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Barriers To Installing Energy-Efficient
Lighting In Federal Buildings

Statement of
L. Nye Stevens, Director
Government Business Operations Issues

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Subcommittee on Environment, Energy and Natural
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and the
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Energy and Commerce
House of Representatives



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BARRIERS TO INSTALLING ENERGY-EFFICIENT
LIGHTING IN FEDERAL BUILDINGS

SUMMARY OF STATEMENT BY
L. NYE STEVENS
DIRECTOR, GOVERNMENT BUSINESS
OPERATIONS ISSUES
GENERAL GOVERNMENT DIVISION
U.S. GENERAL ACCOUNTING OFFICE

At the request of Senator William Roth, GAO has carried out a preliminary review of barriers to installing energy saving fluorescent light bulbs in federal buildings. With the enactment of P.L. 100-615 in November 1988, Congress set a goal of reducing total energy consumption in federal buildings by 10 percent by 1995.

Technological and contracting advances have opened up possibilities of major savings in lighting costs, which with associated air conditioning requirements account for about 60 percent of the electricity an office building consumes.

GAO's work to date, however, has revealed several obstacles that can hamper agencies taking advantage of these potential opportunities. These include:

- Lack of funding for investments in conservation technology, which may involve somewhat higher initial outlays than conventional technology but offer long-term advantages that are not reflected in the budgetary allocation process;
- Dispersion of responsibility for energy conservation, which must compete with many other building investment priorities, and lack of a central capability to evaluate and compare alternative measures;
- Because energy usage of individual buildings is often not separately accounted for, baseline data on energy usage is lacking for measurement of conservation savings and evaluation of alternative investments;
- Only 20 states have utilities that offer rebates for energy conservation measures, which provide an additional incentive where they do exist;
- Unfamiliar federal procurement methods and untested private sector financing result in time-consuming negotiations for awarding "shared energy contracts", where a contractor offers to install and maintain energy saving equipment in return for a share of the cost savings that result over a specified period of time.

Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to discuss the preliminary results of our review of the barriers to installing energy saving fluorescent light bulbs in federal buildings. Our review was requested just last month by Senator William Roth.

Efficient lighting is one of the key elements in reducing energy usage in buildings. According to the Department of Energy's Berkeley Laboratory, about one-fifth to one-fourth of total U.S. electricity consumption is consumed by lighting, of which 40 to 50 percent is used for commercial sector lighting. In addition, lighting, and the attendant air conditioning it requires, accounts for approximately 60 percent of the electricity an office building consumes.

Congress has long recognized the importance and benefits of reducing national energy usage, and the need for the federal government to set an example to the rest of the nation. The federal government is the nation's largest energy user. Every year the government spends approximately \$4 billion for energy used in its 500,000 buildings. Most recently, with the enactment of P.L. 100-615 in November 1988, Congress set the goal of reducing total energy consumption in federal buildings 10 percent by 1995.

Senator Roth asked that we look into the obstacles that the General Services Administration (GSA) faces in installing high technology, energy-efficient lighting in its buildings. He has permitted us to share with you the preliminary results of our work, which began in June, and consisted of interviewing GSA, Department of Energy (DOE), and Defense Logistics Agency (DLA) personnel; reviewing DOE reports on Federal energy conservation progress and energy efficient lighting; and reviewing DLA documents on selling to civilian and military agencies.

NEW ENERGY CONSERVATION OPPORTUNITIES

In recent years, many technological improvements have been made in fluorescent lighting that substantially reduce electrical consumption. For example, the major commercial sources of lamps now offer fluorescent lights that fit into sockets that previously accepted only incandescent bulbs. An 18 watt compact fluorescent bulb can replace a 75 watt incandescent bulb, producing the same amount of light at a fourth of the power. Other improvements include high efficiency ballasts (the starter for fluorescent tubes), mirrored reflectors in lighting fixtures that make it possible to remove some of the bulbs with little or no reduction in light output, and high intensity discharge lamps which can replace incandescent lamps at a fourth of the wattage with 5 percent more light.

In addition to technological improvements in lighting, there have been new programs developed in government and in the private sector intended to make it easier for energy users to reduce their electricity consumption. Legislation was enacted on April 7, 1986 authorizing federal agencies to participate in shared energy savings programs for the purpose of achieving energy and related cost savings in federal buildings. Under this program, a contractor installs and maintains energy conserving equipment. In exchange for its investment, the contractor is paid a percentage of the energy cost savings directly resulting from the energy conservation measures taken during the life of the contract. Funding for such projects is taken from budgets appropriated for energy expenses and related operations and maintenance. Since federal participation in these programs is fairly new, sufficient experience and information is not yet available to evaluate their success. However, the concept has been successfully applied in private industry and state and local governments.

Another alternative that appears promising in concept is the rebate programs offered by several utility companies. With the rebate programs, utility companies offer users cash rebates to install new lighting fixtures. For example, starting in February 1990, the Potomac Electric Power Company (PEPCO) began providing lighting rebates to private and federal customers who replace existing equipment with high efficiency bulbs and ballasts,

reflectors, occupancy sensors, daylight savings sensors, and energy efficient exit signs. The rebates are determined per fixture replaced and include a 10 percent bonus if the customer installs more than one energy efficient improvement per fixture. The company will pay up to 50 percent of the equipment and labor costs. Utility companies in many sections of the country are participating in these programs to avoid having to build additional generating capacity, a comparatively more expensive option. According to DOE officials, the results of federal participation in these programs are not yet available.

BARRIERS TO INSTALLING ENERGY EFFICIENT LIGHTING IN FEDERAL BUILDINGS

Although the technology is available and there are incentives to help agencies fund the cost of energy reduction measures, GSA has made limited progress in taking advantage of such opportunities. GSA and DOE officials cited several barriers, including the inability to obtain the additional funding required; dispersion of authority among managers with many other priorities; the lack of a central point in government responsible for evaluating the claimed benefits of lighting products and disseminating information on which product is the most cost-effective; the lack of baseline data on individual buildings to measure energy reductions after installing energy efficient replacements; the fact that not all utility companies offer rebate programs; and the nuances of federal procurement regulations which can inhibit

energy savings initiatives. I will briefly discuss each of these barriers, with the caveat that we have not independently verified them or measured their overall impact.

Funding

Energy saving lighting equipment is generally more costly to initially purchase than conventional lighting equipment, in spite of its lower "in the long run" life cycle cost. For example, compact fluorescent bulbs, which are four to five times more energy efficient and last 10 times longer than regular bulbs, cost \$10 to \$15, whereas regular bulbs cost 70 cents to \$1.09. In times of budget deficits, facility operations and maintenance is one of the easiest targets for budget reductions. Government agencies like GSA get caught in a proverbial "catch 22" position--if they had some additional funds they could save money, but the savings are not possible without spending that additional amount of money up-front. For example, even with the shared energy saving programs, where a contractor installs the energy efficient equipment at its own expense, agencies are required to invest some funding to seek candidate buildings, monitor their savings, and evaluate alternatives and progress.

Dispersion of Authority

During the last administration, and to a lesser extent in the current administration, energy conservation did not receive a high priority in government operations, according to DOE and GSA

officials we contacted. More emphasis has been recently placed on the budgetary and other benefits of reducing energy usage in Federal buildings. However, dispersion of operating authority for the government's 500,000 buildings among more than a dozen agencies, compounded by GSA's recent delegation of building management functions to tenant agencies, makes central leadership difficult. Energy conservation must compete with many other building investment priorities, such as occupant health and safety, needed renovations to many old and deteriorating Federal buildings, and increased leasing costs facing GSA.

No Central Evaluation of Alternatives

No one in government has the responsibility to test the claimed benefits of energy efficient lighting equipment. The decision on whether to install such equipment is often made by the manager of a particular building. With limited information and budget, a building manager can have difficulty deciding whether to spend what money is available on replacing ballasts in multiple-bulb fixtures or on replacing incandescent bulbs with fluorescent fixtures, or tradeoffs between Brand X which costs \$5 a unit and saves 25 watts each, or Brand Y which costs \$7 a unit but saves 40 watts.

Although limited research on some alternatives has been done at DOE's Lawrence Berkeley Laboratory in California, little work has been done to evaluate specific innovations or competing

products, and there is no formal mechanism in place to transfer the information obtained at Berkeley to the individual building managers.

Further, there is some confusion in government as to which agency is responsible for getting energy efficient lighting products on government catalogues and schedules. Initially, both GSA and DLA handled the procurement of light bulbs. In December 1989, through an agreement with GSA, DLA was given sole responsibility for this function. When we asked DLA in early July how a civilian agency could get a product introduced on the DLA catalogue, DLA officials said that they did not know. When DLA assumed full responsibility for purchasing lighting for civilian and military agencies, no procedures were established to handle requests from civilian agencies to introduce products on the DLA catalogue.

No Baseline Data

A key requirement of P.L. 100-651 is to reduce energy consumption 10 percent in each agency by 1995. This will require comparing the amount of energy used in the base year with that used in 1985. Establishing prior energy use, or the baseline, in federal buildings is difficult because very few buildings are metered individually. Furthermore, according to GSA officials, utility costs are included in the rent in a majority of its leased space,

and the owner has no obligation to give GSA detailed information on utility usage.

The lack of individual building meters also impedes the utilization of shared energy savings programs, where contractors project energy savings from their installation of energy efficient devices and are paid a percentage of the cost savings.

Not All Utility Companies Offer Rebates

According to the Department of Energy's April 1990 utility rebate guide, 51 energy service companies are currently offering rebate programs on energy efficient lighting fixtures in the following 20 states: Arizona, Arkansas, Connecticut, District of Columbia, Florida, Illinois, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Montana, Nevada, New Hampshire, New Jersey, New York, Pennsylvania, Texas, Washington State, and Wisconsin. While the number of utilities participating in rebate programs is encouraging, certainly not all major locations where the government has buildings are covered by such programs.

In 1989, PEPCO applied to the Public Utility Commissions of Washington, D.C. and Maryland for approval to participate in utility rebate programs and increase its generating capacity. PEPCO received approval to participate in such programs in Maryland in November 1989 and in the District of Columbia in February of this year. GSA officials said that as a result of

the expansion to PEPCO's program, 20 to 25 Federal buildings would be retrofitted with energy efficient lighting in 1991. Similarly, on June 29 DOE released its first shared energy savings solicitation dealing with lighting for its headquarters building in Washington, D.C. The project will involve an investment of approximately \$1-1/2 million to replace 40,000 existing fixtures with energy efficient fluorescent fixtures.

Federal Procurement Regulations

DOE and GSA officials said that negotiating shared energy savings contracts can be time-consuming because they involve both unfamiliar federal procurement procedures and relatively untested private sector financing concepts, such as where the contractor pays the cost to install and maintain energy saving equipment. According to the National Association of Energy Service Companies, a particularly significant problem is that the Federal Acquisition Regulation language is not directly applicable to the innovative contracting format required. Federal agencies are required to implement shared energy savings contracting using the "Request for Proposal" process. Under this process, contractors submit proposals on selected buildings for which the agency has not defined a scope of work. Because the contractors work independently, the diversity of proposals resulting from an RFP make it difficult for federal agencies to evaluate them. Regulations restricting communications with the bidders prior to

the award of a contract are another factor inhibiting the evaluation of technologically diverse and innovative proposals.

Determining the allocation of actual versus projected savings between the contractor and the agency involves a calculation of risk on both sides. Changing utility rates, stemming for example from an unanticipated decline in energy prices, can result in savings lower than expected. The government's characteristic aversion to risk tends to lead it to place the risk on the contractor. Should energy prices return to the volatility of the 1970's, the relative inflexibility of the government's contracting process could be a deterrent to extension of the shared energy savings concept.

In addition, according to DOE and GSA officials, the procurement process is complicated for both shared energy savings projects and utility rebate programs because agencies have to identify available energy savings in their buildings; find out how to take advantage of them; evaluate the various energy savings projects; and award a contract to an energy service company.

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Mr. Chairman, that concludes my prepared remarks. We would be pleased to respond to questions.