

Department of Defense

Annual Energy Management Report



Fiscal Year 2004

Meeting the Requirements of Executive Order 13123

*Greening the Government through Efficient Energy
Management*

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EXECUTIVE SUMMARY

The Department of Defense (DoD) continues to make significant progress toward achieving the goals of the Energy Policy Act and Executive Order (EO) 13123 *Greening the Government Through Efficient Energy Management*. The DoD Energy Program initiatives include facility equipment retrofits, energy awareness efforts, energy manager training, audit programs, procurement of energy efficient products, and the use of sustainable design in new construction. Other contributing factors include integrated energy planning, source energy considerations, taking maximum advantage of electrical market transformation, enhanced use of renewable energy, and demonstration of innovative technologies.

The Department has approximately 1.94 billion square feet of facilities. Through Fiscal Year 2004 (FY 2004), we achieved a 26.8 percent decrease in standard building and facility energy consumption (as measured on a British Thermal Units (Btu) per gross square foot (GSF) basis) as compared to a FY 1985 baseline. The goals are a 30 percent decrease by 2005 and a 35 percent decrease by 2010. Additionally, we achieved a significant reduction in total source energy use of 23.3 percent compared to the 1985 base year.

Through this year, DoD has achieved a 13.3 percent reduction in industrial and laboratory facilities since the FY 1990 baseline year. However, this is a 3.6 percent increase since FY 2003. The goals are a 20 percent decrease by 2005 (compared to 1990) and a 25 percent decrease by 2010.

The Department has veered off the track from meeting the FY 2005 energy reduction goals in both the standard building and industrial categories due to the absence of Energy Savings Performance Contract (ESPC) authority. Lack of ESPC authority for FY 2004 is partly to blame. Other factors that have contributed to a lack of typical annual reduction include increased operational tempo at our military installations that provide mobilization and logistical support to overseas engagements as well as increased Ant-Terrorism Force Protection (ATFP) measures at all of our installations. With ESPC authority recently reauthorized, we have launched an aggressive awareness campaign and plan to get back on track to meet FY 2010 reduction goals.

DoD achieved a significant reduction in water usage by implementing water management plans and conservation technologies. In FY 2004, DoD consumed 146.2 billion gallons of potable water. This represents a 15.6 percent decrease from FY 2000 base year.

DoD made remarkable progress in installing renewable energy technologies and purchasing electricity generated from renewable sources (solar, wind, geothermal, and biomass) when life cycle cost-effective. The total renewable energy usage amounted to 3.84 trillion Btus in FY 2004. This was a 17.5 percent increase from last year. The Department continues to emphasize the use of passive solar designs, such as building orientation and window placement and sizing in a variety of building types and new facility construction. Examples of projects completed this year are detailed in Section II.B.

I. MANAGEMENT AND ADMINISTRATION

Energy management at DoD installations is focused on improving efficiency, reducing demand, eliminating waste, and enhancing the quality of life while meeting mission requirements. Accomplishing these objectives reduces utility costs and achieves the program goals.

The facilities energy program is decentralized, with Defense Component Headquarters providing guidance and funding, and installations managing site-specific energy and water conservation programs. Energy project funding comes from a combination of government and alternative financing initiatives. Military installations are responsible for maintaining awareness, developing and implementing projects, and ensuring that new construction meets sustainable design criteria.

A. Energy Management Infrastructure

1. Senior Agency Official

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.

2. Agency Energy Team

The DoD Installations Capabilities Council (ICC), chaired by the Deputy Under Secretary of Defense (Installations & Environment) and chartered to address a broad spectrum of installation issues, is designated as the DoD Agency Energy Team. The membership of the ICC contains the cross-section of DoD senior leadership necessary to make decisions needed to remove obstacles hindering compliance with EO 13123.

B. Management Tools

1. Awards (Employee Incentive Programs)

To increase energy conservation awareness and to recognize energy-saving efforts, DoD rewards individuals and organizations that demonstrate excellence in the field. These rewards serve to highlight and share the best practices among DoD agencies and to motivate employees.

Air Force

The Air Force participated in the *2004 Federal Energy and Water Management Awards*; eight award candidates were submitted, with three awards received. Additionally, in the *Results* category, Dyess AFB received recognition for the base's *Leadership in Federal Energy Management*.

The Headquarters of the Air Force Civil Engineer Support Center (HQ AFCESA) developed a rewards program, called "*Reduced Energy Appreciation Program*" (REAP), which rewards the

top three installations for the best overall reduction in energy use based on their previous year. Winners this year included Davis Monthan AFB AZ, The 611th at Elmendorf 7AFB AS and Fairchild AFB WA. The base energy manager and their BCE received a trip to *Energy 2004* and spoke on their successes to the other commands and bases.

In addition, several Air Force commands have developed energy award programs that distribute funds to base winners each year. Examples include the following:

- PACAF has a \$225 thousand annual award program recognizing long-term and short-term energy reduction projects at their installations.
- AETC has an Energy Management Incentive Award program that is grouped by large base and small base. The winning base for each group receives \$50 thousand.
- ACC has a base energy award program that awards up to a total of \$1 million to ACC bases that exceeded the FY 2004 28 percent milestone goal and/or improved over last year's performance.

The Army

In the Army, installations and regions participate in two energy awards programs: 1) the *Secretary of the Army Energy and Water Management Awards*, and 2) the *Department of Energy Federal Energy and Water Management Awards*. Both award programs recognize individuals and organizations for exceptional performance in achieving energy efficiency. In FY 2004, the Secretary of the Army Energy and Water Management Awards were issued in several categories. The following highlights the award categories and recipients.

Energy Efficiency / Energy Management Installation

- Installations: Fort Benning, Georgia
6th Area Support Group, Stuttgart, Germany
- Individual: Mr. David Osborn – Rock Island Arsenal, Illinois
- Small Group: 415th Base Support Battalion, Kaserslaughtern, Germany
(Mr. Bob Ackley, Chief of Utilities; Mr. Dieter Haertel, Mechanical Engineer; Mr. Paul Lindemer, Chief of Facilities Engineering Division)

Program Effectiveness

- Organization: Rock Island Arsenal, Rock Island, Illinois

Alternative Financing

- Individual: Mr. Gary Meredith – Fort Knox, Kentucky
- Small Group: Corpus Christi Army Depot, Texas
(Mr. Adan Pena, Energy Conservation Officer (CCAD); Mr. Marciano Gonzalez, Mechanical Engineer (CCAD); Mr. Sidney Stewart, Electrical Engineer (CCAD); Mr. Ken Ormsbee, Director, Federal Business Unit of Chevron Energy Solutions.

Army National Guard Award

- Individual: Mr. James Whitehead, Headquarters, Tennessee, NGB – Energy Efficiency / Energy Management
- Organization: Arizona National Guard, Phoenix, Arizona – Energy Efficiency / Energy Management

United States Army Reserve Award

- Installation: Fort McCoy, Wisconsin – U.S. Army Reserves – Energy Efficiency / Energy Management

The Army also received Federal Energy and Water Management Awards. These awards included:

Renewable Energy Award to an Individual

- Daniel Greene, Utilities Chief, Area II, Directorate of Public Works (DPW) U.S. Department of Army, Seoul, Korea

Energy Efficiency / Energy Program Award to Small Groups

- U.S. Department of the Army, United States Military Academy West Point, New York (Paul Leblond, Donald Michaud, Steve Driver)

Department of the Navy

The Department of the Navy (DON) holds an *Annual Secretary of the Navy Energy Awards Ceremony* to recognize outstanding achievement in the efficient use of energy. Eight awards were conferred to Navy and Marine Corps winners in the categories of facilities, ships, and air squadrons. This year, the awards program was expanded to increase participation and provide more levels of recognition. Installations with an aggressive and successful program, despite not winning in their particular category, were recognized as achieving a Platinum (highest) or Gold (second highest) level rating on their energy program.

The Marine Corps Energy Management Team received a *Presidential Energy Award for Outstanding Leadership in Federal Energy Management*. Additionally, DON installations, ships, squadrons and individuals received twelve *Federal Energy and Water Management* awards including the Lou Harris award, an Energy Showcase award, and an Energy Star Building award.

DON also received a *Global Energy Award for Industry Leadership* at the 2004 Platts Global Energy awards. Platts is a division of McGraw Hill, and the award nominations were scored by an international panel of judges composed of the energy industry's elite, including top corporate executives, leading academics, respected commentators, senior analysts and knowledgeable editors

Other DoD Award Programs

Other notable award and employee incentive programs employed by DoD include the National Security Agency's (NSA) "Employee of the Quarter Award" and the Defense Commissary

Agency's (DeCA) "IDEAS" program and on-the-spot awards. This year, DeCA also developed a Midwest and European Regions "Energy Awards Program."

2. Performance Evaluations

Energy and water management provisions are included in performance plans of the DoD Energy Chain of Command, including major command, base and site energy managers. For example, Army Regulation (AR) 11-27, Army Energy Program, requires inclusion of energy and water conservation responsibilities in the position descriptions of members of The Army's energy team, principal program managers, heads of field offices, facility managers, designers, energy managers, and their superiors. Energy and water is managed intensively to ensure efficient and effective use of energy products.

The Army's regional offices conduct scheduled assistance visits to their respective installations and verify that installations are in compliance with the provisions of E.O. 13123 and AR 11-27. These visits include verification of Energy Manager position descriptions and evaluations of personnel responsible for the energy program. In addition, the Army centrally funds Installation Awareness Seminars to assist in the identification of Energy Conservation Measures. During FY 2004, these seminars identified low cost-no cost energy conservation opportunities in excess of \$2 million.

This year, DON completed an energy manager "position description" and defined all the energy management functions and elements at the installation level. The elements of the position description can be used in existing job series to set the performance expectations for energy managers. DON is currently developing performance metrics that combined with use of the position description elements will allow supervisors to evaluate energy manager performance.

For the Air Force, all base energy managers and each major command energy manager have performance statements that include ratings on implementing energy conservation measures to meet federal goals and Executive Orders for their installations and commands.

The Defense Logistics Agency (DLA) has an Energy Manager at each host facility. The Defense Contract Management Agency (DCMA), Defense Finance and Accounting Service (DFAS), Washington Headquarters Services (WHS), the National Security Agency (NSA), and other DoD agencies have all included the duties of reporting energy consumption and costs within individual position descriptions of designated staff.

3. Training and Education

In FY 2004, DoD provided energy management training for 2,332 of the 4,561 appropriate personnel. Energy and water management provisions are included in performance plans of the DoD Energy Chain of Command, including major command, base and site energy managers. The DUSD (I&E) staff is aggressively working as a co-sponsor to the Energy 200X, hosted by the Department of Energy, with the Association of Energy Engineers to arrange and hold Certified

Energy Manager (CEM) training classes in conjunction with the upcoming Energy 2005 workshop in Long Beach, CA scheduled for 14-17 August 2005. This effort, if successful, would maximize the training opportunity for DoD energy managers while minimizing travel expenses.

The following summarizes provides specific examples of DoD training and education programs.

The Army

Awareness and training programs are important for the Army to achieve and sustain energy-efficient operations at the installation level. The Army centrally funds Installation Awareness Seminars to assist in the identification of Energy Conservation Measures. In FY 2004, 29 Army energy managers took the Certified Energy Managers training course.

The U.S. Army Assistant Chief of Staff for Installation Management (ACSIM) provided assistance to installation staffs by providing Energy Awareness Seminars at nine of its installations. These seminars identified low cost/no cost opportunities, helped to heighten the awareness of installation personnel, and assisted the installation in identifying new and improved technologies and energy-saving projects. 304 personnel at installations received training under the Energy Awareness Seminars program.

The Army also uses energy management training courses available from commercial sources, such as Association of Energy Engineers, to meet the requirements of E.O. 13123. The Army is also taking the lead for DoD to oversee revisions to the DoD Energy Manager's Handbook, expected to be complete by February 2005, and ensure maximum distribution to all DoD energy managers.. The Army's revised Energy website is located at <http://hqda-energypolicy.pnl.gov>. The website provides current information and reference materials applicable to the energy program.

The Air Force

This year, the Air Force conducted a series of training and educational sessions. The Air Force Institute of Technology (AFIT) Civil Engineer and Services School at Wright-Patterson AFB OH conducted an Energy Management Training (EMT) course. This two-week course was given once this year. AFIT has also included the energy course material in an on-line computer-training program. Additionally, a one-hour energy briefing was provided in the CE programmer's course. The Air Force Civil Engineer Support Agency (AFCESA), through an Air Force Regional ESPC program, trained 50 personnel (from engineering, contracting, legal and comptroller areas) from eight locations. The Air National Guard (ANG) at base level promoted energy conservation awareness through the following methods: building manager training/meetings, semiannual state employee awareness training, drill weekend assemblies and base newspaper articles. 83 ANG members were trained this year. An energy briefing was provided to hundreds of base facility managers during Annual Real Property updates. Another 452 individuals received energy training included in the curriculum of other training programs.

The Department of the Navy

This year, 264 DON personnel received training in areas specified in the Energy Policy Act. These personnel consisted of Energy Managers, Energy Conservation Officers, Maintenance Mechanics, Planners, Equipment Mechanics, Facilities Supervisors, Accountants, Administrative Officers, Project Managers, APWOs, Architects, Environmental Engineers, Electrical Engineers, Division Directors, Controls Mechanics, Civil Engineers, Budget Analysts, Boiler Plant Personnel, ROICC, Zone Managers, and Utility Engineers. To date, DON has trained 2,134 personnel in energy management.

The training of DON personnel consisted of 312 specific training opportunities in a range of categories. These fall under the specified areas of the Energy Policy Act and include:

1. Operations and Maintenance,
2. Controls, Design, Lighting,
3. Electric Codes,
4. LEEDs Training,
5. Natural Gas Seminars,
6. Water Resource Management, Steam Plant Improvement,
7. Renewable Energy,
8. Energy Accounting,
9. Energy Savings Performance Contracting, Measurement and Verification,
10. Training on Equipment found in Federal facilities, and
11. Certified Energy Managers (CEM) Training.

DON has registered 134 "Certified Energy Managers" since the Certified Energy Managers (CEM) Training program's inception.

DON's eBusiness Office, Card Management Group, worked to ensure that "Energy Related Information" was placed into the curriculum for the mandatory purchase card training. The Navy will now incorporate relevant information regarding federal buyers being directed by FAR Part 23, E.O13123, and EO 13122 to purchase products that are Energy Star labeled or products that are designated to be in the upper 25 percent of energy efficiency in their class as well as products with low standby power.

DON continued and expanded its energy awareness program to train all personnel to be conscious of and influence energy consumption. The program includes CD-ROMs that provide policy, publications and program execution tips for energy managers, as well as, materials targeted to educate and involve military youth. A display providing a summary of program accomplishments is set up annually at the Pentagon during energy awareness week. Distribution of a monthly newsletter titled Energized, and flash emails to energy managers, claimants and HQ quickly disseminates key information. Promotional materials are distributed to personnel to involve all in energy management practices without affecting productivity. DON energy program provided a support for Earth Day at the Navy Memorial in Washington D.C by staffing a booth with information on the energy program, identifying the link between energy consumption and air emissions, and featuring the program on *CNN Headline News*.

Washington Headquarters Service

Within the Washington Headquarters Services (WHS), five (5) DoD personnel from the Defense Facilities Directorate (DFD) participated in the Energy 2004 Conference in Rochester, NY. A sustainable design charette was held in December for Wedge 3 of the Pentagon Renovation project. Attendees included DFD management and contract personnel supporting the renovation of the Pentagon. Seventeen (17) DoD personnel and thirty-one (31) contractors were in attendance. A LEED® workshop was held in April for all levels of WHS personnel and contractors to increase the understanding of the sustainable design initiatives within the Pentagon Renovation program. In addition, twenty-three (23) contractors received training in the energy sustainable design needs of WHS.

Within DFD in FY 2004, two people held Certified Energy Manager's (CEM) certification and six people were designated as "Leadership in Energy and Environmental Design (LEED)" Accredited Professionals. Within the Pentagon Renovation Program in FY 2004, forty (40) government personnel and contractors were designated as LEED Accredited Professionals.

Defense Commissary Agency

In FY 2004, the Defense Commissary Agency (DeCA) Center for Learning hosted six (6) Facility Energy Supervisor/Quality Surveillance Representative (FES/QSR) courses and five (5) Facility Energy Surveillance Executive Courses (FESEC). The FES/QSR training course is a 2-day, commissary specific course for the commissary FES/QSR. The FESEC is a 1-day Executive Training course for commissary store directors and zone managers. DeCA's Department Operations courses address energy usage and conservation through Store Director, Meat Management, Produce Management, Grocery and Quality Assurance courses. These courses are taught throughout DeCA's worldwide operations. Instruction includes lecture and field experiences. In addition to the formal classroom training for energy awareness and conservation practices, participants receive training in quality assurance, reporting and monitoring. A site visit to a nearby commissary facility is also conducted to provide "hands-on experience" and serve as a vehicle for student evaluation

This year, DeCA continued to pursue their goal of having two, trained Facility Energy Supervisors (FES) per store. This staff member attends formal training minimally every 2 to 3 years. This year, DeCA trained 148 commissary store employees, store directors and zone managers by Region in FY 2004. This represents 96% (148/154) of their training goal. Training and travel cost was \$194,000. Students represented facilities in Europe, Far East and CONUS. FES/QSR personnel are normally department managers, quality assurance or store supply personnel.

In addition, all DeCA employees are required to view a 12-minute, commissary energy awareness video, "Put Yourself in the DeCA Energy Efficiency Picture," within 30 days of hire. This video is also part of the FESEC course. This commissary specific video is provided to each commissary; central distribution center (CDC) and office facility. DeCA also presents the energy awareness to Store Directors and managers as a part of Commissary Operations Basic and Advanced Courses. These courses take place in a formal, classroom setting.

4. Showcase Facilities

DoD continues to participate in DOE-designated Showcase Facilities to demonstrate new and innovative energy saving technologies. Facilities that are designated Showcase Facilities may incorporate energy and water saving designs, energy conservation improvements, and renewable energy use. For example, the Admiral Prout Field House and Pool located on the San Diego Naval Base was designated as DoD Showcase Facility. This base demonstrated the effectiveness of solar technology the 200,000 personnel who use the facility each year. The remainder of this section provides summary of FY 2004 DoD Showcase Facilities.

This year the Air Force designated three Showcase Facilities including:

- *Fairchild AFB Band Building* - Air Force's Air Mobility Command (AMC) received one Federal Energy Saver Showcase Award.
- *USAF Academy's Visitor Control Center* – This building incorporates ground-source geothermal heat pump systems for heating and air-conditioning, daylight harvesting and thermally efficient glazing systems.
- *Hurlburt AFB* – The base completed a turn-key project consisting of lighting upgrades in over 1,309,235 sq ft of space, various infrastructure upgrades accomplished and the construction of a central chiller plant. This central chiller plant feeds chilled water to two dormitories and can be expanded to other buildings in the future.

The Department of Navy designated one Showcase Facility in FY 2004 - the Admiral Prout Field House and Pool, Naval Base San Diego. As previously mentioned, the effectiveness of solar technology is demonstrated to personnel who use the facility each year. Two hundred rooftop thermal solar collectors provide more than 60 percent of the energy needed to heat the facility's swimming pool. Controls collect data on the solar water temperature and ambient sunlight, allowing the system to use either the solar panels or boiler to adjust the pool's water temperature. High-efficiency lighting fixtures are controlled by photocells, which turn on and off depending on the amount of daylight entering through energy-saving skylights.

In FY 2004, DeCA designated the *Richards-Gebaur MCSA, MO* as a showcase facility. This project has been rescheduled for award in June 2005 with construction completion scheduled for September 2006. The project includes heat reclaim from the refrigeration systems to provide space heating and water heating, refrigeration compressor systems comprised of several compressor sizes to insure the most efficient combination of compressors are running at any one time to meet the load. A Refrigeration Monitoring and Control System (RMCS) is planned for control of the Refrigeration System and Heating Ventilation and Air Conditioning (HVAC) System to insure efficient operation. The building will:

- Maximize use of energy efficient glass door refrigerated display cases, automatic scheduling of sales area and display case lighting, anti-sweat heater controls, temperature-terminated defrost;
- Incorporate energy efficient lighting systems that include the most advanced lighting equipment available;
- Install occupancy sensors to insure lighting is off when rooms are not in use,

- Install automatic water control on restroom fixtures to insure most efficient use of water;
- Install dual path HVAC units for the sales area; and
- Maximize the use of wall and roof insulation, energy efficient doors and windows.

The Pentagon Building continues to be a DoD Energy Showcase Facility. The goal of the Pentagon Renovation program was to provide an exemplary sustainable DoD Facility. The Pentagon Renovation and Construction Program has incorporated sustainable design requirements into all projects and used the USGBC LEED® rating tool to measure success. Two facilities, the Pentagon Athletic Center and the Metro Entrance Facility, received LEED® certification in FY04. ETSD initiated development of codes and standards for the Pentagon Reservation, which includes the International Code Council (ICC) International Energy Conservation Code. This code regulates the design and construction of buildings for the effective use of energy. The intent of this code is to provide flexibility to permit the use of innovative approaches and techniques to achieve the effective use of energy.

II. ENERGY EFFICIENCY PERFORMANCE

A. Energy Reduction Performance

1. Standard Buildings

EO 13123 set a goal to achieve a 30 percent reduction in energy consumption (measured in Btu/ft²) by 2005 and a 35 percent improvement by 2010, relative to a 1985 baseline. In FY 2004, after applying renewable energy purchase credits of 2,522.6 billion Btu, the Department's standard building energy consumption was 100,253.8 Btu/ft². This represents a total reduction in energy consumption per gross square foot of 26.8 percent relative to a FY 1985 baseline. More aggressive energy reduction was expected; however, with the absence of ESPC authority for FY 2004, several energy conservation projects were delayed.

2. Industrial and Laboratory Facilities

The industrial, laboratory, research and energy intensive facilities consumption in FY 2004, after applying renewable energy purchase credits of 1,165.5 Btu/ft², was 184,972.0 Btu/ft². This equates to a 13.3 percent reduction when compared to the 1990 baseline of 213,349 Btu/ft². EO 13123 goal is to reduce energy consumption by 20 percent by 2005 and by 25 percent by 2010 (considering 1990 as the base year).

Despite this achievement, consumption increased 3.6 percent from last year. The trend of energy usage this year can largely be attributed to the lack of ESPC authority for FY 2004. Additionally, many military industrial bases have increased their operational tempo over the past two years to support mobilization and the war effort. Many installations have been conducting operations around the clock to move troops and cargo in support of advance air operations in the Middle East. For these reasons, the energy density for these installations has gone up without the increase in overall square footage.

DoD's plan is to continue to use all avenues to reduce the energy usage to include ECIP funding, ESPC/UESC and the DOE Alert program to help identify potential energy projects.

3. Exempt Facilities

The Navy has most of the DoD exempt facilities. The Navy exempts mission critical, concentrated energy use transmitters, simulators, cold iron support to ships, and some private party facilities. A list of exempt facilities is provided in the Appendix E of this report.

4. Non-Fleet Vehicle and Equipment Fuel Use

In FY 2004, DoD consumed approximately 1.89 billion gallons (5.3 million barrels*) of mobility fuels. Spending on mobility fuels increased 30 percent from \$4.16 billion in FY 2003 to \$5.39 billion in FY 2004. This increase is attributed to the rise in fuel prices and continuing operations in the Middle East. For example, the price of jet fuel increased from \$0.85 per gallon in FY

2003 to \$1.11 per gallon in FY 2004. Supporting the US and allied warfighters in Middle East combat operations, and providing fuel to sustain civilian non-combatants in occupied territory was the highest and most challenging priorities for the Department in FY 2004.

* 1 barrels = 42 gallons

B. Renewable Energy

The Department of Defense remains dedicated to fulfilling the goals of the Executive Order 13123 by purchasing and generating electricity from renewable sources. In FY 2005, The Department used 3,838.5 BBtu of renewable energy from self-generation and through purchases. This is a 19 percent increase from FY 2003. DoD emphasizes the use of solar and other renewable energy sources where it is cost-effective. Passive solar designs, such as building orientation and window placement and sizing have been implemented in a variety of existing buildings and new facility construction.

1. Self-Generated Renewable Energy

DoD has integrated photovoltaic power systems, solar water heating systems, and transpired solar collectors (solar walls) into its facilities. Active solar heating applications have included maintenance facility solar walls, swimming pool heating, and hot water heating. Below are illustrative examples of self-generated renewable energy projects:

The Army

The Army has integrated photovoltaic power systems, solar water heating systems, and transpired solar collectors (solar walls) into facilities and generated an estimated 210 Billion Btus of self-generated electrical power during FY 2004. This self-generated power is coupled with projects such as ground-source heat pumps, solar water heating systems, and photovoltaic systems to generate electricity for isolated loads such as range targets, airfield landing strip lighting, and remote water pumping stations. Active solar heating applications have included maintenance facility solar walls, swimming pool heating, and hot water heating.

The Army was successful in funding the installation of 10 kW wind turbines at Fort Huachuca, Arizona and at the Headquarters for the Arizona National Guard. The following are self-generating renewable energy projects implemented and operating on Army Installations:

- *Fort Stewart, GA* generates high-pressure steam using wood chips at the central energy plant. In FY 2004, Fort Stewart used about 593 BBtu (65,924 short tons) of wood chips to generate steam.
- *Fort Carson, CO* generates 1 to 2 percent of its energy from renewable sources such as solar heat, photovoltaics, and a solar wall at a hanger.
- *Fort Riley, KS* generated 2500 MMBtus of thermal energy from geothermal heat pumps.
- *Fort Buchanan, PR* installed 32 photovoltaic street lighting systems with an estimated daily savings of 69,750 KWh.

- *Fort Irwin, CA and Fort Polk, LA* generated a portion of their thermal energy with total renewable thermal energy generated in FY 2004 of 127,613 MMBtu.
- *Rock Island Arsenal, IL* generated approximately 22,000 MWh of electricity from its hydroelectric plant in FY 2004.
- *Red River Army Depot, TX* generated 49,070 MMBtu of renewable energy through burning wood scrap.
- *McAlester Army Depot, OK; Fort Hood, TX; Fort Irwin, CA and Yuma Proving Grounds, AZ* use photovoltaic to generate a small portion consumed energy.

The Department of the Navy

DON generated and produced renewable energy, including thermal energy from cogeneration systems, equivalent to 2.9 percent of annual energy consumption. This exceeded DON’s FY 2005 renewable energy goal of 2.5 percent one year ahead of schedule. DON is increasing generation of renewable energy, operating the two largest Federal photovoltaic systems in the United States, and generating “free” thermal energy from the waste heat of two cogeneration systems. DON generated 5,790 MWH of renewable electricity and 789,517 Mbtu of renewable thermal energy.

Projects made operational in FY 2004 include a 1.1 MW photovoltaic system, at MAGTFTC 29 Palms, CA, which is the largest Federal PV system in the United States. The Navy’s other new renewable projects undertaking this year are summarized in the table below. In addition to these projects, DON facilitates the production of 180 MW of electricity from geothermal energy at NAWC China Lake, CA. This facility has fed over 18,000 gigawatt-hours of electricity into the western power grid since its inception.

NAVY RENEWABLE PROJECT (FY 2004)	
Solar Hot Water	
<i>State</i>	<i>Application</i>
HI	MCB Hawaii
NC	MCB Camp Lejeune
PHOTOVOLTAIC	
<i>State</i>	<i>Application</i>
HI	NAVAL BASE Pearl Harbor
CA	MACTFTC 29 Palms
CA	NAVAL BASE San Diego
GROUND SOURCE HEAT PUMPS	
<i>State</i>	<i>Application</i>
SC	MCAS Beaufort
GA	MCLB Albany
COGENERATION (Waste Heat)	
<i>State</i>	<i>Application</i>
NH	NSY & SUPPACT Portsmouth
CA	MACTFTC 29 Palms
MD	NSWC DIV Indian Head

Air Force

This year the Air Force contributed toward DoD's overall progress by implementing several Renewable Energy Projects. These included the following:

- *Dyess, Davis-Monthan, and Barksdale AFBs* have over 400 natural day-lighting fixtures installed in hangars and other high bay facilities. These systems displaced 1908 MMBtu's in FY04.
- *Offutt AFB, NE* installed 132 ground-source heat pumps that delivered 42,297 MMBtu's of renewable heat and cooling energy in excess of what would have been delivered from conventional systems.
- *ANG* installed photovoltaic streetlights at two locations saving 1,645 MWH/yr and installed geothermal heat pumps at one location saving 473 MMBTU/yr.
- *USAF Academy* generated and captured 3,101,063 cubic feet of digester gas on-site that was used in lieu of natural gas to fire a process hot water boiler for the Waste Water Treatment Plant (WWTP). At approximately 65 percent pure methane content, this on-site biomass energy application replaced 2,695.3 MMBtu's of fossil derived fuel use while simultaneously reducing environmental emissions.
- *Eielson AFB* refuse derived fuels recycled over 1.84K tons of paper products for use in the base's central heat and power plant saving 1.65K tons of coal and producing 25,423 MMBtu's.
- *Hickam AFB* continued to use a variety of solar/PV systems including solar attic fans, solar powered bollard lighting, and PV generation at the auto hobby shop with annual savings of 332 MWH.
- *AFRC* installed photovoltaic systems at three locations, yielding a saving of 954 MWH/yr.
- *AETC* installed photovoltaic systems at three locations yielding a saving of seven (7) MWH/yr.
- *Moran AB, Spain* installed a solar panel to heat water for a dining facility, yielding a saving of 32.4 MMBtu/yr.

Washington Headquarters Services

WHS also contributed to overall renewable energy usage. WHS installed a 70-kW photovoltaic array. This, combined with the previously installed (FY 2003) 26-kW photovoltaic array at the Pentagon Heating and Refrigeration Plant (H&RP), brings the total Pentagon Reservation photovoltaic capacity to 96-kW. WHS also has smaller photovoltaic systems at 48 various locations throughout the Reservation to provide lighting for security, parking lot lighting & pedestrian crossing signals for a combined capacity of 14.4-kW. WHS also implemented two solar thermal systems. These systems provide supplemental heat for the emergency generator and hot water for the loading dock area. The two systems have the combined capacity of 5.8 Mbtu per year. A solar thermal system at the H&RP guard booth consists of 400 square feet of tiles with a total capacity of 11.7 kW to provide lighting, heat and air conditioning.

2. Purchased Renewable Energy

DoD continued to purchase energy from renewable sources. For example, the Dyess and Fairchild Air Force bases both purchase 100 percent renewable power for their installations. . In FY 2004, total DoD renewable energy purchases amounted to 550,860 MMBtu. The following provides a brief summary of other DoD agency achievements in this area:

The Navy contributed to overall DoD performance with the following:

- *The Portsmouth Naval Shipyard* (industrial consumption), Norfolk, VA purchases electricity and steam from a privatized waste to energy plant.
- *The NAS Keflavik* in Iceland purchases electricity and steam generated from geothermal energy.

The following Air Force installations purchased energy from renewable sources:

- | | | |
|-------------------|------------------|------------------|
| ▪ USAF Academy | ▪ FE Warren AFB | ▪ Ramstein AB |
| ▪ Grand Folks AFB | ▪ Cannon AFB | ▪ Sheppard AFB |
| ▪ Minot AFB | ▪ Lackland AFB | ▪ Laughlin AFB |
| ▪ Ellsworth AFB | ▪ Edwards AFB | ▪ Goodfellow AFB |
| ▪ Schriever AFB | ▪ Dyess AFB | |
| ▪ Fairchild AFB | ▪ Spangdahlem AB | |

The Defense Commissary Agency (DeCA) also contributed to DoD's performance with the following purchases:

- DeCA purchased 8.973 BBtus of thermal energy generated by geothermal energy for the Keflavik commissary in FY 2004.
- DeCA purchased 540 MWH of electricity generated by hydroelectric sources for the Keflavik commissary

FY 2004 Army purchases of renewable energy included:

- *The Army* purchased 5 million KWh of wind power and 14 million KWh of landfill gas annually from Washington Gas Energy Services.
- *The Presidio of Monterey* purchased 11,509 MWH of solar energy.
- *Fort Lewis* purchased 18,350 MWH of Solar and Wind energy.
- *The Aberdeen Proving Ground* purchased 504.6 BBtu of thermal energy.
- *Redstone Arsenal* purchased 656.7 BBtu of steam from the city of Huntsville.

In addition, the Army has approximately 3,800 "solar roofs" in use at its installations. The Army requested assistance from the Department of Energy's Sandia National Laboratory to assist in the maintenance and repair of several photovoltaic systems. This partnership provides the Army with the technical expertise needed to bring aging, failing systems back to operational status. Active solar heating applications were also expanded to include maintenance facility solar walls, swimming pool heating, and hot water heating in Army family housing.

Examples of the Army's Photovoltaic Power System Projects include the following:

- *Fort Carson, CO* - Water pumping, off-grid lighting, telecomm
- *Fort Huachuca, AZ* - Grid-connected, off-grid lighting
- *Fort Dix, NJ* - Grid-connected, off-grid lighting
- *Yuma Proving Ground, AZ* - Grid-connected, off-grid lighting, remote off-grid facility
- *Yuma Proving Ground, AZ* - Off-grid lighting, remote off-grid facility
- *Pohakuloa Training Area, HI* - Range targets, control towers, airstrip lighting
- *Fort Irwin, CA* - Remote off-grid facility, stand-alone lighting
- *Fort Polk, LA* - Training range field instrumentation
- *White Sands Missile Range, NM* - Grid-connected, weather data equip, telecomm
- *Fort Greely, AK* - Training range field instrumentation
- *Fort Bragg, NC* - Special operations power supply (20-kW panels)
- *Yakima Firing Range, WA* - Water pumping, off-grid lighting, telecomm

This year The Army implemented the following storage cooling system projects that use alternative fuels:

<u>Installation</u>	<u>Storage Medium</u>	<u>Application(s)</u>
Fort Jackson, SC	Chilled Water	Central Energy Plant (CEP) #2
Fort Huachuca, AZ	Chilled Water	Barrack Complex
Fort Gordon, GA	Chilled Water	Office Buildings
Fort Jackson, SC	Chilled Water	Barrack Complex
Construction Engineering Research Lab, IL	Ice	Laboratory Complex
Yuma Proving Ground, AZ	Ice	Single Barrack
Fort Bliss, TX	Ice	Dental Clinic
Fort Stewart, GA	Ice	PX Building
Fort Eustis, VA	Ice	Office Building
Fort Myer, VA	Ice	Commissary and Office Building

C. Petroleum

DoD has made significant progress in reducing the consumption of petroleum-based fuels. For example, the Army's baseline consumption of fuel oil was 101 TBtus in FY 1985 and has been reduced to 8.1 TBtus in FY 2004. Since FY 1985, the Army has reduced petroleum-based fuel use at its facilities by 92.3 percent. Army Installations have been encouraged to investigate alternative fuels such as natural gas and renewable energy that produce less carbon emissions. Installations have also been encouraged to use more natural gas with fuel oil as back up.

This year the Navy's fuel oil use in facilities decreased 4 million gallons or 4.2 percent from last year. Reductions were accomplished primarily through fuel switching to natural gas and electricity, and efficiencies from boiler plant de-centralization, boiler plant tune-ups and improved controls, and steam trap replacements. Additional savings were achieved by utilizing

various weather forecasts, including forecasts provided by the Naval Atlantic Meteorology & Oceanography Center, to delay the heating season start-up until necessary.

D. Water Conservation

While there is no specific water reduction goal outlined in EO 13123, DoD remains committed to reducing over all consumption of natural resources by recording annual water consumption data from The Services. In FY 2004, 142 DoD facilities developed water management plans and implemented best management practices (BMPs). This year, DoD consumed 146.2 billion gallons of potable water. This represents a 15.7 percent decrease in consumption when compared to a FY 2000 base year.

DoD is striving to increase water conservation awareness and reduce water use—particularly where tight water supplies may potentially impact mission accomplishment and personnel morale. Water conservation measures not only reduce water use and cost, but also reduce energy consumption (for pumping) and sewage treatment costs. Additionally, water conservation helps to reduce the quantities of wastewater treatment chemicals (most notably chlorine) being released into the environment, and reduces the risk of drawing down aquifers or saltwater intrusion into aquifers. Thus, water conservation efforts, in addition to being environmentally responsible, can help installations stretch dwindling Operation and Maintenance (O&M) dollars.

The Army

Army policy required that all installations develop a water management plan by September 30, 2004. This year, the Army used 66,148 million gallons of potable water. Army's total water use has steadily declined - water use dropped by almost 45 percent between FY 1992 and FY 1999. During the same time period, water disposal volume dropped by 43.7 percent. Greater treatment and testing requirements imposed on water suppliers by the Safe Drinking Water Act and amendments have increased the cost of providing potable drinking water.

The Department of the Navy

Twenty-two DON installations have water management plans. Of these installations, four have implemented best management practices in water efficiency. DON's water conservation efforts in FY 2004 included the following:

- *MCB Camp Pendleton, CA* installed low flow fixture installations at the, that will yield water savings in excess of 13 million gallons a year.
- *Naval Station Everett, WA* made HVAC improvements, steam trap repairs and rainwater containment systems at PWC Pearl Harbor, HI that will each provide an additional 2 million gallons annually.
- *NAF Atsugi Japan* installed closed loop high pressure washing systems that will save 375,000 gallons of water/yr.
- *Naval Base Coronado, CA* installed controls on irrigation systems and hired a water resources manager.

- *Naval Station Rota Spain* implemented a landscape and golf course irrigation restriction policy that attained about a one-third reduction in water use.
- *Naval Support Activity, Monterey, CA* accomplished irrigation using 90% non-potable water.
- *Naval Air Station Keflavik* conducted a leak detection study and repaired three major leaks totaling 155 gpm.

Washington Headquarter Services

The potable water usage for FY 2004 for Washington Headquarters Services was 183.9 million gallons, an increase of almost 40 percent from the previous fiscal year. Sufficient water sub-metering data is not currently available to facilitate identification of the source of, or reason for, this significant increase. This will be the top water conservation issue for FY 2005.

Despite, this increase, WHS's Wedge 2 Renovation design shows a 30 percent reduction in water use over the EPACT requirements, which was achieved by using water efficient fixtures and infrared controllers in the renovation.

Defense Commissary Agency (DeCA)

The DeCA design criterion requires low consumption toilets and urinals with electronic flush sensors for new and renovated commissaries. Electronic sensor control valves are specified on hand wash lavatories. At locations where host installations maintain "waterless" urinals the projects include the "waterless" urinals. Projects implemented are required to include low flow devices for flush valves and lavatory faucets. The use of electronic valves was included in projects to reduce water use. The DeCA East Region office is located in a GSA negotiated leased building. The Region contracted for the space and requested that the building owner incorporate current commercial energy efficient design with set back thermostats and state of the art equipment SEER ratings. The plumbing fixtures in the office are all of the low flow type and meet commercial plumbing criteria. The energy and utility costs are included in the lease agreement so the rent includes these costs. This makes it beneficial to the owner to use the most cost effective energy using equipment to maximize his savings from energy use.

DeCA water conservation efforts include the following:

- DeCA West continues to upgrade restroom facilities, which include fitting them with low-flow type fixtures and where applicable, sensor activated faucets and flush valves. This is an on-going process.
- More emphasis has been placed on the immediate necessity to repair leaky and/or faulty plumbing fixtures as they are identified. If the Installation/Base maintenance work force is not available to resolve the problem, outside (off-base) maintenance is being sought to acquire immediate correction of the problem.
- Closer monitoring and improved quality checking of commissary store quarterly water use and cost reports (DeCA Form 20-1) has been implemented. Store Directors are also continuing to stress the importance of conserving water in their daily operations.

- The DeCA East San Antonio office implemented local city water conservation rules for lawn watering schedules and has a booster pump in the lawn sprinkler supply line for optimum use of available water pressure.

The National Geospatial Intelligence Agency (NGA)

NGA established a Water Management Program in FY 2003 and continues to implement at least one Best Management Practice (BMP) at each site. A BMP implementation schedule was finalized in the second quarter of 2004. Performance results included:

- 1) All NGA sites completed the publicity and leak detection programs during FY-04.
- 2) All NGA sites also received the Agency water management plan for implementation.
- 3) Two sites established irrigation programs.
- 4) Site managers are monitoring the progress of their water management programs.
- 5) Three water meters have been installed at the Sumner sites; seven more are planned for the East Campus locations during FY05.
- 6) The West Campus has established two water management plans for the main facilities and completed the implementation of four BMP's
- 7) Toilets and urinal upgrades are scheduled for the west campus during FY 05 and are underway in the East.

NGA's Bethesda Site requested the Washington Water and Sewage Authority, to install new water meters. This was initiated in July 2003. Two meters were added in 2004. An additional seven meters are scheduled for installation during 2005 that will bring the total to 10 meters.

Other NGA water conservation efforts included:

- Installing low-flow restroom fixtures,
- Auditing water distribution systems to detect and repair leaks,
- Installing rain sensors in irrigation systems,
- Installing water meters at supply entrances to better track NGA's actual usage (vs. utility company estimates) and aid in resolving discrepancies due to leaks and calibration errors
- Providing training for NGA energy/water managers,
- Developing Agency and Site-specific Energy/Water Management Plans, and
- Developing an Energy and Water Conservation website accessible to NGA employees via NGA's intranet systems.

III. Implementation Strategies

DoD's philosophy is to give the Defense Components the flexibility to manage their own energy programs to meet the goals of Energy Policy Act (EPAct) and EO 13123. DoD's primary objectives in implementing strategies are to improve energy efficiency, eliminate energy waste and reduce costs. To achieve these two objectives, the Services use the following common strategies:

1. **Invest in energy efficient technologies**, such as high efficiency lighting and ballasts, energy efficient motors, and packaged heating and cooling equipment with energy efficiency ratios (EER) that meet or exceed Federal criteria for retrofitting existing buildings.
2. **Utilize Energy Savings Performance Contracts (ESPC) and Utility Energy Savings Contracts (UESC).**
3. **Investing in Energy Monitoring and Control Systems (EMCS).**
4. **Re-energizing of Energy Awareness Campaigns**
5. **Providing training to energy coordinators** at both the region and installation level.

A. Life-Cycle Cost Analysis

The Department's facilities utilize life-cycle cost analysis in making decisions about their investment in products, services, construction, and other projects to lower costs and to reduce energy and water consumption. DoD considers the life-cycle costs of combining projects, and encourages bundling of energy efficiency projects with renewable energy projects, where appropriate. Projects are prioritized for capital funding and execution is based upon the greatest life-cycle savings to investment ratio. The use of passive solar design and active solar technologies are recommended where cost-effective over the life of the project. Sustainable development projects use life-cycle costing methodology and follow the Whole Building Design Guide.

All DON energy projects (centrally funded and financed) are required to evaluate savings on a life cycle basis. Projects submitted utilize the NIST publication handbook 135 and DOE energy discount factors as guidance. In FY03, the DON energy projects team adopted use of DOE's Building Life Cycle Costing software as a standard for determining project economics. Sustainable development projects use life cycle costing methodology and follow the whole building design guide. GSA and DLA guidance on purchasing energy efficient products continues to be distributed in order to educate purchasers of the life cycle costing requirement and provide them assistance making purchasing decisions.

Army facilities also utilize life-cycle cost analysis in making decisions about their investment in products, services, construction, and other projects to lower the costs and to reduce energy and water consumption. The Army is required to use building systems and/or equipment that meets or exceeds the energy performance standards set forth in 10 Code of Federal Regulations 435,

local building standards, etc, and that result in the lowest life-cycle cost. The Army considers the life cycle costs of combining projects, and encourages bundling of energy efficiency projects with renewable energy projects, where appropriate. Utilizing energy efficiency, water conservation, solar and other renewable energy technologies can minimize life-cycle cost. The use of passive solar design and active solar technologies are required, where cost effective over the life of a project.

In FY 2004, DeCA revised the agency's Design Criteria Handbook, DECAH 20-1, to emphasize use of life cycle cost requirements in design of commissaries. The DeCA Design Criteria Handbook emphasizes life cycle cost evaluation of HVAC systems for alternate fuel sources and other energy reduction strategies including direct expansion and gas-fired systems. Design criteria also include other items such as: occupancy sensors, energy efficient lamps and ballasts, LED exit signs, and the use of Refrigeration Monitoring and Control Systems for the most efficient operation of Refrigeration Systems and HVAC. Other requirements stated in the DeCA Design Criteria require the design firms to provide life cycle cost analysis on construction materials and methods.

In FY 2004, the Air Force used life-cycle cost analysis on all new construction projects and retrofit projects, including ESPC, UESC, and ECIP programs. Examples include the:

- BPA-UESC lighting retrofit at McChord AFB WA,
- Decentralization of the power/heat plant at Elmendorf AFB AK,
- Central Heat & Power Plant Upgrade at Eielson AFB, and the
- Theatre Repair Project at Eielson AFB,

B. Facility Energy Audits

DoD demonstrates the department's commitment to energy conservation and the goals of Executive Order 13123 by conducting energy audits of facilities and installations. In FY 2004, DoD completed an audit of 212,794 thousand square feet (ksf) or 10.2 percent of total facility square footage in FY 2004. For example, 25 DeCA commissaries were audited electronically, through analysis of refrigeration monitoring and control data. After the corrections and recommendations are implemented, these audits are expected to yield an annual savings of \$380,000. Since 1992, comprehensive audits were completed on a total of 2,709,169 or 118.4 percent of facility square footage. Some audits were repeat audits, several years apart, or to investigate additional conservation measures not cost effective previously.

C. Financing Mechanisms

Utility Energy Service Contracts (UESC) and Energy Savings Performance Contracts (ESPC) are crucial tools for financing energy efficiency measures that allow installations to improve their infrastructure and pay for the energy efficiency measures through the savings generated by the project over time (10-25 years). ESPCs are partnerships with private sector companies, known as Energy Savings Companies (or ESCOs). UESCs are similar to ESPCs, with the most

notable difference being that the projects are financed and implemented through utility companies

In FY 2004, Defense Components through a decentralized approach awarded 20 UESC and 5 ESPC task orders/contracts producing an estimated annual energy savings of 4,518 MMbtu and a total life-cycle savings of \$89.53 million. Due to the lack of ESPC authority for FY 2004, only the Air Force was able to award a few delivery orders from existing contracts, deemed legally acceptable based on the language used in their contracts. The legal interpretation within the other Services precluded even delivery orders from existing contracts from being awarded.

The contracts awarded include many infrastructure upgrades and new equipment to assist the installations in their energy and water reduction efforts. Examples include new thermal storage systems, chillers, boilers, lights, motors, peak shaving, Energy Monitoring and Control Systems (EMCS) and water reducing devices. For example, an Air Force ESPC delivery order at Ramstein Air Base initiated the replacement of all lighting with energy-efficient lighting in the Commissaries of Sembach, Ramstein, and Vogelweh Kaiserslautern, all located in the Germany. The remainder of this section provides examples of EPSC and UESC projects implemented by Defense Components.

Department of the Navy

DON's Naval Facilities Engineering Command (NAVFAC) utilizes the contract authority of the Department of Energy, Department of Army, and Department of Navy to execute both new contracts and delivery orders in order to capitalize on alternative financing opportunities. In FY 2004, DON's ability to award alternatively financed contracts due to the expiration of ESPC authority was impacted severely. Only \$14.3 million (first capital cost) worth of financed projects was executed. The following is a list of DON delivery orders awarded this fiscal year:

Location	Contract Vehicle
NAVMAG Indian Head, MD	NAVFACENGCOM, Atlantic Division
NSA Philadelphia, PA	NAVFACENGCOM, Atlantic Division
NAS Patuxent River, MD	NAVFACENGCOM, Atlantic Division
NUWC Keyport, WA	NAVFACENGCOM, Southwest Division
NSY Puget Sound, WA	NAVFACENGCOM, Southwest Division
MCB Camp Pendleton, CA	NAVFACENGCOM, Southwest Division

The Army

Army installations access all of the financing mechanisms available to them, including ESPC, UESC, and various forms of appropriated funds. However, in FY 2004, the Army did not award any ESPC contracts due to the absence of legislative authority to award ESPC contracts. Some Army installations have used the Army's Utility Modernization Program to supplement its ESPC projects. For example, using FORSCOM Expanded Utilities Modernization Program (EUMP), Fort Hood upgraded old and failing wash racks, which reduces water consumption. This year the Army awarded two UESC contracts. These included:

Location

Fort Knox, KY -9
Aberdeen PG, MD -1

Project Scope

HVAC Improvement
HVAC Renovation and Conversion

The Air Force

This year, the Air Force awarded five (5) new ESPC and four (4) new UESC task orders for this fiscal year. These task orders include energy infrastructure upgrades and new equipment to help the installations reduce energy and water consumption. Examples include new thermal storage systems, chillers, boilers, lights, motors, EMCS systems and water reducing devices. To help in the verification method, the AF has developed and published Measurement and Verification templates. Air Force ESPC and UESC included the following:

ESPC

<u>BASE</u>	<u>Award Date</u>	<u>Award \$</u>	<u>Contracting Agent</u>
Lackland	26 Apr 04	\$840,666	AF
Mt Home AFB	9 Jun 04	\$2,730,336	AF
Kunsan AB	31 Mar 04	\$1,458,944	AF
Kirtland AFB	3 Dec 03	\$750,675	AF
Osan AB	31 Mar 04	\$3,549,135	AF
Total		\$9,329,756	

UESC

<u>BASE</u>	<u>Award Date</u>	<u>Awarded \$</u>	<u>Contracting Agent</u>
Offutt AFB	20 Apr 04	\$978,712	AF
Ellsworth AFB	16 Aug 04	\$4,280,100	AF
Andrews AFB	1 Apr 04	\$4,340,000	AF
Tinker AFB	3 Oct 04	\$1,171,000	AF
Total		\$10,769,812	

D. Energy-Star® and Energy-Efficient Products

When life cycle cost-effective, DoD organizations select Energy Star® and other energy-efficient products when acquiring energy-consuming products. Guidance generated by DOE, GSA and DLA for energy-efficient products are incorporated into the sustainable design and development of new and renovated facilities. The components are procuring energy-consuming products that are in the upper 25 percent of energy efficiency as designated by the Federal Energy and Management Program. Energy efficient technologies include high-efficiency lighting and ballasts, exit signs, energy efficient motors, low-voltage distribution transformers, and the use of packaged heating and cooling equipment with energy efficiency ratios that meet or

exceed Federal criteria for retrofitting existing buildings. Information technology hardware, computers and copying equipment are acquired under the Energy Star® program using GSA Schedules and either Government-wide or Service contracts.

The Air Force

Examples of Air Force Base Initiatives in implementing Energy-Star and energy efficient products include:

- ACC facility design criteria specifies T-8 lamps with electronic ballasts, high efficiency chillers (0.9 kW/ton) and efficient heating equipment (90%) for new installations and equipment replacements.
- Hickam AFB criteria for energy consuming products outlines minimal efficiency requirements for lighting, appliances, air conditioners, pumps, and motors and requires organizations to stock high efficiency items. The criteria also requires that all electrical equipment (PCs, monitors, laser printers, copy machines, etc.) be Energy Star® compliant and that power management features be enabled at all times

The Army

When life cycle cost-effective, The Army requires Energy Star and other energy-efficient products when acquiring energy-consuming products. Army procurement specifications were updated in FY 2000 and Army regulations are currently under revision. Army procurement regulations are now in compliance with President's directive of 3 May 2001 and will ensure Army installations are procuring only energy-consuming products which are in the upper 25 percent of energy efficiency as designated by the Federal Energy and Management Program. These revisions enable installations to factor energy-effectiveness into the purchase cost of the item and to factor in both the operating and purchase costs of the item into the purchase price to determine "best value."

Defense Commissary Agency

The DeCA Contracting Business Unit (CIC) procures energy efficient products such as paper and plastic grocery bags made up of minimum 35% pre-consumer or post-consumer recycled products. New or replacement cardboard balers are purchased for our commissaries in consideration of efficient disposal of cardboard products. DeCA design criteria requires premium efficiency fan motors for HVAC systems, electronically commuted fan motors on the refrigeration display cases, T-8 fluorescent light fixtures with electronic ballasts in display cases and in new and renovated facilities.

National Security Agency

NSA utilizes energy-efficient products for all new installation, renovation, and O&M projects. Energy efficiency language is incorporated in all new construction and renovation project specifications.

Washington Headquarter Services

WHS made every effort to incorporate Energy Star® and other current energy efficiency standards into the Pentagon Renovation and Construction Program as well as DFD's operations and maintenance (O&M) program.

E. Energy-Star® Buildings

Energy Star Buildings is a program developed by the U.S. Environmental Protection Agency (EPA) to promote energy efficiency in buildings. Energy Star Building criteria are based on a five-stage implementation strategy consists of lighting upgrades, building tune-up, load reductions, fan system upgrades, and heating and cooling system upgrades. This year DoD continued to implement the program. For example, Army installations have assessed their buildings and leasing activities and are working to ensure compliance with Energy Star Building criteria. The Army's new Sustainable Design and Development Criteria will ensure that facilities when constructed or upgraded meet or exceed Energy Star criteria.

One Air Force facility received the Energy Star designation in FY04. HQ AFCESA applied for and was awarded the Energy Star in January 2004. Additionally all new MFH units must be designed to meet the Energy Star criteria.

The Navy's Naval *Medical Center, San Diego, CA* and the *Naval Base Ventura County, Port Hueneme, CA, Welcome Center (2003)* were awarded the EPA energy star label. The Medical Center is also an energy showcase. The welcome center employs an efficient HVAC system and energy efficient lighting.

This year, WHS launched a *LEED EB Pilot Program* that used ENERGY STAR® to baseline the energy performance of the Wedge 2 project. A rating of 60 was achieved based on the use of modeled data. However, a rating of 75 or higher on actual energy usage is required to become an Energy Star building. This information is anticipated to be measured and verified during FY06.

DeCA has no buildings designated as ENERGY STAR® Buildings. However, the agency has selected the *Oceana NAS Commissary, Virginia* as a potential candidate for FY 2005.

F. Sustainable Building Design

Sustainability initiatives require an integrated design approach to the life cycle of buildings and infrastructure. The concepts of sustainable development as applied to DoD installations have been incorporated into the master planning process of each of the Services. Installations are encouraged to approach land use planning and urban design in a holistic manner and integrate it with energy planning. In FY 2004, DoD adopted and applied sustainable design principles in 514 new building projects. Of these, 219 projects can or will be certified under LEED. The following provides examples of Defense Component sustainable building design and construction efforts.

The Army

In FY 2004, 73 percent of the Army's design/construction projects used sustainable design principles. The Army has embraced this concept and has identified projects in FY 2002 and beyond as Army SDD Showcase Facilities. The U.S. Army Corps of Engineers (USACE) has been tasked to incorporate sustainability principles into its design and construction process. USACE has developed a 3-day sustainable design and development workshop to train Army and DoD personnel. Workshops conducted trained approximately 450 design engineers and installation personnel.

In FY 2002, the Department of the Army issued a policy requiring all projects to be scored against the Sustainable Project Rating Tool (SpiRiT) and require all project designs to achieve the Bronze level. The Army hopes to continue to engage the perspectives and expertise of its personnel throughout the plan, design, build and commissioning process and to establish sustainable goals. It helps in deciding current and future resource priorities, materials, mission needs and building performance; and ensuring contract documents are written to support sustainable design, construction and performance objectives. It also facilitates The Army's awareness of how facility systems and materials affect initial project and life cycle costs, operations and maintenance practices, and ultimate facility performance over the facilities lifetime. All Army installations have been encouraged to designate their own SDD Showcase Projects and strive for higher sustainable rating levels (Silver, Gold, and Platinum).

The Air Force

The Air Force Civil Engineer established an *AF Sustainable Development Policy* on 19 Dec 01. All facility and infrastructure projects (by FY09) must apply sustainability development concepts in the planning, design, construction, environmental management, operation, maintenance and disposal process. The Air Force sustainable target for FY 2004 was 20 percent. The Air Force undertook 41 out of 114 potential project or 28 percent. The following are examples Air Force's sustainable design concepts and achievements:

- Two (2) Air Combat Command facilities obtained LEED certification – 1) dormitory at Beale AFB and 2) a CSAR Warehouse at Davis-Monthan AFB.
- McGuire AFB applied LEED criteria in the design of the C-17 Consolidated Flight-Line Operations Facility. These features included:
 - Landscape (hardscape, recreation and xeriscape planting principles),
 - Architecture (site adaptation to provide weather and solar shading),
 - Envelope Materials (low emission glass and thermal panes, additional insulation, and sustainable cladding)
 - Energy Star rated or equivalent appliances, HVAC and lighting.
- Eielson Combined AF-ANG Security Forces building designed to achieve Bronze rating under SPIRIT program.

- Hickam AFB C-17 complex designed to achieve Bronze rating under the SPIRIT program.

The Department of the Navy

DON operates under AVFAC Instruction 9830.1, a Sustainable Development Policy promulgated in June 2003. The policy requires all new construction projects be LEED certifiable. Joint service criteria also requires use of ASHRAE standard 90.1 for design. In FY 2004, 15 of 56 MILCON projects were constructed to be LEED certifiable. A process analysis will be completed in FY05 to determine why the remaining projects were not LEED certifiable, and recommend process improvements to increase the number of MILCON that are LEED certifiable.

This year, DON provided a *US Green Building Council (USGBC) Advanced LEED Workshop* for all business lines in offices in Norfolk, Charleston, San Diego, Pearl Harbor and the NW region. The training assisted approximately 75 NAVFAC employees in passing the *LEED Accredited Professional Exam*. This investment in training, and the exam accomplishment, will lead us to be more efficient and effective in implementing NAVFACINST 9830.1.

To date, the results of the DON investments in sustainable development are being determined through design and manufacturer estimates and modeling. DON awarded a task order contract to determine which design options offer the greatest sustainable solution and the greatest return on investment (ROI), through measurement of the actual performance of buildings. The measurement of the design's effectiveness will also support the business case for further implementation of sustainable development across DON. The information on building performance will be used to:

1. Adapt/Improve equipment to operate more efficiently and as designed;
2. Determine actual whole building return on investment for sustainable development; and
3. Develop design guidance on best sustainable design options.

Defense Commissary Agency

Fifty-one (50) DeCA projects were designed or built in FY 2004 using sustainable development and design principles (or equivalent) as a standard for DeCA commissary construction. The DeCA Design Criteria Handbook, DECAH 20-1 documents sustainable design requirements. The handbook emphasizes use of life-cycle costs, pollution prevention, other environmental and energy costs associated with the construction and life cycle operation of the facility. Detailed requirements are incorporated for items such as energy efficient lighting, dual-path HVAC, premium efficiency fan motors, refrigeration monitoring and control systems, lighting controls, and roof membrane materials. DeCA design criteria are reviewed and updated annually.

G. Energy Efficiency in Lease Provisions

DoD emphasizes energy and water conservation in leased facilities and each of the Services has issued guidance directing that all leased spaces comply with the energy and water efficiency requirements of the Energy Policy Act of 1992. It is DoD's intent to continue to have the landlord make appropriate investments in energy efficiency, which can be amortized in the lease, provided the new total cost (energy costs plus lease cost) does not exceed total costs without improvements. These leases should amortize the investments over the economic life of the improvements. Build-to-lease solicitations for DoD facilities will contain criteria encouraging sustainable design and development, energy efficiency, and verification of building performance. DoD relies upon the General Services Administration (GSA) to ensure the above provisions are included in buildings that they lease for DoD.

The Air Force independently evaluates all leased properties for location, cost/square foot, availability and energy efficiency. All these factors are reviewed before accepting a lease.

The Army emphasizes that energy and water conservation be included in all facility leases and requires these leased facilities to meet energy and water goals. Build-to-lease solicitations for Army facilities contain criteria encouraging sustainable design and development, energy efficiency, and verification of building performance.

NSA has several leases where energy efficient methods and products have been used for all renovations and repairs to leased facilities. Employees occupying or working in these spaces follow all existing agency energy policies. When entering into a lease for unfinished space that NSA will fit-up, we employ the same design standards used for our new buildings and renovation projects.

WHS leases the most facility space from using GSA leases. However, there are three DFD, which use the same GSA lease provisions. The typical "solicitation for offerors" (SFO) requires landowners to comply with the government's energy conservation guidelines. The Leased Facilities Directorate supports day-to-day lease administration. When the Leased Facilities Division adds equipment for special requirements, the division works with the landowners to use energy efficient applications.

H. Industrial Facility Efficiency Improvements

Despite the setbacks addressed previously, DoD continues to make progress toward energy reduction goals. The following highlights several FY 2004 DoD Industrial Facility Improvement Projects:

- The Air Force Facilities at Hanscom, Hill, Robins, and Wright-Patterson are focusing on steam system improvements through replacing traps and repairing / replacing leaking steam lines.

- The majority of chiller plants at on the NSA campus are fully automated. Chillers and associated equipment are operated (automatically) on an as needed basis determined by equipment run-time and building load.
- NSA's MILCON Project is underway. The project involves adding pumps, valves, and piping to the existing chilled water system at the main building complex. When completed, the chilled water plants and distribution systems in these buildings can be interconnected, thereby allowing the most efficient chillers to provide for the buildings cooling requirement.
- Many of the Army's industrial facilities have been in various stages of reduced production.
- DeCA conducted remote diagnostic monitoring of Refrigeration Monitoring and Control Systems (RMCS) at approximately 195 individual commissaries. This monitoring assured that refrigeration and lighting systems were being operated and maintained at their design specifications. Discrepancies were forwarded to maintenance contractors on a daily basis for correction. Lighting controls were monitored and adjusted by this same method in FY 2004. This surveillance resulted in improved contractor maintenance and improved equipment operation and less energy consumed.
- DeCA is also evaluating the use of Web- based energy monitoring control systems based on cellular technology for use at the Oceana NAS, VA Commissary.

I. Highly Efficient Systems

DoD encourages the components to combine cooling, heating, and power systems in new construction and/or retrofit projects when cost effective. The following provides examples of the Services efforts to reduce energy consumption through the implementation of efficiency technologies and projects.

The Army

In facilities that use large quantities of energy, it is the Army's policy to use high efficiency products in the operation and maintenance of central heating and cooling systems. FY 2002 was the final year of a 5-year, \$300 million central heating systems modernization program. The goals of this program were to update the aging central heating systems infrastructure at select, large installations. Central heating systems at 14 major installations were modernized under this initiative in FY 1998-2002.

In addition to the Army's centrally funded program, the installations also used O&M funds to implement energy saving projects such as, upgrade boilers and distribution systems, improved high efficiency pumps and motors, and updated system controls. Army regions and installations, along with the Army Corps of Engineers, evaluate the deployment of highly efficient energy systems for all new construction and major retrofit projects. The Corps incorporate these systems where cost-effective.

The Air Force

In FY 2004, the Air Force completed the following efficiency system projects:

- *Tyndall AFB, FL* installed a hybrid ground source heat pump that supplements the HVAC system serving the bowling alley and base library.
- *Eielson AFB* installed highly efficient aeration pumps at the base wastewater facility saving 523 MWH annually.

Washington Headquarters Services

WHS also completed the installation of a highly efficient system. Wedge 2 installed a new Fan Powered Induction Unit (FPIU), which allowed for a greater ceiling height and more day lighting. Wedge 2 energy requirements encouraged a holistic design strategy to meet the necessary target. The energy target was 120 kBTU/sq.ft. This target has been met in the design modeling and will be verified in FY 2006 after the project's completion.

WHS also developed the following EMCS performance trending strategies and procedures to be executed to detect and diagnose possible problems that could result in the loss of system energy efficiency. These procedures use existing building data to monitor the theoretical systems performance to allow operators to keep the system optimized for the best energy efficiency. They also serve to an early detection system for EMCS conditions that could result in an unnecessary increase in energy consumption. The procedures include:

- Variable Volume Fan Power Performance Trending
- Steam Heating Coil Performance Trending
- Chilled Water Coil Performance Trending
- Hot Water Heating Coil Performance Trending
- Offline Controllers Procedure
- Unoccupied Cycle AHU Sensor Calibration Procedure
- Detection of Chilled Water Valve Leakage Procedure
- Detection of Heating Hot Water Valve Leakage Procedure
- Operation of AHU Heating and Cooling Valves Procedure
- Detection of Low Analog Input Values Procedure
- Space Temperature Sensor Open Circuit Detection Procedure

The Department of the Navy

DON is committed to implementing highly efficient systems. DON is also conducting a *Backpressure Steam Turbine Feasibility Study* in FY 2005 at the Naval Base Kitsap Bremerton, WA. DON maintains cogeneration plants at: *NSY Portsmouth, NH MAGTFTC, 29 Palms, CA,* and *NSWC Indian Head, MD.* The National Naval Medical Center in San Diego, CA increased cogeneration capacity by 3.6 MW producing 12,960 Mwh in FY 20004. The Naval Training

Center Great Lakes, MI awarded a 10 MW cogeneration project on a UESC contract in August 2003. This project should be completed by May 2005.

J. Distributed Generation

DoD is pursuing distributed and off-grid generation where it is life cycle cost-effective to provide peak saving opportunities and energy security. Typical applications include micro-turbines, fuel cells, cogeneration plants, flywheels and back-up generators. For example, the WHS Pentagon Reservation has a 96-kW of photovoltaic generation. The following provides examples of DoD's off-grid generation projects.

This year the Army installed two (2) generation systems. These two projects are as follows:

1. **Fort Bragg, NC** completed the 82nd Cogeneration Project and started operation in April 2004. This cogeneration project provides chilled water, hot water and steam for the 82nd Area at Fort Bragg. It also provides electricity to the post electric grid. This project consists of a five MW dual-fuel turbine-generator and integral heat recovery steam generator. The turbine will be fueled by natural gas and utilize No. 2 diesel oil for back up. The exhaust gases from the turbines feed a 1,000-ton absorption chiller and a heat recovery steam generator sized to handle the entire heating load of the 82nd Heating Plant, which includes the Faith Barracks Complex. This project, which replaces faulty equipment, will create substantial energy savings and is one piece of Fort Bragg's overall energy security plan.
2. **Fort. McPherson, GA** installed a five-kilowatt proton exchange membrane (PEM) fuel cell manufactured by Plug Power. This fuel cell project was awarded under the ERDC/CERL Residential Proton Exchange Membrane Fuel Cell (PEMFC) Demonstrations program. This was one of the first PEM fuel cells to be installed at an Army facility. The fuel cell operates at a nominal 2.5 kW and provides thermal energy to the hot water tank serving the residence. Construction Engineering Research Laboratory (CERL) and Department of Energy / Federal Energy Management Program (DOE/FEMP) monitor this fuel cell.

The Air Force has several projects including:

- *Dobbins ARB*, which peak shaves up to one MW by using base generators. The base has 27 fuel cells in operation;
- *Hickam AFB*, which installed solar powered bollard lights for a pathway extending 1.5 miles;
- *Eielson*, which has PV panels at remote locations producing 23.8 MWHs annually; and
- *Eielson AFB*, which is testing PV Obstruction Lights.

DON cogeneration systems are capable of off-grid generation and help reduce demand on the electric grid. The following highlights the Navy's contribution to off grid energy generation.

- *Navy Region Southwest, San Diego, CA* generated 1,279 Mwh from its 750kW photovoltaic system.
- *MAGTFTC 29 Palms* completed construction of a 1.1 MW photovoltaic system. It became operational in November 2003. The system generated 720 Mwh in FY04.
- *Naval Base Guantanamo Bay* began constructing a 3.8 MW wind farm, and upgrading their diesel generators with two energy efficient generators totaling 7.2 MW capacity. The wind farm is expected to be operational 3rd quarter FY05.
- *Naval Base Pearl Harbor, HI* awarded a design/build contract for a 300kW photovoltaic generating system that will be operational in 4th quarter FY05.

In addition, DON is validating the performance and cost of Proton Exchange Membrane (PEM) fuel cells power plants in combined heat and power applications. Although PEM technology has made progress toward viable commercial products, there are still substantial durability, reliability, and availability issues that remain (e.g., due to hydrogen processing techniques, the PEM fuel stack becomes contaminated and can fail with as little as 6 months of continuous operation). Installation of twenty 5kW PEM fuel cells started in JUN 2004. The \$2.1M contract fully covers design, construction, commissioning, O&M, repairs, performance monitoring, decommissioning, and site restoration. The following installations are hosting the fuel cell demonstrations:

- Naval Support Unit Saratoga Springs, NY (8 power plants)
- Naval Base Coronado, San Diego, CA (5 power plants)
- Submarine Base Point Loma, San Diego, CA (3 power plants)
- Naval Air Weapons Station, China Lake, CA (1 power plant)
- Naval Base Ventura County, CA (2 power plants)
- Public Works Center, Pearl Harbor, HI (1 power plants)

Seventeen of the plants were installed and operational as of September 2004. The Naval Base Ventura County and Public Works Center, Pearl Harbor sites are scheduled to be operational in the first quarter of FY 2005. All the fuel cells extract hydrogen from natural gas except for the plant at Pearl Harbor that processes propane. The intent of the demonstration is to assess the performance, operations, maintenance, and repair requirements of the PEM fuel cells. The fuel cell power plants will operate for one year under this program.

DON installed a 20 kW “wave power buoy” at MCAS Kaneohe Bay, HI. The pilot project, a Phase 3 Small Business Integrated Research (SBIR) project, will demonstrate the capability of harnessing wave power to drive an off shore generator and transmit the power on shore where it can be fed to the base grid. The buoy became operational in FY04, but there were problems with shock absorption and re-design became necessary. The re-designed buoy will be installed in FY 2005.

A DON sponsored Phase I SBIR project completed modeling of the performance of Ocean Thermal Energy Conversion (OTEC) at various island sites. The economics for OTEC appear

favorable at Naval Support Facility, Diego Garcia. Site-specific data on weather, ocean and wave currents, and seafloor mapping will be collected and the contractor will produce a preliminary design in FY 2005.

K. Electrical Load Reduction Measures

Each of the DoD Components responded to the President's Memorandum of May 3, 2001 and reduced its summer peak demand in the Western United States. In FY 2004, the Services installed non-renewable distributed generation technologies. Below are several examples. Army reduced its summer peak demand in the Western United States.

The Army

In FY 2004, the Army completed assessment reports for Camp Parks, CA; Fort Huachuca, AZ; Sierra Army Depot, CA and Presidio of Monterey, CA. This year, the DOE/FEMP also sponsored *Assessment of Load and Energy Reduction Techniques* (ALERT) audits. ALERT audits were conducted at Fort Benning, GA; Fort Knox, KY and Fort Jackson, SC.

Fort Gordon, GA and Fort Rucker, AL employ diesel generators to manage the peak load at the installations. Redstone Arsenal, AL continued construction on a 3.1 MW Peak Shaving Generator Project. This year, Fort Jackson submitted an Electrical Peak Demand Reduction project for the FY 2006 ECIP program.

The *Battelle-Pacific Northwest Division*, under ODUSD for Installations and Environment (I&E), is assisting US Army installations in developing energy projects to support aggressive energy management programs. These studies are designed to reduce energy demand and consumption cost at selected Army installations under the Western Power Grid Peak Demand and Energy Reduction Program. The studies provide a site-wide assessment of the energy-saving potential at the installation.

National Security Agency

In the event that load reduction is required due to an emergency, NSA will bring its generator plants on-line to provide power to the campus. This would provide a load reduction of approximately 40 MW. It should be noted that due to Agency operating conditions, and on-going maintenance work, this level of load reduction is not guaranteed.

Defense Commissary Agency

DeCA has established the following electrical load reduction procedures:

- *Lighting Measures* - California stores turn off 50% of sales area lighting during load reduction warning periods. All stores with electronic Refrigeration Monitoring and Control Systems (RMCS) turn off 50% of sales area and all display case lighting during non-business hours.

- *Personal Computers and Appliance Measures* - Printers and personal computers not being used as servers are turned off at the end of each business day and on weekends. ENERGY STAR® power down features are activated on most electronic equipment. Personal appliances, such as coffee pots and radios are turned off.
- *DeCA investigates* thermal storage systems or alternative energy sources for air-conditioning.
- *DeCA's installs* motion sensors and separate lighting circuits to allow turning off unneeded lights.

Department of the Navy

DON is validating the performance of energy technologies such as cool roofs, heat pipes, power conditioners, and destratification fans. The results of the demonstrations will be used to guide installations on the life cycle cost benefits of using these technologies to reduce electrical loads. Electrical load reduction measures taken by DON in FY 2004 are shown in the table below.

Department of the Navy: FY 2004 Electrical Load Reduction Measures	
<u>Installation</u>	<u>Project Description</u>
Naval Air Station, Lemoore, CA	Added controls to 250 Hp of air-compressors, put hangars and barracks into "hibernation" while squadrons are on deployment, implemented 1 week early shutdown of boilers base wide and 1 week delay of A/C startup base wide.
Naval Air Facility El Centro, CA	The two flight-line compressors were shut down on weekends and during holidays.
Naval Base Coronado, CA	Implemented Building Tune-up Program on four buildings; reviewed all facility retrofit and construction projects to ensure optimal energy efficiency.
Naval Base Point Loma, CA	Secured three unnecessary chilled water booster pumps. Valved off unused chiller and turned off unneeded circulation in same building.
Naval Weapons Station Seal Beach, CA	Enforced shutdown of air compressors during periods of non-use. Installed twist timers on numerous lighting fixtures in shop areas. Secured lighting in hallways for 80% of the day. Operated heavy machinery in the early morning and late afternoon times.
NAWS China Lake, CA	Raised the thermostat settings on AC units during summer and lower thermostat settings on heaters in winter. Replacing T-12 lamp and magnetic ballasts with T-8 and electronic.
Naval Support Activity, Monterrey CA	Half of security lighting was shut down.
Naval Air Station, Fallon, NV	Work with billeting contractor to make sure all rooms are turned to an energy saving state every time the rooms are in an unoccupied state. Open hangar doors during the day and shut off lights. Turn on cooling units later in the year.

Naval Air Station, Corpus Christi, TX	A 3,000-hp and 5,000-hp whirl tower was not operated during peak demand hours.
Naval Station Mayport, FL.	Replaced airfield lighting with more efficient LED.
NSA Orlando, FL	Ensured proper maintenance of all HVAC and electrical systems. Ensured all computers, monitors, printers, copiers, and fax machines have been set to energy saving modes.
Naval Station Great Lakes, IL	Load shedding and peak shaving.
Naval Support Activity Crane, ID	Installed High Bay Fluorescent Lights
Naval Submarine Base Kings Bay GA	Management of chillers and cooling towers to minimize equipment operation.
Naval Weapons Station Charleston, SC	Replaced A/C filters quarterly, Temperature setbacks implemented during unoccupied hours. Exterior lights off during daylight hours.
Naval Support Activity Portsmouth, NH	Implemented a buyback/replacement program to reduce the number of space heaters and save on electricity.
NAVSEA Warfare Center Division Newport, RI	Installed DDC control systems with shutdowns, setbacks, and economizer cycles. Continued installation of lighting occupancy controls with computer controlled scheduling, operator selectable light levels, and automatic dimming.
NSWCCD, West Bethesda, MD	Purchased "Watt Stopper" power strips with personal sensor to reduce operating hours of portable electric heaters.
NSWCCD-SSES Philadelphia, PA	DDC schedule modifications on AC and lighting systems at multiple buildings. Purchased "Watt Stopper" power strips with personal sensor to reduce operating hours of portable electric heaters.
Naval Forces Japan	COMFLEACT Yokosuka utilized time-of use billing system to shift water tank pump operation to nighttime. At NAF Misawa, common area lighting is turned off when rooms are unoccupied and daylight is used. Space temperatures were set back when spaces were unoccupied. Installation of card key entry/exit system in all rooms at the NAF Atsugi BEQ, controls the lights whenever a tenant/user enters or leaves the room.
US Navy Support Facility, Diego Garcia	Installed solar fixtures in isolated bus stops.
Naval Station Rota, Spain	Installed new AC controls, and retrofit light fixtures. New summer AC policy reduced usage.

Washington Headquarter Services

The WHS *Renovation Program* energy requirements will reduce the electrical demand for the building thus reducing the overall peak load for the building. The Pentagon has diesel-powered

back-up generators for mission critical and life/safety systems. However, there is no allowance in the Pentagon Reservation's air permit to operate for the purpose of reducing peak demand. An effort is made to coordinate the monthly run tests with periods of peak demand when applicable.

FOB #2 has one 2.5 MW building-wide generator which backs up the entire building (as well as several agency-owned downstream generators). The building generator was brought online in FY 2004 is now operating in the automatic mode to back up mission critical loads.

National Geospatial Intelligence Agency (NGA)

This year, NGA's largest facility in St. Louis established electrical load shed plan consisting of using the EMCS to cycle or shed all non-essential loads, such as air handlers serving administrative areas, non-essential lighting and other non- production loads. The continued decrease in both kilowatt-hours and electric demand is attributable to several factors in St Louis. These factors included the following:

- More of the large mainframe computers have been removed.
- All of the motor generator power conditioners have either been removed or taken offline.
- Several air conditioning units serving these areas were removed, the removal reduced of the cooling load.
- Use of the small steam boiler created a decrease in the STL natural gas consumption since March 2004

IV. Data Tables and Inventories

- A. FY 2004 Annual Energy Management Data Report**
- B. Energy Scorecard for FY 2004**
- C. Goals of Executive Order 13123 and NECPA/EPACT**
- D. Industrial and Laboratory Facility Inventory**
- E. Exempt Facilities Inventory**
- F. Exhibit A - Reporting Green Energy Purchases**

Appendix A: FY 2004 Annual Energy Management Data Report

Appendix B: Energy Scorecard for FY 2004

Appendix C: Goals of Executive Order 12123 and NEPA/EPACT

Goals of Executive Order 13123 and NECPA/EPACT		
Category	Goal	Comments
Greenhouse Gas Emissions	30% reduction by 2010	Base year is 1990. DOE will calculate agencies' progress toward this goal and report it on agencies' annual energy scorecards
Energy Efficiency		
Standard Buildings	30% improvement by 2005	Base year is 1985
	35% improvement by 2010	
Industrial and Laboratory Facilities	20% improvement by 2005	Base year is 1990
	25% improvement by 2010	
Exempt Facilities	N/A	Despite lack of quantitative goal, agencies should implement strategies to improve energy efficiency at these facilities.
Renewable Energy	Implement renewable energy projects	Installation of Federal solar energy systems will help support the Million Solar Roofs initiative
	Purchase electricity from renewable energy sources	
	Install 2,000 solar energy systems at Federal facilities by 2000	
	Install 20,000 solar energy systems at Federal facilities by 2010	
Petroleum	Reduce petroleum use	Switches to alternative energy sources should be life-cycle cost effective
Source Energy	Reduce use of source energy	Accomplish by undertaking projects that are life-cycle cost effective
Water Conservation	Reduce water consumption*	Accomplish via life-cycle cost effective measures, energy-savings performance contracts, or other financing mechanism
NECPA/EPACT		
Energy Efficiency	20% improvement by 2000	Base year is 1985
Financing	Undertake all energy efficiency improvement projects that have a simple payback period of 10 years or less by 2005	E.O. 13123 expands this goal by mandating that any energy efficiency project that is life-cycle cost effective be undertaken
Audits	Conduct audits for energy efficiency on 10% of facilities annually	E.O. 13123 includes language supporting this goal
* FEMP has established water efficiency improvement goals as directed by the Executive Order. Agencies must implement Water Management Plans and Best Management Practices according to the following schedule:		
	05% of facilities by 2002	
	15% of facilities by 2004	
	30% of facilities by 2006	
	50% of facilities by 2008	
	80% of facilities by 2010	
For more detail, see the FEMP guidance document Water Efficiency Improvement Goal for Federal Agencies.		

Appendix D: List of Industrial and Laboratory Facilities

The following buildings and facilities were classified as process buildings

Army Industrial and Laboratory Facilities:

- *Anniston Army Ammunition Plant, TN*
- *Radford Army Ammunition Plant, Radford VA*
- *AAFES Food Processing Plant, Grünstadt, Germany*

Air Force Industrial and Laboratory Facilities:

- *Hill AFB, UT*
- *Tinker AFB, OK*
- *Robins AFB, GA*
- *Arnold AFB, TN*

Navy Industrial and Laboratory Facilities:

WV ABL MINERAL CO	LANTORDCOM DET EARLE COLTS NECK NJ
NSY PORTSMOUTH NH	NAVWPNSTA SEAL BEACH CA
LANTORDCOM YORKTOWN VA	NSWC DET WHITE SANDS NM
NSWC DIV CRANE IN	NAVSURFWARCEN DET BAYVIEW ID
NAVSURFWARCEN CARDEROCKDIV BETHESDA MD	FISC YOKOSUKA JA
NSWC DIV INDIAN HEAD MD	NAVSURFWARCEN DET DANIA FL
NSWC DIV DAHLGREN VA	NAVSHIPREPFAC YOKOSUKA JA
NSY NORFOLK VA	NAVSURFWARCENDIV PORT HUENEME CA
NWS YORKTOWN SJC ANNEX	SWFPAC BANGOR WA
FISC NORFOLK VA	NSWC DIV CORONA CA
LANTORDCOM DET CHARLESTON SC	NAVAVNDEPOT JACKSONVILLE FL
NAVSHIPYD PUGET SOUND WA	NAVAVNDEPOT NORTH ISLAND CA
NAVUSEAWARCENDIV KEYPORT WA	NAVAVNDEPOT CHERRY PT NC
NSY PEARL HARBOR HI	NAVSPASURFLDSTA CHULA VISTA CA
NAVWPNSTA SEAL BEACH DET FALLBROOK CA	NAVUNSEAWARCENDIV NEWPORT RI
AFRADBIOBSCHINST BETHESDA MD	UNISERUOFHEASCN BETHESDA MD
NAVMAG INDIAN ISLAND WA	SWFLANT KINGS BAY GA
NSWC PT HUENEME DET SAN DIEGO	FISC JACKSONVILLE FL
TRIREFAC KINGS BAY GA	NUWC NEWPORT NE DETS
SIMA PASCAGOULA MS	USMC BLCMD
NAVSURFWARCEN DET MEMPHIS TN	MCLB BARSTOW CA
INACTSHIPFAC PHILA PA	CG MCLB ALBANY GA

Defense Commissary Industrial Facilities:

<u>LOCATION</u>	<u>CITY</u>	<u>STATE</u>	<u>COUNTRY</u>
ABERDEEN	Baltimore	MD	U.S.A.
ALBANY MCLB	Albany	GA	U.S.A.
ALTUS	Altus	OK	U.S.A.
ANCHORAGE	Anchorage	AK	U.S.A.
ANDERSEN AFB	Yigo	-	Guam
ANDREWS AFB	Camp Springs	MD	U.S.A.
ANNAPOLIS	Annapolis	MD	U.S.A.
ANSBACH	Katterbach	-	Germany
ARDEC	Patterson	NJ	U.S.A.
ARNOLD AFB	Tullahoma	TN	U.S.A.
ASCHAFFENBURG	Aschaffenburg	-	Germany
ATHENS NSCS	Athens	GA	U.S.A.
ATSUGI	Yokohama	-	Japan
AVIANO	Pordenone	-	Italy
BABENHAUSEN	Babenhausen	-	Germany
BAD AIBLING	Bad Aibling	-	Germany
BAD KISSINGEN	Bad Kissengen	-	Germany
BAD NAUHEIM	Bad Nauheim	-	Germany
BAMBERG	Bamberg	-	Germany
BANGOR ANGB	Bangor	ME	U.S.A.
BANGOR NSB	Silverdale	WA	U.S.A.
BARBERS POINT	Pearl City	HI	U.S.A.
BARKSDALE AFB	Bossier City	LA	U.S.A.
BARSTOW MCLB	Barstow	CA	U.S.A.
BAUMHOLDER	Baumholder	-	Germany
BEALE AFB	Marysville	CA	U.S.A.
BITBURG	Bitburg/Trier	-	Germany
BOLLING AFB	Washington	DC	U.S.A.
BREMERTON	Bremerton	WA	U.S.A.
BRUNSWICK NAS	Portland	ME	U.S.A.
BUCKLEY AFB	Aurora	CO	U.S.A.
BUEDINGEN	Buedingen	-	Germany
C. E. KELLY	Pittsburgh	PA	U.S.A.
CAMP CARROLL	Taegu	-	South Korea

CAMP CASEY	Tongduchon	-	South Korea
CAMP COURTNEY	Gushikawa	-	Japan
CAMP FOSTER	Naha	-	Japan
CAMP HOWZE	Munson	-	South Korea
CAMP HUMPHREYS	Pyongtaek	-	South Korea
CAMP KINSER	Naha	-	Japan
CAMP KURE	Hiroshima	-	Japan
CAMP LEJEUNE	Jacksonville	NC	U.S.A.
CAMP MERRILL	Dahlonga	GA	U.S.A.
CAMP PAGE	Taegu	-	South Korea
CAMP PENDLETON	Oceanside	CA	U.S.A.
CAMP RED CLOUD	Uijonbu	-	South Korea
CAMP STANLEY	Uijongbu	-	South Korea
CAMP ZAMA	Tokyo	-	Japan
CANNON AFB	Clovis	NM	U.S.A.
CARLISLE BARRACKS	Carlisle	PA	U.S.A.
CHARLESTON AFB	Charleston	SC	U.S.A.
CHARLESTON NWS	Charleston	SC	U.S.A.
CHERRY POINT	Havelock	NC	U.S.A.
CHIEVRES	Chievres	-	Belgium
CHINA LAKE	Ridgecrest	CA	U.S.A.
CHINHAE NAS	Chinhae	-	South Korea
COLUMBUS AFB	Columbus	MS	U.S.A.
CORPUS CHRISTI	Corpus Christi	TX	U.S.A.
CRANE NWSC	Crane	IN	U.S.A.
DAHLGREN	Fredericksburg	VA	U.S.A.
DARMSTADT	Darmstadt	-	Germany
DAVIS-MONTHAN	Tucson	AZ	U.S.A.
DEXHEIM	Dexheim	-	Germany
DOVER AFB	Dover	DE	U.S.A.
DUGWAY	Dugway	UT	U.S.A.
DYESS AFB	Abilene	TX	U.S.A.
EDWARDS	Rosamond	CA	U.S.A.
EGLIN AFB	Niceville	FL	U.S.A.
EIELSON AFB	Fairbanks	AK	U.S.A.
EL CENTRO	El Centro	CA	U.S.A.
ELLSWORTH AFB	Rapid City	SD	U.S.A.

F. E. WARREN	Cheyenne	WY	U.S.A.
FAIRCHILD	Spokane	WA	U.S.A.
FALLON	Fallon	NV	U.S.A.
FORT BELVOIR	Alexandria	VA	U.S.A.
FORT BENNING	Columbus	GA	U.S.A.
FORT BLISS	El Paso	TX	U.S.A.
FORT BRAGG - NORTH	Fayetteville	NC	U.S.A.
FORT BRAGG SOUTH POST	Fayetteville	NC	U.S.A.
FORT BUCHANAN	San Juan	-	Puerto Rico
FORT CAMPBELL	Clarksville	TN	U.S.A.
FORT CARSON	Colorado Springs	CO	U.S.A.
FORT DETRICK	Frederick	MD	U.S.A.
FORT DRUM	Watertown	NJ	U.S.A.
FORT EUSTIS	Newport News	VA	U.S.A.
FORT GILLEM	Atlanta	GA	U.S.A.
FORT GORDON	Augusta	GA	U.S.A.
FORT GREELY	Delta Junction	AK	U.S.A.
FORT HAMILTON	New York	NY	U.S.A.
FORT HOOD I	Killeen	TX	U.S.A.
FORT HOOD II	Killeen	TX	U.S.A.
FORT HUACHUCA	Sierra Vista	AZ	U.S.A.
FORT HUNTER-LIGGETT	King City	CA	U.S.A.
FORT IRWIN	Fort Irwin	CA	U.S.A.
FORT JACKSON	Columbia	SC	U.S.A.
FORT KNOX	Louisville	KY	U.S.A.
FORT LEAVENWORTH	Leavenworth	KS	U.S.A.
FORT LEE	Petersburg	VA	U.S.A.
FORT LEONARD WOOD	Waynesville	MO	U.S.A.
FORT LEWIS	Tacoma	WA	U.S.A.
FORT MCCOY	La Crosse	WI	U.S.A.
FORT MCPHERSON	Atlanta	GA	U.S.A.
FORT MEADE	Laurel	MD	U.S.A.
FORT MONMOUTH	Eatontown	NJ	U.S.A.
FORT MYER	Arlington	VA	U.S.A.
FORT POLK	Leesville	LA	U.S.A.
FORT RILEY	Junction City	KS	U.S.A.
FORT RUCKER	Daleville	AL	U.S.A.

FORT SAM HOUSTON	San Antonio	TX	U.S.A.
FORT SILL	Lawton	OK	U.S.A.
FORT STEWART	Hinesville	GA	U.S.A.
FORT WAINWRIGHT	Fairbanks	AK	U.S.A.
GARMISCH	Garmisch	-	Germany
GELNHAUSEN	Gelnhausen	-	Germany
GIEBELSTADT	Giebelstadt	-	Germany
GIESSEN	Giessen	-	Germany
GOODFELLOW	San Angelo	TX	U.S.A.
GRAFENWOEHR	Grafenwoehr	-	Germany
GRAND FORKS AFB	Grand Forks	ND	U.S.A.
GREAT LAKES NTC	Waukegan	IL	U.S.A.
GRICIGNANO	Grigignano	-	Italy
GULFPORT NCBC	Gulfport	MS	U.S.A.
GUNTER AFB	Montgomery	AL	U.S.A.
HANAU	Hanau	-	Germany
HANNAM VILLAGE	Seoul	-	South Korea
HANSCOM	Bedford	MA	U.S.A.
HARIO HOUSING	Hario	-	Japan
HARRISON VILLAGE	Indianapolis	IN	U.S.A.
HEIDELBERG	Heidelberg	-	Germany
HICKAM AFB	Honolulu	HI	U.S.A.
HILL AFB	Ogden	UT	U.S.A.
HOHENFELS	Hohenfels	-	Germany
HOLLOMAN AFB	Alamogordo	NM	U.S.A.
HUNTER AAF	Savannah	GA	U.S.A.
HURLBURT FIELD	Fort Walton Beach	FL	U.S.A.
IDAR OBERSTEIN	Idar Oberstein	-	Germany
ILLESHEIM	Illesheim	-	Germany
IMPERIAL BEACH	Imperial Beach	CA	U.S.A.
INCIRLIK	Incirlik	-	Turkey
IWAKUNI MCAS	Iwakuni	-	Japan
IZMIR	Izmir	-	Turkey
JACKSONVILLE	Jacksonville	FL	U.S.A.
KADENA AFB	Naha	-	Japan
KANEOHE BAY	Kaneohe Bay	HI	U.S.A.
KEESLER AFB	Biloxi	MS	U.S.A.

KEFLAVIK	Keflavik	-	Iceland
KELLEY BARRACKS	Stuttgart	-	Germany
KEY WEST NAS	Key West	FL	U.S.A.
KINGS BAY NSB	St. Marys	GA	U.S.A.
KINGSVILLE	Kingsville	TX	U.S.A.
KIRTLAND AFB	Albuquerque	NM	U.S.A.
KITZINGEN	Kitzingen	-	Germany
KUNSAN AFB	Kunsan City	-	South Korea
LACKLAND AFB	San Antonio	TX	U.S.A.
LAJES FIELD	Terceira Island	-	Azores
LAKEHURST	Toms River	NJ	U.S.A.
LANGLEY AFB	Hampton	VA	U.S.A.
LAUGHLIN AFB	San Antonio	TX	U.S.A.
LEMOORE	Fresno	CA	U.S.A.
LITTLE CREEK NAB	Virginia Beach	VA	U.S.A.
LITTLE ROCK AFB	Jacksonville	AR	U.S.A.
LIVORNO	Pisa	-	Italy
LOS ANGELES AFB	Los Angeles	CA	U.S.A.
LUKE AFB	Phoenix	AZ	U.S.A.
MACDILL AFB	Tampa	FL	U.S.A.
MALMSTROM AFB	Great Falls	MT	U.S.A.
MANNHEIM	Mannheim	-	Germany
MARCH AFB	Riverside	CA	U.S.A.
MAXWELL AFB	Montgomery	AL	U.S.A.
MAYPORT NS	Atlantic Beach	FL	U.S.A.
MC CULLY BARRACKS	Wackenheim	-	Germany
MCCHORD AFB	Tacoma	WA	U.S.A.
MCCLELLAN AFB	North Highlands	CA	U.S.A.
MCCONNELL AFB	Wichita	KS	U.S.A.
MCGUIRE AFB	Wrighttown	NJ	U.S.A.
MEMPHIS NAS	Memphis	TN	U.S.A.
MERIDIAN NAS	Meridian	MS	U.S.A.
MINOT AFB	Minot	ND	U.S.A.
MIRAMAR NAS	San Diego	CA	U.S.A.
MISAWA AFB	Misawa	-	Japan
MITCHEL FIELD	Garden City	NY	U.S.A.
MOFFETT FIELD	Mountain View	CA	U.S.A.

MOODY AFB	Valdosta	GA	U.S.A.
MOUNTAIN HOME AFB	Mountain Home	ID	U.S.A.
NAPLES	Naples	-	Italy
NELLIS AFB	Las Vegas	NV	U.S.A.
NEUBRUECKE	Neubreucke	-	Germany
NEW LONDON	Groton	CT	U.S.A.
NEW ORLEANS NSA	New Orleans	LA	U.S.A.
NEW RIVER MCAS	Jacksonville	NC	U.S.A.
NEWPORT	Newport	RI	U.S.A.
NORFOLK NB	Norfolk	VA	U.S.A.
NORTH ISLAND	San Diego	CA	U.S.A.
OCEANA NAS	Virginia Beach	VA	U.S.A.
OFFUTT AFB	Bellevue	NE	U.S.A.
ORD COMMUNITY	Monterey	CA	U.S.A.
OROTE (GUAM)	Agat	-	Guam
OSAN AFB	Osan	-	South Korea
PANZER BARRACKS	Boeblingen	-	Germany
PARRIS ISLAND	Beaufort	SC	U.S.A.
PATCH BARRACKS	Stuttgart	-	Germany
PATRICK AFB	Cocoa Beach	FL	U.S.A.
PATUXENT RIVER	Lexington Park	MD	U.S.A.
PEARL HARBOR	Honolulu	HI	U.S.A.
PENSACOLA	Pensacola	FL	U.S.A.
PETERSON	Colorado Springs	CO	U.S.A.
PORT HUENEME	Port Hueneme	CA	U.S.A.
PORTSMOUTH NAS	Portsmouth	NH	U.S.A.
PORTSMOUTH NNSY	Portsmouth	VA	U.S.A.
PUSAN	Pusan	-	South Korea
QUANTICO	Woodbridge	VA	U.S.A.
RAF ALCONBURY	Peterborough	-	England
RAF CROUGHTON	Bichester	-	England
RAF FAIRFORD	Fairford	-	England
RAF LAKENHEATH	St. Edmunds	-	England
RAF MENWITH HILL	Harrogate	-	England
RAF MILDENHALL	Newmarket	-	England
RAMSTEIN AFB	Ramstein	-	Germany
RANDOLPH AFB	San Antonio	TX	U.S.A.

REDSTONE ARSENAL	Huntsville	AL	U.S.A.
RHEIN MAIN AB	Frankfurt	-	Germany
ROBINS AFB	Macon	GA	U.S.A.
ROCK ISLAND AR.	Rock Island	IL	U.S.A.
ROTA	Jerez	-	Spain
SAGAMI DEPOT	Tokyo	-	Japan
SAGAMIHARA	Tokyo	-	Japan
SAN DIEGO NS	San Diego	CA	U.S.A.
SAN ONOFRE	San Clemente	CA	U.S.A.
SASEBO	Sasebo	-	Japan
SCHINNEN	Heerlen	-	Netherlands
SCHOFIELD BARRACKS	Wahiawa	HI	U.S.A.
SCHWEINFURT	Schweinfurt	-	Germany
SCOTIA	Schenectady	NY	U.S.A.
SCOTT AFB	Belleville	IL	U.S.A.
SELFRIE ANG	Mt Clemens	MI	U.S.A.
SEMBACH	Kaiserslautern	-	Germany
SEYMOUR JOHNSON	Goldsboro	NC	U.S.A.
SHAW AFB	Sumter	SC	U.S.A.
SHEPPARD AFB	Wichita Falls	TX	U.S.A.
SIGONELLA	Catania	-	Sicily
SMOKEY POINT NS	Marysville	WA	U.S.A.
SPANGDAHLEM	Bitburg	-	Germany
SUGAR GROVE NSGA	Sugar Grove	VA	U.S.A.
TAEGU	Taegu	-	South Korea
TINKER AFB	Oklahoma City	OK	U.S.A.
TOBYHANNA	Scranton	PA	U.S.A.
TRAVIS AFB	Fairfield	CA	U.S.A.
TWENTYNINE PALMS	Twentynine Palms	CA	U.S.A.
TYNDALL AFB	Panama City	FL	U.S.A.
USAF ACADEMY	Colorado Springs	CO	U.S.A.
VANCE AFB	Enid	OK	U.S.A.
VANDENBERG AFB	Lompoc	CA	U.S.A.
VICENZA	Vicenza	-	Italy
VILSECK	Vilseck	-	Germany
VOGELWEH	Kaiserslautern	-	Germany
WALTER REED	Washington	DC	U.S.A.

WEST POINT	Highland Falls	NY	U.S.A.
WHIDBEY ISLAND NAS	Oak Harbor	WA	U.S.A.
WHITE SANDS MR	Las Cruces	NM	U.S.A.
WHITEMAN AFB	Knob Noster	MO	U.S.A.
WHITING FIELD	Pensacola	FL	U.S.A.
WIESBADEN	Wiesbaden	-	Germany
WRIGHT-PATTERSON	Dayton	OH	U.S.A.
WUERZBURG	Wuerzburg	-	Germany
YOKOSUKA NESC	Yokosuka	-	Japan
YOKOTA AB	Tokyo	-	Japan
YONGSAN	Seoul	-	South Korea
YUMA MCAS	Yuma	AZ	U.S.A.
YUMA PG	Yuma	AZ	U.S.A.

Appendix E: List of Exempt Facilities

Facility/ Function	Location	Facility/ Function	Location
Cold Iron	SUBASE NEW LONDON CT	Simulator	WPNSTA CHARLESTON SC
Cold Iron	NSY NORFOLK VA	Simulator	NAS PENSACOLA FL
Cold Iron	PWC NORFOLK VA	Simulator	NAS JACKSONVILLE FL
Cold Iron	WPNSTA CHARLESTON SC	Simulator	NAS DALLAS TX
Cold Iron	NAS PENSACOLA FL	Simulator	NAS KINGSVILLE TX
Cold Iron	NAS KEY WEST FL	Simulator	NAS LEMOORE CA
Cold Iron	NAVSTA ROOSEVELT ROADS PR	Simulator	NSWC DIV PT HUENEME CA
Cold Iron	SUBASE KINGS BAY GA	Simulator	MCAS MIRAMAR CA
Cold Iron	NAVSTA MAYPORT FL	Transmitter	NAS JACKSONVILLE FL
Cold Iron	WPNSTA EARLE COLTS NECK NJ	Transmitter	NAVSECGRUACT WINTER HARBOR ME
Cold Iron	NAVSTA GUANTANAMO CUBA	Transmitter	RADTRANF ANNAPOLIS MD
Cold Iron	NSWC COASTSYSTA PANAMA CITY FL	Transmitter	NAVRADTRANFAC SADDLEBUNCH KEYS
Cold Iron	NAVPHIBASE LITTLE CREEK VA	Transmitter	NAVCOMMSTA JACKSONVILLE FL
Cold Iron	NETC NEWPORT RI	Transmitter	NAVRADSTA /T/ JIM CREEK WA
Cold Iron	NAVSTA ROTA SP	Private Party	NAS DALLAS TX
Cold Iron	NAVSTA PASCAGOULA	Private Party	NAVCOMMU WASHINGTON DC
Cold Iron	NAVSTA INGLESIDE TX	Private Party	NAF EL CENTRO CA
Cold Iron	NUSC NEW LONDON LABORATORY	Private Party	NSWC COASTSYSTA PANAMA CITY FL
Cold Iron	NAVBASE SAN DIEGO CA	Private Party	COMFLEACT YOKOSUKA JA
Cold Iron	NAVBASE CORONADO SAN DIEGO CA	Private Party	NAVOBSY WASHINGTON DC
Cold Iron	NSY PUGET SOUND BREMERTON WA	Private Party	NAF ATSUGI JA
Cold Iron	NSY PEARL HARBOR HI	Private Party	CBC PORT HUENEME CA
Cold Iron	SUBASE PEARL HARBOR HI	Private Party	CBC GULFPORT MS
Cold Iron	FLEASWTRACENPAC SAN DIEGO CA	Private Party	MCAS IWAKUNI JA
Cold Iron	FLEET ACTIVITIES CHINHAE SK	Private Party	PWC PEARL HARBOR HI
Cold Iron	COMFLEACT YOKOSUKA JA	Private Party	NAVSTA ROTA SP
Cold Iron	COMNAVMAR GUAM GQ	Private Party	NAS KEFLAVIK IC
Cold Iron	NAVBASE VENTURA, PORT HUENEME CA	Private Party	NAVCOMMSTA KEFLAVIK IC
Cold Iron	COMFLEACT SASEBO JA	Private Party	HDQTRS 4TH MARDIV NEW ORLEANS
Cold Iron	PWC PEARL HARBOR HI	Private Party	NAVSTA PASCAGOULA MS
Cold Iron	NAVSTA PEARL HARBOR HI	Cold Iron	NAVRESREDCOMNW SEATTLE WA
Cold Iron	SUBASE SAN DIEGO CA	Cold Iron	SUBASE BANGOR WA
Cold Iron	NAVSTA EVERETT WA		

Appendix F: Exhibit A - Reporting Green Energy Purchases