BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Uncertainties About The Effectiveness Of Federal Programs To Make New Buildings More Energy Efficient

Two Federal programs--the State Energy Conservation Program and the Energy Performance Standards for New Buildings Program--are intended to increase the energy efficiency of new buildings. However, in many cases, neither the Department of Energy nor the States know whether thermal efficiency standards have been adopted and enforced by local jurisdictions under the State program. This lack of information raises questions about the program's effectiveness, and it will complicate the implementation of building energy performance standards when they go into effect.

The Department of Energy needs to continue to encourage State and local jurisdictions to adopt building standards stressing thermal efficiency and to undertake a joint effort with the States to determine how well local governments are enforcing the standards.

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

This report presents the results of our evaluation of the States' progress in developing and implementing thermal efficiency standards for new buildings as part of the State Energy Conservation Program. The report also discusses certain issues which may impede the timely and effective implementation of building energy performance standards currently being developed by the Department of Energy. AGC00912

The report is a partial response under our legislative mandate, contained in section 462 of the Energy Conservation and Production Act, to review the activities of the Department of Energy in carrying out programs authorized by title IV of that act. It is also intended to assist the Congress in its deliberations over the possible need for sanctions to assure full and uniform implementation of building energy performance standards, when promulgated.

Copies of this report are being sent to the Director, Office of Management and Budget; the Secretary of Energy; and the chairmen of energy-related congressional committees.

Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

UNCERTAINTIES ABOUT THE EFFECTIVENESS OF FEDERAL PROGRAMS TO MAKE NEW BUILDINGS MORE ENERGY EFFICIENT

D I G E S T

Making new buildings more energy efficient could save as much as 1.5 million barrels of oil per day by the year 2000. Two Federal programs are directed at achieving these energy savings--the State Energy Conservation Program and the energy performance standards for new commercial and residential buildings program.

The State Energy Conservation Program provides for each State to establish a number of conservation programs, including building standards stressing thermal efficiency, to achieve State conservation goals.

The building energy performance standards program will govern the design and construction of new commercial and residential buildings. Its goal is to achieve the maximum number of practical improvements in energy efficiency and to increase the use of non-depletable energy in new buildings.

The States probably will not achieve their 1980 energy conservation goals for new buildings. Also, it is unclear whether States considered by the Department of Energy to be in compliance with State Program requirements have, in fact, complied. Furthermore, unless the Department works closely with States and local jurisdictions to assure that energy efficiency standards and codes are effectively implemented, the performance standards program will be delayed.

GAO recognizes that the Department has not yet finalized building energy performance standards. GAO's conclusions and recommendations in this area should be considered as guidance.

THERMAL EFFICIENCY STANDARD PROGRAM EFFECTIVENESS UNCERTAIN

The effectiveness of the thermal efficiency standards program is questionable. In many States, the standards were not implemented by January 1, 1978--the Department's target date. GAO estimates that these delays could reduce the projected 1980 energy savings by the equivalent of about 46,000 barrels per day of oil.

While 41 States had adopted some type of thermal efficiency standards by September 1979, in at least 14 of these States

--standards have not been established for all building categories,

--standards are not mandatory for all new construction, or

--standards are not mandatory in all jurisdictions of the State.

These situations can substantially reduce the number of buildings constructed with conservation features and further reduce projected energy savings for 1980.

Although the Department of Energy has developed criteria to determine State compliance with the mandatory program requirements, the Department has not consistently applied these criteria to all States, and the criteria do not assure compliance with the law or Department of Energy regulations. The Department should reassess the way it determines State compliance with program requirements. Should it find that some States are not in full compliance, it should consider granting those States more time to comply, rather than withdrawing program funds.

The Department should not, however, continue to grant extensions indefinitely. At some point it may need to seriously consider the advisability of granting any further extensions.

IMPLEMENTATION OF BUILDING ENERGY PERFORMANCE STANDARDS MAY BE DELAYED

The performance standards program can be expedited if States and local governments have fully implemented thermal efficiency standards before the standards become effective. However, many State and local jurisdictions have not yet adopted thermal efficiency standards. In addition, most States GAO reviewed do not know what building standards local governments have adopted and if or how local governments are enforcing State-enacted standards.

As things stand, States will not be able to certify that all jurisdictions have adopted and are enforcing building codes consistent with the performance standards, when they become effective. If States cannot accurately certify compliance, further Federal action, including the possible use of sanctions, may be necessary to assure that performance standards are fully and uniformly implemented.

The Department needs to continue to encourage State and local jurisdictions to adopt thermal efficiency standards. A joint Federal/ State effort should be undertaken to monitor local government activities to adopt thermal efficiency standards.

To avoid the kind of uncertainties about the effectiveness of the performance standard program that occurred with the thermal efficiency standard program, the Department needs to develop a management system providing a data base to effectively evaluate performance standards' implementation.

RECOMMENDATIONS

With respect to the State Energy Conservation Program, the Secretary of Energy should reassess the way it determined State compliance with program requirements for fiscal year 1979 funding. If any State is determined not

to be in full compliance, the Secretary should consider granting more time for such State to comply.

With respect to the building energy performance standards program, the Secretary should

--continue to work with the States and/or local jurisdictions to assist them in adopting and enforcing thermal efficiency standards, even if the statutory authorization for the State Energy Conservation Program expires;

--work jointly with the States to monitor local jurisdictions' standards implementation activities, so that States will have a reliable basis for certifying compliance with the building energy performance standards, when promulgated; and

--develop and implement a management system providing a data base for effectively evaluating the program when implemented.

This report was discussed with Department officials, who generally agreed with the findings and recommendations.

Contents

ABBREVIATIONS

BEPS	Building Energy Performance Standards
BTU	British thermal unit
DOE	Department of Energy
GAO	General Accounting Office
NIBS	National Institute Of Building Sciences

CHAPTER 1

INTRODUCTION

Energy conservation is expected to play an important role in reducing the Nation's dependence on foreign oil. Estimates indicate that, by incorporating energy conservation features in new building design, 1/ a savings of about 1.5 million barrels of oil a day can result by the year 2000. Such savings will be realized as old structures are replaced with new, more energy-efficient buildings.

The Energy Policy and Conservation Act of December 22, 1975 (Public Law 94-163) established a basis for assisting State programs designed to promote energy conservation and to reduce the estimated energy consumption projected for 1980. Under the State Energy Conservation Program, each participating State is responsible for developing and implementing a comprehensive energy conservation plan designed to achieve established 1980 energy conservation goals. To be eligible for Federal assistance, each State plan must contain, among other things, mandatory thermal efficiency standards and insulation requirements for new and renovated non-Federal buildings. The program is administered by the Department of Energy (DOE).

The legislative authority to develop and implement State energy conservation programs under the Energy Policy and Conservation Act expired on September 30, 1979. The administration proposed new legislation--the Energy Management Partnership Act--which would continue a program of Federal financial assistance for existing State energy activities. However, because the Congress had not fully considered this legislation, it passed authority to carry on the State Energy Conservation Program through fiscal year 1980.

The Energy Conservation and Production Act of August 14, 1976 (Public Law 94-385), as amended, also recognized the importance of energy conservation in the building sector by requiring that DOE develop energy conservation performance standards for new residential and commercial buildings. One

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1/Two programs, authorized by the Energy Policy and Conservation Act and the Energy Conservation and Production Act, are directed at achieving future energy savings through more energy-efficient building design and construction.

purpose of this program is to assure that reasonable energy conservation features will be incorporated into new commercial and residential buildings. The effective date for the standards, originally established by law for 1981, was advanced to 1980 under the President's National Energy Plan.

This report discusses (1) the thermal efficiency building standards program's status and results and (2) problems experienced by the States in adopting and enforcing such standards. The results of our work indicate the need for further DOE action to assure the effective implementation of the energy conservation performance standards under development.

Our work concerning the State thermal efficiency building standards program supplements our work being carried out in response to our legislative mandate contained in Section 462 of the Energy Conservation and Production Act. Section 462 requires the Comptroller General to report to the Congress, for each of fiscal years 1977 through 1979, on DOE activities to carry out four energy conservation programs, including the State Energy Conservation Program. 1/

We recognize that DOE is still in the process of developing building energy performance standards. Accordingly, our conclusions and recommendations in this area should be considered as guidance for improving the overall effectiveness of that program.

Informal comments on a draft of this report were obtained from DOE officials responsible for the programs we reviewed. Their comments have been incorporated where appropriate. Overall, these officials agreed with the findings, conclusions, and recommendations contained in this report.

SCOPE OF REVIEW

To determine the thermal efficiency building standards program's status and results, we reviewed reports and records at DOE headquarters and at its Kansas City Regional Office and at the National Institute of Building Sciences (NIBS) in

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1/We are currently finalizing our report on fiscal year 1978 program activities. The results of our fiscal year 1977 review are contained in our report to the Congress "Evaluation of Four Energy Conservation Programs--Fiscal Year 1977" (EMD-78-81, Nov. 21, 1978).

Washington, D.C. We also visited 10 States and 16 local jurisdictions in Colorado, Florida, Indiana, Iowa, Kansas, New Mexico, New York, Ohio, Utah, and Wisconsin. These States represented a cross section of potential problem areas which our preliminary work indicated existed in most States and which could hamper effective implementation of Statewide building standards. Information on two other States (California and Virginia) was obtained from NIBS field visit reports. In addition, we reviewed proposed DOE procedures for establishing energy conservation performance standards.

CHAPTER 2

STATE PROGRAM EFFECTIVENESS AND COMPLIANCE WITH ENERGY POLICY AND CONSERVATION ACT UNCERTAIN

The effectiveness of the thermal efficiency building standards program, a part of the State Energy Conservation Program, is questionable because

--thermal efficiency building standards were not adopted in a timely manner by some States and

--some State building standards were not mandatory for all new construction.

In addition, it is unclear whether other States had complied with the Energy Policy and Conservation Act's requirement for such standards. As a result, it is highly unlikely that States will achieve their estimated goals for reducing energy consumption in new buildings.

DELAYS IN ADOPTING AND IMPLEMENTNG STANDARDS RESULT IN PROJECTED ENERGY SAVINGS LOSSES

Only 41 States (excluding U.S. territorial possessions) had adopted some type of thermal efficiency standards as of September 1979. Furthermore, many of these States experienced delays in enacting and implementing the standards presently in effect. Based on delays in adopting standards in 11 States and the District of Columbia which had not adopted standards as of April 1979, and an additional 12 States we reviewed, we estimate, in total, the annual loss of 100 trillion British thermal units (Btu's), or 46,000 barrels/day oil equivalent, of energy savings projected for 1980.

States' failure to timely adopt standards

DOE regulations called for the State thermal efficiency standards to be in place and ready for implementation by January 1, 1978, unless DOE granted an extension. Only 4 of the 12 States we reviewed had standards authorized and ready for implementation by January 1, 1978, or shortly thereafter. The other eight States took an additional 5 to 11 months to enact enabling legislation, revise model building codes to specific State requirements, and provide

training for effective standards implementation. Examples of these situations follow.

New York

New York did not enact enabling legislation until July 1978. The statute authorized the State Energy Office to promulgate an energy efficiency building code applicable to all new buildings, and specified that the code be equal to American Society for Heating, Refrigerating, and Air Conditioning Engineers, Inc., (ASHRAE) Standard 90-75 1/ or requirements set forth in State public service commission opinions concerning residential structures. The act provided for the building code to become effective October 1, 1978. However, because of delays in finalizing the code, the effective date for these standards was changed to January 1, 1979. The additional time was needed to provide local jurisdictions sufficient time to prepare for implementing the building code and for the substantial completion of the first round of training for designers and inspectors.

Indiana

During its 1977 session, Indiana passed legislation authorizing the State to select energy conservation building codes for adoption, effective January 1978. Mandatory enforcement was not required, however, until a model building code could be adjusted to specific State needs and formally adopted. This was expected to be accomplished in 1979.

Florida

The Florida Thermal Efficiency Code was enacted in June 1977. The legislation provided that, effective December 31, 1978, all new buildings conform to ASHRAE

1/DOE regulations published in November 1976 and revised in April 1979 required (1) that the mandatory thermal efficiency standards for new nonresidential buildings be no less stringent than ASHRAE Standard 90-75, "Energy Conservation in New Building Design"; and (2) that the standards for new residential buildings be no less stringent than either the ASHRAE Standard 90-75 or Department of Housing and Urban Development's minimum property standards. ASHRAE 90-75 is a nationally recognized consensus standard which provides design requirements for improving the use of energy in new buildings.

Standard 90-75, Department of Housing and Urban Development minimum property standards, or one of the model building codes developed from the ASHRAE standard. The State Energy Office issued Florida's model building code in November 1978, but during a special session of the legislature, the effective date was extended to March 15, 1979. The Florida Home Builders Association requested the extension because of alleged confusion and lack of readiness concerning the building code's implementation.

Achievement of projected 1980 energy savings unlikely

Under provisions of the Energy Policy and Conservation Act, all States participating in the program were responsible for developing and implementing a comprehensive plan directed at reducing the total amount of their projected energy consumption in 1980. The overall program goal was to reduce energy consumption by 5 percent or more.

States projected that total planned 1980 energy savings from implementing thermal efficiency building standards would be about 294 trillion Btu's (134,000 barrels/day oil equivalent). However, we estimate that about 34 percent of the projected 1980 savings could be lost due to delays in implementing the standards.

The effective date of new building standards occurs some time after passage of enabling legislation. After enactment of legislation by a State, it can take up to 1 year or longer to revise model building codes and train builders and inspectors before new standards are fully implemented and applied to new building designs. These factors, along with construction lead time--ranging up to 6 months for residences and 24 months or more for many commercial buildings--determine the actual effective date of new building standards as well as the associated energy savings. Under the above circumstances, therefore, if the actual adoption or implementation dates occurred later than planned, a corresponding reduction would result in the number of years the standards would be in effect through 1980 and thus, in the energy savings originally projected.

The total planned 1980 energy savings from implementing thermal efficiency standards was estimated at about 39 trillion Btu's for 12 States which had not adopted standards as of April 1979. Because of the time lag between passage of enabling legislation and completion of the first buildings

incorporating the new building standards, we estimate that little, if any, of the planned energy savings will be achieved in 1980.

Eight of the 12 States we visited also experienced delays and did not meet their initial target dates for having the building standards in place and ready for implementation. We estimate the loss in energy savings associated with these delays at approximately 25 trillion Btu's or a 24-percent reduction in projected 1980 energy savings. Our computation of these losses was based on reducing the number of years the standards were originally expected to be in effect by the amount of time which elapsed between the planned and actual adoption or implementation dates.

If the delays experienced by 8 of the 12 States we reviewed were typical of experiences in other States which have adopted thermal efficiency standards, then about 100 trillion Btu's (46,000 barrels/day of oil equivalent) or 34 percent of the projected 1980 energy savings for all States may be lost. This includes the estimated 39 trillion Btu's projected for the 12 States which had not adopted standards as of April 1979, plus 24 percent of the 1980 savings projected by the remaining States.

While our estimate of the loss of projected 1980 energy savings raises questions about the effectiveness of the thermal efficiency standards program, it does not necessarily indicate what has actually occurred in building construction. This is because data relative to the number of new buildings constructed with energy-savings features was not readily available.

Many of the nationally recognized building codes now include ASHRAE 90-75 building standard requirements. Local governments which have adopted these codes may be incorporating thermal efficiency features in new building design even if their respective States have not adopted or do not require mandatory standards enforcement for all new construction. For example, Oklahoma had not established Statewide mandatory standards by April 1979, but four of its largest communities had adopted model building codes which incorporated ASHRAE 90-75 building standard requirements.

ADOPTED STANDARDS ARE NOT MANDATORY FOR ALL NEW BUILDINGS

While 41 States had adopted some type of thermal efficiency standards for new buildings by October 1979, in at least 14

--standards had not been established for all building categories,

--standards were mandatory for all new construction, or

--standards were not mandatory in all jurisdictions of the State.

These situations could substantially reduce the number of buildings constructed with energy conservation features, further reducing the achievement of projected 1980 energy savings.

Out of 10 States, enabling legislation in 7 States did not provide for establishing standards for all building categories. For example, five of these States had established standards for public (State-owned) buildings, but not for residential and private commercial buildings. Three additional States had adopted standards for all building categories, but did not require mandatory compliance with the standards for all new construction. In one of these States, the standards established for new residential and private commercial buildings were voluntary. Thus, application of thermal efficiency standards was not required for most new building construction in these 10 States.

Two other States, included in our review, exempted certain buildings from complying with State standards. Florida's statute exempted buildings of less than 1,500 square feet which, in turn, exempted a significant number of detached single family residences throughout the State. State energy office officials said that this exemption was necessary to get the law passed. However, another official said that most local governments with significant amounts of construction would not allow the exemption in their local building codes. Iowa legislation did not require compliance with State standards for construction of buildings under 100,000 cubic feet in areas without building codes. According to State officials, the legislature intended to exclude residential buildings from complying with the standards so homeowners would not be required to incur any additional expenses.

In two States, standards were established for all building categories, but mandatory compliance was limited to local jurisdictions with building codes. In Colorado, for example, standards apply only to jurisdictions with building codes. The State law did not authorize its government to require areas without building codes to adopt the State standards. State officials, however, estimate that 96 percent of the population in Colorado lives in areas covered by local building codes. About 12 percent of the jurisdictions did not have building codes.

STATE PROGRAM COMPLIANCE WITH ENERGY POLICY AND CONSERVATION ACT UNCERTAIN

Although DOE developed criteria to determine State compliance with the mandatory thermal efficiency standards program requirements, the Department did not apply these criteria to all States on a consistent basis. Furthermore, meeting the criteria did not assure State compliance with the Energy Policy and Conservation Act or DOE's regulations.

Program requirements and DOE compliance criteria

The Energy Policy and Conservation Act provides for approving Federal financial assistance only for those States which are implementing all five of the required conservation measures specified in the act. In the event that a State fails to comply with the requirement for thermal efficiency standards, or one of the other required measures, funds applicable to all required and voluntary conservation measures must be withheld or withdrawn unless DOE grants an extension to provide additional time to comply. These legal restrictions apply even though the State substantially achieves or exceeds its established energy conservation goals by implementing the other approved conservation measures. 1/

1/As one of the required measures, thermal efficiency standards account for about 5 percent of the 1980 energy conservation goals. The five required measures account for less than 40 percent of the goal.

With respect to minimum requirements for compliance with the mandatory thermal efficiency standard program, the Energy Policy and Conservation Act and implementing DOE regulations require that mandatory thermal efficiency standards be implemented for new buildings throughout each State's political subdivisions. DOE requires that all local jurisdictions enact legislation calling for thermal efficiency standards implementation in States which lack the authority to establish Statewide building standards before such States are considered in compliance with minimum requirements. DOE generally classified those States which had enacted Statewide thermal efficiency standards as having met the minimum requirements for funding.

As of October 1979, DOE considered 26 States to be in compliance with the thermal efficiency standards requirement and 25 States, including the District of Columbia, had been granted extension of time to comply. However, DOE's compliance determinations did not take into account (1) whether such States had authority to enforce Statewide building standards or (2) the status of local government implementation of the State-enacted thermal efficiency standards.

DOE basis for determining compliance unreliable

DOE's determination of States' compliance with the thermal efficiency standards program was unreliable because DOE had not applied its compliance criteria to all States in a consistent manner. Furthermore, meeting the DOE-established criteria did not assure State compliance with program requirements.

As of May 1979, on the basis of DOE-developed program compliance criteria, DOE had questioned whether 22 States and the District of Columbia were complying with program funding requirements. Of these 23 jurisdictions, 12 States and the District of Columbia had not enacted any State building standards at that time, and 11 States had enacted building standards; but the standards were not mandatory for all new building construction.

However, based on our review of 12 of the remaining 28 States, 3 that DOE considered to be in compliance did not have mandatory standards for all new building construction. Standards established by these States covered all building categories but were not mandatory for all jurisdictions

within the State or for all new residential construction. Neither the act nor the implementating regulations authorize such exception. Furthermore, meeting the DOE-developed criteria did not assure that the remaining 25 States had complied with program requirements because the criteria did not take into account State enforcement control authority or the status of local government implementation of the standards throughout the States.

State laws generally hold local governments responsible for enforcing energy-related building standards for some, or all, new building construction. Such local authority existed in 9 of the 12 States reviewed. However, only one of these States had monitored local jurisdictions' enforcement of these standards. At the time of our review, neither DOE nor officials in the remaining 11 States had determined whether the State-adopted standards had been implemented or how they would be implemented by local officials having enforcement responsibilities. Also, in seven States where local officials had been granted an option to choose among alternative building standards, the State officials did not know whether the State building standard, comparable standards, or more stringent standards had been implemented in the various jurisdictions. Only three States had plans to establish monitoring systems at a later date.

We also noted instances where local governments had not implemented State-enacted building standards covering all building categories. Results of a survey conducted by one State disclosed that eight communities refused to implement the State building standards, and six communities were unaware that such standards existed. The other communities reported that the standards had been or would be implemented.

In 2 of the 16 communities we contacted, Statewide building standards had not been implemented because local officials were not aware of their existence. In another case, State officials were aware that two counties had never enforced the State building standards. Officials in another State knew of one sparsely populated county in violation of the State law which required that all jurisdictions adopt a building code.

During discussions with DOE on a draft of this report, DOE officials informed us that, as of October 1979, only 26 States were considered to be in full compliance. Of the remaining 24 States and the District of Columbia,

standards for new buildings and the remaining 20 were in various stages of implementing such standards or had implemented standards for certain building types or in selected geographic areas within the States.

CONCLUSIONS AND RECOMMENDATIONS

The thermal efficiency standard program's effectiveness in meeting its goal for improving energy efficiency in new building construction is questionable. A savings of approximately 100 trillion Btu's (34 percent of the annual energy savings projected by the States to result from the thermal efficiency standards program in 1980) may not be achieved because many States failed to meet their initial target date for thermal standards adoption or implementation. Additional losses in the projected 1980 energy savings may also occur because thermal standards adopted in some States were not mandatory for all new building construction. Whether the energy efficiency of new buildings actually constructed has improved is uncertain because DOE and most States had not developed information with respect to the number of new buildings constructed with thermal efficiency features.

Whether States have complied with the law and DOE regulations concerning implementation of the thermal efficiency standards is uncertain. Neither DOE nor most States have developed information to determine the extent of thermal efficiency standards implementation by local governments. In addition, DOE failed to consider, when determining State compliance, whether State standard enforcement mechanisms were in place to assure implementation of Statewide building standards. Furthermore, DOE initially considered a few States to be in compliance even though their standards were not mandatory for all new construction.

Overall, we are concerned that DOE's determination of State compliance with program requirements was not totally consistent with the law or its own regulations. On the other hand, as we have previously concluded, 1/ a closely coordinated cooperative relationship with the States is essential to the success of the Nation's energy conservation efforts. It is likely that strict adherence to the

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1/"Evaluation of Four Energy Conservation Programs--Fiscal Year 1977" (EMD-78-81, Nov. 21, 1978).

law and DOE regulations would have resulted in some States failing to receive 1979 program funds. This situation, in turn, could have then seriously jeopardized already established Federal/State relationships in the energy conservation area.

The purpose of the State Energy Conservation Program, as stated in the law, is to promote the conservation of energy and reduce the rate of growth of energy demand. In our view, this purpose has been better served by granting some States extensions of time to comply with program requirements and awarding the States 1979 program funds rather than withholding those funds until full compliance has been achieved. However, we believe DOE should reassess its determinations for those States considered to be in compliance to assure that such States have fully met all program requirements. If it is determined that any of those States have not fully met program requirements, DOE should consider granting such States extensions of time to comply.

DOE should not, however, continue to grant extensions forever. At some future time, DOE may need to seriously consider the advisability of granting any further extensions to those States which do not appear to be making good-faith efforts to comply.

Recommendations

We recommend that the Secretary of Energy reassess the compliance determinations for those States considered to be in full compliance with the State Energy Conservation Program requirements for fiscal year 1979 funding. In making its reassessment the Secretary should consider

--whether States have and are using enforcement authority to assure building thermal efficiency standards implementation and

--the status of local implementation of State-enacted building thermal efficiency standards.

If any State is determined not to be in full compliance, the Secretary should consider granting an extension of time for such State to comply.

CHAPTER 3

ISSUES AFFECTING BUILDING

ENERGY PERFORMANCE STANDARDS IMPLEMENTATION

Unless DOE expedites its plans to prepare for implementing the building energy performance standards (BEPS) and works closely with States and local jurisdictions to strengthen the States' ability to properly certify compliance with BEPS, consistent and effective BEPS implementation will be delayed. If the States cannot properly certify compliance with BEPS, future Federal action, including the possible use of sanctions, may become necessary to assure full and uniform implementation of BEPS.

PERSPECTIVE

Title III of the Energy Conservation and Production Act, as amended, requires that DOE develop and promulgate performance standards 1/ for new residential and commercial buildings--BEPS. The standards are to be designed to achieve the maximum practical improvements in energy efficiency and increases in the use of nondepletable sources of energy.

BEPS will be expressed in terms of total Btu's per square foot per year and reflect an energy consumption goal for an entire building. They are also expected to be developed for different building types in different climatic regions. It will be necessary for building designers to balance the interrelations between the building's energy-consuming sub-systems to achieve the performance goal.

DOE, on November 19, 1979, published proposed BEPS in the Federal Register for public comment. Promulgation of the final standards is expected after a 6-month public comment period. The Energy Conservation and Production Act provides that, within 90-days after the final BEPS, the Congress will decide, by joint resolution, whether financial sanctions are necessary and appropriate to assure that the standards are in fact applied to all new building construction.

1/The term "performance standard" means an energy consumption goal or goals to be met without specification of the methods, materials, and processes to be employed in achieving that goal or goals, but which include statements of the requirements, criteria, and evaluation methods to be used, and any necessary commentary.

BEPS will be significantly more complex to comply with than present thermal efficiency standards. DOE is developing manual and computer calculation models which are expected to be able to determine and verify (1) whether a proposed building design meets BEPS requirements and (2) whether thermal efficiency standards in place are equivalent to BEPS consumption goals. States are envisioned as playing the key role in assuring ultimate adoption and implementation of BEPS via a certification of compliance process.

DOE NEEDS TO EXPEDITE BEPS IMPLEMENTATION PLANS

It is unlikely that States can meet the mandated timeframes for implementing BEPS unless DOE carries out, in a timely manner, its plans to develop

- --methods to assess, and modify if necessary, existing thermal efficiency standards to meet BEPS requirements;
- --model building codes which will meet BEPS requirements; and
- --effective programs to train architects, builders, and inspectors to comply with BEPS.

In addition, DOE should continue its efforts to assist State and local governments in adopting and implementing thermal efficiency standards in those areas which have not yet adopted these standards since having such standards and related building codes in place will facilitate the implementation of BEPS.

Under DOE State Energy Conservation Program guidelines, most States have adopted or plan to adopt ASHRAE 90-75 building standards to comply with that program's requirements for thermal efficiency standards. If these standards do not meet the final BEPS requirements, most States will need to amend legislation or fulfill other legal and/or administrative requirements before adopting new standards. Colorado's residential energy conservation standards, for example, regulate only the building shell and are specified within the enabling legislation. The State cannot modify these standards without changing the statute or developing new legislation.

Many State officials believe that up to 18 months will be needed before BEPS can be effectively implemented if present thermal standards must be replaced. This is consistent with the results of our work, which showed that 8 of 12 States reviewed needed from 18 to 24 months to (1) enact enabling legislation, (2) revise model building codes to individual State needs, and (3) provide training for effective enforcement after DOE promulgated the thermal building standards.

Effective implementation of BEPS will also require effective training programs and appropriately designed building codes to assure that energy performance requirements are met. Although training courses were provided for implementing the thermal building standards, most State officials believed that architects, builders, and inspectors will need extensive training to attain the expertise needed to determine whether a proposed building design meets BEPS requirements.

DOE officials advised us that they planned to evaluate the ASHRAE 90-75 building standard and, if technically feasible, identify any modifications needed for amending the standard to meet equivalency with energy performance standards. This should help avoid the need for additional legislative action in many States and local jurisdictions which have already adopted these standards, and thus, expedite BEPS implementation. Also, DOE plans call for developing training programs and model building codes or other control mechanisms, such as design calculation models, for implementing BEPS rather than having each State develop these common requirements individually. In our opinion, if DOE carries out these plans in a timely manner, BEPS implementation can be expected in less time than the 18 to 24 months which were required by most States to adopt and implement the thermal building standards.

Although effective BEPS implementation can be expected if thermal efficiency standards are in place when BEPS are promulgated, as discussed in chapter 2, some States and local jurisdictions have not yet adopted thermal building standards. Thus, DOE should continue its drive for thermal building standards adoption and implementation, where needed, before BEPS promulgation.

DOE NEEDS TO ASSURE STATE COMPLIANCE WITH BEPS

Many States currently do not have the authority to enforce State-enacted building standards. In addition, most States are not aware of which local jurisdictions are implementing thermal efficiency building standards. The Energy Conservation and Production Act provides for States to certify that BEPS equivalent building codes have been adopted and implemented within the State. Therefore, the lack of State enforcement authority and/or unawareness of local jurisdiction building standard implementation would prevent States from properly certifying State compliance with BEPS requirements. DOE needs to work jointly with the States in effectively monitoring local jurisdictions' building standard implementation activities, particularly in those States which lack State building standard enforcement authority.

Under Section 305 of the Energy Conservation and Production Act, each State must certify that either

--it has adopted and is implementing, on a Statewide basis or with respect to each area, a building code or other laws or regulations which provide for the effective application of the performance standard or

--the appropriate local governments have adopted and are implementing buildings codes or other construction control mechanisms which meet or exceed the requirements of the performance standards.

In most States we reviewed, local governments are responsible for adopting and enforcing existing building standards and codes. This occurs even where Statewide building standards have been established by State legislation. Although 5 of the 12 States reviewed can enforce building standards for some or all new construction, existing legislation pertaining to energy-related building codes in the other 7 do not authorize State enforcement and contain no penalty provisions for non-compliance. Thus, if local officials fail to enforce State standards applicable to their jurisdictions, there is no apparent recourse. However, only one State was precluded by its State constitution from enacting legislation to enforce building standards.

As discussed in chapter 2, information concerning the status of local implementation of energy-related building standards is lacking. Most of the States reviewed do not know if or how local governments are enforcing State-enacted thermal building standards. Furthermore, where local governments have been granted options to adopt either the State-enacted building standard or an equivalent standard, the States are unaware of what standards the local governments have adopted.

If the above situations do not change, States will not be in a position to certify that all their jurisdictions have adopted and are implementing building codes consistent with BEPS requirements. Furthermore, if the States cannot accurately certify compliance with BEPS, further Federal actions, including the possible use of sanctions, may become necessary to assure full and uniform BEPS implementation.

CONCLUSIONS AND RECOMMENDATIONS

Building energy performance standards are expected to save significant amounts of energy in the years ahead by improving the energy efficiency of the Nation's buildings. To a great extent, however, the effectiveness of BEPS will depend on the ability of State and local governments to adopt and implement appropriately designed building codes. In this regard, BEPS are expected to be significantly more complex to comply with than the thermal efficiency building standards currently used in most States.

DOE needs to expedite its ongoing activities to develop (1) methods for assessing the energy performance equivalency of building standards currently in use; (2) model building codes which will meet BEPS requirements; and (3) training programs for architects, builders, and inspectors. In addition, DOE should continue its efforts to assist State and local jurisdictions in adopting and implementing thermal efficiency standards. Unless this is done, it is unlikely that the States will be able to meet the timeframes for implementing BEPS.

Currently, most States are not in a position to properly certify that all local jurisdictions have adopted and implemented building standards which comply with BEPS. This is true because many States do not have the authority to enforce State-enacted building standards, and most States are unaware of which standards, if any, are being implemented by local jurisdictions. In our view, DOE should work

jointly with the States in effectively monitoring local jurisdictions' building standard implementation activities, particularly in those States which lack building standard enforcement authority. This would allow States to obtain the information necessary to properly certify whether compliance with BEPS is to be accomplished.

RECOMMENDATIONS

We recommend that the Secretary of Energy

--continue to work with the States and/or local jurisdictions to adopt and implement thermal efficiency standards so BEPS implementation can be expedited;

--work jointly with the States to monitor local jurisdictions' building standard implementation activities, particularly in those States which lack building standard enforcement authority, so that States will have a reliable basis for certifying compliance with the building energy performance standards, when promulgated; and

--develop and implement a management system directed at providing a data base for effectively evaluating BEPS when it is implemented. The system should include, at a minimum, information on (1) the number and percentage of new buildings designed in accordance with the required standards and (2) energy savings based, to the maximum degree feasible, on actual and verifiable energy consumption data.

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