

**Department of Defense
FY 1999
Energy Resources Management Progress Report**

Executive Summary of Energy Efficiency Progress

In Fiscal Year (FY) 1999, the Department of Defense (DoD) used 108,561 British Thermal Units per gross square foot (BTU/GSF) in our buildings, continuing our progress towards meeting the goals of Executive Order (EO) 13123, "*Greening the Government Through Efficient Energy Management.*" This represents a 19.8 percent reduction in consumption below the FY 1985 baseline and a 0.92 percent reduction from FY 1998—a slight decline in our rate of progress, but still on track to meet the President's goal of 35 percent by 2010. The Components are aggressively pursuing life-cycle cost-effective initiatives that will provide additional energy reductions while still meeting mission requirements.

The Department's excluded buildings and industrial process facilities (i.e. buildings with energy intensive operations) consumed 171,348 BTU/GSF in FY 1999. DoD cannot measure specific progress towards meeting the EO 13123 goal for these facilities (25 percent energy reduction between FY 1990 and FY 2010), because many Defense Components lack adequate square footage records prior to FY 1996 and no other practical metric has been found. However, on a BTU/GSF basis, the energy consumed in these facilities has come down 3.89 percent since FY 1996—an average of 1.3 percent per year—a rate greater than the 1.25 percent annual reduction called for by EO 13123.

The Principal Deputy Under Secretary of Defense (Acquisition, Technology and Logistics) is the DoD Senior Agency Official responsible for meeting the goals of EO 13123. The existing DoD Installations Policy Board (IPB), chaired by the Deputy Under Secretary of Defense (Installations) and chartered to address a broad spectrum of installations issues, has been designated as the DoD Agency Energy Team. The membership of the IPB contains the cross-section of DoD senior leadership necessary to make decisions needed to remove obstacles hindering compliance with the EO.

DoD continues to make steady progress toward meeting the requirements of EO 13031 "*Federal Alternative Fueled Vehicle Leadership.*" Through increased emphasis on funding for Alternative Fuel Vehicles (AFV), the Department increased its acquisition of AFVs in FY 1999. The Department is also working to increase its access to commercial refueling infrastructure for AFVs. While some obstacles remain a significant challenge, such as availability of suitable AFV models and the availability of adequate alternative fuel infrastructure, DoD is working hard to increase its acquisition of AFVs and use of alternative fuels.

The Department is committed to actively searching the competitive markets to identify and procure energy efficient products for facilities and equipment, as required by the 1992 Energy Policy Act. The Defense Logistics Agency (DLA), is working closely with other Federal agencies, such as Department of Energy (DoE) Federal Energy Management Program (FEMP) and the General Services Administration (GSA), to identify energy efficient products. The FEMP, GSA

and DLA product catalogs are widely used within DoD. Although no specific procurement targets exist within the Department, purchasing agents are encouraged strongly to procure ENERGY STAR® products and products in the top 25 percent of energy efficiency, when they are cost-effective.

Executive Order 13123 Implementation Plan

The Department has undertaken an integrated program to optimize the management of its utility systems—seeking to increase efficiency and reduce costs while improving reliability and safety. This program has three elements: (1) reducing energy and water consumption; (2) taking advantage of deregulated energy commodity markets; and (3) privatizing the utilities infrastructure.

Conserving energy is important to the Department, because it saves money and reduces greenhouse gas emissions harmful to the environment. In FY 1999, DoD spent over \$2.2 billion to buy energy for its installations, consuming over 250 trillion BTUs. As stated earlier, our energy use per square foot in buildings continues to decrease—down almost 20 percent since 1985. We are well on the way towards meeting the President’s year 2010 energy reduction goal of 35 percent and plan to use a balanced program of appropriated funding and private-sector investment to continue our progress.

In FY 1999, Congress appropriated \$32.5 million for the Energy Conservation Investment Program (ECIP). Although Congress cut all ECIP funding in FY 2000, the FY 2001 President’s budget contains \$33.6 million for the program. We typically use ECIP funding to augment private-sector investment and plan to focus more on projects with large energy savings that are not very attractive to the private-sector, because they require substantial up-front capital investments with long payback periods. We plan to program about \$50 million per year for ECIP in the future.

In FY 1999, DoD greatly increased the use of Energy Savings Performance Contracts (ESPCs) and utility incentive agreements—saving nearly 1.7 trillion BTUs per year—more than doubling the energy savings obtained the previous year. In excess of \$6 billion in ESPC investment capacity is now available to DoD installations as a result of indefinite-delivery contracts developed by the Military Departments and a memorandum of agreement between the Defense Energy Support Center (DESC) and DoE. Congress added \$4 million to the Defense-wide O&M account in FY 2000, to assist in training, providing technical expertise and performing energy audits, and otherwise facilitate the ESPC process. This money has been allocated to the Components for technical support and project oversight, measurement and validation training, and an ESPC awareness program. We will continue to build on our FY 1999 successes with the Military Departments planning to use more than \$1.2 billion in private-sector financing over the next five years.

The Department will employ the principles of “sustainable design” to ensure its new facilities minimize the use of resources and reduce harmful effects on the environment. These buildings will use innovative technologies to reduce energy and water consumption, decrease waste products and increase the recyclable content of construction materials, while creating livable, healthy and productive surroundings for the occupants. DoD was instrumental in

developing a “Whole Building Design Guide” available to all design professionals, both in government and the private-sector. This intuitive, internet-based tool serves as a portal to the design criteria and other resources needed to construct cost-effective, sustainable buildings.

We are continuing our program to conduct energy audits of all DoD facilities using a mix of appropriated and private-sector funding. The Renewable and Energy Efficiency Planning software and the Federal Energy Decision Screening system have been found to be particularly useful tools in determining the investment required to implement energy projects with a 10-year payback or better. DoD intends to use private-sector financing as the primary source of funding energy audits to meet the EO 13123 goal to audit ten percent of our facilities each year.

DoD is committed to creating opportunities to install cost-effective renewable energy technology. During the last two years alone we have installed more than 2,500 “solar roofs,” single-handedly meeting the President’s year 2000 goal of 2,000 roofs in the Federal Government. We plan to continue our efforts to use solar and other renewable technology, particularly at remote locations, where it competes favorably with traditional power systems.

Adequately trained personnel are critical to the safe and efficient operation of our utility systems. During FY 1999, more than 1,600 DoD employees received energy management or technical training. The Department intends to maintain this level of training in future years. Showcase facilities demonstrate the use of innovative techniques to improve energy and water efficiency. Although hindered by a lack of funding in previous years, the Department intends to emphasize the benefit of these facilities, with a target of developing at least three showcase facilities per year.

The DLA distribution centers serve as the focal point of DoD’s program to procure energy and water efficient products. DLA has been a leader in increasing the use of these products by such programs as their two-for-one compact fluorescent light initiative. Procuring agents, including users of government credit cards, will continue to be encouraged to procure ENERGY STAR® products and other products in the top 25 percent of energy efficiency.

The Department intends to take maximum advantage of electricity rate restructuring to lower its energy costs, and will include green power in its procurements where it is cost-effective. Where practicable, we will bundle regionally the diverse loads of DoD installations to create greater buying power. DESC has established a competitive electricity procurement program. Power contracts awarded by DESC in California, Pennsylvania and New Jersey, bundled demand regionally to obtain the best rates possible and resulted in approximately \$825,000 in cost avoidance.

DoD continues its efforts to privatize its utility systems. Defense Reform Initiative Directive #49 directed the Military Departments to develop plans for privatizing all of their utility systems by September 30, 2003. This initiative is designed to allow the Department to manage resources rather than utility infrastructure – using the expertise and investment capital of local utilities and private-sector suppliers to modernize, operate, and maintain DoD’s utility systems more efficiently and effectively. The scope of the task is daunting, however, with over 1,500 systems remaining to be evaluated for transfer.

Use of ESPCs and other Financing Alternatives

FY 1999 was a record year for the DoD ESPC programs in terms of the number of awards and the magnitude of potential savings (the Defense Components awarded 45 ESPC task/delivery orders with an average contract term of 16 years, with an estimated life-cycle savings of nearly \$379 million). The annual energy savings resulting from these awards is estimated to be 1,204,533 million BTUs (MMBTU). There are now approximately 70 ESPC projects underway within DoD. There are also approximately 150 demand side management (DSM) and utility partnership agreements in effect at Defense installations.

A combined private sector investment capacity of \$3.2 billion is available for use by the Department on one of the existing Defense indefinite delivery indefinite quantity (IDIQ) multi-regional ESPCs, which cover all fifty states and the District of Columbia. Additionally, several Defense Components have executed Memorandums of Agreement (MOA) to use DoE regional or “technology-specific” Super-ESPCs. In June, DESC awarded the single largest ESPC issued by the Federal Government to date, that will use over \$67 million in private capital to install energy savings measures at five bases in the Army’s Military District of Washington. This ESPC guarantees an annual reduction of 597,668 MMBTUs and more than 50 million gallons of water, and an annual cost savings of \$11.9 million. There will also be an annual reduction of approximately 24,000 metric tons of greenhouse gas emissions (carbon is the standard for measurements) and more than 600 metric tons of pollutants that cause smog and acid rain. Over the 18 year term of the contract, it is expected to result in a total cost savings of over \$219 million.

There still are some barriers to greater use of the ESPC authority. From the perspective of the local installation, the ESPC process is unique and extremely complex. Many installations prefer to use utility DSM agreements, because they are simpler and the energy managers are familiar with the local utility provider. Some installations and major claimants are hesitant to enter into long-term financial commitments (greater than 10 years), because of concerns about mission changes, electricity market restructuring, or even the potential of another round of base closures. Additionally, although the National Energy Conservation Policy Act allows cost savings from energy conservation efforts to remain available to undertake additional conservation measures without further appropriation, no effective mechanism has been found to allow agencies or installations to retain these savings beyond the current fiscal year. Any future year “savings” are considered “cost avoidances” and are normally reprogrammed to cover other, more pressing requirements.

The Military Departments are using a wide variety of tools to overcome these problems, including training and education programs to better “market” ESPCs, an Internet website that provides basic information on ESPCs, and briefings and site visits to commands. DoE regional workshops are widely promoted, as well. Additionally, the Department of Navy (DoN) has initiated a pilot program that offers some up-front funding to help overcome some of the reluctance of installation commanders to enter into ESPCs. Using FY 1999 Operations and Maintenance (O&M) Energy Program funds, this program invested \$1 million to reduce the capital investment cost of ESPC projects.

The Air Force and DoN have continued to aggressively pursue DSM agreements with local utility companies for energy and water retrofit projects. In FY 1999, the Air Force initiated ten DSM agreements that will potentially save 97,877 BTUs per year, while DoN initiated 107 DSM projects. DoN also invested \$7 million in O&M funds to reduce the amount of project financing required, which installed \$66 million in energy efficiency equipment. Basic ordering agreements are in place with most utility companies servicing DoN activities. These contracts cover a wide range of technologies including lighting, natural gas conversions, controls, and boiler systems. DESC continues to work with the Services and local utilities to encourage the use of these incentives. Other Defense Components, including the National Security Agency and the Defense Commissary Agency, have entered into long-term electricity purchase agreements with their local utilities that facilitate the use of various financial incentives.

Use of Solar and Renewable Energy

In early 1998, the Department committed itself to the Million Solar Roofs Initiative, with a Departmental goal of 3,000 “solar roofs” in use by the end of FY 2000. The Department installed 1,226 “solar roofs” in FY 1998 and another 1,436 “solar roofs” in FY 1999. These 2,589 “solar roofs” demonstrate the Department’s commitment to the increased use of solar energy and other forms of renewable energy, where it is cost-effective. Passive solar designs, such as building orientation and window placement/sizing, are already being implemented in a variety of building types as part of Sustainable Design features.

In general, renewable energy projects still are not competitive with other energy projects on a life-cycle cost basis. The capital costs tend to be high for the energy savings generated, resulting in paybacks that are considerably longer than competing conventional technology. Each of the Services has developed strategies to overcome this problem. The Navy uses the revenue from sales of excess geothermal power at Naval Air Weapons Station (NAWS) China Lake, CA to finance additional energy conservation and technology projects. The Army intends to increase their renewable energy program by putting special emphasis on it in their Energy Conservation Investment Program (ECIP) projects and by increasing the use of DoE renewable energy funding programs. The Air Force specifically sought energy service companies (ESCOs) with experience in renewable energy projects for their regional ESPCs.

Washington Headquarters Services (WHS), in collaboration with DoE, and with cost-sharing support from private-sector companies, installed a 15kW photovoltaic (PV) panel array demonstration project at the Pentagon Heating and Refrigeration Plant compound. This project demonstrates a new technology—micro-inverters attached to each PV panel rather than one large inverter on the entire array. This will facilitate the planned increase in size of the array to 60kW in FY 2000. In FY 2001, WHS is planning a roof-top solar hot water heating system for the Pentagon, allowing the steam distribution line serving the building to be secured during the summer months.

The following “solar roof” projects were implemented in FY 1999:

Location	Description	Size (kW)	# Roofs
Pentagon	Photovoltaic array	15	7
Ft. Carson, CO	Water pumping, off-grid lighting, telecommunications	30	15
Ft. Huachuca, AZ	Grid connected and off-grid lighting	50	25
Ft. Dix, NJ	Grid connected and off-grid lighting	20	10
Yuma Proving Ground, AZ	Grid connected and off-grid lighting, remote off-grid facility	700	350
Pahakuloa Training Area, HI	Range targets, control towers, airstrip lighting	50	25
Fort Irwin, CA	Remote off-grid facility, stand alone lighting	20	10
Fort Polk, LA	Training range field instrumentation	10	5
White Sands, NM	Grid-connected, weather data equipment, telecommunications	60	30
Fort Greely, AK	Training range field instrumentation	10	5
Fort Bragg, NC	Special operations power supply	200	100
Pearl Harbor, HI	Solar hot waters heaters in family housing		774
Andros Island, Bahamas	Solar hot water heating system		4
Twentynine Palms, CA	Solar hot water heating system		1
Naval Station Norfolk, VA	Solar hot water heating system (2 pools)		75
TOTAL		1,165	1,436

The Department also is developing other solar and solar-thermal projects. At Luke AFB, AZ, an Energy Services Company has proposed refurbishing and modifying existing solar systems to heat water for some dorms and a nearby dining hall. The National Imagery and Mapping Agency (NIMA), St. Louis, MO, is currently investigating solar and other renewable energy projects within the scope of the ESPC that is being implemented, and they are investigating the augmentation of the domestic hot water system with solar heating.

In addition to the application of solar energy, the Department is also committed to other renewable energy technologies. The largest on-going renewable energy project is the 180 megawatt geothermal power plant located at the NAWS China Lake, CA. Revenue from the excess electric power from the geothermal plant is used to finance energy cost reduction efforts throughout the Navy.

Renewable Energy projects initiated in FY 1999 include:

Location	Project
Ft. Jackson, SC	Central energy plant chilled water storage cooling system
Ft. Huachuca, AZ	Barracks complex- chilled water storage
Ft. Gordon, GA	Central energy plant chilled water storage cooling system (design completed, in the bid negotiation)
Ft. Jackson, SC	Central energy plant chilled water storage cooling system (design completed, project on hold)
CERL, Champaign, IL	Laboratory complex ice storage cooling system
Yuma Proving Ground, AZ	Barracks ice storage cooling system
Ft. Bliss, TX	Dental clinic ice storage cooling system
Ft. Stewart, GA	Exchange building ice storage cooling system
Ft. Eustis, VA	Office building ice storage cooling system
Little Rock AFB, AR	Geothermal heat pumps (1500 family housing units)

Other renewable initiatives are being undertaken. Design has been completed on a project to install almost 1,000 geothermal heat pumps at Charleston AFB. Additionally, Air Force Space Command is designing a project to install more wind turbines and is considering the use of pumped water for energy storage at Ascension Island. The Air Force also asked the Idaho Engineering Laboratory to perform a wind study for a 5 megawatt power plant at Lajes AFB, Azores. Additionally, Sandia National Laboratory has been surveying Nellis, Davis Monthan, Edwards, and Luke AFBs for the Air Force to find potential renewable projects. Finally, DLA has continued testing of solar tracking skylights.

Minimization of Petroleum

DoD fuel oil consumption in buildings decreased by 5.81 percent from FY 1998 to FY 1999. Each Component's energy management plan includes a strategy to reduce the use of petroleum and to replace the fuel oil-fired boilers with natural gas or dual-fuel burners. The Army encourages maximum efforts be taken to improve plant efficiency and implement usage of non-petroleum fuels. The Air Force has a program to convert from petroleum to other energy sources where cost effective and logical, achieving a 66.9 percent decrease since FY 1985.

DoN aggressively pursues the elimination of fuel oil for heating buildings where natural gas is available and conversion costs can be recovered within ten years—resulting in petroleum use decreasing by 16 percent from FY 1998 to FY 1999. Distributed heating projects are currently underway at NEAS Lakehurst, NJ; NTTC Pensacola, FL; and NAS Fallon, NV. DoN also uses an optimization program for its central plants, which includes reviewing boiler loading and redundancies, and operator training. In FY 1999, projects identified include fuel switching, remote monitoring and control, and re-building equipment.

DESC is the implementing agency for the DoD Direct Supply Natural Gas Program. The objective of this program is to obtain the most cost-effective and reliable supply of natural gas for DoD installations, encouraging the Components to minimize their use and reliance on petroleum products. In FY 1999, DESC competitively procured over 55,400,000 MMBTU of natural gas,

with 166 DoD installations participating in the program, saving more than \$33.7 million—five more installations and \$10.1 million greater savings than FY 1998. Fuel oil as backup to interruptible natural gas reduced by 21,000 gallons (2,913 MMBTUs) from FY 1998 to FY 1999. Direct conversion from fuel oil to natural gas eliminated more than 55,000 gallons of fuel oil in FY 1999 (annual thermal content of 7,629 MMBTUs).

Sustainable Development and Design

The Sustainable Development and Design process is emphasized within the DoD to ensure new facilities incorporate the most current energy management technology within budgetary constraints. DoN chairs the Federal Facilities Council working group tasked with integrating Sustainable Design, Value Engineering, and Life Cycle Costing in Federal construction programs. A DoD co-chaired working group, formed to meet EO 13123 requirements, developed Sustainable Design principles for the Federal Government. These principles have been incorporated into the Internet based Whole Building Design Guide that can be accessed at <http://www.wbdg.org>. The President's Council for Environmental Quality Environmental Technology Task Force has asked the Naval Facilities Engineering Command to co-chair an Executive Committee that would expand the Whole Building Design Guide to include revisions to the Sustainable Building Technical Manual. This public-private venture will create a national asset promoting Sustainable Development. Training courses for Sustainable Design have been developed as part of a Tri-Service effort and will be offered starting in FY 2000.

All sixty-one DoN FY 1999 Military Construction (MILCON) projects incorporated Sustainable Design criteria. DoN participated in the National Town Meeting for a Sustainable America in May 1999. Their booth highlighted the Whole Building Design Guide and the bachelor enlisted quarters (BEQ) at Great Lakes, IL. The BEQ was accepted by the U.S. Green Building Council as one of their 25 pilot projects being used to test their Leadership in Energy and Environmental Design criteria. The new BEQ at Naval Station Pearl Harbor, HI, incorporating several sustainable design features, was awarded the First Annual Good Business Energy Efficiency Award by the Hawaiian Electric Company in February 1999.

The Air Force has employed sustainability concepts during the planning, design, construction, operation, and demolition of Air Force facilities. This also supports many aspects of DoD's Compliance Assurance and Pollution Prevention program requirements. Projects designed or built this fiscal year using Sustainable Design principles include: 108 units of replacement housing at Vandenburg AFB, CA; FY 2000 Fitness Center at Barksdale AFB, LA; and a multimillion-dollar MILCON C-17 beddown at McChord AFB, WA.

The U.S. Army Corps of Engineers has the responsibility to develop and adopt Sustainable Design for Army installations. The installations are encouraged to approach land use planning and urban design in a more holistic manner and integrate sustainable development into the master planning process. The Army Planning for Community Energy, Economic, and Environmental Sustainability program (PLACE³S), which creates a coordinated, information-based planning process, is facilitated by “Smart Places,” a public domain software.

Other DoD agencies emphasize energy efficiency in new facility construction and rental procurement. Agencies that do not use the Army Corps of Engineers or Naval Facilities Engineering Command issue their own energy policy. The Defense Commissary Agency (DeCA) has published a design criteria handbook, which emphasizes sustainable design, life cycle costing, and pollution prevention. The Fort McPherson, GA, Commissary, built in 1999, incorporates dual path air conditioning, occupancy sensors, refrigeration monitoring control system, and state of the art lighting systems.

The new Remote Delivery Facility project, being built directly adjacent to the Pentagon for WHS, will incorporate Sustainable Design principles to minimize the impact that the facility has on the environment. These design elements include minimizing the building profile, low maintenance, native landscaping, energy efficient mechanical and electrical systems, indoor air quality monitoring and ventilation control, and the use of environmentally preferred products.

NIMA completed a construction of a replacement facility in Arnold, MO for those lost during the St. Louis floods in 1993. The new facility, a \$40M complex to house printing, distribution and storage functions, has been designed to conform with DoD energy efficiency requirements. In FY 1999, the National Security Agency has obtained a new and more efficient leased office building at their annex complex. The main strategy was to ensure that new buildings and renovations are being designed with "energy smart" features and endorsing the Agency's procurement of more energy efficient equipment.

The Defense Finance and Accounting Service (DFAS) and other DoD Components using GSA leased facilities incorporate sustainable technologies when renovating existing facilities or when new buildings are designed. In close coordination with GSA and using an Army Corps of Engineers design, a complete renovation was made to the DFAS Indianapolis Center. The project included improvements to the building envelope and replacement of the heating, ventilation, and air conditioning (HVAC) system. In addition, four other MILCON program improvement projects were completed in FY 1999 for DFAS facilities at Rock Island, IL, Columbus and Dayton, OH, and DFAS Headquarters in Arlington, VA. These projects featured energy efficiency measures such as energy monitoring systems, motion sensors, state of the art controls, efficient HVAC systems, double pane windows, and building insulation.

Showcase Facilities

Two modifications to existing facilities have been designated showcase facilities by the Air Force. Budget constraints have limited this designation elsewhere within the Department. The two Air Force projects were:

- Dyess AFB, TX: aircraft hanger, supply warehouse, and youth center; active and passive daylighting with lighting controls (460 units installed).
- Misawa AB, Japan ECIP project: replaced 6 each 200-ton centrifugal chillers; removed 4,000 pounds of R-11 refrigerant from operation; and 9,270 MMBTU annual energy savings.

Performance Evaluations / Incentive Awards

DoD Components include specific energy related responsibilities into position descriptions, provide performance recognition programs, and support the use of incentive awards, which are normally implemented at the installation level. The Services and Components have individual awards programs and are also participants in the DoE Federal Energy and Water Management Awards Program. In FY 1999, DoD received fourteen awards (six Army, four DoN and four Air Force).

The Army Energy Program Team was the recipient of Vice President Gore's Hammer Award, presented by the Secretary of the Army, the Honorable Louis Caldera on September 9, 1999. The team is composed of action officers from the Army's Logistics Integration Agency, the U.S. Army Corps of Engineers, and the Office of the Assistant Chief of Staff for Installation Management.

DoN hosted the FY 1999 annual Secretary of the Navy awards ceremony with the Honorable Robert B. Pirie, Jr., Assistant Secretary of the Navy for Installations and Environment, presenting the awards. Seven awards were provided to Navy and Marine Corps winners in the categories of facilities, ships, and air squadrons.

USAF's Air Education Training Command (AETC) has an energy management incentive award program to award the two best energy management programs in the command each fiscal year. The Air Mobility Command energy awards provide \$400,000 to bases who demonstrate the greatest energy program emphasis and success toward meeting reduction goals. Both awards evaluate both industrial and family housing categories, cumulative energy reduction between the current year and the FY 1985 baseline year, current year and the previous year, and a narrative from each installation detailing their energy program efforts.

DoD Components routinely incorporate energy management responsibilities into their unique and respective awards and performance appraisal programs. The WHS, for example, established an "on the spot" cash award program to recognize outstanding performance in energy management. Most major DoD installations have Certified Energy Managers assigned and installations' performance goals are established at each site level.

Training

DoD emphasizes and supports cost effective training, through recognized professional organizations, DoE and other Government agencies training programs, multi-media sources and energy management training offered by the Military Services' training programs for all personnel within the Department's energy management community. The Department also participates in the identification and development of long term training needs and initiatives to meet the energy management training and certification requirements, supporting the planned increase in energy and water conservation. The DoD Energy Manager's Handbook is contained on the Construction Criteria Base CD-ROM.

The Army provided energy management training for 685 personnel during FY 1999. The current year cost for the training was \$200,000. The U.S. Army Logistics Integration Agency (LIA) conducts Army Energy Awareness Seminars at approximately 20 installations per year. A course in energy management for existing facilities that meets the requirements of the Energy Policy Act of 1992 for trained Energy Managers is available through the Association of Energy Engineers, and the Army Corps of Engineers in Huntsville, AL. LIA has also established an Army Energy Program Home Page on the Internet. It contains numerous reference materials applicable to the energy program as well as an "Ask Captain Conservo" interactive e-mail chat room feature to promote information sharing and interaction within the Army energy management community.

Approximately 415 DoN energy managers/facilities personnel received technical training in areas specified in the EAct. Personnel attended technical courses offered by universities, associations and government agencies. Four sessions of the DoN in-house facilities energy management course were conducted in four different Engineering Field Division regions.

The Air Force Institute of Technology (AFIT) Civil Engineering School at Wright-Patterson AFB, OH conducts an Energy Management Training (EMT) course twice a year. AFIT has also incorporated emphasis on energy efficiency in its other technical courses offered, as well as in their on-line computer-training programs. The Air Force uses specialized courses from other sources when the need arises i.e., a training class by Association Energy Engineers Instructors, provided Certified Energy Manager (CEM) training to 33 individuals. During FY 1999, 299 personnel (from engineering, contracting, legal and comptroller areas) from 41 locations were trained via satellite down-link on the Air Force Regional ESPC program.

Each DoD Component has its own unique energy management training plan. Many of them have implemented extensive public relations campaigns. These include recognizing non-energy individuals for conservation efforts, producing stickers for light switches, publishing "how-to" and "point of contact" manuals, and supporting energy poster contests.

Procurement of Energy Efficient Products

The Department has an active program to identify and procure energy efficient and environmentally preferable products, specifically through the leading distribution centers of the DLA. The program includes identification, development and procurement of renewable energy equipment technology where cost-effective. DLA, FEMP, and GSA product catalogs are widely used, as well as the Construction Criteria Base (available on CD-ROM and the Internet). Although no specific procurement targets exists within the Department, purchasing agents are encouraged strongly to procure ENERGY STAR® products and products in the top 25 percent of energy efficiency, when they are cost-effective.

DoE and GSA were tasked with identifying energy efficient products for the Federal Government. DoN was an active participant in the GSA working group of Energy Efficient Products. The Department concentrated its efforts on making use of the guidance generated by the lead agencies. In addition, DoN recommends that energy managers utilize the DLA lighting catalog and Washington State Energy Office Motor-Master database to assist in purchasing energy efficient equipment. The recently published DoE resource of energy efficient products was

distributed to all DoN energy managers in FY 1999. Energy managers were encouraged to ensure planners, estimators and other procurement officials received the DoE guidance.

During programming and early design reviews of renovation projects, the Air Force encourages the use of highly energy efficient products such as lighting, motors, and chillers. Criteria have been provided to the base level designers to purchase only energy efficient equipment (based on life-cycle cost). The Air Force continues encouraging energy managers to use the references in the Construction Criteria Base (CCB), the DLA lighting catalog, and the electronic version of E-Source, delivered to all installation energy managers.

Other Defense Components follow DoD and other Federal guidance in planning, procurement and use of cost-effective energy efficient and environmentally preferred products. Most locations support recycling of toner cartridges and other materials (paper, aluminum, glass, and plastics).

“Green Lights” and ENERGY STAR® Buildings Program

In June 1997, DoD, DoE, and EPA entered into a memorandum of understanding (MOU) regarding ENERGY STAR® labels for all DoD buildings. The MOU considers buildings as ENERGY STAR® Buildings if they were included in comprehensive audits and all projects with a 10-year or better payback are implemented, to the maximum extent practicable, within agency resources. DoD continues to honor its commitment as an ENERGY STAR® Buildings partner with EPA and DoE, to encourage the use of cost-effective, energy-efficient building designs and technologies, and to improve personnel productivity and reduce pollutant emissions. This is reinforced by the Department’s commitment to Sustainable Design.

Army installations will assess their buildings and leasing activities against the ENERGY STAR® Building criteria by the end of 2002. ENERGY STAR® Buildings must meet a set of criteria based on accomplishing an integrated set of steps to reduce energy consumption. The five stage implementation strategy consists of lighting upgrades, building tune-up, other load reductions, fan system upgrades, and heating and cooling system upgrades. Actual ENERGY STAR® Building certification and labeling is based on measured building data and a comparison with archetypes in various regions of the country. Since Army buildings are not generally metered and temporary metering schemes are cost prohibitive, the installation may self-certify and develop a local label for non-metered buildings based on the knowledge of what retrofits and no cost/low cost options have been completed in those buildings. Where metered data is available, the installation will use that data to input the Benchmarking software program available on the EPA web site to certify the buildings against criteria and label accordingly. To the greatest extent practicable, installations shall select ENERGY STAR® and other energy efficient products when acquiring energy-using products.

The Air Force has obtained the ENERGY STAR® information and the DoD partnership agreement and placed it on the AFCESA home page. Additionally, the Air Force has distributed this information to all major commands (MAJCOMs), and is encouraging the MAJCOM/bases to participate in this program. Several Air Force bases have signed up for the “Green Lights”

program including Bolling AFB, MD; Westover ARB, MA; and Malmstrom AFB, MA. At Malmstrom, they have surveyed 74 percent of the facilities and upgraded 31.2% of the facilities. For Westover ARB, they have surveyed 64 percent of floor space, and upgraded 46 percent of lighting to “Green Lights” standards.

DoN has surveyed approximately 51 percent of its facilities and installed approximately half of the projects identified. The other DoD Components occupy fewer facilities, operations are smaller in scope, and typically have fewer resources and opportunities to implement the principle of the ENERGY STAR© Program. However, they are all partners and support and implement ENERGY STAR© principles as resources allow.

Environmental Benefits of Energy Management Activities

The Department recognizes that conserving energy will not only save money, but will also result in substantial environmental benefits. Energy conservation helps the Department meet its requirements under environmental laws by reducing emission of air pollutants, such as ozone and carbon monoxide. In addition, energy conservation helps reduce greenhouse gases, such as carbon dioxide. Therefore, the Department closely coordinates its energy management and environmental programs to take full advantage of their synergy. As a result, DoD has been very successful in reducing its greenhouse gas emissions. From FY 1998 to FY 1999, DoD installations reduced their carbon emissions by 1.2 percent.

DoN, through its energy program efforts, reduced carbon equivalent emissions by approximately 0.5 million metric tons carbon equivalent compared to emissions in FY 1985. At \$3/ton cost for externalities, the reductions are worth \$1.5 million annually.

The Air Force’s windfarm and PV systems at Ascension Island reduce greenhouse gases by 2,900,000 lbs./yr. for CO₂ and 103,000 lbs./yr. for nitrous oxides. In addition to the direct environmental benefits of energy conservation, the Air Force has also realized the following indirect environmental benefits:

- Langley AFB, VA: under the DSM contract with Virginia Power, disposed of all the obsolete ballasts as part of the \$10.8M delivery order which involved lighting and HVAC for 15 buildings. The cost to dispose these obsolete ballasts was \$23,200.
- Mt. Home AFB, ID: an ECIP project replaced 13 oil-fired boilers in 13 facilities with high efficiency natural gas boilers. As part of the environmental clean up program, the 13 oil tanks were removed.
- Offutt AFB, NE: eliminated 1400 lbs. of chlorofluorocarbon (CFC) refrigerant, R-11. An FY99 ECIP project for Bldg. 304, Offutt AFB, eliminated an additional 7200 lbs. of CFC refrigerant R-11.

Alternative Fueled Vehicles (AFV)

In FY 1999, DoD acquired 2,712 AFVs. In addition, the Department received 102 extra AFV credits for acquiring medium- and heavy-duty AFVs, for a total of 2,814 AFVs and credits. The total of 2,814 AFVs and credits for FY 1999 represent an increase of 549, or 24 percent, over the FY 1998 total of 2,265 AFVs and credits included in last year's DoD report. DoD's acquisition rate for AFV increased from 32.3 percent in FY 1998 to 36.6 percent in FY 1999.

DoD continues to take steps in the areas of policy, management and oversight, and budget to achieve compliance with the requirements of EO 13031, *"Federal Alternative Fueled Vehicle Leadership."* With original equipment manufacturers making more AFV models available, and with use of biodiesel now counting toward achievement of AFV goals, DoD expects to continue to increase the percentage of AFVs that it acquires.

The Department does not have an automated system to identify, collect, record, and report alternative fuel usage data. Developing such a system at a time when DoD is still striving to ensure that sufficient funds are available to meet mandated AFV acquisition requirements, is cost prohibitive. Manual collection of the data is also cost-prohibitive. Thus, we are able to provide only an incomplete estimate of alternative fuel used in FY 1999. One major obstacle to collecting and reporting alternative fuel usage data is that the Government Credit Card System currently is unable to collect and report detailed data, known as Level 3 data, on the types of fuel being purchased. DoD will continue to work with the General Services Administration so that in the future we will be able to obtain more complete data on the types of alternative fuel purchased with Government Credit Cards.

Fuel Use	Quantity	Cost (\$)
E85 or E100 (gallons)	3,496	unknown
M85 or M100 (gallons)	7,149	unknown
CNG (thousands of cubic feet)	1,033,542	\$671,378.80 ¹
LNG (gallons)	2,830	unknown
Propane (gallons)	721	\$638.81
Electricity (kWh)	1,807	\$1,510.92

¹ Some DoD components provided estimates for CNG usage, but were unable to provide an estimate for cost. Thus, quantity and cost data cannot be used to determine average cost per thousand cubic feet.