are crafted to solve a market failure such as an externality, monopoly power, or asymmetric information. The benefits generated by these regulations are social benefits (e.g. cleaner air, more competitive markets, consumer sovereignty) that justify collective action through government regulation. What makes many energy efficiency regulations unusual is that they rely on a different type of benefit, often called a "private benefit," to justify government action.

In this rule, the "private benefit" is the value of consumer savings resulting from reduced energy costs, and the primary benefit of the rule is reduced energy bills for purchasers of commercial refrigeration equipment, such as supermarkets, restaurants, convenience stores, and "big-box stores." Rather than being a benefit to society at large, this alleged benefit accrues to the purchasers of the commercial equipment. The fact that these sophisticated, cost-conscious companies are not already demanding higher-efficiency equipment from manufacturers calls into question the validity of DOE's analysis that prohibiting the purchase of lower-cost, lower-efficiency products will save companies money.

Executive Order 12866 requires regulatory agencies to assess possible alternatives to regulatory action, and to include this assessment of alternatives in its Regulatory Impact Assessment:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating… Each agency shall 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.[13]

DOE lists five policy alternatives in its TSD, including tax credits, rebates, voluntary standards, early replacement, and the alternative of not regulating, and analyzes each alternative in turn. The analysis of voluntary standards in particular is interesting, given that the primary benefit of this rule (79%) are these private savings to sophisticated commercial purchasers, which one could assume might incentivize voluntary action.

[13] Exec. Order No. 12866, Regulatory Planning and Review, §1(a).

However, DOE notes that while its analysis predicts large financial benefits from higher efficiency standards, users of commercial refrigeration are not already demanding the production of high-efficiency equipment. Instead of evaluating whether its modeling assumptions accurately reflect real world conditions and tradeoffs, DOE relies on several theories as to why commercial customer preferences might be incorrect (without distinguishing the large, repeat purchases of profit-motivated commercial entities from individual household decisions):

> 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. This undervaluation suggests that regulation that promotes energy efficiency can produce significant net private gains (as well as producing social gains by, for example, reducing pollution). 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 (e.g., an inefficient ventilation fan in a new building or the delayed replacement of a water pump); (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 (e.g., renter versus building owner, builder versus home buyer). Other literature indicates that with 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.[14]

Particularly in this case, where the "consumers" in question are cost-conscious purchasers of commercial equipment, DOE needs to consider alternative explanations for the difference between its estimates of costs and savings and the revealed calculations of purchasers. Rather than assuming the equipment purchasers are wrong, DOE should consider the alternative hypothesis that its analysis does not reflect real world conditions and tradeoffs.

For example, DOE discounts future energy savings at a discount rate of 3% for its primary benefit estimates, whereas the cost of equity for private firms is much higher.[15] For example, New York University's Stern School of Business estimates that the cost of capital for restaurants

[14] *Energy Conservation Program: Energy Conservation Standards for Commercial Refrigeration Equipment*. 78 FR 55980

[15] For more on agency misuse of discount rates in energy and environment policy, see: Mannix, Brian F. *Whose Telescope Is Defective? Discount Rate Arbitrage In Energy and Climate Policy*. http://www.aei.org/files/2010/11/08/Mannix-Brian-Whose%20Telescope%20Is%20Defective.pdf

is 8.48%, nearly three times the discount rate of future energy savings used by DOE.[16] NYU Stern puts Wal-Mart's cost of capital at above 7%,[17] more than twice the rate used in DOE's calculation. This difference between the discount rate DOE uses and the rates firms actually face appears to be a more likely explanation for the difference in how DOE and commercial purchasers of refrigeration equipment value future energy savings than DOE's explanation that purchasers lack "information," "sufficient salience of the long-term or aggregate benefits," or the proper "incentives."

DOE's analysis also depends on assumptions about future energy prices, which may differ from industry's expectations and necessarily affects the benefits derived from future energy savings. Additionally, DOE does not seem to consider that commercial customers may value attributes other than energy efficiency when making refrigeration equipment purchases. It is troubling that, despite the fact that cost-conscious commercial consumers are not demanding access to higher-efficiency appliances, DOE can paradoxically conclude that reducing consumers' options will make them better off. [18]

Conclusion

As DOE explains in its proposed rule, two types of market failure could potentially be addressed by setting energy efficiency standards for commercial refrigeration equipment: externalities related to greenhouse gas emissions and asymmetric information regarding high-efficiency commercial appliances. However, neither of the potential market failures cited by DOE is solved by its proposed energy efficiency standards, leaving the proposal economically unjustifiable.

DOE estimates global externality benefits of the proposed standard at $80 million, compared to costs to US citizens of $97 million. Additionally, DOE expects only 3% of the annualized externality benefits of carbon reductions to accrue to Americans. Thus, the annualized costs to American citizens outweigh the social benefits of the standard by 7 to 1, calling into question whether this proposal is economically justified, as required by law.

Additionally, DOE does not explain why sophisticated, profit-motivated purchasers of commercial refrigeration would suffer from either informational deficits or cognitive biases that would cause them to purchase products with high lifetime costs without demanding higher-price, higher-efficiency products. This asymmetric information, if it exists, could be remedied by improved labeling or other types of consumer education campaigns rather than banning products from the marketplace. DOE's approach, in addition to ignoring any potential underlying

[16] Damodaran, Aswath. *Cost of Capital by Sector*. New York University Stern School of Business, Jan. 2013. http://pages.stern.nyu.edu/~%20adamodar/New_Home_Page/datafile/wacc.htm
[17] *Wal-Mart Discounted Cash Flow Valuation*. New York University Stern School of Business, http://pages.stern.nyu.edu/~iag/presentations/2008-2009/WMT_Valuation.pdf
[18] Dudley, Susan E. "Perpetuating Puffery: An Analysis of the Composition of OMB's Reported Benefits of Regulation." *Business Economics* 47.3 (2012): 165-76.

information asymmetry issues, is contrary to President Obama's instruction to agencies in Executive Order 13563:

> Where relevant, feasible, and consistent with regulatory objectives, and to the extent permitted by law, each agency *shall identify and consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public*. These approaches include warnings, appropriate default rules, and disclosure requirements as well as provision of information to the public in a form that is clear and intelligible.[19]

DOE's proposal does not maintain flexibility and freedom of choice for purchasers of commercial refrigeration equipment, and the resulting benefits to not justify the costs as required both by statute and by Executive Order.

[19] Exec. Order No. 13563, Improving Regulation and Regulatory Review, §4.