ENERGY EFFICIENCY STANDARDS FOR APPLIANCES: ARE THEY NEEDED?

MINI BRIEF NUMBER MB82233

AUTHOR:

Langdon Crane

Science Policy Research Division

THE LIBRARY OF CONGRESS

CONGRESSIONAL RESEARCH SERVICE

MAJOR ISSUES SYSTEM

DATE ORIGINATED 06/14/82
DATE UPDATED 12/12/83

FOR ADDITIONAL INFORMATION CALL 287-5700

ISSUE DEFINITION

The Energy Policy and Conservation Act (EPCA) (P.L. 94-163), as amended by the National Energy Conservation Policy Act (NEPCA) (P.L. 95-619), requires that energy efficiency standards be established for each of 13 classes of appliances that are major consumers of energy. NEPCA stipulates that such standards "be designed to achieve the maximum improvement in energy efficiency which the Secretary [of Energy] determines is technologically feasible and economically justified." The Department of Energy announced proposed standards for 8 of the 13 classes of appliances in June 1980 and initiated public hearings on them prior to final promulgation. In January 1981, the DOE suspended this process; after re-studying the proposed standards, it announced in April 1982 a finding that no standards are economically justified. GAO has criticized this finding on the grounds that the basic assumptions of the analysis are questionable. Others are concerned that the DOE's adoption of "no standards" may preclude individual States from adopting their own sets of standards for appliance efficiencies because of specific prohibitions under EPCA.

BACKGROUND

Congress, in its first major legislation directed at energy conservation, the Energy Policy and Conservation Act, adopted several measures to improve the energy efficiencies of major energy-consuming appliances. One was the mandated labeling of appliances offered for sale to show their estimated annual operating costs, as well as the range of annual operating costs of comparable appliance units, to provide essential information about the relative efficiency of each appliance offered for sale. Another measure required energy efficiency targets for major energy-consuming appliances, targets that were to "be designed to achieve the maximum improvement in energy efficiency which the Administrator [of the Energy Research and Development Administration] determines is economically and technologically feasible to attain for each such type [of appliance] manufactured in calendar year 1980." All targets were to result in increases in energy efficiency of at least 20% over the average efficiency levels found in 1972. The Act also provided that the Administrator (now the Secretary of Energy) should impose mandatory energy efficiency standards for new appliances in those cases where it appeared that the energy efficiency targets might not be met by 1980.

The following classes of appliances were specifically covered under the provisions of EPCA:

Refrigerators and refrigerator-freezers

Freezers

Dishwashers

Clothes dryers

Waterheaters

Room air conditioners

Home heating equipment, not including furnaces

Television sets

Kitchen ranges and ovens

Clothes washers

Humidifiers and dehumidifiers

Central air conditioners

Furnaces

Plus, any other appliances that the Administrator deems appropriate for the purposes of the Act which are likely to consume more than 100 kilowatt-hours of energy, or its equivalent, per household per year.

Effect on State and Other Laws

To simplify and regularize the imposition of energy efficiency standards -- and to preclude the imposition of as many as 50 different, and possibly incompatible, State standards -- EPCA provided that 1) the standards, 2) the testing procedures underlying those standards, and 3) the information required of manufacturers to establish and maintain those standards, as adopted for the Federal Government by the DOE according to the provisions of the Act, would supersede any State or local regulation for the same purposes. However, EPCA did provide that a State or local government could obtain an exception to this provision if it could demonstrate to the satisfaction of the Administrator (of ERDA, whose authority is now held by the Secretary of Energy) that there is a substantial State or local need sufficient to justify a special regulation requiring greater efficiency than the Federal regulation, and that such a special regulation would not unduly burden interstate commerce.

Amendments to EPCA Under NECPA

The National Energy Conservation Policy Act amended EPCA in a number of important respects. NECPA discarded the concept of energy targets, and instead required that energy efficiency standards be adopted for each of the 13 classes of appliances stipulated in EPCA. The concept of a 20% minimum improvement was dropped in favor of a requirement that "...energy efficiency standards for each type (or class) of covered products...shall be designed to achieve the maximum improvement in energy efficiency which the Secretary [of Energy] determines is technologically feasible and economically justified."

In addition, in response to complaints from a number of industrial spokesmen about the financial and other burdens that efficiency standards would impose, NECPA required a thorough analysis of the costs and benefits of such regulation prior to the imposition of standards. "Before determining whether a standard is economically justified...the Secretary, after receiving any views and comments furnished with respect to the proposed standard...shall determine that the benefits of the standard exceed its burdens, based to the greatest extent practicable, on a weighing of the

following factors:

(1) the economic impact of the standard on the manufacturers and on the consumers of the products subject to such 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 of, or in the initial charges for, or maintenance expenses of, the covered products which are 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 products likely to result from the imposition of the standard,
(5) the impact of any lessening of competition determined in writing by the Attorney General that is likely to result from the imposition of the standard,
(6) the need of the Nation to conserve energy and
(7) any other factors the Secretary considers relevant."

DOE Proposes Standards for 8 Classes of Appliances in 1980

The Federal Register of June 30, 1980 (Vol. 45, No. 127) set forth DOE's conclusions on efficiency standards for 8 of the 13 classes of appliances stipulated in EPCA. After extensive analysis according to the guidelines set forth in NECPA, energy efficiency standards were proposed for 1) refrigerators and refrigerator-freezers, 2) freezers, 3) clothes dryers, 4) water heaters, 5) room air conditioners, 6) kitchen ranges and ovens, 7) central air conditioners, and 8) furnaces. Each of the standards was claimed to produce more than a 20% improvement in efficiency over 1972 levels, in accord with the original provisions of EPCA. The DOE-determined costs and benefits of these standards to the Nation as a whole are set forth in TABLE 1. Though these figures have been superseded by later DOE analyses, they continue to be quoted by proponents of standards and are provided here for comparison.

TABLE 1. The Original DOE Calculations of Energy Savings to Result from Appliance Standards.

Class	1982-2005 Cumulative Energy Savings (Quads)	Net Present Value of the Regulation (Billion $s 1978 dollars)
Refrigerators and refrigerator-freezers	3.6-7.6	$4.5-6.7
Freezers	0.8-1.4	1.0-1.4
Clothes dryers	0.3-0.6	0.3-0.4
Water heaters	3.9-5.9	5.4-6.0
Room air conditioners	0.2-0.6	0.2-0.4
Kitchen ranges and ovens	0.3-0.8	0.3-0.7
Central air conditioners	2.6-3.7	0.4-0.8
Furnaces	2.0-4.3	2.5-3.4

Source: Federal Register, Vol. 45, No. 127.

TABLE 2. The 1981 Revision of DOE's Original Energy Savings Calculations

Class	1982-2005 Cumulative Energy Savings (Quads)
Refrigerators and refrigerator-freezers	0.63
Freezers	1.14
Clothes dryers	0.04
Water heaters	2.75
Room air conditioners	0.71
Kitchen ranges and ovens	0.00
Central air conditioners	5.20
Furnaces	0.47

In every case, the life cycle cost of the appliance to the average consumer was calculated by DOE to be lower than the life cycle cost of current appliances. However, DOE's analysis of the ability of manufacturers to raise the necessary capital to comply with the standards indicated possible hardships. While it was expected that 98-99% of the manufacturers of refrigerators and refrigerator-freezers, clothes dryers, central air conditioners, and furnaces would be able to earn sufficient capital to comply with the standards, only 93-94% of the manufacturers of room air conditioners and of kitchen ranges and ovens might be expected to do so, and only 80% of water heater manufacturers and 75% of freezer manufacturers.

Response to the DOE Proposed Standards

Public hearings and invited comments on the proposed appliance standards indicated a number of concerns about the DOE analysis, both technical and economic. Though in many of the comments there was objection to the presence, or to the method of imposition and enforcement, of the proposed standards, industry spokesmen offered evidence to indicate that the DOE analysis had underestimated the costs of compliance to industry, and had overlooked a number of important practical problems related to the size, shape, and performance capabilities of certain appliances designed to meet the proposed standards.

Faced with these comments, DOE performed a new round of economic and energy analysis, making appropriate changes in basic assumptions. This produced a marked reduction in total expected energy savings: from a range of 13.8-25.1 Quads in the first round of analysis to 10.9 Quads in the second round, as outlined in the TABLE 2. As a result, DOE intended to revise its proposed standards downward in required efficiency, and to drop standards for kitchen ranges, ovens, and clothes dryers.

A New Round of Analysis, and Reversal of Viewpoint

On Dec. 17, 1980, DOE notified Congress that it could not meet the Jan. 2, 1981 deadline for a final determination on the proposed standards. On Feb. 23, 1981, DOE issued notice to Congress that it intended to delay implementing the standards that it originally proposed pending further study. DOE formed an internal task force of senior officials to review the appliance standards developmental work that had been performed and to recommend what course DOE should follow with respect to standards. The task force commissioned a new analysis of the costs and benefits of standards, using hypothetical standards requiring three or four different levels of efficiency for each appliance and postulating a more rapid rise in energy prices than had been assumed in the past. The results were published in the Federal Register Apr. 2, 1982 (Vol. 47, No. 64).

In this new analysis, DOE revised its basic approach for calculating the benefits of setting energy efficiency standards for appliances. The calculations were performed in two steps. First, calculations were performed to estimate the energy savings that would result from consumer preferences for more efficient appliances in response to DOE's projected energy price increases. Second, these savings were compared with the energy savings calculated by DOE to be expected from the imposition of energy efficiency standards, but neglecting the effects of energy prices on consumer appliance preferences. Calculations were performed using the Oak Ridge National

Laboratory (ORNL) Residential Energy End Use Model, the same model used to calculate energy savings for the 1980 findings. The time period was changed to 1987-2005 from 1982-2005.

On the basis of this latest analysis, and of its analysis of the costs imposed by standards on manufacturers, DOE concluded that efficiency standards are not necessary, because the pressure of rising prices will prompt consumers to demand, and manufacturers to produce, appliances that are of efficiency comparable to the efficiencies that would be required under standards. The DOE finding was that:

> The increase in the cost of energy in the last ten years...has created substantial incentives for manufacturers to make, and consumers to buy, more energy efficient appliances. These incentives to a certain extent have been restrained by regulation of the price of oil and natural gas, which subsidized consumption and discouraged conservation...In the years ahead...with the deregulation of oil and the scheduled deregulation of most natural gas in 1985, market forces are expected to play an increasingly dominant role in the pricing of all energy. Therefore, DOE expects that the appliance market will respond swiftly in the level of energy efficiency provided in new appliances. In short, if standards are not adopted, the appliance market can be expected, over the period 1987-2005, to increase the level of shipment-weighted energy efficiency of the average new appliance to levels generally comparable to those that might be required by mandatory standards.

DOE's analysis found that in the absence of standards, the average efficiency of six of the most energy consumptive appliances will improve in efficiency by 32% in the period 1978-2005. The imposition of standards would produce an average improvement of 37% in these same appliances (oil and gas furnaces, room air conditioners, central air conditioners, electric and gas water heaters, refrigerator-freezers, and freezers.) Put more broadly, DOE estimates that improvements in efficiencies without standards for any of the appliances will result, in the 1987-2005 period, in savings of 27.6 Quads, whereas DOE estimates that the imposition of standards would produce savings of 32.8 Quads in that same period. DOE's conclusion is that the difference between these two predictions is not significant, primarily because of the uncertainties in such predictions. In addition, DOE points out that standards may not be beneficial to every appliance customer because of variations in the expected use of each appliance and because of variations in the expected duration of ownership of the appliance.

Continuing this line of thought, DOE's 1982 analysis finds that such factors as 1) reductions in life cycle cost, 2) reductions in electrical generating capacity to power appliances, (3) reductions in environmental impact from the reduced combustion of fuel for energy, and 4) the actual savings in energy fuels and energy costs are not predicted (by the Oak Ridge Model) to be significantly affected by the imposition of standards. TABLE 3 lists the increases in energy savings that the Oak Ridge Model predicts will occur if appliance standards are imposed instead of leaving energy efficiency improvements to the marketplace. The savings listed are those predicted for the most stringent standards that DOE analyzed (less stringent standards would produce lower savings of energy, except where noted).

TABLE 3. The 1982 DOE Calculations of Energy Savings to be Expected from Appliance Standards

Class		1987-2005 Cumulative Energy Savings (Quads)		Net Present Value of the Regulation ($ in billions 1978 dollars)
Refrigerators and refrig. freezers		0.16	maximum	$0.25
Freezers		0.33	maximum	0.72
Clothes dryers	(elec)	0.19	maximum	0.07
	(gas)	0.02	maximum	-0.01
Water heaters	(elec)	2.07	maximum	2.64
	(gas)	0.08	maximum	0.18
Room air conditioners		0.64	maximum	0.73
Kitchen ranges/ovens	(elec)	-0.33*		0.0
	(gas)	0.28	maximum	-0.13
Central air conditioners		4.52	maximum	0.10
Furnaces	(gas)	0.0		-0.04
	(oil)	0.0		0.02

*In this case, the imposition of the most stringent efficiency standard was predicted by the Model to cause more energy to be used with the standard than without it. If a lower level of energy efficiency were required under a lower standard, a small saving in energy was predicted by the Model.

SOURCE: Federal Register, Apr. 2, 1982 (vol. 47, no. 64)

GAO Reviews DOE's Analysis of Appliance Standards

The General Accounting Office examined the 1982 DOE analysis of appliance standards (Rept. EMD-82-78) and summarized its conclusions as follows:

> DOE's basis for its proposal that no appliance efficiency standards be established is highly questionable. First, the analysis in support of DOE's proposal relies heavily on an unvalidated key assumption that consumers will purchase substantially more efficient appliances in response to increases in real energy prices. Secondly, DOE has been inconsistent in projecting the effect of market forces on consumers and appliance manufacturers. Finally, during the standards development process, DOE projected future energy savings from standards using four markedly different energy price assumptions, and used a significantly higher price assumption in its April 1982 NOPR [Notice of Proposed Rulemaking, as published in the Federal Register] than other available estimates. The potential impact of the inconsistent treatment of market forces and the use of high energy price assumptions is to decrease the energy savings from, and increase the costs of, appliance standards.

In testimony before the House Committee on Energy and Commerce on May 21, 1982, Dexter Peach, Director of GAO's Energy and Minerals Division, stated that DOE's analysis "...relies heavily on an unvalidated key assumption that consumers will purchase substantially more efficient appliances in response to increases in real energy prices. We found that actual consumer purchases of appliances during the 1970s -- a time of rising real energy prices -- did not support DOE' key assumption." Among his other points in that testimony, Peach pointed out that, in performing the analysis for its current recommendations, DOE used energy price projections that are "significantly higher than other available estimates." He also claimed that the calculations of the cost impacts of standards on manufacturers had not been performed in consistent fashion because none of the costs of manufacturing more efficient appliances was ascribed to factors other than standards (such as consumer preferences for more efficient appliances).

However, GAO concluded that DOE's second proposed set of standards (which were never formally announced, but which relaxed requirements for six of the appliances and provided no standards for kitchen ranges and ovens or for clothes dryers) "had potential." This was based in part on a GAO finding that even with no increase in real energy prices the second set of standards might produce 1.5 Quads of energy savings in the single year of 2000, if it was assumed that the average efficiencies of purchased appliances remained unchanged unless standards were imposed. In particular, GAO felt that the second proposed set of standards provided useful efficiency levels for furnaces, central air conditioners, water heaters, and refrigerators. GAO recommended that the Secretary of Energy not adopt a "no standard" rule until reviewing GAO's views and conclusions.

THE FOCUS OF CURRENT ISSUES

The crux of the issue would seem to be whether appliance customers will assimilate and act upon the energy labeling information that EPCA requires; labeling requirements will not be affected by decisions about appliance standards. With the exception of furnaces and central air conditioners, where customers must rely on manufacturers' specification sheets (which are generally regarded as being too complicated for most to use effectively), this information will continue to be provided by labels that report the results of standardized testing procedures mandated under EPCA. If consumers ignore the information provided, or if manufacturers fail to offer highly efficient appliances for sale, then the use of standards would increase energy savings.

The Pre-emption of State Standards

At present, "no standards" determination by the Secretary of Energy would, by virtue of the provisions in EPCA mentioned above, preempt individual States and localities from imposing their own energy efficiency standards unless the Secretary concurs that some special circumstance exists which justifies such standards for their areas and that it can be shown that such standards will not burden interstate commerce. Legislation has been proposed (H.R. 3244) by Rep. Richard Ottinger to remove the preemption provisions from EPCA so that States and local governments could adopt their own standards.

This could result in a good deal of regulatory disparity among States. It might even create a situation in which a State (or States) with a large and attractive appliance market might make regulations that came to be observed by all major appliance producers. In such a case, individual States might effectively preempt a Federal decision that no standards be imposed.

Officials from States such as Florida and California in congressional hearings have claimed that the State standards, which have been applied in the interim period before Federal standards are decided, have saved a great amount of energy and enabled their residents to avoid considerable costs in constructing new electrical generating capacity. They argue for the value of State standards in lieu of Federal standards from the standpoint of local needs and interests.

A Proposed Alternative

An alternative proposal has been offered by Rep. Carlos Moorhead (H.R. 2283) to circumvent the entire question of Federal energy efficiency standards by eliminating the standards and State preemption provisions of EPCA while retaining the energy efficiency labeling provisions of the Act. His position has been that State and local governments should be primarily responsible for the regulation of energy conservation activities, rather than the Federal Government.