

[6450-01]

DEPARTMENT OF ENERGY

Office of Conservation and Renewable Energy

Energy Conservation Standards for New Federal Residential Buildings

AGENCY: Department of Energy

ACTION: Finding of No Significant Impact (FONSI) on Proposed Energy
Conservation Standards for New Federal Residential Buildings.

SUMMARY: The U.S. Department of Energy (DOE) is proposing interim energy conservation standards for new federal residential buildings (to be identified as a newly established Subpart B of Part 435, Ch. 2 of Title 10 CFR) as required by the Energy Conservation Standards for New Buildings Act of 1976, as amended, (the Act) 42 U.S.C. Section 6831 et seq. The Notice of Proposed Rulemaking (NPR) for this action is being published in today's Federal Register. Federal agencies would be required to design federal residential buildings to satisfy the energy efficiency requirements of the proposed interim standards. The proposal requires a federal agency to establish an energy consumption goal for the design of a new federal residential building using the computerized calculation procedure provided in a microprocessor program (COSTSAFR) and to adopt such procedures as may be necessary to assure that the design of a new federal residential building is not less energy conserving than the energy consumption goal established for the design. The computer program determines the most effective set of energy conservation measures, selected from among the measures included within the program, that will produce the optimum life cycle cost for a specific type of residential building in the geographic location where it will be constructed.

This most effective set of measures is expressed as a total point score which, in turn, serves as the energy consumption goal for the design of the federal residential building.

The computer program produces a compliance point system that is intended to be attached to housing Requests for Proposals issued by agencies of the federal government. The point system, which is specifically tailored to each request, is to be used by proposers to demonstrate that their specific designs comply with the energy consumption goal. The point system also provides a standard method for each proposer to estimate the energy cost over the life of the building in discounted dollars. This estimate can then be used by evaluators to estimate the total energy performance of each proposal.

The interim standards were designed specifically to accommodate the types of federal construction most commonly built, federal economic parameters and federal procurement procedures. The Department is in the process of developing residential standards that would be more applicable to the non-federal sector. These will be issued at some future date as voluntary standards.

Based on an environmental assessment (EA), DOE has determined that the proposed interim standards are not a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act. Therefore, an environmental impact

statement will not be prepared. Single copies of the EA (DOE/EA-0300) are available on request at the following address.

PUBLIC AVAILABILITY:

Hearings and Dockets Branch
Office of Conservation and Renewable Energy
U.S. Department of Energy
Docket Number CAS-RM-79-112-B
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SUPPLEMENTARY INFORMATION:

DOE prepared an environmental assessment (EA) of the proposed interim standards pursuant to the National Environmental Policy Act of 1969, as amended, Pub. L. 91-190, 40 U.S.C. 4221 et seq., and the implementing regulations of the Council on Environmental Quality (40 CFR Parts 1500-1808). The

EA addresses the possible incremental environmental effects attributable to the application of the proposed interim standards to the design of new federal residential buildings.

The EA concludes that the effect of the proposed interim standards on a building's habitability as well as on the outdoor environment, the economy and federal institutions, will be very small. Specific conclusions are summarized below.

Approach Used in the Analysis

The analysis looks at a No Action Alternative and the Proposed Standard. The No Action Alternative represents current practices in federal residential construction and is the base case against which the Proposed Standard is evaluated. Base case information was collected from the survey work on the construction practices of the military establishment.

To evaluate the effects that the proposed interim standards would have on the environment, DOE reviewed current construction plans for federal residential units typical of current and expected construction during the FY 1986 - FY 1990 period. A design was selected for each type of residential unit. Each of these nine "base case" residential units was tested in a series of computer simulations to achieve the maximum practicable improvements in energy efficiency. This assessment included the use of life cycle analysis. The energy efficiency and life cycle cost information was used to architecturally redesign each residential unit to meet the proposed interim standards. These architecturally upgraded residential units became the "redesign case" units,

or the Proposed Standards. The EA compared the typical buildings presently being constructed by the government to the buildings that are likely to be built after using the COSTSAFR computer program once the proposed interim standards are promulgated, and evaluated environmental consequences with emphasis on possible alterations to indoor air quality.

General Findings

The EA finds that the effect of the proposed residential building energy conservation standards on building habitability, as well as on the outdoor environment, the economy and federal institutions, will be very small.

General findings are summarized below:

A. Habitability

In the assessment, habitability is expressed in terms of changes in indoor air pollutant concentrations. Various pollutants are released continuously or intermittently within residential buildings. An indoor air quality computation model that uses specific pollution emission values (release rates) for selected materials and occupant activities was used to calculate pollutant concentration levels in the nine case-study residential buildings, based on their design characteristics for the base case (current practice) and redesign case (proposed interim standards). Incremental pollutant concentrations were calculated for particulate matter, carbon monoxide, carbon dioxide, nitrogen dioxide, radon and formaldehyde. In addition, a qualitative assessment was made of chemical compounds and microorganisms. The changes in the various indoor air pollutant concentrations and concomitant occupant health and safety effects that can be attributed to design changes called for by the proposed interim standards are minimal.

1. Particulate Matter

Implementation of the proposed interim standards is expected to reduce the level of particulate matter slightly in all residences where electric cooking appliances are used and in residences where the indoor/outdoor air exchange rate is increased from 0.7 to 1.0 air changes per hour.

2. Carbon Monoxide

Calculated indoor concentrations of carbon monoxide (CO) from cooking and smoking are well below levels currently associated with health risk. The proposed interim standards will reduce CO concentrations.

3. Carbon Dioxide

Residential units designed under the proposed interim standards are expected to maintain low concentration levels of carbon dioxides (CO₂). The health risks from indoor CO₂ concentration are not increased.

4. Nitrogen Dioxide

Release of nitrogen dioxide (NO₂) in residential indoor environments is small. The calculated concentrations of NO₂ for the redesign residential units are either the same as the base case design or are slightly lower.

5. Radon

Calculated values for indoor air concentrations of radon indicate that for site-built residential units, indoor concentration levels for the base case and the redesign case are either the same or are slightly reduced in the case where the redesign units have an increased air exchange rate. The redesign case study for manufactured homes shows a two-inch reduction in floor insula-

tion at one of the four climate sites evaluated. This reduction in floor insulation may result in a very small increase in radon infiltration from soil into the residential unit.

6. Formaldehyde

The proposed interim standards are expected to reduce the level of formaldehyde concentrations. The reduction may benefit certain sensitive individuals who have a very low threshold to formaldehyde.

7. Chemical Compounds

A large number of chemical pollutants have been identified in indoor residential air. Many of these chemical compounds are odorous, irritants, or suspected carcinogens. The proposed interim standards are not expected to measurably increase or decrease health risks due to chemical pollutants in residential indoor air.

8. Microorganisms

Microorganisms can become indoor air pollutants with potential health risk under certain conditions. The most severe indoor microorganism pollution problems result from growth of organisms on a damp surface or stagnant water reservoir within the residential unit. The principal building design change affecting the residential building's ability to shed moisture-laden air is the use of air-to-air heat exchangers in selected redesigned apartment units. Moisture condensation is expected as warm moisture-laden air is exhausted through the heat exchanger. Condensed moisture, if not effectively collected and disposed of over the entire life of the operating unit, may eventually create host areas for microorganisms. The use of air-to-air heat exchangers

in large numbers is a relatively new phenomenon in the U.S. To date, research and use have not proven that air-to-air heat exchanger ventilation systems, over the long term, will always be operated and maintained as intended. Thus, the effects of air-to-air heat exchangers on microorganism growth and distribution is of concern over the longer term.

B. Outdoor Environmental Impacts

The overall magnitude of the improvement in outdoor environmental quality from reduced fuel usage and reduced insulation production is so small it is not measurable. Although the magnitude of changes in outdoor environmental quality cannot be measured, they are likely to be positive.

C. Economic Effects

The primary national effects of adopting the proposed interim standards by federal agencies, cumulated over five years, would be to reduce federal government expenditures over the life cycle of these residential buildings by about \$27 million (1985 dollars). This \$27 million savings is comprised of fuel savings of approximately \$53 million, offset by increased capital costs of about \$26 million. Regional impacts are also expected to be small. There are no discernible impacts on any industrial sector as a result of adopting the proposed interim standards, nor will there be any adverse impacts on small business. Some modest non-quantifiable effects may be associated with a change in the procedures that result from adopting the proposed interim standards, but these also are expected to be very small.

D. Institutional Effects

The proposed interim standards are not radically different from standards already being used by the federal government or by the private sector. They do, however, require computer algorithms to be used in the assessment of

compliance. Offsetting this will be a reduction in the amount of paperwork currently required to assure compliance.

Determination

Based upon the findings of the EA, DOE has determined that the proposed interim standards do not constitute a major federal action significantly affecting the quality of the human environment, within the meaning of NEPA. Therefore, an environmental impact statement is not required.

Issued in Washington, D.C., April 17, 1986.



Mary L. Walker
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