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ENERGY EFFICIENCY

Long-standing Problems with DOE's Program for Setting Efficiency Standards Continue to Result in Forgone Energy Savings





Highlights of [GAO-07-42](#), a report to congressional requesters

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Why GAO Did This Study

The Department of Energy (DOE) sets energy efficiency standards through the rulemaking process for certain consumer product categories, such as kitchen ranges, and industrial equipment, such as distribution transformers. Congress reported in 2005 that DOE was late in setting standards and required DOE to report every 6 months on the status of the backlog.

GAO examined (1) the extent to which DOE has met its obligations to issue rules on minimum energy efficiency standards for consumer products and industrial equipment and (2) whether DOE's plan for clearing the backlog will be effective or can be improved. Among other things, GAO convened an expert panel on energy efficiency standards to identify causes and effects of delays and assess DOE's plans.

What GAO Recommends

GAO recommends that DOE adopt elements of effective project management in its standards rulemaking, such as using a more transparent process and allocating adequate resources within its appropriation. In commenting on this report, DOE did not respond to the recommendations but said it was incorrect to single out any official or office for the delays and that the report did not reflect many of its standards-setting activities since EPC Act 2005. GAO reported several causes of delays; activities since EPC Act 2005 were outside this report's scope.

www.gao.gov/cgi-bin/getrpt?GAO-07-42.

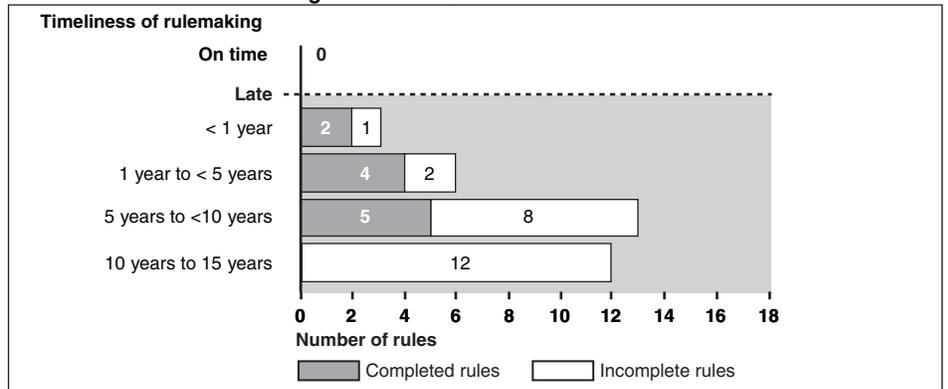
To view the full product, including the scope and method, click on the link above. For more information, contact Jim Wells at (202) 512-3841 or wellsj@gao.gov.

What GAO Found

DOE has missed all 34 congressional deadlines for setting energy efficiency standards for the 20 product categories with statutory deadlines that have passed. DOE's delays ranged from less than a year to 15 years. Rulemakings have been completed for only (1) refrigerators, refrigerator-freezers, and freezers; (2) small furnaces; and (3) clothes washers. DOE has yet to finish 17 categories of such consumer products as kitchen ranges and ovens, dishwashers, and water heaters, and such industrial equipment as distribution transformers. Lawrence Berkeley National Laboratory estimates that delays in setting standards for the four consumer product categories that consume the most energy—refrigerators and freezers, central air conditioners and heat pumps, water heaters, and clothes washers—will cost at least \$28 billion in forgone energy savings by 2030. DOE's January 2006 report to Congress attributes delays to several causes, including an overly ambitious statutory rulemaking schedule and a lengthy internal review process. In interviews, however, DOE officials could not agree on the causes of delays. GAO's panel of widely recognized, knowledgeable stakeholders said, among other things, that the General Counsel review process was too lengthy and that DOE did not allot sufficient resources or make the standards a priority. However, GAO could not more conclusively determine the root causes of delay because DOE lacks the program management data needed to identify bottlenecks in the rulemaking process.

In January 2006, DOE presented to Congress its plan to bring the standards up to date by 2011. It is unclear whether this plan will effectively clear DOE's backlog because DOE does not have the necessary program management data to be certain the plan addresses the root causes. The plan also lacks critical elements of an effective project management plan, such as a way to ensure management accountability for meeting the deadlines. Finally, the plan calls for a sixfold increase in workload with only a small increase in resources. DOE plans to manage the workload through improved productivity.

Timeliness of DOE Rulemakings That Have Come Due



Source: GAO analysis of DOE data.

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Abbreviations

| | |
|-------------|---|
| ASHRAE | American Society of Heating, Refrigerating and Air-Conditioning Engineers |
| Btu | British thermal unit |
| CABO | Council of American Building Officials |
| DOE | Department of Energy |
| DOT | Department of Transportation |
| EPAAct 2005 | Energy Policy Act of 2005 |
| EPCA | Energy Policy and Conservation Act |
| ICC | International Code Council |
| IECC | International Energy Conservation Code |
| LBNL | Lawrence Berkeley National Laboratory |
| MEC | Model Energy Code |
| PMF | Presidential Management Fellows |
| PNNL | Pacific Northwest National Laboratory |

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United States Government Accountability Office
Washington, DC 20548

January 31, 2007

The Honorable John D. Dingell
Chairman
Committee on Energy and Commerce
House of Representatives

The Honorable Rick Boucher
Chairman
Subcommittee on Energy and Air Quality
Committee on Energy and Commerce
House of Representatives

The Honorable Edward J. Markey
House of Representatives

Recent energy cost increases and concerns about global warming are leading to a new national focus on reducing U.S. energy consumption. Household and commercial products that are regulated by the U.S. Department of Energy (DOE) will account for about 30 percent of estimated total U.S. energy consumed in 2006, according to DOE's Lawrence Berkeley National Laboratory. Increasing the energy efficiency of these kinds of products could produce significant energy savings. Not surprisingly, therefore, Congress has long been interested in improving energy efficiency. In 1975, under the Energy Policy and Conservation Act (EPCA), Congress required DOE to set target minimum energy efficiency standards for manufacturers of specified categories of consumer products such as refrigerators, dishwashers, furnaces, and hot water heaters. Congress has amended the statute to include additional consumer product categories such as fluorescent lamps and plumbing products, as well as industrial equipment categories such as steam boilers and electric motors. Minimum efficiency standards for consumer product and industrial equipment categories are designed to eliminate the least efficient products from the market.¹

¹DOE's energy efficiency standards program is separate from the Energy Star program, which is a joint DOE-Environmental Protection Agency voluntary labeling program that identifies and promotes the products that meet the most efficient energy conservation standards.

EPCA, as amended, also reflects manufacturers' and states' interest in having uniform federal standards for energy-efficient products, rather than a patchwork of state standards. It prohibits states and localities from setting more stringent standards than the federal standards for covered products unless the states obtain waivers from DOE. When the act was passed, several states were setting their own energy efficiency standards, and stakeholders, including states and manufacturers, generally believed that uniform federal standards would result in lower costs for manufacturing and, hence, lower prices for consumers, as well as saving energy overall.

Under EPCA amendments, Congress mandated deadlines for DOE to issue rules that set minimum energy efficiency standards for most consumer product categories. Congress also made manufacturers' compliance with the standards mandatory. The statute also requires DOE to set and revise standards through the federal rulemaking process. This process calls for analyzing the technical and economic issues associated with setting energy efficiency standards for each category, proposing a standard through public notification, soliciting comments on the standard, revising the rule, and issuing the final rule. DOE program staff in Washington develop these rules, using analysis by experts—such as staff at Lawrence Berkeley National Laboratory (LBNL) and other contractors—on the technical and economic aspects. The rules undergo legal and policy reviews within the department before they are issued.

Most of the categories with deadlines require at least two rules—either to set an initial standard and later update it or to update a congressionally set standard and then update it again about 5 years after the first deadline. For categories without deadlines, DOE must first review revisions that nongovernmental standard-setting entities make to their model standards and, generally, issue a rule announcing whether it will adopt these revised model standards or reject them and issue its own standards.

In 1993, we reported that while DOE had issued rules for some of the product categories with passed deadlines, these had always been issued late, and the others had not been issued yet. We cited inadequate resources as a major reason for delays.² Congressional action in 2005 reflected continuing concerns about DOE's ability to issue rules for

²GAO, *Energy Conservation: Appliance Standards and Labeling Programs Can Be Improved*, GAO/RCED-93-102 (Washington, D.C.: March 1993).

energy-efficient consumer products and industrial equipment. The Energy Policy Act of 2005 (EPAcT 2005) required DOE to report to Congress by February 8, 2006, and again every 6 months following the submission of that report, on its plans to clear its backlog of standards that need to be set or considered for revision. In its first report, submitted in January 2006,³ DOE reported a backlog of required rulemakings for many consumer product and industrial equipment categories but made a commitment, from the Secretary on down, to take a number of steps to clear the backlog by 2011.⁴ Twenty of these consumer product and industrial equipment categories have statutory deadlines that have passed and involve 34 different product rules.⁵

The requirement for reports to Congress every 6 months highlights the importance Congress places on setting energy efficiency standards for specific consumer products and industrial equipment. The missed deadlines have meant missed opportunities to reduce (1) consumers' energy costs, (2) the need for new power facilities, and (3) the level of polluting emissions such as carbon dioxide, among other things. While some consumers may choose to buy products that are more efficient without waiting for federal standards, others may not do so for a number of reasons—because the more efficient products may cost more at the time of purchase, for example. If, however, all models in a category have to meet certain minimum energy efficiency standards, then the potential for savings over the life of the product, due to lower energy bills, can be significant. For example, by 2030, for the minimum energy efficiency standards for consumer products that DOE has set thus far, DOE projects that consumers will save nearly \$125 billion. Enough energy would be saved to operate all U.S. homes for over 2 years, based on 2006 estimated energy consumption.

As requested, this report examines (1) the extent to which DOE has met its statutory obligations to issue rules on minimum energy efficiency

³Department of Energy, *Energy Conservation Standards Activities*. (Washington, D.C.: Jan. 31, 2006).

⁴The second report, released in August 2006, reiterated the catch-up plan and reported on DOE's actions toward clearing the backlog. These actions include making progress on and issuing rules related to the standards-setting process, but none established new standards for the products and equipment included in the scope of this report.

⁵This reported backlog did not include an additional 17 product categories added by EPAcT 2005 to DOE's mandate for setting energy efficiency standards, 9 of which have deadlines for DOE rulemakings. These additional responsibilities were not part of our review.

standards for consumer products and industrial equipment and (2) whether DOE's plans are likely to clear the backlog of required rulemakings and whether these plans could be improved. In addition, you asked us to assess whether DOE has met statutory deadlines for building code determinations (see app. I). In future work, GAO plans to evaluate federal agencies' efforts to provide household consumers with information about energy savings opportunities for purchases of appliances, lighting, and other energy consuming products.

We reviewed statutes and regulations regarding the requirements and deadlines for minimum energy efficiency standards for consumer products and industrial equipment. We interviewed relevant officials from, and analyzed documentation provided by, DOE, a DOE contractor, energy organizations, and nongovernmental standard-setting entities; an expert on regulatory efficiency; and government officials from Canada and California—governments that are known for their exemplary standards-setting programs.⁶ In addition, we convened a Web-based panel of 33 energy efficiency standards stakeholders from federal and state governments, industry, nonprofit organizations, and utilities who are both widely recognized as knowledgeable about key aspects of energy efficiency standards and are involved with DOE's standards rulemaking process. We obtained panel members' views using a modified, Web-based version of the Delphi method, a systematic process for obtaining individuals' views and obtaining group members' consensus, if possible, on a problem of interest. A more detailed description of our objectives, scope, and method is presented in appendix II. We did not examine the merits of the standards DOE has set. Although DOE is required to issue rules regarding standards for plumbing products, we excluded them from this report because they primarily involve conserving water, rather than energy. In addition, we did not consider deadlines for the purposes of this report set in EAct 2005; nor did we examine DOE's activities undertaken since EAct 2005 that did not result in a completed standard. We conducted our review from June 2005 through January 2007 in accordance with generally accepted government auditing standards.

⁶California has set standards for products not covered under federal law, such as commercial clothes washers and external power supplies for electronic devices such as laptop computers, mobile phones, printers, and digital cameras.

Results in Brief

DOE has missed all 34 of the deadlines for rulemaking that have come due for the 20 consumer products and industrial equipment categories with deadlines that have passed. In addition, it has not revised standards for one of the six industrial equipment categories that have no deadlines but for which DOE is obligated to issue new rules. Of the 34 rules with missed deadlines, 11 were issued late, and the other 23 have not been issued at all. Delays in meeting deadlines range from about 2 months to 15 years. Overall, all required rulemakings have been set for only three product categories with deadlines: (1) refrigerators, refrigerator-freezers, and freezers; (2) small furnaces; and (3) clothes washers. DOE has yet to set all required rulemakings for 17 additional categories such as—for consumer products—kitchen ranges and ovens, dishwashers, clothes dryers, hot water heaters, and—for industrial equipment—various electric motors and electric distribution transformers, which reduce the voltage of an electric utility’s power distribution line to the lower voltages suitable for most equipment, lighting, and appliances. In addition, standards are up to date for five of the six industrial equipment categories that have no deadlines but which must have standards set: (1) warm air furnaces, (2) packaged boilers, (3) storage water heaters, (4) instantaneous water heaters, and (5) unfired water storage tanks (that store water and have an external source for heating it). The sixth category—a particular type of large air conditioner and heat pump—has not had standards set. Our panel members cited increased energy consumption as one of the most significant effects of the delays. In fact, according to LBNL, the delays for the four consumer product categories with the greatest energy savings potential will cost the nation an estimated \$28 billion in forgone savings by 2030. Our panel also pointed to other potential effects of delays, such as states attempting to set their own efficiency standards and manufacturers’ and utilities’ difficulties in making business plans. Standards that differ from state to state would be likely to cause higher manufacturer costs than a single federal standard and, hence, higher costs for consumers.

It is unclear whether DOE’s latest plan for clearing its backlog of rulemakings will effectively bring its minimum energy efficiency standards up to date, primarily because DOE cannot be certain it knows the root causes of the delays, and its catch-up plan lacks critical elements of an effective project management plan. Specifically:

- *Root causes are uncertain.* Neither DOE nor our panel could agree on, and we could not definitively determine, the root causes of the delays. DOE has not developed the program management data it needs to identify bottlenecks in the rulemaking process and develop solutions. As a result, we could not determine if the corrective actions DOE has proposed will

alleviate delays. In developing the catch-up plan, the managers relied primarily on anecdotal information from program staff to determine the causes of delays. In the absence of management information, such as the length of each stage of DOE's rulemaking process, we were not able to determine which of these causes or combinations of causes account for the delays. Some of our panelists raised concerns that DOE may not be addressing what they believe are the most relevant reasons for delays; for example, DOE may not have allocated sufficient funding or assigned adequate technical staff. Unless the causes of the delays are known, it is difficult to know whether problems have been addressed. But, most of the panelists rated the components of DOE's plan highly and expect that it will help DOE meet the deadlines of its catch-up schedule if these actions are implemented.

- *The plan lacks critical project management elements.* According to leading project management practices, effective project plans have two key components that are lacking in DOE's plan. First, plans should hold officials and staff accountable for meeting interim and final deadlines. If the officials do not meet these deadlines, they should provide legitimate reasons for the delays. Second, the plan should include provisions for adequate resources. Instead, DOE's plan increases the workload sixfold over that in recent years without increasing proportionately the resources it will devote to the program. DOE officials told us they plan to rely on increased productivity, with only a marginal increase in resources, to bring the standards up to date. Furthermore, DOE's plan does not include a means of ensuring that staff and reviewers are accountable for meeting deadlines.

To help ensure that DOE reduces or eliminates the backlog, we are making recommendations to the Secretary of Energy that DOE revise its catch-up plan to incorporate leading management practices. In commenting on a draft of this report, DOE did not provide views on our recommendations. DOE said it was incorrect to single out any official or office for the delays and that the report did not reflect many of its standards-setting activities undertaken since EPCA 2005. We disagree with DOE's characterization of our analysis. We reported several causes of delays in the standards-setting process; also, the activities DOE has taken since EPCA 2005 that did not result in completed standards are outside of the scope of this report.

Background

Under EPCA, as amended, covered product and equipment categories may need one or two rulemakings for the following reasons:

-
- Most often, if Congress established a standard in the law, DOE must publish a rule revising the standard or explaining why a revision is not justified. Generally, such statutes require two rulemakings: an initial revision and then a second revision, usually 5 years later. This type of rulemaking is associated with most categories.
 - For several consumer products for which Congress did not set a standard in law, DOE must issue two rules—one rule to create a standard and a later rule to update the standard.
 - For several industrial equipment categories for which Congress established a standard in law, DOE must review amendments to model standards set by a specified nongovernmental standard-setting entity. Based on DOE's review, it must either publish a rule updating the statutory standards to reflect the amended model standards, or publish a rule demonstrating that a more stringent standard is justified. The statute specifically requires DOE to consider the standards set by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
 - For three other industrial equipment categories, DOE must first publish a determination of whether a standard is needed. If DOE determines the need for a standard, it must then publish a rule setting such a standard 18 months after publishing the determination. However, DOE does not have a deadline for making a determination.

Overall, DOE is required to determine that revisions to standards achieve the maximum improvement in energy efficiency that is “technologically feasible and economically justified.” In determining whether a standard is economically justified, DOE must consider the economic impacts of the revision on manufacturers and consumers, the savings in operating costs throughout the life of the product, the total projected amount of energy savings likely to result from the standard, and whether the standard would result in a product that is less useful or does not perform as well. Table 1 shows the number of deadlines and types of actions required for consumer product and industrial equipment categories with deadlines that have passed. In addition, DOE is obligated to issue rules adopting revised standards for another six industrial equipment categories: packaged terminal air conditioners and packaged terminal heat pumps; warm air furnaces; packaged boilers; storage water heaters; instantaneous water heaters; unfired water storage tanks. DOE has no mandated deadlines for issuing these rules.

Table 1: Actions DOE Is Required to Take for Consumer Product and Industrial Equipment Categories with Rulemaking Deadlines

| Action required for consumer product or industrial equipment categories | Number of rulemaking deadlines that have come due |
|--|---|
| Consumer products | |
| Issue a rule revising a standard or explaining why a revision is not justified | |
| 1 Clothes washers | 2 |
| 2 Refrigerators, refrigerator-freezers, and freezers | 2 |
| 3 Small furnaces | 1 |
| 4 Central air conditioners and heat pumps | 2 |
| 5 Clothes dryers | 2 |
| 6 Dishwashers | 2 |
| 7 Fluorescent lamp ballasts | 2 |
| 8 Room air conditioners | 2 |
| 9 Water heaters | 2 |
| 10 Direct heating equipment | 2 |
| 11 Furnaces | 1 |
| 12 General service fluorescent lamps and incandescent reflector lamps | 2 |
| 13 Additional general service fluorescent and general service incandescent lamps | 1 |
| 14 Kitchen ranges and ovens | 2 |
| 15 Mobile home furnaces | 1 |
| 16 Pool heaters | 2 |
| Subtotal—number of consumer product rules required | 28 |
| Industrial equipment | |
| Issue a rule revising a standard or explaining why a revision is not justified | |
| 17 Electric motors not requiring national certification | 2 |
| 18 Electric motors requiring national certification | 2 |
| Issue a determination of whether a revision is justified, and, if so, issue a rule setting the standard | |
| 19 Distribution transformers | 1 |
| 20 Small electric motors | 1 |
| Subtotal—number of industrial equipment rules required | 6 |
| Total—number of rules required for consumer products and industrial equipment | 34 |

Source: GAO analysis of DOE data.

Note: The numbers in the column on the left represent the number of product categories.

DOE Has Missed All Rulemaking Deadlines at a Cost of Billions in Forgone Energy Savings

DOE has missed all 34 of the rulemaking deadlines that have come due for the 20 product categories with deadlines, completing 11 of these rules late and not yet completing the remaining 23. DOE has also not revised standards for one of the six industrial equipment categories that require updates but have no deadlines. LBNL estimates that delays in setting minimum energy efficiency standards for four categories of consumer products that DOE believes use the most energy will cost the nation at least \$28 billion in forgone energy savings by 2030. Our panel members identified two additional significant effects of the delays: states attempting to set their own standards and businesses and utilities having difficulty in making business decisions and planning for the future.

DOE Has Not Met Any of Its Rulemaking Obligations on Time

As table 2 shows, none of the 34 rules with passed deadlines was completed on time. For rules that have been completed, delays ranged from less than 1 year to about 10 years; and incomplete rules are as much as 15 years late.

Table 2: Timeliness of DOE Rulemakings That Have Come Due

| Status | Completed rulemakings | Incomplete rulemakings |
|------------------------------------|-----------------------|------------------------|
| On time | 0 | 0 |
| Less than 1 year late | 2 | 1 |
| 1 year to less than 5 years late | 4 | 2 |
| 5 years to less than 10 years late | 5 | 8 |
| 10 years to 15 years late | 0 | 12 |
| Total | 11 | 23 |

Source: GAO analysis of DOE data.

Table 3 shows the status of rules completed for consumer product and industrial equipment categories with deadlines that have passed. As the table shows, only three product or equipment categories—clothes washers; refrigerators, refrigerator-freezers, and freezers; and small furnaces—have had all their rules completed. As the table also shows, some categories have had one of two required rules completed, and others have had no rules completed.

Table 3: Status of Efficiency Standards for Consumer Products and Industrial Equipment with Rulemaking Deadlines That Have Passed

| Consumer product or industrial equipment category | Number of rulemaking deadlines that have come due | Status and number of completed rules (in parentheses) |
|---|---|---|
| Consumer products | | |
| 1 Clothes washers | 2 | All rules completed (2). |
| 2 Refrigerators, refrigerator-freezers, and freezers | 2 | All rules completed (2). |
| 3 Small furnaces ^a | 1 | All rules completed (1). |
| 4 Central air conditioners and heat pumps | 2 | First rule completed (1). |
| 5 Clothes dryers | 2 | First rule completed (1). |
| 6 Dishwashers | 2 | First rule completed (1). |
| 7 Fluorescent lamp ballasts | 2 | First rule completed (1). |
| 8 Room air conditioners | 2 | First rule completed (1). |
| 9 Water heaters | 2 | First rule completed (1). |
| 10 Direct heating equipment | 2 | No rules completed. |
| 11 Furnaces | 1 | No rules completed. |
| 12 General service fluorescent lamps and incandescent reflector lamps | 2 | No rules completed. |
| 13 Additional general service fluorescent and general service incandescent lamps ^a | 1 | No rules completed. |
| 14 Kitchen ranges and ovens | 2 | No rules completed. |
| 15 Mobile home furnaces ^a | 1 | No rules completed. |
| 16 Pool heaters | 2 | No rules completed. |
| Industrial equipment | | |
| 17 Electric motors—not requiring national certification | 2 | No rules completed. |
| 18 Electric motors—requiring national certification | 2 | No rules completed. |
| 19 Distribution transformers ^a | 1 | No rules completed. |
| 20 Small electric motors ^a | 1 | No rules completed. |
| Total | 34 | (11) |

Source: GAO analysis of DOE data.

Note: The numbers in the column on the left represent the number of product categories.

^aOnly one rulemaking required.

Appendix III provides additional information on the deadlines for these product and equipment categories.

Furthermore, for the six industrial equipment categories that do not have deadlines, DOE has completed rules for five and has begun, but not

completed, the rulemaking process for the remaining category, as table 4 shows.

Table 4: Status of Required Industrial Equipment Standards Revisions without Deadlines

| Industrial equipment category | Date of ASHRAE revision | DOE action |
|---|-------------------------|---------------------|
| Packaged terminal air conditioners and heat pumps | 1999 | Rule not completed. |
| Warm air furnaces | 1999 | Rule completed. |
| Packaged boilers | 1999 | Rule completed. |
| Storage water heaters | 1999 | Rule completed. |
| Instantaneous water heaters | 1999 | Rule completed. |
| Unfired water storage tanks | 1999 | Rule completed. |

Source: GAO analysis of DOE data.

Delays Resulted in Forgone Energy Savings of at Least \$28 Billion and Create Problems in Other Areas

DOE does not have estimates of the energy savings lost because of delays in completing rules. However, LBNL staff provided us with estimates of delays for the four categories of consumer products that DOE believes use the most energy—refrigerators and freezers, central air conditioners and heat pumps, water heaters, and clothes washers. According to these estimates, the nation would have saved at least \$28 billion in energy costs, even after paying higher equipment costs, by 2030 if these standards had been put in place when required—that is, 2.1 quadrillion British thermal units (Btu) of natural gas and 1.4 quadrillion Btus of electricity. Historically, LBNL, under contract to DOE, has performed most of the technical and economic analyses for proposed standards rulemakings. To estimate the cost of delays, LBNL staff used the estimates of savings they developed to support proposed standards for the four consumer products. According to our analysis, LBNL took steps to ensure the estimates were reasonably accurate by considering such factors as whether the technologies used for the analysis would have been available at the time of the deadlines for setting standards. The total forgone energy savings is equal to the annual primary energy consumption of approximately 20 million U.S. households. In addition, the delays will also result in 53 million tons of carbon dioxide emissions, an amount equivalent to about 1 percent of total estimated U.S. carbon dioxide emissions in 2004. Our panelists noted that they consider increased energy consumption to be one of the two most significant effects of DOE’s delays in revising efficiency standards.

Similarly, delays for one type of industrial equipment, electric distribution transformers, have resulted in significant forgone energy savings.

Distribution transformers reduce the voltage of an electric utility's power distribution line to the lower voltages suitable for most equipment, lighting, and appliances. Nine years ago, DOE determined that standards for distribution transformers were warranted as technologically feasible and economically justified and were likely to result in significant savings. However, DOE did not publish proposed standards for distribution transformers in the *Federal Register* until August 2006.⁷ According to DOE, the energy savings from the proposed distribution transformer standards would eliminate the need for approximately 11 new 400-megawatt power plants by 2038, enough to provide a sufficient flow of electricity to about 3 million homes.⁸

These estimates account for only a portion of the forgone savings from the lack of timely rules for consumer products and industrial equipment; however, no estimates of the forgone savings are available for the remaining product and equipment categories. Equally important, because many energy-using products and equipment have long service lives, delays in setting standards lead to years of using the products and equipment that are less energy efficient than they could be, compounding the loss of the energy efficiency. For example, electric distribution transformers have a typical service life of about 30 years. With about 50 million transformers in the United States, each year of delay until a rule setting standard is completed means that more of these transformers will be replaced at the present energy efficiencies, rather than the proposed level, leading to many additional years of forgone savings.

Other, nonquantifiable effects have also resulted, or can result, from delays in issuing energy efficiency rules. Our panel members noted the possibility that states would attempt to set their own appliance efficiency standards as the other most significant effect of delays. Indeed, states are dissatisfied with DOE's delays. In 2005, 15 states and New York City sued DOE for "foot-dragging [that] results in greater—and avoidable—energy use." The states cited, among other effects, high energy costs, increased environmental harm, and burdens on the electricity grid from DOE's

⁷Before DOE published proposed distribution transformer standards, the Energy Policy Act of 2005 established energy conservation standards for low-voltage, dry-type distribution transformers. Pub. L. No. 109-58 §135(c)(3) (codified at 42 U.S.C. § 6295(v)). Consequently, DOE's proposed standards do not apply to these types. 71 *Fed. Reg.* 44,356, 44,357 (Aug. 4, 2006).

⁸A megawatt is a measure of a flow of electricity; 1,000 megawatts is a sufficient flow of electricity to power about 750,000 homes.

delays as justification for their actions. The suit was settled recently, with DOE agreeing to eliminate its backlog by 2011, the same date set in its report to Congress. According to officials from the California Energy Commission, California has begun to press Congress to lift the preemption that prevents the states from readily setting their own standards. While states had expressed dissatisfaction with the pace of rulemaking and before 1987 had petitioned DOE for waivers, the 1987 amendment to EPCA made it considerably more difficult to obtain a waiver, according to DOE officials. Since then, DOE has received only one petition for a waiver. Panel members commented that if states obtain waivers and pass individual standards, the result could be a patchwork of state standards, preventing economies of scale in manufacturing and raising costs for both consumers and manufacturers.

Panel members also pointed out that delays make business planning difficult for manufacturers and utilities, which could also increase their costs and, therefore, costs to consumers. As one panel member noted, “Product manufacturers don’t know when new standards will take effect in advance, making it difficult to plan product redesigns and thereby increasing cost of compliance.” According to another panelist, “An uncertain future regulatory environment makes it very difficult for appliance and equipment manufacturers to make investment decisions.” For example, a manufacturer may be reluctant to invest large sums in a new technology if the new technology may be made obsolete by new federal efficiency standards or if new standards might not allow the manufacturer to gain a hoped-for competitive advantage via new technology. To minimize such uncertainty and its attendant risks, manufacturers want DOE to make regulatory decisions on time.”

Effectiveness of DOE’s Catch-Up Plan Is Uncertain

DOE has developed a catch-up plan to resolve the backlog of delayed energy efficiency standards. However, since DOE has not completely identified the root causes for the delays and because the plan lacks critical elements of an effective management approach, the likelihood of success is not clear.

DOE's Plan Lays Out an Approach to Clearing the Backlog, but It Is Unclear Whether the Plan Is Addressing Root Causes of Delays

According to DOE's January 2006 report to Congress, the department has identified four causes of delays in its efficiency standards rulemaking: (1) an overly ambitious schedule set in statute; (2) the sequential nature of the rulemaking process; (3) the consequences of the Process Rule, which the report states that DOE adopted in 1996 to address concerns about its analyses and stakeholder involvement; and (4) DOE's internal document review and clearance process. Specifically:

- *An ambitious statutory schedule.* According to the report, Congress's rulemaking schedule was "rigorous." As a result, the program staff were unable to meet the deadlines from the beginning. These delays were exacerbated when Congress increased the number of products that required rulemakings. In 1994, DOE attempted to address the backlog by proposing standards for eight products in one rulemaking. However, according to DOE, this rulemaking effort met with strong opposition from industry, drawing over 5,000 responses during the comment period, and DOE withdrew the proposal. Following this experience, Congress imposed a 1-year moratorium on new or amended standards. The moratorium further exacerbated the backlog, according to DOE.
- *Sequential nature of the rulemaking process.* The elements of a rulemaking must occur sequentially, and, according to DOE, "this sequence-dependent nature of the analyses makes it vulnerable to unrecoverable delays." The standards rulemaking process includes many overlapping requirements from EPCA, as amended; Executive Orders; and the Process Rule, which create a complex analytical and procedural challenge, according to the report. The standards rulemaking process typically consists of three stages—an advance notice of proposed rulemaking, a notice of proposed rulemaking, and a final rule—and each of these stages includes internal and external review and comment periods, as well as technical analyses that build on previous analyses. Most of these tasks cannot be done concurrently, so when delays occur, often the time lost cannot be made up because of these rigid requirements.
- *Consequences of the Process Rule.* Under DOE's 1996 "Process Rule,"⁹ the potential energy savings, rather than statutory deadlines, determine which standards should be set first. Consequently, DOE reported to Congress, it analyzed the likely impacts of all pending energy efficiency rulemakings and used this analysis to categorize each rulemaking as high-, medium-, or

⁹*Procedures for Consideration of New or Revised Energy Conservation Standards for Consumer Products, Final Rule*, 61 *Fed. Reg.* 36,973 (July 15, 1996).

low-priority, depending on energy-savings potential. Regardless of deadlines, high-priority rules received the bulk of the resources, medium-priority rules received some resources, and low-priority rules were not addressed at all. The Process Rule also called for increased stakeholder input and expert review, which added time to the rulemaking, according to DOE's report. Finally, according to DOE's 2006 report, the Process Rule increased the complexity of the technical analysis required, adding more time.

- *Internal document review and clearance process.* The quality of draft rulemaking documents was inconsistent, according to DOE's 2006 report, which made the internal review process time consuming. In addition, reviews by the Office of General Counsel, Office of Policy and International Affairs, and other internal reviewers were not always managed effectively, according to the report. Consequently, issues were not identified and resolved early in the process, and draft rules often did not receive the timely reviews needed to approve them for issuance.

While DOE identified these causes for rulemaking delays in its January 2006 report, DOE staff we spoke with did not agree on the causes. Program staff told us General Counsel's legal reviews were excessively long, while General Counsel officials attributed their lengthy review to the poor quality of documents, which required extensive non-legal editing. DOE lacks program management data that would enable it to identify with specificity where in the agency's internal review process delays are occurring. In addition, LBNL staff disagreed with the report's contention that the Process Rule required more time for technical analysis. Rather, they said, the Process Rule's requirement for more complex analysis and for more systematic stakeholder involvement addressed those parts of the rulemaking process earlier than before but took about the same amount of time.

Our panel members, based on their past involvement or familiarity with standards rulemaking, agreed that the internal review process was problematic. Specifically, the most frequently cited cause for delays in developing energy efficiency standards were delays in the General Counsel review process. One panel member stated that the General Counsel review process was "one of the lengthiest and most opaque elements of the standards process." In addition, about half of our panelists said the low priority historically given to the program, not only by DOE but by the Administration and Congress as well, was a great cause of delay in issuing the standards. Finally, panel members identified two additional major

causes of delay that DOE did not, namely inadequate budget and insufficient technical staff.

While some of these identified causes are beyond DOE's control, such as the statutory deadlines, DOE reported that it could take actions to clear the backlog by 2011. DOE plans to do the following to ensure that rulemakings are more timely:

- *Make the rulemaking process more efficient.* DOE plans to stagger the start of rulemakings in order to make the best use of staff time and resources. In the past, DOE staff worked on one rule at a time. Under DOE's plan, staff will work on several rules simultaneously, which should enable the staff to make better use of their time when drafts are out for review. In addition, DOE plans to combine several products with related technical and policy characteristics—such as water heaters, pool heaters, and direct heating equipment—into a single rulemaking, which should expedite the rulemaking process.
- *Adhere to the deadline for closing public comments.* DOE reported that it will only consider comments received before their deadlines in its current analysis. In the past, DOE continued to consider comments after the closing date stated in the *Federal Register* and responded to those comments with additional analysis, which delayed the issuance of the final rulemaking.
- *Simplify the analysis for each rulemaking.* Senior management officials are expected to approve the staff's analytical approach and scope of effort earlier in the rulemaking process. In the past, rulemaking staff conducted their analysis for a product category without ensuring that senior management approved of their approach. As a result, according to the plan, management often called for a different approach when reviewing a draft analysis, which required significantly more time. In addition, DOE plans to conduct less exhaustive analysis for some rules, rather than conducting the same level of analysis for all rules. If all the stakeholders agree that a product category does not require DOE's usual complex analysis, which would be the case when the key issues are clearly understood, DOE will perform less extensive analysis. DOE expects this change to shorten rulemaking times.
- *Better ensure the quality of the proposed rulemaking and accountability of all staff and reviewers.* DOE plans to take four actions toward this goal: (1) train staff in how to meet all regulatory procedural requirements and provide readily available comprehensive guidance in order to avoid procedural mistakes that lead to delays, (2) contract with a national

laboratory to maintain a data management system for tracking rulemaking progress and use the resulting data to identify problems for quicker resolution, (3) match skill levels with tasks so that resources are used most efficiently, and (4) encourage stakeholders to negotiate a proposed standard in return for an expedited rulemaking process.

- *Improve the document review and clearance process.* DOE plans to emphasize better document quality so that reviewers can focus their efforts on legal and policy issues rather than on basic editorial issues. In the past, formats, styles, and approaches of documents were not consistent, which slowed down the review process. DOE has issued a style guide and a template for documents to better ensure consistency. In addition, DOE plans to have different reviewers examine the proposed rulemaking concurrently, rather than sequentially, throughout the rulemaking process.
- *Adhere to a 36-month timetable for completing a rule.* DOE will allocate approximately 16 months for analysis, 6 months for public review and comment, 8 months for its internal review, and 6 months for review by the Office of Management and Budget. In the past, while DOE had a 3-year limit for rulemaking, it virtually never issued rules within that period.

Most panelists rated the components of DOE's catch-up plan highly and expect that, if followed, it will likely help DOE meet its schedule for completing rules. The panelists particularly favored the parts of DOE's catch-up plan to reform its internal review process, use an expedited process when stakeholders recommend standards on which they have reached consensus, and stagger rulemakings. They also emphasized the importance of having the Secretary of Energy and the administration provide more management attention and priority to the program. Finally, most agreed that certain aspects of DOE's current rulemaking process should not be changed. Specifically, DOE should continue to perform complete technical and economic analyses and explain its justification for the standards it selects, include the public and stakeholders throughout the rulemaking process, and ensure that the process and analyses are transparent.

Despite these favorable views, some panelists expressed concern that DOE might not have addressed what they consider the most relevant causes of delay. For example, according to one panelist's observations, "the delays are an internal management problem at DOE, and the department's internal procedures are a black box. It is hard to know with any assurance what the real problem is and whether the issue is budget or

staffing or bureaucratic procedures.” According to another panelist’s review of DOE’s plan, the plan “focused too much on reducing analytical complexity and controlling stakeholder participation—neither of which were major contributors to delays—and too little on internal process improvements, without which delays will continue.”

Although many of DOE’s actions appear reasonable, we agree that DOE may not have identified the root causes of its rulemaking delays. Consequently, DOE risks expending resources on the wrong factors or emphasizing minor or irrelevant causes. DOE has not developed the program management data it needs to identify bottlenecks in the rulemaking process. Even though DOE has work logs that compile limited data on some parts of the rulemaking process, such as the amount of time taken for internal reviews, the data are not detailed enough to identify the source of delays. Furthermore, DOE does not have data on the length of all stages of its rulemaking process. Because DOE managers lacked data to determine causes, they said they compiled information about possible causes during discussions with staff. Despite the problems with their data, managers told us that they believe that they have identified the root causes of delay.

DOE’s Plan Lacks Critical Elements of Effective Project Management

According to our work on leading performance management practices and the work of a government regulatory process expert, management plans should contain specific strategies to resolve problems and help congressional decision makers understand how the agency plans to improve its performance.¹⁰ Such plans also provide a basis for accountability. While DOE’s plan includes elements intended to make the rulemaking process more efficient, it lacks two critical elements to help ensure success of the plan—assurance of accountability and management’s allocation of adequate resources. Specifically:

- *Assurance of accountability.* While DOE has laid out a schedule for clearing its rulemaking backlog for standards, its past poor performance calls into question whether it is likely to be accountable to the schedule in the catch-up plan. According to an Assistant General Counsel who manages and tracks the regulatory process for the Department of Transportation (DOT), an agency with very extensive and effective

¹⁰GAO, *Agencies’ Annual Performance Plans Under the Results Act*, [GAO/GGD/AIMD-10.1.18](#) (Washington, D.C.: February 1998).

electronic regulatory management, a successful rulemaking process holds its management and staff accountable to interim and final deadlines. For example, DOT publishes its deadlines on its Web site, making the agency's actions to meet the deadlines transparent to all stakeholders. While DOT's deadlines are target dates only, this transparency puts pressure on each participant to carry out his or her responsibilities on time or to provide legitimate reasons for any delays. DOE publishes a schedule of deadlines for some standard-setting rulemaking, including the interim deadlines, in its *Semiannual Regulatory Agenda*.¹¹ However, when DOE misses these deadlines, it generally does not explain why, or how it plans to make up the lost time when it publishes revised deadlines. The catch-up plan does not ensure that the pattern of missing deadlines will be broken.

- *Adequate resources.* As far back as 1993 we reported that insufficient resources were a primary cause of DOE's delays in updating energy efficiency standards. This may still be the case. While the DOE plan calls for a sixfold increase in workload, it does not increase program staffing and contractor budgets in the same proportion. Program managers told us they generally have had 7 to 14 staff working on energy efficiency rules, with 7 on the job as of fiscal year 2006. They plan to add 2 full-time staff and 1 from the Presidential Management Fellows (PMF) program, a nonpermanent position, for an increase to 10 staff in fiscal year 2007.¹² Similarly, from fiscal years 2000 through 2006, DOE's budget for contractor staff has averaged about \$10 million per year. For fiscal year 2007, DOE requested \$12 million for contractors, a 20 percent resource increase. DOE expects these limited resource increases to cover a 600 percent increase in workload. In the absence of further increasing resources, DOE said in its January 2006 report it plans to meet the increased workload by improving productivity.

Conclusions

DOE's program for energy efficiency standards has been plagued by delays for decades. Although many steps in DOE's most recent January 2006 plan to address these delays appear to be reasonable, DOE does not definitively know whether the plan will address root causes and clear the backlog.

¹¹The Unified Agenda (also known as the Semiannual Regulatory Agenda), published twice a year in the *Federal Register*, summarizes the rules and proposed rules that each federal agency expects to issue during the next 6 months.

¹²The PMF program is a 2-year paid government fellowship sponsored by the Office of Personnel Management for recent graduate students who seek a professional experience in the U.S. government.

Furthermore, DOE's plan lacks important elements of effective management practices that would help assure success. Consequently, it is unclear whether DOE can carry out the ambitious schedule it has set for itself to update energy efficiency standards. If DOE does not succeed in clearing its backlog, the nation and consumers will continue to forgo the benefits of more energy-efficient consumer products and industrial equipment. The loss of such benefits will make the nation depend even more on imported energy. The continuing commitment of DOE's top management to make standards rulemaking a top organizational priority is essential to DOE's success in completing all energy efficiency rules.

Recommendations for Executive Action

To increase the likelihood that DOE's plan for updating minimum energy efficiency standards is successfully implemented, we recommend that the Secretary of Energy take the following actions:

- Employ the elements of leading management practices, including
 - expediting the efforts DOE has begun to establish a tracking system to gather data that may be used to identify and address causes of delays to more effectively manage the rulemaking process;
 - ensuring that the interim goals and time frames are transparent to all stakeholders, and that all internal stakeholders, including reviewers and program staff, are held accountable to the time frames; and
 - allocating adequate resources within DOE's appropriation.

Agency Comments and Our Evaluation

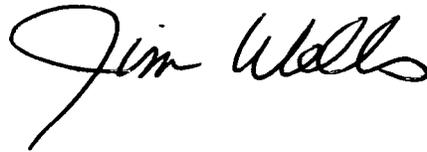
We provided the Department of Energy with a draft of this report for review and comment. Although DOE did not provide views on our recommendations, it expressed concerns in two areas. First, regarding our discussion of the causes of delays in setting standards, DOE stated that it is incorrect to assign blame for delays to any one office, official, decision, or process—and specifically to the Office of the General Counsel. DOE stated that doing so reflects a simplistic and largely incorrect understanding of the program's complexity. DOE noted that the delays in setting standards have spanned administrations of both parties, several Secretaries of Energy, and various DOE offices and personnel; also, although DOE work logs may indicate that a specific office has a document for a certain period of time, during that time multiple individuals from different offices may have been working together on the document. We disagree with DOE's characterization of our analysis. In

establishing the context for our findings, we pointed out that the energy efficiency standards-setting process was complex and that there were multiple reasons for delays. To provide more definitive information on the root causes of the extensive delays that have been experienced, we sought data from DOE and the opinions of cognizant DOE staff. However, because DOE management could not provide data to conclusively document the reasons for the substantial delays, or the data provided by DOE as contained in internal work logs were inadequate to determine causality, and because representatives of the various DOE offices could not agree on the root causes, we turned to a well-recognized process for identifying causes in complex situations—a Delphi panel. Panel members were carefully, objectively selected individuals who have been closely involved in DOE’s rulemaking process for setting standards over an extensive period of time. They most frequently cited delays in the General Counsel review process as cause for delays in developing energy efficiency standards. We believe that our use of this method provided a clearer understanding of the causes of delays than DOE has been able to provide. As we noted earlier, in DOE’s January 2006 report to Congress and in our interviews with representatives of the offices involved in the standard-setting process, those associated with the program generally acknowledged that they could have done more but pointed to others as the cause of the delays and therefore have not fully accepted responsibility for the program’s failures. Second, DOE stated that our report did not capture many of the recent standards-setting activities undertaken since enactment of EAct 2005. We agree that there has been a flurry of standards-related activity, as expressed by DOE in its letter commenting on our report, and we have noted this in our report. Although we recognize that DOE has taken a number of steps that should move the program forward, it has not yet published any additional final standards for the product and equipment categories included in the scope of our work and our report’s findings have not changed. DOE’s letter commenting on our report is presented in appendix V.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the Secretary of Energy and other interested parties. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or members of your staff have questions about this report, please contact me at (202) 512-3841 or wellsj@gao.gov. Contact points for our

Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix VI.

A handwritten signature in black ink that reads "Jim Wells". The signature is written in a cursive, flowing style.

Jim Wells
Director, Natural Resources
and Environment

Appendix I: Status of the Department of Energy's Model Building Code Determinations

States and their subdivisions, such as counties and cities, adopt building codes that establish minimum requirements for energy-efficient design and construction of commercial and residential buildings. The building codes regulate components that affect the amount of energy that a building will use, such as the building envelope, electrical power, and lighting. These codes vary from one state to another and sometimes within a state. They may be mandatory or voluntary codes, either requiring builder compliance or serving as guidelines. States and local jurisdictions may adopt model building codes developed by nonprofit organizations, such as the American Society of Heating, Refrigerating and Air-Conditioning Engineers' (ASHRAE) Standard 90.1 and the International Code Council's (ICC) International Energy Conservation Code (IECC). Both ASHRAE and ICC publish codes for commercial and residential buildings.

ASHRAE uses a consensus and public hearing process to develop its model building codes. It involves the design community, including architects and lighting and mechanical designers; the code enforcement community, including building code officials and state regulatory agencies; building owners and operators; manufacturers and utility companies; and representatives from the Department of Energy (DOE), energy organizations, and the academic community. ICC uses a different process to develop its model building codes. Under its process, anyone can propose a code, and the IECC code development committee, which includes mostly building code officials, votes on the proposals. According to staff at the Pacific Northwest National Laboratory (PNNL), which monitors state building codes for DOE, although ASHRAE and ICC use different processes to develop their model building codes, the two organizations incorporate each other's codes into their own when they revise them. As a result, ASHRAE and ICC codes that are revised at about the same time generally have similar energy efficiency provisions.

The Energy Conservation and Production Act, as amended (the Act), directs DOE to evaluate revisions to these model building codes and publish its determinations of whether the revision would improve energy efficiency. For commercial buildings, defined by DOE to include buildings other than low-rise residential buildings, the Act directs DOE to evaluate ASHRAE's revisions to its Standard 90.1. Each time ASHRAE revises Standard 90.1, DOE has 12 months to determine whether the revision will improve energy efficiency in commercial buildings and publish a notice of that determination in the *Federal Register*. For residential buildings, defined by DOE as low-rise residential buildings, the Act directs DOE to evaluate revisions the Council of American Building Officials (CABO) makes to its Model Energy Code (MEC), or any successor to that code. In

1995, the ICC succeeded CABO and, as such, the IECC replaced the MEC. Each time the ICC revises the IECC, DOE has 12 months to determine whether the revision will improve energy efficiency in residential buildings and publish a notice of that determination in the *Federal Register*. The Act does not specify what type of revision triggers the start of the 12-month period for either commercial or residential determinations; but, according to DOE officials, the 12-month period is triggered by ASHRAE's and ICC's publication of revised codes.

The Act provides that if the Secretary determines that a revision to ASHRAE's or ICC's model building code will improve energy efficiency—called a positive determination—states “shall” review their building codes. For commercial model building codes, each state has 2 years after DOE publishes a positive determination on a revised ASHRAE model building code to certify to DOE that it has reviewed and updated the provisions of its commercial building code in accordance with the revised code. For residential model building codes, each state also has 2 years after a positive determination for certification, but it must certify to DOE that it has reviewed the provisions of its residential building code and determined whether it is appropriate to update them to meet or exceed the revised code. Subsequent to enactment of these provisions, the Supreme Court ruled that the constitution does not allow Congress to require states to regulate a matter.¹ DOE program managers told us that DOE does not require states to review their codes following a positive determination.² Instead, the managers told us, DOE facilitates states' efforts to adopt revised codes. PNNL officials told us they assist DOE on all aspects of the building code determinations and provide training and technical assistance to state and local officials responsible for building codes.

As of August 2006, ASHRAE and ICC have published a combined total of nine revisions to their model building codes for DOE to evaluate. ASHRAE revised Standard 90.1 three times, and CABO revised the MEC twice before it was incorporated into ICC in 1995. The ICC issued its first version

¹*New York v. United States*, 505 U.S. 144 (1992) (holding that a provision of the Low-Level Radioactive Waste Policy Act, requiring states to take ownership of waste or regulate according to instructions of Congress, was invalid). The court also stated that Congress may hold out incentives to the states as a means of encouraging them to adopt suggested regulatory schemes and offer states the choice of regulating an activity according to federal standards or having state law preempted by federal regulation.

²A DOE staff member noted that the Energy Conservation and Production Act, as amended, does not contain a provision authorizing DOE to enforce these provisions.

of the IECC in 1998 and has since revised it three times. Deadlines for DOE's determinations have come due on all these revisions, except the 2006 IECC revision, which will be due in January 2007.

We were asked to report on (1) whether DOE has met its statutory deadlines for determining if states should adopt revised commercial model building codes, (2) whether DOE has met its statutory deadlines for determining if states should consider adopting revisions to the residential model building code, and (3) whether and, if so, to what extent DOE tracks states' building codes. This appendix contains information about these objectives.

To address the commercial and residential building code determinations DOE has completed, we reviewed the requirements and deadlines for building code determinations contained in statute and DOE determinations published in the *Federal Register*. We also interviewed and obtained documents from officials at DOE, PNNL, ASHRAE, ICC, and the American Council for an Energy Efficient Economy. Since DOE program officials use ASHRAE's and ICC's revision publication dates as the trigger date for DOE's deadlines for making determinations, we used these dates for our analysis. We did not attempt to determine why DOE might miss deadlines for determinations or why individual states adopt building codes.

DOE Has Completed One of Three Commercial Building Code Determinations

DOE has completed only one of three commercial model building code determinations that have come due. DOE issued a positive determination for the first of three revisions to ASHRAE's Standard 90.1 about 17 months after the deadline. As of December 2006, DOE had not completed determinations for either of the remaining revisions and has decided to combine them. Table 5 provides details about the revisions' publication dates, the deadlines for the determinations, and the status of DOE's reviews.

Table 5: Status of DOE's Review of ASHRAE Standard 90.1 Revisions

| ASHRAE revision | Revision publication date | DOE determination due date | DOE determination issue date | DOE determination status | State certification due date |
|---------------------------|---------------------------|----------------------------|------------------------------|-----------------------------------|---|
| ASHRAE Standard 90.1-1999 | January 28, 2000 | January 28, 2001 | July 15, 2002 | Completed over 17 months late. | July 15, 2004 |
| ASHRAE Standard 90.1-2001 | November 7, 2001 | November 7, 2002 | None | Incomplete and over 4 years late. | 2 years after DOE issues the determination. |
| ASHRAE Standard 90.1-2004 | December 21, 2004 | December, 21, 2005 | None | Incomplete and over 1 year late. | 2 years after DOE issues the determination. |

Sources: GAO analysis of ASHRAE, DOE, and *Federal Register* data.

DOE Has Completed Four of Five Residential Building Code Determinations

DOE has completed four of five residential building code determinations that have come due. DOE issued determinations for all of these four CABO/ICC revisions to the MEC/IECC and said the revisions would improve energy efficiency. DOE completed its first determination on time and completed the next three from 1 month to over 1 year late. As of December 2006, DOE had not yet completed the determination for the fifth IECC revision. Table 6 provides details about the revisions' publication dates, the due dates for the determinations, and the status of DOE's reviews.

Table 6: Status of DOE's Review of MEC and IECC Revisions

| CABO/ICC revision | Revision publication date | DOE determination due date | DOE determination issue date | DOE determination status | State certification due date |
|-------------------|---------------------------|----------------------------|------------------------------|---|---|
| 1993 MEC | October 21, 1993 | October 21, 1994 | July 15, 1994 | Completed over 3 months early. | July 15, 1996 |
| 1995 MEC | April 12, 1995 | April 12, 1996 | December 6, 1996 | Completed over 7 months late. | December 6, 1998 |
| 1998 IECC | May 13, 1998 | May 13, 1999 | January 10, 2001 | Completed over 1 year late. | January 10, 2003 |
| 2000 IECC | December 30, 1999 | December 30, 2000 | January 10, 2001 | Completed less than 1 month late. | January 10, 2003 |
| 2003 IECC | January 27, 2003 | January 27, 2004 | None | Incomplete, 2 years and 11 months late. | 2 years after DOE issues the determination. |
| 2006 IECC | January 15, 2006 | January 15, 2007 | None | Not yet due. | 2 years after DOE issues the determination. |

Sources: GAO analysis of ASHRAE, DOE, and *Federal Register* data.

DOE Tracks States' Building Codes

DOE and PNNL staff track states' commercial and residential building codes and publish information about them on DOE's Web site. PNNL staff told us they e-mail state officials twice a year to confirm that DOE has the most current information about the states' commercial and residential building codes and to obtain any updated information. Additionally, they are in frequent contact with the states and continually update their information on states' building codes. DOE's Web site reports the type of code adopted by each state and whether builder compliance with the code is voluntary or mandatory, and provides limited information about the stringency of the code, which PNNL staff determines by analyzing the state-provided information. For example, DOE's Web site reports that Florida has adopted mandatory codes for both commercial and residential buildings and that the commercial building code is more stringent than the ASHRAE 90.1 2001, and the residential building code is more stringent than the 2000 IECC. The complete list of state commercial and residential building codes for energy efficiency is available at http://www.energycodes.gov/implement/state_codes/state_status_full.php.

Although the information published on DOE's Web site compares the stringency of state codes with ASHRAE's and ICC's model building codes, PNNL staff told us the information should not be used to judge the stringency of state codes relative to the ASHRAE's and ICC codes for which DOE has made a determination. The staff explained that while more recent state codes are generally more energy efficient than older state codes, there are other factors that affect their stringency. For example, states may adopt DOE's latest determination on ASHRAE's and ICC's codes as their state building codes, but may amend them to be weaker or stronger. For example, according to PNNL staff, Georgia adopted the latest DOE residential determination but amended to it to be more similar to prior DOE determinations. In other cases, the changes to a revised code may not affect all states equally; therefore, while a state may not have adopted the most recent revision, the changes in that revision may not have applied to that state anyway. For example, PNNL staff told us that, although Massachusetts did not adopt the 2000 IECC, the differences between the 2000 IECC and the 1995 MEC, which Massachusetts did adopt, did not apply to that state. Therefore, PNNL staff consider Massachusetts's code to be as stringent as the 2000 IECC. Furthermore, PNNL staff told us that, while some states have adopted model building codes that are more recent than those for which DOE has issued a determination, these codes should not be assumed to be more stringent than those for which DOE has made a determination until PNNL makes a comparable technical analysis. PNNL staff told us that they have the information and technical capability to compare the stringency of all the

state codes with those for which DOE has made a determination. However, they said they typically analyze building codes on a state-by-state basis only at DOE's request and that they do not currently have a comprehensive analysis of how all states' codes compare to DOE's latest determinations. As of September 2006, DOE had not directed PNNL to complete a comprehensive analysis. DOE officials told us that DOE focuses on facilitating states' efforts to adopt building codes rather than penalizing them for not meeting DOE building code determinations and, as such, they do not believe a comprehensive analysis of which states' building codes are as stringent as those for which DOE has made a positive determination justifies the resources it would require.

Appendix II: Objectives, Scope, and Method

Our objectives were to examine (1) the extent to which DOE has met its statutory obligations to issue rules on minimum energy efficiency standards for consumer products and industrial equipment and (2) whether DOE's plans are likely to clear the backlog of required rulemakings and whether these plans could be improved.

To address these objectives, we reviewed the statutory requirements and deadlines for developing energy efficiency standards for consumer products and industrial equipment, program information available on DOE's Web site, information provided by program staff, and DOE's January 2006 and August 2006 reports to Congress. For the purposes of our review, we did not include the 17 additional product categories that the Energy Policy Act of 2005 added to DOE's responsibilities, including the one that came due in August 2006. Although DOE is also required to issue rules regarding standards for plumbing products, we excluded them from this report because they primarily involve conserving water, rather than energy. Furthermore, we did not evaluate the merit of the standards DOE has issued.

We conducted interviews with DOE program officials; officials of the Office of General Counsel; officials at Lawrence Berkeley National Laboratory, the National Energy Technology Laboratory, and the National Institute of Standards and Technology; and a regulatory process expert at the Department of Transportation. We also interviewed officials at the American Council for an Energy Efficient Economy; the Appliance Standards Awareness Project; the American Society of Heating, Refrigerating and Air-Conditioning Engineers; the California Energy Commission; Pacific Gas and Electric Company; and Natural Resources Canada; and obtained documentation as needed. We analyzed data on DOE's rulemaking process, estimates of national energy savings from energy efficiency standards, and program resources.

In addition, we used a Web-based, modified Delphi method to obtain views from a panel of 33 stakeholders on the causes and effects of delays in setting standards and on proposed solutions to these delays. The Delphi method is a systematic process for obtaining individuals' views on a question or problem of interest and, if possible, obtaining consensus. Our modified Delphi method had two phases. Phase 1 consisted of a series of open-ended questions concerning DOE's delays. In Phase 2, panel members rated the significance or priority of the causes of delays, effects of delays, and solutions to delays that they had identified in phase 1.

We selected the panel members from a group of stakeholders who were both widely recognized as knowledgeable about one or more key aspects of energy efficiency standards, and who were involved or familiar with DOE's rulemaking process. The group included officials from federal and state agencies, manufacturers, trade associations, energy efficiency advocacy groups, consumer interest groups, utilities, and utility associations, some of whom were previously employed by DOE as participants in the rulemaking process. We used a variety of methods to determine that the panelists we selected had the expertise necessary to participate in the panel. A list of the 33 panel members is included in appendix IV. To report panel results, when two-thirds or more of the panel agreed, we use the term "most." When one-half or more of the panel agreed, we use the term "the majority."

We conducted our review from June 2005 through January 2007 in accordance with generally accepted government auditing standards.

Appendix III: Rulemakings and Delays for Consumer Products and Industrial Equipment with Deadlines That Have Passed

| Consumer product or industrial equipment category | First rule | | | Second rule | | |
|---|-----------------------|-------------|----------------------------|--|-------------|----------------------------|
| | Due date | Actual date | Years delayed ^a | Due date | Actual date | Years delayed ^a |
| Consumer products | | | | | | |
| Clothes washers | 01/01/90 | 05/14/91 | 1.4 | 01/01/95 | 01/12/01 | 6.0 |
| Refrigerators, refrigerator-freezers, and freezers | 07/01/89 | 11/17/89 | 0.4 | 07/01/94 | 04/28/97 | 2.8 |
| Small furnaces | 01/01/89 | 11/17/89 | 0.9 | Included in "Furnaces" deadline ^b | N/A | N/A |
| Central air conditioners and heat pumps | 01/01/94 | 01/22/01 | 7.1 | 01/01/01 | Overdue | 6.0 |
| Clothes dryers | 01/01/90 | 05/14/91 | 1.4 | 01/01/95 | Overdue | 12.0 |
| Dishwashers | 01/01/90 | 05/14/91 | 1.4 | 01/01/95 | Overdue | 12.0 |
| Fluorescent lamp ballasts | 01/01/92 | 09/19/00 | 8.7 | 01/01/97 | Overdue | 10.0 |
| Room air conditioners | 01/01/92 | 09/24/97 | 5.7 | 01/01/97 | Overdue | 10.0 |
| Water heaters | 01/01/92 | 01/17/01 | 9.0 | 01/01/00 | Overdue | 7.0 |
| Direct heating equipment | 01/01/92 | Overdue | 15.0 | 01/01/00 | Overdue | 7.0 |
| Furnaces | 01/01/94 | Overdue | 13.0 | 01/01/07 | Not due | Not due |
| General service fluorescent lamps and incandescent reflector lamps | 04/24/97 | Overdue | 9.7 | 04/24/02 | Overdue | 4.7 |
| Additional general service fluorescent and general service incandescent lamps | 11/15/98 | Overdue | 8.1 | Included in general service fluorescent lamps and incandescent reflector lamps deadline ^c | N/A | N/A |
| Kitchen ranges and ovens | 01/01/92 | Overdue | 15.0 | 01/01/97 | Overdue | 10.0 |
| Mobile home furnaces | 01/01/92 | Overdue | 15.0 | Included in Furnaces deadline ^b | N/A | N/A |
| Pool heaters | 01/01/92 | Overdue | 15.0 | 01/01/00 | Overdue | 7.0 |
| Industrial equipment | | | | | | |
| Electric motors—not requiring national certification | 10/24/99 | Overdue | 7.2 | 10/24/04 | Overdue | 2.2 |
| Electric motors—requiring national certification | 10/24/01 | Overdue | 5.2 | 10/24/06 | Overdue | 0.2 |
| Distribution transformers | 10/24/96 ^d | Overdue | 10.2 | N/A | N/A | N/A |
| Small electric motors | 10/24/96 ^d | Overdue | 10.2 | N/A | N/A | N/A |

Source: GAO analysis of DOE data.

^aCalculations for years delayed for overdue rules are as of December 31, 2006.

^bSubsequent updates to standards for the category called Furnaces are intended to cover updates for mobile home furnaces and small furnaces and are included in the Furnaces deadlines.

**Appendix III: Rulemakings and Delays for
Consumer Products and Industrial Equipment
with Deadlines That Have Passed**

^cSubsequent updates to standards for the category called “General service fluorescent lamps and incandescent reflector lamps” are intended to cover updates for “Additional general service fluorescent lamps and incandescent reflector lamps” and are included in the Furnaces deadlines.

^dDeadline for setting initial standard following determination of feasibility (18 months after publication of testing requirements.)

Appendix IV: Participants in Energy Efficiency Standards Delphi Panel

Karim Amrane
Air-Conditioning and Refrigeration Institute

Donald Brundage
Southern Company

David Calabrese
Association of Home Appliance Manufacturers

Thomas Catania
Whirlpool Corporation

Sue Coakley
Northeast Energy Efficiency Partnerships

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Trane and American Standard

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Northwest Power and Conservation Council

Andrew Fanara
Environmental Protection Agency

Gary Fernstrom
Pacific Gas and Electric

David Goldstein
Natural Resources Defense Council

Mel Hall-Crawford
Consumer Federation of America

Carl Hiller
Applied Energy Technology

John Holt
National Rural Electric Cooperative Association

Earl Jones
GE Consumer & Industrial

Joseph Mattingly
Association of Appliance & Equipment Manufacturers

James McMahan
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Deborah Miller
ICF Consulting

Harry Misuriello
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Jim Mullen
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Steven Nadel
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Kyle Pitsor
National Electrical Manufacturers Association

James Ranfone
American Gas Association

Priscilla Richards
New York State Energy Research and Development Authority

Michael Rivest
Navigant Consulting, Inc.

Steve Rosenstock
Edison Electric Institute

Michael Sherman
Massachusetts Division of Energy Resources

Doug Smith
Van Ness Feldman

**Appendix IV: Participants in Energy
Efficiency Standards Delphi Panel**

Sriram Somasundaram
Pacific Northwest National Laboratory

David Steiner
Maytag Corporation

Charlie Stephens
Oregon Department of Energy

Tim Stout
National Grid USA

John Wilson
California Energy Commission

Appendix V: Comments from the Department of Energy



Department of Energy

Washington, DC 20585

January 12, 2007

Mr. Jim Wells
Director, Natural Resources and Environment
Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

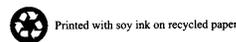
Dear Mr. Wells:

Thank you for the opportunity to comment on the Draft Report, *Energy Efficiency: Long-Standing Problems with DOE's Program for Setting Efficiency Standards Continue to Result in Forgone Energy Savings* (GAO-07-42).

We commend the Government Accountability Office (GAO) for the work it has done to gather input from many individuals and organizations in preparing its draft report. The report details the long history of the Department of Energy's program relating to energy efficiency for consumer appliances and industrial equipment, and describes delays that have occurred in the issuance of efficiency standards since the program's inception in 1975.

It is important to recognize that past delays were the result of many different factors over the course of many years. The delays have spanned Administrations of both parties, several Secretaries of Energy, and various Departmental offices and personnel. As a result, it is simply incorrect to assign sole or even primary blame for these delays to any particular office, official, decision, or process. The review panel used by the GAO apparently attempted to assign primary blame for the program's delays to the Department's Office of the General Counsel, but any attempt to do so reflects an overly simplistic and largely incorrect understanding of the program's complexity and the interrelated work that is performed by different Departmental offices, individuals, and contractors. Departmental offices work collaboratively on this program. Even though certain office work logs may reflect that a specific office has possession of a certain document over a particular period of time, it is often the case that during this period of time, multiple different individuals in different individual offices are working together to identify, address and resolve issues associated with the document.

Moreover, the report does not capture the many recent steps forward and the progress made by this program particularly since enactment of the Energy Policy Act of 2005 (EPACT 2005). Secretary Bodman has made this program a personal priority and has produced significant results in the last 18 months. Additionally, the benefits that will be achieved by appliance standards put in place between 1988 and 2007 are estimated to add up to a savings of 55.4 quads and \$133.3 billion net present value through the year 2030.



Our plans and our commitment are well documented. On January 31 2006, Department submitted to Congress our first Energy Conservation Standards Activities report in accordance with section 141 of EPACT 2005. That report covered the history of the program but more importantly set forth an action plan for the future. On August 8, 2006, the Department submitted its second report detailing the progress made in implementing that plan. Those reports confirm that the Department's accomplishments demonstrate the serious commitment that the Department has made to fulfill its obligations.

Rulemaking activities that have been completed since the EPACT 2005 was enacted:

- Ceiling Fan Light Kits – 72 FR 1270 – January 11, 2007
- Residential Clothes Washers Petition for Exemption – 71 FR 78157 – December 28, 2006
- Test Procedures Prescribed in EPACT 2005 requiring clarification and codification – 71 FR 71340 – December 8, 2006
- Small Electric Motors Determination – 71 FR 38799 - July 10, 2006
- Test Procedures for Distribution Transformers – 71 FR 24972 – April 27, 2006
- Schedule Setting Public Meeting – 70 FR 61395 – October 24, 2005
- Codification of energy conservation standards prescribed in EPACT 2005 – 70 FR 60407 – October 18, 2005
- Test Procedures for Central Air Conditioners and Heat Pumps – 70 FR 59122 – October 11, 2005

We also have made significant progress on the following rulemakings that were previously initiated and that we plan to complete this year:

- Furnaces and Boilers - Final Rule Scheduled for September 2007
- Distribution Transformers - Final Rule Scheduled for September 2007
- Commercial Heating, Air-Conditioning and Water Heating Equipment - Final Rule Scheduled for February 2007
- Test Procedures for Residential Air Conditioners and Heat Pumps - Final Rule Scheduled for September 2007

Additional appliance rulemaking activities during this time included:

- Test Procedures for Distribution Transformers Technical Amendment – 71 FR 60662 – October 16, 2006
- Test Procedures Prescribed in EPACT 2005 requiring clarification and codification PROPOSED RULE – 71 FR 42178 – July 25, 2006
- Test Procedures for Central Air Conditioners and Heat Pumps Proposed Rule – 71 FR 41320 – July 20, 2006
- Covered Products Household Definition – PROPOSED RULE 71 FR 26275 – May 4, 2006
- Distribution Transformers Test Procedures Information Collection Notice – 71 FR 24844 – April 27, 2006

- Commercial Heating, Air Conditioning and Water Heating Equipment Notice and Comment Period – 71 FR 12634 – March 13, 2006
- Residential Clothes Washers Petition for Exemption – 71 FR 6022 – February 6, 2006

Following is a listing of notices regarding appliance standards rulemakings that have been issued since the report was submitted to Congress in January 2006:

- Battery Chargers and External Power Supplies – 71 FR 78389 – December 29, 2006
- Residential Water Heaters – 71 FR 67825 – November 24, 2006
- Direct Heating Equipment – 71 FR 67825 – November 24, 2006
- Pool Heaters – 71 FR 67825 – November 24, 2006
- Refrigerated Bottle or Canned Beverage Vending Machines Test Procedures – 71 FR 58308 – October 3, 2006
- Refrigerated Bottle or Canned Beverage Vending Machines Standards – 71 FR 36715 – June 28, 2006
- Incandescent Reflector Lamps – 71 FR 30834 – May 31, 2006
- Fluorescent Lamps – 71 FR 30834 – May 31, 2006
- Incandescent General Service Lamps – 71 FR 30834 – May 31, 2006
- Ice-Cream Freezers, Self-Contained Commercial Refrigerators, Freezers, and Refrigerator-Freezers without doors, and remote-condensing commercial refrigerators, freezers and refrigerator-freezers – 71 FR 23876 – April 25, 2006
- Residential Dishwashers – 71 FR 15059 – March 27, 2006
- Ranges and Ovens and Microwave Ovens – 71 FR 15059 – March 27, 2006
- Residential Dehumidifiers – 71 FR 15059 – March 27, 2006
- Commercial Clothes Washers – 71 FR 15059 – March 27, 2006

There are many other standards related accomplishments that we could list but we simply want to make the point that the Department is aggressively developing energy conservation standards. That fact was not evident in GAO's draft report and should be of interest to members of Congress and also to the taxpayers supporting this program. Additionally, the Department entered into a consent decree with multiple plaintiffs that sets forth a schedule for completing the backlog of energy efficiency standards for appliances; that schedule is commensurate with the schedule in the Department's January 2006 Report to Congress. The United States District Court for the Southern District of New York entered that consent order on November 6, 2006.

We have met all of the commitments that have come due since our first report containing our action plan was submitted to Congress on January 31, 2006. The draft GAO report stated that "most panelists rated the components of DOE's plan highly and expect that it will help DOE meet the deadlines of its catch-up schedule if these actions are implemented." The combined increase in rulemaking activities and the performance record since the report was submitted should emphatically answer any question you may have regarding the Departments commitment and abilities.

If you have any questions concerning DOE's comments on this Draft Report, please contact me at (202) 586-9220.

Sincerely,



Alexander A. Karsner
Assistant Secretary
Energy Efficiency and Renewable Energy

Appendix VI: GAO Contact and Staff Acknowledgments

GAO Contact

Jim Wells, (202) 512-3841, wellsj@gao.gov

Staff Acknowledgments

In addition to the individual named above, Karla Springer, Assistant Director; Tim Bober; Kevin Bray; Valerie Colaiaco; Janelle Knox; Megan McNeely; Lynn Musser; Alison O'Neill; Don Pless; Bill Roach; Frank Rusco; Ilga Semeiks; and Carol Herrnstadt Shulman made key contributions to this report.

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