How Federal Agencies Can Conserve Utilities And Reduce Their Cost

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General Services Administration
Department of Defense

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To the Secretary of Defense and the
Administrator of General Services

Here is our report entitled "How Federal Agencies Can Conserve Utilities and Reduce Their Cost." We made our review mainly at Department of Defense and General Services Administration facilities.

Our initial work on many of the matters discussed in this report and on which the agencies have commented was done before April 1973. Because energy problems and activities were continuing to grow, we did more work through 1973 and into 1974.

Throughout 1973 and 1974, Government interest, concern, and administrative actions involving energy have accelerated. Most recently, the Administrator, Federal Energy Administration, advised us that he was (1) planning inspections of agencies' energy-saving activities and (2) issuing guidelines to strengthen the roles of the agencies' energy conservation coordinators. We believe that, if the agencies provide these coordinators with appropriate responsibility and authority, agencies' energy conservation programs can be increasingly successful.

This report is designed to provide agencies and their energy conservation coordinators with a summary of the types of problems which our earlier and more recent studies indicate are systemic to long-range energy conservation measures within the Government. The report also recognizes the constructive actions of the executive branch and some of the actions planned through the first few months of 1974.

We want to invite your attention to the fact that this report contains recommendations to you which are set forth on page ii. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the heads of Federal agencies to submit written statements on actions they have taken on our recommendations to the House and Senate Committees on Government Operations not later than 60 days after the date of the report and the House and Senate Committees on Appropriations with the agencies' first requests for appropriations made more than 60 days after the date of the report.

We are sending copies of this report today to the Chairmen of the House and Senate Committees on Appropriations, Public Works, and Government Operations; the Director, Office of Management and Budget; the Administrator, Federal Energy Administration; the Director, National Bureau of Standards; and the Administrator, National Aeronautics and Space Administration.

Sincerely yours,

Director

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ABBREVIATIONS

DOD	Department of Defense
GAO	General Accounting Office
GSA	General Services Administration
NASA	National Aeronautics and Space Administration

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GENERAL ACCOUNTING OFFICE REPORT TO THE SECRETARY OF DEFENSE AND THE ADMINISTRATOR OF GENERAL SERVICES

HOW FEDERAL AGENCIES CAN CONSERVE UTILITIES AND REDUCE THEIR COST

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D I G E S T

WHY THE REVIEW WAS MADE

Government agencies spend at least $1.5 billion a year on electricity, gas, fuel oil, coal, water, and sewage disposal. Building and facility operations account for almost 40 percent of the energy consumed in the Government. General Services Administration (GSA) and Department of Defense (DOD) facilities are responsible for most of this consumption. (See p. 1.)

The use and cost of utilities have risen substantially in recent years and will continue to rise. The pressures of increasing demand and limitations on supply make it essential that the Government, as an example to the Nation as well as for reasons of economy, conserve its use of energy. (See p. 1.)

Because of this situation, GAO wanted to see what Federal agencies were doing to efficiently manage utilities, mainly electricity.

FINDINGS AND CONCLUSIONS

In June 1973, the President ordered the Federal Government to reduce its anticipated energy consumption by 7 percent over the succeeding 12 months.

The Office of Energy Conservation, Federal Energy Administration, is responsible for monitoring and reporting on the Government's progress in reducing energy use. That Office reported an overall reduction of 23 percent and a reduction of 11 percent in energy used in building and facility operations during the first half of fiscal year 1974. (See p. 3.)

Although GSA and DOD have agency-sponsored utility conservation programs, 12 of the 19 installations GAO reviewed had no utility conservation and management plans. Generally, utility conservation was being given insufficient attention and prominence at the installation level.

GSA disagreed with GAO, saying utility conservation had received much attention over the years and even greater attention recently. However, a DOD energy study and GSA internal correspondence indicated that the need for improvement still existed late in 1973. (See pp. 4 to 12.)

The Office of Energy Conservation pointed out that many of the conditions discussed in GAO's report related to the period before April 1973, when that Office was established. This observation is correct; GAO did its initial work before April 1973. However, in 1973 there was an acceleration of Government interest and action involving energy, so GAO did more work after submitting its report

for comment. GAO's report is designed to cover problems which are systemic to long-range energy conservation measures within the Government, as well as to recognize the constructive actions of the executive branch. (See p. 12.)

To use energy more efficiently and lower utility costs, planning in building design and construction needs to be improved. Both the National Bureau of Standards and GSA recognize that new research is needed for design and operation of Federal buildings. (See pp. 13 to 20.)

Procuring utilities is very complex and highly technical. Most utility companies consider it the customer's responsibility to select the lowest applicable rate available for his particular conditions. However, installations often do not know all rates available to select the lowest applicable rate; also, the nature of public utility services eliminates the need to compete for the customer's business.

As a result, an installation has no assurance of getting the lowest rate for utility services. Rates being paid vary from near-wholesale to retail. (See pp. 21 to 27.)

The Government needs to develop more in-house expertise in the utilities area to obtain the lowest utility costs and to help conserve energy. It does not have enough personnel with adequate training and experience to effectively monitor utilities. (See pp. 28 to 37.)

A number of improvements in Federal energy conservation have taken place since GAO completed its fieldwork. The Federal Energy Administration has issued guidelines designed to further reduce Federal energy consumption. GSA also has issued guidelines with over 185 ideas for conserving energy in building design, construction, and operation. These guidelines, if followed, should result in great savings. A GAO report to the Federal Energy Administration pointed out that it would be beneficial for agency energy conservation officers to review energy conservation activities at the field level to encourage compliance with the guidelines. (See p. 38.)

In response to the report, the Administrator, Federal Energy Administration, advised GAO that inspections of all major energy-consuming agencies were planned and that guidelines delineating the duties of energy conservation coordinators were being prepared. (See p. 4.)

RECOMMENDATIONS

The Administrator of General Services, in coordination with the Secretary of Defense and the Administrator of the Federal Energy Administration and, where necessary, the Director, Office of Management and Budget, should:

--Consider using utility rate consultants to monitor rates and charges until enough in-house expertise has been developed. (See p. 26.)

--Provide personnel required for managing utilities effectively and develop experience in such

personnel by establishing necessary training programs. (See p. 35.)

--Advise Federal agencies to disseminate information on utility management and conservation within their own organizations. (See p. 35.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

DOD, the Office of Energy Conservation, and the Office of Management and Budget generally agreed with GAO's recommendations. (See pp. 43, 53 and 56.)

DOD said the primary reason it did not have more in-house personnel to monitor rates and charges by utility organizations was the overall limit on personnel. (See p. 46.)

GSA believes in-house competence can be developed at much less cost as quickly as rate consultants can be hired and become productive. (See p. 51.)

GAO would have no objection to GSA's developing in-house competence instead of having rate consultants, if this method produces overall savings.

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CHAPTER 1

INTRODUCTION

The Federal Government spends at least $1.5 billion annually on electricity, gas, fuel oil, coal, water, and sewage disposal and on operating and maintaining Government-owned plants and distribution systems. A large part of this amount--about 40 percent--is for energy consumed in operating buildings and other facilities. The use and cost of utilities is rising each year and is expected to continue rising as more demand is placed on our dwindling energy resources and as environmental factors restrict the uses of such resources.

Under the Federal Property and Administrative Services Act of 1949, the General Services Administration (GSA) is charged with providing an economical and efficient system within the Government for procuring and supplying personal property and nonpersonal services, including management of public utility services, and representation before Federal and State utility regulatory bodies. This act allows an exemption from its requirements for the Department of Defense (DOD) whenever the Secretary of Defense determines that such exemption is in the best interest of national security. GSA may also designate and authorize any executive agency to carry out any function vested in GSA by the act. DOD and GSA executed a statement of areas of understanding for procuring utility services.

GSA

GSA prescribes policies and procedures for Government agencies to follow to economically procure and use public utility services. In addition, GSA conducts utility seminars and gives the agencies technical advice and assistance. GSA has areawide contracts with various utility companies for individual agencies to use. These contracts do not provide savings in utility costs through reduced rates, but they do reduce the administrative work that would be involved if each installation made separate contracts. GSA conducts negotiations with some utility companies for other agencies and will institute or participate in proceedings before regulatory bodies.

GSA building managers are responsible for those utility contracts which do not exceed $10,000 annually. At the GSA regional level (except for region 3), the Buildings Management Division of the Public Buildings Service[1] has responsibility for those utility contracts that do not exceed $50,000 a year. The Office of Motor Equipment Transportation and Public Utilities of the Federal Supply Service has responsibility for reviewing and approving those contracts which exceed $50,000 a year.

DOD

The Army, Navy, and Air Force each have separate utility procurement and management organizations. The Army Office of the Chief of Engineers, the Naval Facilities Engineering Command, and the Air Force Directorate of Civil Engineering develop policies and procedures for buying and selling utility services. Each of these headquarters activities has counterparts at the field command or area level. Rate negotiations are carried out at the field command or area level and, in the case of the Air Force, by the base procurement officer with the technical advice of the base civil engineer.

The headquarters activities provide technical services to lower echelons, review each utility contract with an annual cost of $50,000 or more, furnish technical advice, and present testimony as expert witnesses at rate hearings before regulatory bodies. These activities also conduct some training for contracting officers responsible for utilities services; where necessary, help negotiate contracts for individual installations; and evaluate installation performance by analyzing operating costs and reports and by making staff visits.

These headquarters activities also establish and supervise the carrying out of technical policy and standards for the maintenance, repair, and operation of Government-owned utility systems, including conservation programs.

FEDERAL ENERGY ADMINISTRATION

The Federal Energy Office (now the Federal Energy Administration), created by the President in December 1973, is

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[1]The Buildings Operation Division has this responsibility in region 3.

responsible for advising him on the establishment and integration of domestic and foreign policies relating to the production, conservation, use, control, distribution, and allocation of energy and other energy matters. The Office of Energy Conservation, established in the Department of the Interior in April 1973, became part of the newly created Federal Energy Administration. It monitors and reports on the results of the President's June 1973 order that the Federal Government reduce energy consumption by 7 percent over the succeeding 12 months. In response, the Office reported an overall reduction of 23 percent in energy use for the first half of fiscal year 1974. The 23-percent figure included an 11-percent savings in building and facility operations. We did not examine the accuracy of this figure.

OTHER AGENCIES

All executive agencies, to variable extents, procure and manage their own utilities. Some of them spend large amounts for these services. For example, the total utilities cost for the National Aeronautics and Space Administration (NASA), the Atomic Energy Commission, and the Veterans Administration is well in excess of $200 million annually.

Although utilities other than electricity are discussed in this report, we mainly examined electricity, which represents about half the energy consumed in Federal building and facility operations. Building and facility operations represent about 40 percent of the Federal Government's energy consumption.

CHAPTER 2

ROOM FOR IMPROVEMENT IN UTILITY CONSERVATION EFFORTS

Utility conservation programs administered by DOD, GSA, and NASA take various forms, such as policies, statements, directives, manuals, brochures, and public relations letters. However, of the 19 locations where we made our review, 12 had no utility conservation and management plans, although 1 was preparing to formulate such plans.

We observed a wide variation in the priorities installation management officials assigned to utility conservation efforts. Generally, utility conservation was being given only a part-time effort, and Government personnel were not treating utility conservation as a truly important matter.

In commenting on our report, GSA said that utility conservation had received much attention over the years and had received even greater attention recently. However, in a review of energy conservation of Federal office buildings which we made in the summer of 1973, we noted that operating personnel did not uniformly reflect the attention and emphasis given this area at GSA's policy level. GSA building managers were not always following recommended energy conservation guidelines. A DOD energy task force noted in November 1973 that DOD had a similar problem.

Unless energy conservation guidelines are coupled with followup reviews and procedures to enforce compliance, there is no assurance that conservation measures will be uniformly carried out at all levels.

On April 30, 1974, the Administrator, Federal Energy Administration, commented on a report we issued on March 29, 1974, concerning energy use by Government vehicles. He directed his comments, however, to Federal Energy Administration efforts within the Government generally. The Administrator indicated his staff was reviewing existing data and reporting systems and was planning to inspect installations of all Cabinet departments and major energy-using agencies. The Administrator, in response to our recommendations, was also planning to issue guidelines to the heads of departments and agencies broadening the role of energy conservation coordinators.

If these coordinators are given appropriate authority and responsibility for energy affairs within their departments and agencies, they can insure that headquarters' policies are being carried out at the operating levels.

EXAMPLES OF GOOD CONSERVATION EFFORTS

A conscientious effort to conserve utilities can result in substantial savings; we cite the following examples.

GSA building

A concentrated effort to conserve utilities at the Dirksen Building in Chicago, Illinois, began in December 1967. While costs increased at other locations, the building's engineer, by 1970, was able to reduce electric costs $60,000 (about 16 percent) below the level of 1967 costs. He estimated that his conservation plan saved an average $120,000 a year, compared to what the Government might otherwise have been paying.[1] Some of the methods he used to reduce electric costs at the Dirksen Building follow.

Instructions for the cooling season provide that chiller starting time be early enough to bring the building's temperature down to about 70°F by 8 a.m. The temperature is allowed to rise to about 78°F in the afternoon to save on electric power. On Monday through Friday the air-conditioning chillers are shut down at 5:30 p.m., unless required to keep the temperature below 85°F. Fans and pumps are shut down at 6 p.m. Operating instructions provide that, when it is necessary to start chillers after 8 a.m., the load for the chillers in service be reduced to a minimum ampere setting. Agencies requesting cooling or heating after duty hours are quoted hourly rates which they will be charged.

Certain other conservation measures reported for the Dirksen Building follow.

--Lights are turned off at the end of the day, and the custodial force uses only the lights needed to do its work.

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[1]See app. II for composition of electric power bills.

--The number of lights and the wattage for lights used in stairwells and lobby areas has been reduced.

--Incandescent lights have been replaced with fluorescent or mercury-vapor lights.

--Watt-hour meters and water meters have been installed to identify actual consumption by equipment, such as elevators, computers, or chillers, so that problem areas can be identified.

--A demand meter has been installed at the control panel and is parallel with the power company's meter to record the kilowatt demand. When the demand reaches a prescribed level, certain electric equipment is shut down to make sure that the demand does not exceed that level.

NASA facility

NASA's Lyndon B. Johnson Space Center[1] in Houston, Texas, provides another example of the benefits of management action to reduce utility costs. From fiscal year 1969 through fiscal year 1972, electrical demand was reduced 14 percent and the power cost was reduced from $0.00610 to $0.00575 a kilowatt hour. This cost reduction was achieved by a number of actions, including:

--Obtaining a more favorable rate through negotiation.

--Installing capacitors.[2]

--Establishing a utilities control center which, among other things, monitors demand readings and coordinates the use of equipment requiring a lot of power.

Air Force base

Officials at Kelly Air Force Base, Texas, have taken the following actions to reduce the costs and use of electricity.

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[1]Formerly the Manned Spacecraft Center.

[2]A condenser which stores an electrical charge.

--Changed janitors to the day shift.

--Rescheduled high power consumption equipment, such as industrial furnaces, to other than the peak shift.

--Installed capacitors to improve the power factor.

--Made periodic inspections for unnecessary lighting and other wasteful practices.

Actions taken at the Dirksen Building, the Lyndon B. Johnson Space Center, and Kelly Air Force Base are a few examples of what can be done to reduce the use and/or cost of utilities when a concerted effort is applied.

EXAMPLES OF NEED FOR MORE CONSERVATION EFFORT

Assignment of people

Although a number of people were involved in utility conservation and management at Kelly Air Force Base, their utility management responsibilities were extra duties which were subordinate to higher priority duties.

Officials of both the Atlantic Division of the Naval Facilities Engineering Command in Norfolk, Virginia, and the Office of the Base Civil Engineer, Langley Air Force Base, Virginia, believed they did not have enough personnel with adequate expertise[1] to carry out and follow through on formal utility conservation programs. Despite this belief, Atlantic Division personnel seemed to show an interest in and a positive attitude toward conservation efforts.

The effort to conserve energy at the Dirksen Building in GSA region 5 was not typical of other GSA activities. We visited four field offices in GSA region 9 and found no formal conservation plan existing in any of them. At the GSA region 9 headquarters in San Francisco, California, we were told that each of the field offices had been instructed to set up its own conservation plan. However, regional personnel

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[1]The problem of expertise within Federal agencies is discussed in more detail in ch. 5.

could locate neither the instructions nor any of the conservation plans. The Acting Chief, Maintenance and Utilities Section, said that it was not necessary for the regional office to have the field offices' conservation plans since the plans could be reviewed during annual field office evaluations.

The Chief, Maintenance and Utilities Section, is responsible for the utilities conservation program. This requires that he review costs, rate schedules, and use demand factors. He is also responsible for developing effective field office controls and for initiating corrective action, when required, to change rate schedules or operation methods. Having a copy of each field office's conservation plan at the regional office would seem to be necessary for review, reference, and modification as problem areas surface and corrective action is directed or taken.

Although there was no formal conservation plan for the region as a whole, there were individual conservation instructions for various employees; e.g., when custodial help should turn off lights or when electricians should turn motors on or off. Although such instructions may help conserve electricity, a formal conservation plan is necessary so that regional technical personnel and management officials can evaluate it to see how consumption and demands are coordinated and whether realistic targets have been established. Once a formal conservation plan has been developed, it can be adopted as the criteria to be followed by operating personnel and as a standard for measuring performance.

Using available data

At the GSA field offices we visited, electric power analyses (records of power use and costs, by building) and charts developed from the monthly electric bills showed use, demand, and costs. However, the GSA officials we interviewed could not give specific reasons for fluctuations and were not using the information as a management tool for conservation. The information was not being analyzed at GSA headquarters either.

Control of peak demand

Dewatering drydocks requires a great deal of electricity. The dewatering we observed at the Hunters Point Naval Shipyard,

San Francisco, used three 1,500-horsepower electric pumps with a total capacity of 450,000 gallons a minute. The peak demand for the month, August 1972, occurred at the time this dewatering took place. We estimated that deferring the dewatering from the peak period to an off-peak period could have reduced the shipyard's electric bill for the month by about $2,200.

A review of the dewatering records for the largest drydock at Hunters Point for the period January 1970 to June 1972 showed that dewatering generally took place during peak-demand periods. In some cases dewatering was stopped during the off-peak-demand period and resumed the following day during the peak-demand period. Since the highest recorded demand in any one month can affect the electric bill for succeeding months, it is imperative to schedule high-demand activities, such as dewatering, during off-peak-demand periods, if at all possible.

Richards-Gebaur Air Force Base, Missouri, did not use its standby electric generators to lower peak demand, although this could have greatly reduced electric costs. At both Richards-Gebaur Air Force Base and Forbes Air Force Base, Kansas, operation of electric motors was not rescheduled to other than peak-demand periods and operating hours for equipment were not controlled to obtain the maximum economy. The air-conditioning equipment, except for window units, was not shut down at night or on weekends or holidays in unoccupied buildings. Local Air Force officials had no engineering studies on which to base their equipment-operating policies.

Use of capacitors to improve power factor

Some installations had not acted to improve their power factors, which deal with the phase relationship between current and voltage. Current usually lags behind the voltage, and the full power effect is not realized. The power factor is the ratio of true (effective) power to apparent (total) power. This ratio may be improved (the effective power brought closer to the total power) by using capacitors or synchronous motors to reduce the reactive or idle current in the system and thus get fuller use of the electric power passing through the meter. Utility companies often levy an additional charge when the power factor is below a certain level and some also offer discounts when the power factor is above a certain level.

GSA instructions state that the power factor should be checked regularly to see if improvements are needed. GSA installed a capacitor at the Federal Building, 450 Golden Gate Avenue, San Francisco, which increased the power factor from 87 to 98 percent. This particular capacitor cost $7,300. This improvement increased the discount--from 0.2 to 1.3 percent of the monthly power charge--which amounted to a savings of $3,200 a year.

Navy instructions state that improving the power factor is an important element of conserving electricity and that, if the overall system power factor is so low as to incur a penalty or to cause excessive system losses, methods for improvement should be investigated. Personnel at the naval station's Sewell Point complex in Norfolk submitted an economic study through the beneficial suggestion program that showed potential annual savings of $27,000 by installing capacitors costing $25,000. We discussed the matter with Navy officials, noting that capacitors may be justified at other locations. The Atlantic Division of the Naval Facilities Engineering Command has made other studies which show that, by investing $120,000 in capacitors, $268,000 can be saved annually.

Each site or case usually requires a study to determine whether it is economically feasible to install equipment to improve the power factor.

CONCLUSIONS

Effective conservation methods not only serve the objective of prudent use of energy resources but also generally are consistent with the utility manager's objective of reducing costs or holding them in check.

There was room for improvement in the Government's utility conservation efforts. Generally, utility conservation was being given only a part-time effort, and Government personnel were not administering utility conservation as a major duty. Many activities had no utility conservation and management plans. We believe that detailed energy and economic studies are needed for each existing facility to determine what can be done to conserve fuel energy. Management should make the needed modifications to improve the efficiency of utility systems. Recommendations directed at these problems, together

with the agencies' comments on them, are set forth in chapter 5.

AGENCY COMMENTS AND OUR EVALUATION

DOD

DOD said it fully recognized the need for a responsive utility conservation program and had promulgated the policy and guidance to establish such a program DOD-wide. DOD has recently intensified its efforts in this area.

DOD's November 15, 1973, report entitled "Management of Defense Energy Resources" concluded that all services had longstanding utility conservation programs that were being revived after a period of neglect but that an appreciation of the need for energy conservation had not filtered down to the user level. The report pointed out that allocated resources were not adequate to carry out an effective conservation program but that energy conservation programs were most successful at installations where the commanding officers had taken an active interest.

GSA

The Administrator of General Services disagreed with our observation that utility conservation was being given only a part-time effort and that Government personnel were not treating utility conservation as an important matter. He stated that utility conservation had received much attention over the years and even greater emphasis recently. According to the Administrator, GSA had utility conservation plans in effect in the early 1960s and had issued many instructions in handbooks and other forms.

We recognize that utility conservation efforts have increased in recent months because of national emphasis on the subject. However, it was obvious from our review that the concern expressed at GSA's higher levels has not been uniformly displayed by operating personnel. Our review of energy conservation in Federal office buildings in the summer of 1973 confirmed this observation. Among other things, building managers were not always adhering to GSA guidelines for energy conservation or to recommended equipment-operating procedures.

In a letter dated October 11, 1973, to all regional commissioners of the Public Buildings Service, the Assistant Commissioner for Buildings Management noted a slow start in carrying out energy-conserving directives issued after the President's June 29, 1973, energy message. He noted that, on the basis of results reported to date and visits to some of the regions, it was obvious that GSA operating personnel, as well as tenant agency personnel, were not yet convinced of GSA's determination and need to meet the President's energy reduction goal. He further said that action must be taken to overcome some misgivings and reluctance on the part of operating personnel to take positive action to achieve the prescribed economies in occupied space. He insisted that all operating personnel and building occupants be made aware of their energy conservation responsibilities.

Office of Management and Budget

The Office of Management and Budget said that, due to the complexity of the utilities area and the wide diversity of Federal buildings and activity, time and effort would be required to institute a complete, effective utility conservation program.

Office of Energy Conservation

The Office of Energy Conservation said that it was trying to solve some of the problems noted in our report and that this was a major undertaking with great potential for conserving resources.

The Office observed that many of the conditions discussed in our report related to the period before the Office was established in April 1973. This is correct. We did our initial work before April 1973. In 1973, however, there was an acceleration of interest, concern, and administrative actions within the Government involving energy. Therefore, after submitting our report to the agencies for comment, we did some more work. This report is designed to cover problems which our earlier and more recent studies indicate are systemic to long-range energy conservation measures within the Government. It also recognizes the constructive actions of the executive branch and some of the actions planned through the early part of 1974.

CHAPTER 3

EFFECT OF DESIGN AND CONSTRUCTION ON UTILITY COST

Better building design and construction would lower utility costs and contribute to more judicious use of critical fuel energy. The National Bureau of Standards has estimated that 20 percent of the fuel energy used in buildings in 1970 was wasted. The Bureau attributed this waste to (1) esthetic considerations which were inimical to good energy use, (2) technical data's not being available, and (3) concentration on initial construction costs rather than on life-cycle costs. These factors have contributed to using inefficient equipment and building insulation.

Several instances where initial design decisions and inefficent equipment have resulted in higher utility costs and wasted fuel energy are described in the following sections.

EXTERIOR GLASS

Many Government office buildings constructed during the past 10 years have 20 percent or more glass surface. Buildings having a high percentage of glass surface need more energy for cooling and heating because such buildings gain and lose heat much more rapidly than buildings with a low percentage of glass surface.

For example, in a recently constructed 65,000-square-foot Atlanta, Georgia, office building, the air-conditioning load could have been cut from 180 to 130 tons and the heating capacity reduced by 800,000 British thermal units if the building had 50 percent less glass, according to a May 1972 National Bureau of Standards and GSA Roundtable on Energy Conservation in Public Buildings.

GSA engineers told us that architect-engineering firms, in designing buildings for any customers, including GSA, consider the appearance and type of materials used in other buildings in the same area. A Federal office building to be built in Lincoln, Nebraska, will have about 75-percent glass surface, according to GSA.

The Fritz G. Lanham Building in Fort Worth, Texas, contains 787,000 square feet of floor space. Approximately 50 percent of the building's exterior surface is 1/4-inch tempered gray glass. GSA runs the perimeter air-conditioning equipment day and night during the air-conditioning season to keep that area cool. Thus fuel energy is wasted and operating costs are increased.

TECHNICAL DATA NOT AVAILABLE OR USED

The National Bureau of Standards and GSA recognize that new research is needed in building design and operation. Both recognize that energy can be saved if the considerable amount of existing energy conservation data is used. They plan to disseminate this data to the design and construction industry. Following is a brief discussion of some of the areas having potential for savings in utility costs and energy consumption.

Standard ventilation rate is outdated

The National Bureau of Standards has proposed a demonstration project to measure the energy saved, the building cost reductions, and the occupants' responses as a result of reduced ventilation and air circulation rates in office buildings. Currently, interior areas of commercial and office buildings are generally designed for six air changes an hour. This ventilation rate is used as a standard, even though the supporting research was done in public school facilities about 60 years ago, before air-conditioning or mechanical ventilation was used.

The National Bureau of Standards believes new research is needed on ventilation rates and fresh-air rates in terms of the present knowledge of personal comfort, health, air cleaning, and types of mechanical systems. If ventilation requirements were reduced, fans and the motors to operate them could be smaller; less energy would be used to condition the air; less space would be required for fans, ducts, etc; less noise would be produced; and initial and operating costs would decrease. The findings from this research could provide the basis for new ventilation standards and could make major cost reductions and energy savings possible through future office building design.

In GSA's 650 Capitol Mall Building in Sacramento, California, a judge complained about excess courtroom noise. Honeywell, Incorporated, made a study and determined that reducing the speed of the air-conditioning fans and adjusting air deliveries in rooms would reduce noise and vibration. When Honeywell tested two fans, it found that power requirements were reduced 50 percent, most air turbulence noises were eliminated in building spaces served, vibration was reduced about 60 percent, and only 5 percent was lost in air delivery. Honeywell indicated that applying the 50-percent reduction in power to all fans would save about $900 each month. The study indicated that other technical adjustments to the air-conditioning system could save $4,000 more annually in gas and electricity.

Energy saved through reduced lighting levels

According to the energy conservation roundtable, research should be done to develop new lighting criteria. The participants concluded that the electrical energy required to light new buildings could reasonably be reduced a minimum 25 percent without any changes in working style.

There are at least three benefits from lowering lighting levels. First, the energy required to light a given area is reduced. Second, the heat generated by lighting equipment is reduced, which, in turn, lowers the air-conditioning load. Some lighting experts estimate that, except on the very hottest days, the main function of air-conditioning is to remove the heat given off by interior lighting. Third, utility costs are lower because of the first two benefits. (See ch. 6 for recent guidelines on lighting levels.)

CONCENTRATION ON CONSTRUCTION COST RATHER THAN LIFE-CYCLE COST

According to the American Institute of Architects, industry has usually been concerned with the cost of putting up a building rather than with the total cost to construct and operate the building over its useful life (life-cycle cost). This approach is basically incompatible with low energy use. Although such items as insulation and heating and cooling equipment can be selected without affecting a building's basic structure or purpose, what is selected can significantly affect energy use and the life-cycle cost.

We believe the approval process for constructing Government buildings has affected energy use, because concern has been with limits on construction costs rather than with life-cycle costs. Consequently, many Government buildings use energy inefficiently. GSA has recognized that energy requirements can vary as much as 40 percent for buildings of approximately the same size. GSA has been gathering information on about 400 Federal buildings in the hope that the data, once analyzed, will be useful in developing new technology.

Energy conservation should be considered when buildings are designed

The energy conservation roundtable concluded that specifically providing for energy conservation features in building design could reduce the building's energy consumption by 10 to 20 percent. According to the roundtable, buildings so designed could be built with no increase in total cost--the initial cost plus the operating cost over the building's projected life.

The report on the roundtable stated that, in constructing buildings, gains may be achieved most readily by improving the insulation level, changing design temperature and temperature-control practices, adjusting lighting levels, and selecting more efficient equipment. Also, the energy requirements for existing buildings could be decreased by changing equipment-operating practices, such as curtailing the use of large motors during peak-demand periods and when the building is not occupied; reducing cooling and heating of unoccupied space, such as storerooms and vacant areas; and reducing lighting levels. The report also pointed out that maintaining equipment and insulation is very important to energy conservation and that regular maintenance checks are imperative. (See p. 38 for temperature-level restrictions the Federal Energy Office instituted in January 1974.)

To further the research and development of energy-saving techniques, GSA has decided to experiment in the design of two buildings to accommodate tests and development of new techniques while the buildings are housing normal Government activities. Details of these buildings follow.

Federal Office Building, Manchester, New Hampshire

The building's design, including configuration, orientation, arrangement of doors and windows, and selection of materials, will be controlled to reduce the energy required to operate the building.

--The building will be as nearly square and as large per floor as the site will permit.

--Windows in the east, west, and south walls will occupy only 5 to 15 percent of the area. Double glazing and shading will be used. There will be no windows in the north wall.

--Walls and roof areas will be insulated better than under the current normal practice.

The mechanical, electrical, and lighting systems will be carefully selected and coordinated to minimize energy consumption. Further, different types of mechanical, electrical, and lighting systems will be provided on various floors of the building so that performance and energy use can be directly compared after the building is occupied. If funds permit, a solar collector will be provided on the building roof and solar energy will be used for heating and cooling several upper floors. Some planned features are:

--A heat recovery and use system will include a large, insulated tank to store hot water. Heat will be reclaimed from many sources, including heat pumps and chillers, water-cooled transformers, possibly from burning trash, and possibly from a generator. In addition, heated water from the solar collector, if included, can be stored in the same insulated tank for use during periods when no solar energy is being collected.

--Modular pumps, boilers, etc., will be used as much as possible to provide for best efficiency for the varying loads.

--Economizer cycles are planned for all air-handling units to take the most advantage of outside air when appropriate.

--Heat recovery systems will permit transfers between exhaust and intake air.

The building will be operated to minimize energy use.

--Normal operations and custodial work will be confined to the workday.

--All ventilation fans will be shut off 10 minutes each hour.

--Temperatures of corridors, restrooms and equipment and storage rooms will be allowed to vary to 65° F in the winter and 80° F in the summer.

--Temperature may be set back (5 to 10 degrees) 1 hour before closing time in the winter.

The building will be instrumented to facilitate data collection, evaluation of the building's energy requirements as a whole, and evaluation of the various mechanical, electrical, and lighting systems installed on different floors of the building. Also, employee reaction to the building and its environmental systems will be evaluated.

Federal Office Building, Saginaw, Michigan

This building dramatizes GSA's firm commitment to consider environmental concerns in designing, constructing, and operating Federal buildings. It will serve as a laboratory for testing both recognized and innovative environmental features and equipment and will inspire others in the building industry to improve the environment.

The outdoor environment will be enhanced by a park constructed around the building and on about one-third of the roof; parking areas will be screened from the street; and children will be able to use parking areas as play areas after working hours. The indoor environment will include large open spaces and full window walls at most locations to provide an open view to the outside.

Recycled rubble will be used for wall panels and paving surfaces. Aluminum used in the building will be either recycled or from the national stockpile. Rainwater will be collected from around the building for lawn sprinkling. The

requirements for municipal water will be minimal for drinking and lavatories. Single-pipe, single-temperature water will be supplied to lavatories.

A solar energy system is expected to provide all the domestic hot water required for the building and approximately 70 percent of the heating, thus saving normal fuel sources while operating pollution free.

New GSA design guidelines

GSA issued guidelines on March 20, 1974, which are designed to reduce energy consumption by 50 percent in new Government building construction. The publication, "Energy Conservation Design Guidelines for Office Buildings," includes over 185 ideas for conserving energy in building design, construction, and use. The guidelines apply to buildings to be constructed under GSA's aegis, and GSA urges other agencies to apply them to all buildings being constructed with Federal funds.

CONCLUSIONS

Because planners have selected designs and equipment without enough regard for energy conservation, many Government buildings are wasting fuel energy. Use of exterior glass has been overemphasized, adequate technical data has not been available or used, and operating costs have not been given adequate weight in relation to construction costs.

Studies of the latest energy conservation technology are needed to provide a basis for planning economical facilities. Building designs should be selected on the basis of energy use and life-cycle costs. Use of materials, such as glass, for esthetic value at the expense of energy, should be reexamined.

AGENCY COMMENTS AND OUR EVALUATION

GSA, along with the other agencies which submitted comments, stated that energy conservation was a major design consideration. Both GSA and DOD believe that the policy of designing public buildings with esthetics in mind need not conflict with energy conservation. We agree.

GSA

The Administrator of General Services has designated the new Federal Office Building to be constructed in Manchester as the "Energy Conservation Demonstration Project." GSA has set a goal of using 20 percent less energy than would be required for a comparable, existing building. The design is nearing completion, and GSA expects the energy saving to exceed the 20-percent goal. GSA claims that, when constructed, this building, while making a positive contribution to its surroundings, will be an example of what can be done when energy conservation is a major consideration at the concept stage of a building.

DOD

DOD said that since 1954 it had issued a series of instructions on air-conditioning and fuel selection and specific guidance for various types of similar facilities and that these instructions included specific energy conservation considerations and requirements. DOD also said that more research should be done on ventilation criteria and lighting standards, with criteria changes being based on adequate research, and that the indiscriminate use of glass should be stopped. DOD added that life-cycle costing considerations for buildings should include realistically projected energy costs for future years.

Office of Energy Conservation

The Office of Energy Conservation said that, in deciding on design criteria, total installation expenses would have to receive more attention because of rising energy prices and the need to save energy.

CHAPTER 4

PROCUREMENT AND CONTRACT ADMINISTRATION PROBLEMS INVOLVING UTILITIES

Procuring utilities in the correct amount, at the proper time and place, and in the best interest of the Government can be a complex, highly technical matter that requires close teamwork by procurement, engineering, and legal personnel. Also required is an intimate knowledge of the specific requirements of an activity or installation, including familiarity with the supplier's tariffs, rules, and regulations.

A widely held misconception is that utility companies automatically give customers the most preferential rates obtainable. Most utility companies have several rate schedules available but consider it the customer's responsibility to select the lowest applicable rate for his particular conditions. Therefore it is important that the correct selection be made initially and that conditions and rate schedules be periodically monitored to insure continued service at the lowest applicable rate.

Utility rates paid by the Government vary by location, contract, volume, use, facilities, and regulations. At some sites the Government pays retail rates and at others it pays near-wholesale rates. Most Government installations we visited paid retail utility rates. An Army procurement seminar reported that the potential savings from obtaining wholesale rather than retail rates could range from 10 to 30 percent.

ALL RATES NOT KNOWN

As previously noted, utility companies consider the customer responsible for selecting the lowest applicable rate schedule. However, it appears that in most cases GSA relies on the companies to advise it of the applicable rate schedules. Following is an excerpt from one of the standard letters GSA sent to the utility companies requesting information.

> "Eight years ago, 1964, we requested and received copies of bills for electric service rendered by your company to all Federal Government agencies.

Would you again be so kind and send us copies of all Government bills which amount to $5,000 or more for the twelve-month period ended with June 1972. Also, copies of the rate schedules used in computing the bills and copies of any published rate schedules which might be used as an alternate."

In most cases the utility companies were reluctant to include any alternative rate schedules with the information they provided. As a result, GSA used the "National Electric Rate Books," published by the Federal Power Commission[1] on a State-wide basis, for backup reference. However, these books contain only summaries of the standard published rates offered by the utility companies. They do not include the many special contract rates that exist between utilities and private consumers. Reviewing the "National Electric Rate Books" for the most applicable published rate may be sufficient in the case of a typical post office or other small Government user, but rates applicable to large Government installations should be compared with the special rates offered to large users in private industry. The only way to do this is to visit the State utility commissions where these rates are on file. This is where more effort on the part of GSA regional representatives could be productive, in our opinion. Operating at a regional level, GSA would have relatively easy access to the rates on file with the State utility commissions.

There are many rate consulting firms claiming to save their clients thousands of dollars every year just by searching out lower available rates. They attribute their ability to do this to the fact that over the years they have accumulated a wealth of information on the numbers and types of rates available. They can compare one client's rates with others for similar service and often find a lower rate available. In the agencies we studied, there were generally no personnel with the expertise and experience to provide similar savings to the Government.

CONJUNCTIVE BILLING

Conjunctive billing for utilities is the combining of utilities use, measured through two or more metering points,

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[1]See app. I for a description of the role of the Federal Power Commission.

for one or more installations, as if the billing were for a single meter or service. Generally conjunctive billing will be to the customer's advantage, because combining two or more meter readings may result in lower rates than billing for each meter reading. However, the utility companies and municipal districts serving some of the installations we visited (discussed below) did not bill these installations conjunctively.

When utility companies refuse to bill conjunctively, the alternative is to consolidate circuits for obtaining electricity through one metering point when the consolidation is deemed practicable and economical.

The Red River Army Depot and the Lone Star Army Ammunition Plant, Texarkana, Texas, are contiguous and are provided electrical power by a utility company through two distribution points. Both bills are sent to the depot for payment, but the company is unwilling, under the present power delivery system, to combine these bills and lower the cost to the Army. At Kelly Air Force Base the utility company considers each of five electrical metering points as a separate customer and refuses to combine meter readings for billing.

RATE SETTING UNDER REGULATION AND COMPETITION

Utility suppliers, for the most part, operate without competition in franchised territories and are controlled primarily by State regulatory commissions. With the approval of regulatory bodies, they can bring about changes in contract rates by changing existing rules and regulations. In many States, local governments can make rulings without State regulatory commission approval.

If the Federal Government is not satisfied with its rates or its negotiations with companies or local jurisdictions, it must seek its remedies in formal proceedings before the State regulatory commissions or the courts.

Consequently, contracting officers find it difficult to negotiate favorable rates and terms for the Government even though specialized help may be obtained from higher headquarters.

Following are examples of some of the types of problems the Government faces in negotiating its rates.

Richards-Gebaur Air Force Base had been billed on a conjunctive basis for electric power served from two primary points, but the power company changed its rates, rules, and regulations so that conjunctive billing was discontinued. The added annual cost under separate billings was estimated at $21,000.

Kansas City, Missouri, billed Richards-Gebaur as a commercial, out-of-city water user, even though the northern part of the installation has been within city limits since January 1963. The base's water meter is within the city limits, and the base owns all water mains and waterlines on the base. The Air Force contracting officer determined that the base would have paid about $123,000 less if the city had billed at in-city water rates over a 4-year period.

Richards-Gebaur personnel noted in 1966 that the city might be overcharging the base for water, and they so notified the city. The city did not agree. The city took the position that it was justified in charging the base out-of-city rates because some of the water was ultimately used outside the city limits. The city suggested that the Air Force install, at Government expense, an accurate metering system which would measure the water consumed inside the city limits. After the metering system was accepted and the contract amended, the city would charge in-city rates for water used inside the city limits.

It was not until April 1972 that the city finally agreed to consider modifying the billing rate on the basis of a formula or percentage of the amount of water estimated to be used in the city limits. Base officials told us that more analysis and negotiations would be necessary before a settlement was made.

The separate experiences of Fort Rucker, Alabama, and Richards-Gebaur provide a contrast of problems in competitive and noncompetitive environments. Some years ago Fort Rucker was furnished electric service by a franchised power company at what was approved as a fair and reasonable price by the State commission and the Army Power Procurement Officer. A local cooperative later offered to provide electric service to the fort. Competitive proposals were solicited and the power company providing the service lowered its rates about 20 percent, which resulted in a cost reduction to the Government of about $500,000 over a 5-year period.

NEED TO IMPROVE CONTRACT ADMINISTRATION

About half the energy consumed in Government buildings is electricity. Adequate surveillance of electric meters and bills is needed to provide the necessary cost controls.

Although some Government installations have good systems for utility cost control, including electric meter reading, bill checking, and discrepancy reconciliation, some installations we visited were not verifying electric bills and were accepting the power suppliers' meter readings as correct.

GSA's "Executive Seminar In Public Utilities Service Procurement" outlines the documents or records that should be kept as part of a complete and up-to-date record of each utility service contract. This record should at least include background data on negotiations with utility companies, rate analyses, current information on applicable rate schedules, account and meter numbers, and points of contact and addresses of utility companies. However, at some installations the files containing this necessary documentation and information were incomplete.

CONCLUSIONS

Proper utility procurement can be a complex and highly technical matter. Utility companies usually have several rates available, depending on the conditions of service, but the customer is normally responsible for selecting the lowest applicable rate for his particular conditions. It is important, therefore, that Federal agencies have full knowledge of the available rates and periodically assure themselves that the selected rates are the most favorable ones.

Because of the complexities of rate analyses and the Government's current lack of expertise in this field, the Government should consider using utility rate consultants to monitor rates and charges. When the Government has developed an adequate expert staff and data bank to insure that it can fulfill its responsibility to acquire utilities at minimum cost, it could stop using outside rate consultants.

Our review showed that data pertinent to utility contracts, rates, costs, etc., was not generally available in agency files. Failure to keep adequate records on contracts can result in poor contract administration.

RECOMMENDATION

The Government should request special rates when special load characteristics or situations justify such requests. Identifying the situations and relating them to the best available rates requires a level of expertise not generally available within the Government.

We recommend that the Administrator of GSA and the Secretary of Defense, in coordination with the Office of Management and Budget and the Federal Energy Administration, consider using utility rate consultants to monitor rates and charges until an in-house capability has been developed.

AGENCY COMMENTS AND OUR EVALUATION

GSA

Although he believes that GSA is doing a reasonably adequate job, the Administrator of General Services said that the opportunity for large savings in public utility services costs is very real and that much more could be done Government-wide in this management area. It is GSA's opinion that in-house competence can be developed at substantially less cost as quickly as rate consultants can be hired and become productive. According to GSA, the need is for increases in appropriations and employment ceilings.

DOD

DOD said that:

--Using utility rate consultants to monitor rates and charges until enough in-house expertise has been developed is a proper management procedure.

--The military services currently have utility engineers at the major headquarters level who know about the various utility rates and schedules for their geographical areas and can provide expert advice to subordinate installations. These experts are required to review all utilities contracts over $50,000 for technical sufficiency and rate acceptability.

--The primary reason DOD does not have more in-house personnel to monitor rates and charges by utility

organizations is that the number of personnel has been limited. Utility rate consultants cannot be hired merely to avoid personnel staffing limits.

--Consultants have occasionally been expert witnesses in various rate cases where in-house expertise was not available.

--A new computer program is being implemented to monitor rates and charges to particular installations and thus lessen the critical neeed for more personnel to perform these duties.

DOD's November 15, 1973, report entitled "Management of Defense Energy Resources" pointed out there was a lack of experienced personnel to negotiate rates with utility companies and recommended that the Army, Navy, and Air Force provide the services of expert utility rate engineers at the contract review level.

We believe the information which rate analyses firms could supply to Government negotiators would be invaluable. We do not view contracting with these firms as a means of circumventing employment ceilings. Although experienced personnel have a major part in monitoring utility rates, the key to the firms' success is their data banks of rates being offered by the utility and those being paid by other customers of the utility who are clients of these firms. None of this information would be readily available to the Government if such firms were not used. Therefore, using such firms should be seriously considered.

Office of Energy Conservation

The Office of Energy Conservation of the Federal Energy Administration suggested that our recommendation apply to all Government agencies. We agree and have told the Office of Management and Budget of the potential application of our recommendation to other Federal agencies.

Office of Management and Budget

The Office of Management and Budget agreed with our recommendation.

CHAPTER 5

NEED FOR MORE EXPERTISE AND COORDINATION

The Federal Government needs to develop more expertise in the utility area to enable agencies to minimize utility costs and at the same time contribute to the conservation of energy. In addition, more cooperation and coordination is needed among Federal agencies.

NEED FOR BETTER STAFFING

In GSA, the Public Utilities Management Division of the Office of Motor Equipment Transportation and Public Utilities, Federal Supply Service, has responsibility for (1) planning, developing, and coordinating policies, regulations, procedures, and standards governing civilian executive agencies' procurement, use, and conservation of public utility services, (2) directing the conduct of negotiations for public utilities, (3) recommending modifications in the type of services being used, (4) providing liaison with and consulting services to all civilian executive agencies on matters pertaining to utility rates, tariffs, and schedules, and (5) directing the development of training materials and programs in utility management and operations for civilian executive agencies (including GSA) to use.

At the time of our fieldwork, the Public Utilities Management Division had only 11 people to carry out these responsibilities. The effect of limited manpower within GSA can be shown by the following example.

GSA's first formal attempt at utility rate analysis began in 1964 when one man was responsible for reviewing the rates for all Federal agencies. Until he retired in March 1969, this man saved a considerable amount. Yet, when rapid increases in the cost of utility services made this type of rate review work most essential, it was not done in GSA for over 3 years.

In June 1972, GSA once again started rate analysis work but still had only one person assigned to do the job. One person analyzing utility rates charged to Federal agencies is not enough to adequately cover this area. GSA has stated that, at the current staffing level, it would take 5 years to

complete a review of utility rates for all Federal activities. We believe a review every 5 years is not frequent enough, considering the pace at which utilities have been restructuring their rates.

Current staffing levels prohibit GSA from doing a complete job of rate review even if a 5-year cycle were considered adequate. GSA is forced into review by exception, concentrating its efforts where they will do the most good but excluding many areas with potential savings. For example, during the 1964-69 period of rate review, all of those utilities with GSA areawide contracts were excluded from review. At the time of our fieldwork, GSA had areawide contracts with 54 utility companies. GSA expects to review these contracts before it begins a State-by-State review. Some contracts will not be reviewed because prior analysis has proved futile or because they are small.

DOD installations we visited generally did not have enough personnel with adequate experience to give proper attention to utility matters. For instance, the Atlantic Division of the Naval Facilities Engineering Command had only enough personnel to render consultant services to user activities on the basis of data in management reports and could not visit all activities to furnish guidance based on more current data. Under these circumstances, the Atlantic Division plans to have only its major user activities follow Navy guidelines pertaining to analysis and conservation techniques. Langley Air Force Base officials attributed their lack of a formal conservation program to a shortage of personnel with adequate expertise.

NEED FOR MORE AND BETTER TRAINING

There are several reasons for Government personnel's lack of expertise in procuring and managing utilites. The area is complicated and difficult and requires considerable education, training, and experience. There appears to be a shortage of qualified personnel in the private sector, and the Government apparently has not been very successful in attracting the number of qualified personnel it needs.

The energy conservation roundtable recognized the need for an entire educational program in energy conservation, including libraries for collecting and disseminating energy conservation data and training courses for key groups, such as architects, engineers, and maintenance personnel.

The Government has some personnel with adequate experience in the utility field. At the DOD installations we visited, personnel with engineering degrees generally handled the procurement, management, and conservation of utilities. For example, at the Western Division of the Naval Facilities Engineering Command, the Real Property Maintenance Division handles utilities. The Director of the Division and the heads of the Management Engineering Branch and the Commercial Utilities Branch are professional engineers. The head of the Commercial Utilities Branch has been an expert witness in utility rate cases before regulatory bodies in various States. At Kelly Air Force Base, most of the people involved in utility conservation and management have engineering degrees and adequate work experience.

Not enough training is given to utilities personnel in responsible positions, and the training given is frequently inadequate. For example, in GSA region 9, we reviewed the career appraisal files of the Chief, Building Management Division; the Chiefs of the Repair and Improvement Branch, Operations Branch, Contractual Services Section, and Maintenance and Utilities Section; and four building managers. None of these officials had attended GSA's Executive Seminar in Public Utilities Service Procurement or taken courses that would give them some expertise in utilities contracting.

An operating engineer at one GSA building told us that he did not know how to read meters and did not verify readings.

At the Atlantic Division of the Naval Facilities Engineering Command, Langley Air Force Base, Kelly Air Force Base, and Red River Army Depot we were told that training in managing and conserving utilities was minimal.

There is no formal training specifically in utility management for personnel in any of the military departments. The Army offers a 4-week course in facilities engineering management, but only 2 hours are allocated to utilities, 1 hour of which is on utility contracts. The Air Force offers a utility contract and administration course, but only 2 hours of this 8-day course are concerned with managing and conserving utilities. The Navy's training in utility management and conservation is limited to that given in the Naval Civil Engineering School for Public Works Officers. Even though the personnel responsible for monitoring utilities at the installation level appear to have sound engineering

backgrounds, we feel that not enough emphasis is given to training in utility management.

NEED FOR MORE COOPERATION AND COORDINATION

As previously noted, a number of agencies manage their own utilities. However, there is a lack of coordination not only among the various agencies but also within them. Criteria and practices within DOD and GSA are not consistent or adequate. Also, the dissemination of utilities data needs improvement.

For many years the military services have had conservation programs, but to a great extent these conservation programs have been directed towards turning off unused lights and repairing leaky water faucets. At the installations we visited, conservation programs and practices varied greatly, as described in chapter 2.

We believe that the cost to the Government is increased because each agency, service, or installation approaches utilities procurement and management with varying degrees of guidance, expertise, and interest.

We believe information on utility procurement, management, and conservation needs to be disseminated among the various Federal agencies because agencies are able to negotiate preferential rates in some areas of the country while in other areas agencies pay discriminatory rates.

In mid-1970 DOD established Joint Utilities Services Boards by geographical areas. Four Boards were established for the United States and four for overseas areas. The objective of these Boards is to provide a way for DOD components to exchange information; study utility procurement problems and contract terms and procedures; compare rate schedules; and, where possible, act jointly to secure rates and terms most favorable to the Government. The Boards are to meet at least quarterly. Other Government agencies, e.g., NASA, GSA, and the Atomic Energy Commission, are invited to participate (but do not always do so) to provide the impact of additional hundreds of millions of dollars in annual utility procurement and a broader base of experience and expertise in the procurement and representation field.

Although the Boards do not have the authority to direct action, they provide a forum for participating agencies to

discuss utility problems. The participants' joint efforts may lead to a solution that would not be evident to an individual agency.

We believe that regular, active participation in the Boards by all agencies would help solve utilities problems and minimize costs on a Government-wide basis. These "interagency" utility boards could consider major utility management problems and then adequately disseminate data. Most of the installations we visited had not received data from the Joint Utilities Review Boards.

DOD was not an active participant in the roundtable on energy conservation in May 1972. Since DOD is one of the Government's largest property owners and spends more money for utilities than all other Government agencies, we believe it should have had a prominent role at the roundtable.

Operating people frequently were not aware of data developed or criticism made by internal auditors on utility management matters. Some of the same types of deficiencies we noted were repeatedly reported by GSA's internal auditors, indicating that management had not taken effective action to eliminate the deficiencies. Although four GSA field offices in region 9 were included in an audit, none of the building managers for the field offices were provided with an audit report or abstract thereof. We believe regional officials should make sure that responsible personnel are aware of deficiencies and that effective corrective action is taken for valid deficiencies reported.

At the military installations we visited there were virtually no audits or reviews of utilities in fiscal years 1970-72.

EXAMPLES OF NEED FOR MORE EXPERTISE AND COORDINATION

The results of the lack of adequate expertise, coordination, and cooperation can be demonstrated by the following examples. As shown below, a problem solved in one location frequently remained unsolved in other locations because it had not been recognized or acknowledged.

Hours specified for operation of air-conditioners and other equipment varied

Operating hours for air-conditioners and other equipment, such as air handlers and heating equipment, varied between GSA buildings and DOD installations. Operating hours were not based on detailed engineering studies. GSA generally limited hours of operation from 5 a.m. or 6 a.m. to 6 p.m. for air-conditioning and suggested shutting down air-conditioning equipment to the maximum extent possible on weekends and holidays in buildings unoccupied during those periods.

Base engineering officials at Forbes Air Force Base told us that

--except for window air-conditioners, air-conditioning units were not turned off during the hot season;

--they thought it best to leave the air-conditioners on since they had many shell-type buildings with little insulation;

--they would need more people to turn off the air-conditioners and that timers were too expensive; and

--the capacity of many of the units was marginal and therefore the units must be kept running to prevent heat buildup.

At Richards-Gebaur Air Force Base, central air-conditioning units of 5 tons or more were not shut down on weekends and holidays.

It is important that individual determinations be made at each location regarding the most economical hours to start and stop such equipment, especially in view of the significant operating costs. Such determinations should be based on detailed engineering studies, in which the use of automatic timers should be considered.

Temperatures specified for buildings varied

Specified temperatures for buildings varied among Government installations and added to the cost for air-conditioning and heating. Temperatures in Government

buildings may vary from about 70°F to 80°F during office hours. GSA operating engineers told us that in many buildings it was necessary to turn on air-conditioning units if the outside temperature rose to about 60°F. Some building managers adjusted temperatures to satisfy tenant complaints.

Regulations at Fort Riley, Kansas, and at Forbes Air Force Base provided for heating temperatures that differed as much as 10 degrees for the same type of room or building. At the Lake City Army Ammunition Plant, Independence, Missouri, unused buildings were heated to 55°F, compared with Army requirements of 40°F. At Fort Riley officials told us that vacant buildings were heated to only 35°F. The mechanical engineers at Forbes told us that in many buildings it was almost impossible to maintain specified temperatures because the building occupants reset the thermostats to desired levels.

One power company reported that, compared with a setting of 78°F, a setting of 74°F required 39 percent more electricity and a setting of 72°F required 63 percent more electricity to air-condition a home. Another power company suggested that air-conditioner thermostats be set at 76°F or higher because most people are comfortable at that setting and because every degree below 76°F can increase cooling costs 6 to 10 percent.

After our review, the Federal Energy Administration established temperature standards to minimize energy consumption without adversely affecting employee comfort and Government property. (See ch. 6.)

Use of capacitors not uniform

Many installations use capacitors to get a better electric power factor and lower electric costs. Since capacitors are an effective means of lowering electric power costs, an adequate number of electric capacitors should be installed, where justified, when a utility offers monetary incentives for a good power factor. At Forbes Air Force Base, officials estimated savings of about $129,000 in the first 3 years capacitor banks were installed. However, the Navy at Norfolk was just beginning to look into the feasibility of installing capacitors. It appears that installations without adequate capacitors have not been properly apprised of the advantages.

CONCLUSIONS

The Government needs to train personnel more effectively in procuring and managing utilities. Training--based on the level of expertise needed--should include on-the-job training and comprehensive courses. Career planning should be such that persons specializing in utility procurement and management can obtain necessary experience to do a professional job.

The dissemination of information within Government agencies needs to be improved to insure that utility services are obtained at the lowest cost consistent with reliable service.

RECOMMENDATIONS

We recommend that the Administrator of General Services, in coordination with the Secretary of Defense and the Administrator of the Federal Energy Administration and, when necessary, the Director of the Office of Management and Budget:

--Provide the personnel required for managing utilities effectively and develop experience in such personnel by establishing necessary training programs.

--Advise Federal agencies to disseminate information on utility management and conservation within their own organizations.

AGENCY COMMENTS AND OUR EVALUATION

Develop more in-house expertise

The Administrator of General Services said that GSA had been aware of the need to develop more in-house expertise and had been engaged for several years in a comprehensive training program for its operating people. In addition, the Administrator said that GSA had sent a number of staff people to utility-oriented seminars, meetings, and training sessions and indicated that GSA planned to continue its efforts in this area.

DOD agreed that adequate staffing and training should be provided for utility management personnel and that this was a continuing DOD objective. DOD said that the Air Force has established permanent training courses in utility conservation and operation.

Disseminate information
within own organization

DOD supports our recommendation and said that a formal, comprehensive utility conservation program had been in effect within DOD for many years and was now being reemphasized to ease the current energy crisis situation. DOD said that the past effectiveness of its conservation program could be seen from the fact the DOD's annual per capita increase in electrical use was approximately 3 percent, compared with a national average of 7 percent.

The Administrator of General Services did not comment on our recommendation that Federal agencies disseminate utility management and conservation information within their organizations. Following is an example of the need for this dissemination. One of the conservation methods GSA has advocated in its "Conservation of Utilities" program calls for controlling boilers by observing stack temperatures and carbon dioxide content. In a subsequent review made during mid-1973, we found that some operators were unaware of what these measurements meant and did not have instruments to observe these parameters. As we mentioned in chapter 2, that review also disclosed that building managers were not always adhering to GSA's energy conservation guidelines or recommended equipment operating procedures.

Our report included a recommendation that Federal agencies be directed to cooperate and coordinate with each other to solve utility problems and exchange information. The Office of Energy Conservation said that the mechanism for cooperation and coordination and for exchanging information was functioning under the management system devised to carry out the Federal energy reduction effort. We recognized the need for such a mechanism early in our review and believe the Office can contribute a great deal to better energy management in the Federal Government.

DOD stated that it had long recognized the need for coordination between the services and had established Joint Utilities Services Boards by geographical area, worldwide. These Boards have been very effective in coordinating and standardizing utility rates, according to DOD. DOD agreed that more coordination and cooperation between Government agencies was desirable.

GSA did not specifically comment on this recommendation except to say that GSA was a member (by invitation) of and participated actively on the four Joint Utility Services Boards in the continental United States.

The Office of Management and Budget agreed with our recommendation that a program be developed for disseminating information on utility management, conservation, and problems.

CHAPTER 6

RECENT DEVELOPMENTS HAVING AN IMPACT ON ENERGY CONSERVATION

A number of improvements in Federal energy conservation have taken place since we completed our fieldwork in August 1973. The oil embargo sharpened the Nation's awareness of the need to conserve energy, and conservation measures were implemented with less resistance than otherwise might have been encountered.

The Federal Energy Office was established in December 1973. On January 17, 1974, it directed that further reductions be made in Federal Government energy consumption and issued guidelines stating that the maximum heating temperatures during the cold months is to be 65°F to 68°F during working hours and not more than 55°F during nonworking hours. During the seasonably hot months, air-cooling systems are to be held at not lower than 80°F to 82°F during working hours. Overhead lighting is to be reduced to not more than 50 foot-candles at work stations, 30 foot-candles in work areas, and 10 foot-candles in nonwork areas. These guidelines, if followed, should result in substantial energy savings.

GSA also issued guidelines, dated March 20, 1974, designed to reduce energy consumption by 50 percent in new Government building construction. The guidelines present over 185 ideas for conserving energy in building design, construction, and use.

In our report to the Federal Energy Office dated March 29, 1974 (B-178205), we pointed out that it would be beneficial for agency energy conservation officers to review energy conservation activities at the field level, perhaps with the assistance of the internal audit group or another independent group. This review is especially important because the oil embargo has been lifted and there may be a tendency to drift back to former operating practices and comfort levels.

CHAPTER 7

SCOPE OF REVIEW

We examined the methods used to obtain utilities, mainly electricity, and what steps are taken to insure that the utility is efficiently used. We reviewed procurement and operating procedures and practices, conservation programs, the training of utilities personnel, and the extent of coordination between Government agencies.

We visited the following locations.

GSA:
- Chicago, Illinois
- San Francisco, California
- Fort Worth, Texas
- Stockton, California
- Kansas City, Missouri
- Washington, D.C.
- Sacramento, California

Army:
- Office of the Chief of Engineers, Washington, D.C.
- Fort Riley, Kansas
- Lake City Army Ammunition Plant, Independence, Missouri
- Red River Army Depot, Texas

Navy:
- Headquarters, Naval Facilities Engineering Command, Washington, D.C.
- Hunters Point Naval Shipyard, San Francisco, California
- Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia
- Naval Facilities Engineering Command, Western Division, San Bruno, California
- Navy Public Works Center, Norfolk, Virginia

Air Force:
    Forbes Air Force Base, Kansas
    Kelly Air Force Base, Texas
    Langley Air Force Base, Virginia
    Richards-Gebaur Air Force Base, Missouri
NASA:
    Lyndon B. Johnson Space Center, Houston, Texas
Department of Commerce:
    National Bureau of Standards, Gaithersburg,
      Maryland

ROLE OF FEDERAL POWER COMMISSION

The Federal Power Commission has jurisdiction over the transmission and sale, at the wholesale level, of electric energy and gas in interstate commerce and over public utilities engaged in such commerce. The Commission is responsible not only for approving the wholesale rates but also for prescribing and enforcing a uniform system of accounts for electric utility and natural gas companies subject to its jurisdiction. Except for Minnesota, South Dakota, and Texas, retail electric and gas rates generally must be approved by a State public service commission.

APPENDIX II

COMPOSITION OF ELECTRIC POWER BILLS

Electric power bills are usually composed of at least four elements.

1. Energy--the actual amount of electricity, measured in kilowatt hours, consumed during a billing period.

2. Demand--the maximum amount of power required in any demand interval (usually 15 or 30 minutes) during the billing period. High demand in any billing period can often affect the bills for succeeding months.

3. Power factor--the ratio of kilowatts to kilovolt amperes. A low power factor often results in an additional charge; a high power factor can reduce power cost.

4. Fuel adjustment charge--a charge made by utility suppliers to account for changing costs of fuel used to generate electricity.

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

IN
INSTALLATIONS AND LOGISTICS

23 OCT 1973

Mr. V. L. Hill
Assistant Director-in-Charge
Facilities Acquisition and Management Group
General Accounting Office
Washington, D. C. 20548

Dear Mr. Hill:

Reference is made to your draft report of August 17, 1973 to the Secretary of Defense concerning the opportunities to conserve utilities and reduce their cost within the Federal Government (OSD Case Number 3691).

The draft report has been reviewed by this office and the headquarters of the Military Departments. Our comments resulting from these reviews are attached.

We fully recognize the need for a responsive utilities conservation program and have promulgated the policy and guidance necessary to establish such a program DoD-wide. With complete awareness of the current energy shortage we have intensified our efforts to assure that the DoD achieves the President's recently established goal of a seven percent reduction in energy consumed by the Federal agencies.

We appreciate the opportunity to review and comment on the draft report. The recommendations and observations contained therein will be helpful in the continuation effort toward a more economical and effective DoD real property maintenance activity program.

Sincerely,

Hugh E. Witt

HUGH E. WITT
Acting Assistant Secretary of Defense
(Installations & Logistics)

Enclosure
Comments

APPENDIX III

DEPARTMENT OF DEFENSE POSITION
ON
GAO DRAFT REPORT, DATED AUGUST 17, 1973
(OSD Case #3691)

"Opportunities to Conserve Utilities and Reduce Their Cost"

I. Summary of GAO Draft Report

GAO, realizing the increased usage and cost of utilities over the past several years, reviewed the actions that Federal agencies were taking to manage the utilization and procurement of utilities in an efficient manner. They recommend that the Administrator of General Services in coordination with the Secretary of Defense and, where necessary, the Director, Office of Management and Budget:

(1) Require that energy conserving materials and equipment be given priority over aesthetic features in the design of Federal buildings.

(2) Consider the use of utility rate consultants to monitor rates and charges until sufficient in-house expertise is developed.

(3) Provide the staffing required for managing utilities effectively and develop experience in such personnel by establishing necessary training programs.

(4) Advise agencies to disseminate information on utilities management and conservation within their own organizations.

(5) Direct agencies to cooperate and coordinate with each other to solve utilities problems and exchange information.

II. General Comments

The Department of Defense generally agrees with the basic observations and recommendations made in the draft report. With regard to the recommendations, DoD Directive 4165.2 sets forth the objectives of DoD's Real Property Maintenance Activities (RPMA) Program. One specific objective is: "To furnish utilities services in the most cost effective manner, taking into consideration the priorities of missions assigned to the installations and facilities served and total life cycle costs." This Directive also lists the following program policies:

(a) Positive programs for conservation of utilities services will be initiated and continued to ensure that consumption does not exceed actual requirements. As a part of such programs, each DoD component shall establish controls to minimize those instances in which installations utilizing commercial utilities temporarily exceed maximum peak demands as contained in their rate schedules, and are thus billed at the higher rate for an entire billing period;

(b) Maximum use will be made of cross-servicing of utilities among military installations in order to make the most efficient use of available utilities. Where feasible and economically justified, the utilities systems of installations will be cross-connected to obtain the advantage of single metering and/or conjunctive billing;

(c) The DoD components will make maximum use of and effect maximum coordination with the regional Joint Utilities Services Boards in matters relating to the procurement of commercial utilities and to DoD-directed RPMA consolidation studies; and

(d) Utilities operations and maintenance standards and criteria shall be continuously monitored, improved and promulgated to ensure uniform cost effective practices. Such criteria shall take advantage of modern technical equipment and techniques to improve system reliability, support capability and operational efficiency. Automatic controls and automated systems will be used wherever justified by sound cost benefit studies. Legislation was recently enacted to expedite upgrading of utilities. Minor construction projects can now be accomplished if amortized within a three year period.

III. Defense Position on GAO Recommendations

Although we recognize that recommendation (1) is directed to GSA we agree that conservation of energy demands is an important consideration in the design of all Government facilities. Beginning in 1954, the DoD has issued a series of instructions on air conditioning, fuel selection, and specific guidance for various types of repetitive facilities. All of these instructions included specific energy conservation considerations and requirements. All of these were updated and included in the DoD Construction Criteria Manual 4270.1-M issued in 1968. This Manual has again been updated October 1, 1972. The energy conservation requirements in the latest revision have been strengthened and expanded. For example, all new facilities costing over $300,000 must give detailed engineering design consideration for all forms and methods of energy conservation.

It is also agreed that additional research should be done on ventilation criteria and lighting standards. Further, it is recognized that criteria changes should be based on adequate research. Such research could be done by the National Bureau of Standards or other appropriate organizations. We agree that the indiscriminate use of glass should be stopped but do not concur with the implication that aesthetics must be downgraded to conserve energy. President Nixon's directive of 16 May 1972 stressed the importance of aesthetics in public buildings, and tasked the National Endowment for the Arts to develop programs and policies to enhance the environment through intelligent use of art and design. It is not necessary that such programs and policies be in conflict with conservation of energy. In the design of its facilities, the Military Department attempts to give proper weight to aesthetics along with energy demand and other maintenance and operating costs.

Your recommendation (2) that consideration be given for the use of utility rate consultants to monitor rates and charges until sufficient in-house expertise is developed is a proper management procedure. The Services have utilities engineers at major headquarters level who can provide expert advice upon request from subordinate installations. These utilities engineers are knowledgeable of the various utilities rates and schedules for their particular geographical area. Requests can be often times resolved by telephone. In complex cases field personnel furnish sufficient data for complete analysis of the problem by the utilities engineers. These experts must also review and approve all utilities contracts over $50,000 for technical sufficiency and rate acceptability. The primary reason we do not have more in-house personnel to monitor rates and charges by utility organizations is due to the overall limits placed on the number of personnel. The need for additional in-house personnel has to be balanced against the overall needs of the Services. Utility rate consultants cannot be hired merely to avoid personnel staffing limits.

The Military Departments have participated in many public utility rate cases before state and federal regulatory commissions which have resulted in substantial savings to the United States. In these cases, one Department generally represents all of the Executive Agencies of the government under delegations of authority from GSA. Consultants have occasionally been used as expert witnesses in various rate cases where in-house expertise was not available. A new computer program is being implemented to effectively monitor rates and charges to particular installations and thus lessen the critical need for additional personnel to perform these duties.

Your recommendation (3) related to providing the staffing required for managing utilities effectively and developing experience in such personnel by establishing necessary training programs. It is agreed that adequate staffing

and training should be provided for utilities management personnel. As you may be aware a successful training program requires an adequate staffing level for this purpose, a position not always achieved. However, this is a continuing objective of DoD. An example of how this objective is being carried out is the Air Force program for managing utility conservation contained in Air Force Manual AFM 91-12, Policies, Procedures and Criteria for the Management and Conservation of Utilities. This designates the deputy base commander as the Base Conservation Officer. It also assigns the Base Facilities Board to work closely with the Base Conservation Officer in developing, implementing and monitoring the conservation program. This procedure involves many people on a part time basis representing the whole spectrum of base activities and has proven to be an effective system. The Air Force has also established permanent training courses in utility conservation and operation for both airmen and officers, supplemented from time to time by seminars and work shops.

We support your recommendation (4) to advise Federal agencies to disseminate information on utilities management and conservation within their own organizations. A formal, comprehensive utilities conservation program has been in effect within DoD for many years and is now being re-emphasized in a major effort to mitigate the current energy crisis situation. On August 1, 1973 this office issued a memorandum containing a series of energy conservation requirements. Included was the requirement that life cycle cost studies would be based on the cost of utilities being twice that of FY 1972. In addition, this memorandum established minimum efficiency requirements for window-type air conditioning units and for unitary air conditioners less than 60,000 BTU per hour. The past effectiveness of our conservation program can be seen from the fact that DoD's annual per capita increase in electrical usage is approximately 3% compared with a national average of 7%.

We concur in your final recommendation directing agencies to cooperate and coordinate with each other to solve utilities problems and exchange information. DoD has long recognized the need for coordination between the Services and has established Joint Utilities Services Boards by geographical area, world-wide. These Boards are made up of members from the Army, Navy, Air Force, or any other Defense agency that may be involved in a particular locality. General Services Administration sends representatives to the board meetings which are held on a regular basis each quarter. These Boards operate under the auspices of the DoD Joint Utilities Services Committee of the DoD Real Property Maintenance Council. They have been very effective in coordinating and standardizing utility rates to the benefit of all the Services. We agree that additional coordination and cooperation between Government agencies is desirable.

IV. Clarification of GAO Findings

[15]

Page 23 of the draft report treats life-cycle studies. Another important factor which will make analysis of design alternatives more useful and meaningful is to include realistically projected energy costs for future years. Every indicator points to a rise in energy cost regardless of the direction taken by the general economy of the nation. The inclusion of projected energy cost in life-cycle studies will provide appropriate justification for incorporatin energy conserving features in the initial construction of new facilities.

[See GAO note 1.]

GAO notes:

1. Deleted comments pertained to matters discussed in the draft report but omitted from this report.

2. Numbers in brackets refer to pages in this report.

UNITED STATES OF AMERICA
GENERAL SERVICES ADMINISTRATION
WASHINGTON, DC 20405

NOV 6 1973

Honorable Elmer B. Staats
Comptroller General of the United States
General Accounting Office
Washington, DC 20548

Dear Mr. Staats:

This is in reference to the letter of August 20, 1973, from your Assistant Director-in-Charge, Facilities Acquisition and Management Group, transmitting a copy of the General Accounting Office (GAO) proposed report to the Congress on Opportunities to Conserve Utilities and Reduce their Cost. We appreciate having the opportunity to review and comment on the proposed report before it is released.

The draft report covers the activities of several agencies in the procurement and use of public utility services by Government agencies. Our comments are offered in two parts since GSA has a line responsibility in its design, construction and operation of Federal buildings and a staff type of Government-wide responsibility in its "management of public utility services" as specified in Section 201(a)(1) of the Federal Property and Administrative Services Act (40 USC 481).

Public Buildings Construction and Operation

We strongly disagree with the statement on page 1 under Observation and Conclusions, that utilities conservation is being given only a part-time effort and Government personnel are not treating it as an important matter. Utilities conservation has received much attention over the years with greater emphasis recently. GSA in the early 1960's as matters of economy and good business practice had utilities conservation plans in effect. Numerous instructions have been issued in handbooks and other forms. Accordingly, we recommend that the statement be reworded to indicate that there is room for improvement rather than Government personnel not treating utility conservation as an important matter.

[2]

Page 2 of the report, last paragraph, states that the Government needs to develop more in-house expertise in the utilities area. We have been aware of this need and have been engaged for the past several years in a comprehensive training program for our operating people. Further, we have sent

a number of staff people to utility oriented seminars, meetings and training sessions. We plan to continue our efforts in this area.

[See GAO note, p. 52 .]

We suggest that this item be changed to recommend that energy conservation be designated as a major design consideration during all the phases of design including the initial concept development.

For example, to assure that GSA in its design and construction program takes advantage of the latest technological advances in the area of energy conservation, the Federal Building at Manchester, New Hampshire, has been designated as the Energy Conservation Project. We set as a goal an energy consumption level of 20 percent less than would be required for a comparable building. The design is nearing completion and we expect to exceed the original goal. When constructed, this building will be an example of what can be done when energy conservation is a major consideration at the concept stage of a facility. It will be aesthetically appealing yet designed with energy conservation as a major concern.

[7]
On page 13 the report states that four field offices in GSA Region 9 had no formal conservation plan existing in any one of them. While some field offices have more formal plans than others, the four field offices in question have been making efforts to conserve utilities and we have intensified our conservation efforts in all GSA field offices.

Public Utilities Management

There can be no doubt that the opportunity for very substantial savings in public utilities services costs is very real. While we believe that GSA in its public buildings function is doing a reasonably adequate job, we are certain that much more could be done in the Government-wide management area. Our record of savings of from $10 to $35 for every dollar spent on this function over the past 8 years speaks for itself.

[11,22,26]
In the report there are frequent references (pages 3, 27, 33 and 34) supporting a recommendation that utility rate consultants be used until sufficient in-house

expertise is developed. It is our opinion that the development of in-house competence can be accomplished as quickly as rate consultants could be hired and geared up to be productive and at substantially less cost. The need is for increases in appropriations and employment ceilings.

[See GAO note, p. 52.]

General

In conclusion, we are aware of the need to provide improved staffing for managing utilities and the development of expertise in such personnel through effective training programs. Where necessary at the operating level, this effort will be intensified. GSA has embarked on an intensive energy conservation program in response to the President's directive on June 29, 1973, to reduce anticipated energy consumption by 7 percent. We believe that we will substantially exceed this goal.

Sincerely,

Arthur F. Sampson
Administrator

GAO note: Deleted comments pertained to matters discussed in the draft report but omitted from this report.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

DEC 14 1973

Mr. Max Hirschhorn, Deputy Director
Resources and Economic Development Division
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Hirschhorn:

We have reviewed your draft report "Opportunities to Conserve Utilities and Reduce Their Costs, General Services Administration, Department of Defense." In general, it is a thoughtful commentary on the sample of agencies and their involvement with utility conservation. We concur in the report recommendations. It should be noted, however, that many of the conditions discussed in your report relate to the period preceding the April 18, 1973, establishment of the Office of Energy Conservation. The mission of that Office has been directed to solving some of these problems by coordinating Federal energy conservation programs, conducting research on issues related to energy conservation, and working to educate the public on energy efficiency and costs. As is indicated by your report and recommendations, that mission is a substantial undertaking with major potential for resource economies.

The Office of Energy Conservation has provided comments, on certain matters in the report, which we hope will be of assistance in updating your evaluation on some of the progress being made in this important management area, or will provide added insight on some of the technical issues involved. [See GAO note 1, p. 55.]

1. Cooperation and coordination among Federal agencies. The mechanism for cooperation and coordination among Federal agencies to solve utilities problems and exchange information is in place and functioning under the management system devised to carry out the Federal Energy Reduction Effort. This management includes consideration of appropriate follow-up strategies responsive to the President's November energy message. Attachment I provides a summary of the sixteen largest energy users in the Federal establishment, all of whom have energy coordinators designated by name. The Attachment indicates our latest information on the percent time each of these coordinators spends in energy conservation within his organization. [See GAO note 2, p. 55.]

Also, in evaluating progress in developing a management system for Federal energy conservation, you may find it helpful to review the Interim Report on Energy Conservation presented to the President last September, and the first quarter report, to be released in the near future, on performance of Federal agencies from July through September.

2. Building design and construction. Initial design can, indeed, result in higher utility costs and the waste of fuel energy. Adding to the examples in your report, is the GSA standard that relative humidity must be maintained within 5 percent limits (in combination with cooled air). For humid climates this leads to excessive energy commitments for air conditioning particularly where reheat systems are employed. As another example, considerable utility savings could be realized if buildings went back to individually installed light switches. Many buildings require a whole floor (or large section of floor) to be turned on to provide lighting at individual workplaces. Conversely, the report criticism of glass on buildings should avoid a blanket indictment. Certain kinds of glass permit sun heat loads to be utilized to decrease heating requirements and even to provide an energy source for cooling.

Whatever prior favoritism existed in the trade-offs between the cost to construct and life-cycle cost, should be subject to different economic focus in the future. Energy prices are going to rise substantially and promptly. Even from an economic basis, let alone a new a-priori value of energy conservation, more attention is going to have to be placed on total installation expenses in deciding design criteria.

Attachment II presents a brief summary of changes which might be undertaken in building codes to incorporate lower operating energy requirements. These are being followed up by the Office of Energy Conservation.

3. Procurement and administration of contents for utility services. Your recommendations on this subject could include the suggestion that installations should review operations to see if certain equipment operations (particularly start-ups) can be scheduled at off-peak times. This might entail staggered work hours, or operational rescheduling. It should be pursued vigorously (both early a.m. and in late afternoon). Also, we suggest that the recommendations to DOD and GSA be broadened to include all agencies. Rate consultants to monitor rates and changes until such time as an in-house capability is developed should apply to all Federal agencies.

4. Use of capacitors.

[See GAO note 3, p. 55.]

[See GAO note 3.]

The Office of Energy Conservation is working both with public and private groups to expand the awareness of actions which can be undertaken to encourage energy conservation in utilities and building design. That Office will be pleased to discuss your draft report with you further.

Sincerely yours,

Allan L. Reynolds
Director of Audit
and Investigation

Attachments [See GAO note 2, below]

GAO notes:

1. The Office of Energy Conservation was transferred to the Federal Energy Office from the Department of the Interior in December 1973.

2. The attachments have been omitted because they are not directly relevant to matters discussed in this report.

3. This portion of the comments was revised by letter dated January 20, 1974, from the Federal Energy Office. The essence of this letter was that the Federal Energy Office agreed with our statements in the draft report relating to capacitors but reiterated the importance of an adequate study to properly balance the capacitors with the load characteristics of the installation.

APPENDIX VI

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

FEB 9 1974

Mr. V. L. Hill
Assistant Director-in-Charge
Facilities Acquistion and Management Group
United States General Accounting Office
Washington, D. C. 20548

Dear Mr. Hill:

This is in response to your letter to the Director requesting our comments on the GAO draft report entitled "Opportunities to conserve utilities and reduce their cost".

Your review of the utilities area comes at a very opportune time when significant attention is required and is being given not only to the rapidly increasing costs of utilities but also the critical situation of the fuel products required to generate electrical power. Considerable attention is being given to energy conservation by all Federal agencies as a result of the recent embargo of Near East petroleum products and the more than doubling of prices for those products which continue to be imported.

We generally concur in the recommendations contained in the draft report that greater emphasis be given to building design and construction to assure effective utility use, that a capability be attained to monitor and review utility rates to assure that the lowest possible rates are obtained, and that a program be developed for dissemination of information on utility management, conservation, and problems encountered. Due to the complexity of the utilities area and the wide diversity of Federal buildings and activity, time and effort will be required to institute a complete and effective total utility conservation program.

We are prepared to assist the General Services Administration and the Department of Defense in conserving utilities and reducing their cost.

Sincerely,

B. A. Bridgewater, Jr.
Associate Director

APPENDIX VII

PRINCIPAL OFFICIALS RESPONSIBLE

FOR ADMINISTERING ACTIVITIES

DISCUSSED IN THIS REPORT

	Tenure of office			
	From		To	
SECRETARY OF DEFENSE:				
James R. Schlesinger	July	1973	Present	
William P. Clements, Jr. (acting)	May	1973	July	1973
Elliot L. Richardson	Jan.	1973	May	1973
Melvin R. Laird	Jan.	1969	Jan.	1973
SECRETARY OF THE ARMY:				
Howard H. Callaway	May	1973	Present	
Robert F. Froehlke	July	1971	May	1973
Stanley R. Resor	July	1965	June	1971
SECRETARY OF THE NAVY:				
John W. Warner	May	1972	Present	
John H. Chafee	Jan.	1969	May	1972
SECRETARY OF THE AIR FORCE:				
John L. McLucas	May	1973	Present	
Robert C. Seamans, Jr.	Jan.	1969	May	1973
ADMINISTRATOR OF GENERAL SERVICES:				
Arthur F. Sampson	June	1972	Present	
Rod Kreiger (acting)	Jan.	1972	June	1972
Robert L. Kunzig	Mar.	1969	Jan.	1972
ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION:				
James C. Fletcher	Apr.	1971	Present	
George M. Low (acting)	Sept.	1970	Apr.	1971
ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION:				
John C. Sawhill	May	1974	Present	
William E. Simon	Dec.	1973	May	1974