DEPARTMENT OF DEFENSE
FISCAL YEAR 2001 ANNUAL ENERGY MANAGEMENT REPORT

Executive Summary of Energy Efficiency Progress

Despite experiencing more severe weather and substantial escalation in natural gas prices in Fiscal Year (FY) 2002 resulting in use of less efficient alternative fuels, the Department of Defense (DoD) is still on track to meet the goals of the Energy Policy Act and Executive Order (EO) 13123, as demonstrated by our achievement of a 23 percent decrease in standard building and facility energy consumption on a British Thermal Units (Btu) per gross square foot (GSF) basis compared to the FY 1985 baseline. In Fiscal Year (FY) 2001, DoD consumed 211.5 trillion Btu (TBtu) in its buildings and facilities. This is a 0.2 percent reduction in consumption per gross square feet from the previous year.

In FY 2001, DoD's industrial and laboratory facilities consumed 28.65 TBtu. These energy intensive facilities have reduced consumption per gross square feet by 20.34 percent since the FY 1990 baseline year. Although this was an increase of 4.9 percent from FY 2000, DoD has already reached the FY 2005 goal of EO 13123 and is well on track for meeting the FY 2010 goal of a 25 percent reduction.

The DoD Energy Program initiatives include facility equipment retrofits (particularly using private capital), energy awareness efforts, energy manager training, audit programs, procuring energy efficient products and the use of sustainable design in new construction. Other contributing factors include integrated energy planning, source energy considerations when fuel switching, taking maximum advantage of electrical market transformation, enhanced use of renewable energy and demonstration of innovative technologies.

DoD leads the Federal Government with approximately 2.2 billion square feet of facilities. The annual energy bill for military installations exceeds $2.4 billion. Additionally, DoD purchased $4.02 billion worth of mobility fuels in FY 2001 —mostly diesel and jet fuel. Although significant progress has been made in reducing overall energy consumption, electricity use continues to increase because of a growth in electronic equipment, air conditioning and automation requirements.

I. Management and Administration

Energy management at DoD installations is focused on improving efficiency, eliminating waste, and enhancing the quality of life while meeting mission requirements. Accomplishing these objectives will reduce costs and ensure that the program goals are achieved.

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

B. Management Tools

1. Awards (Employee Incentive Programs)

Energy conservation awards are presented to individuals, organizations, and installations in recognition of their energy-savings efforts. In addition to recognition, these awards provide the motivation for continued energy-reduction achievements. In October 2001, the Department of the Navy (DoN) held its FY 2001 annual Secretary of the Navy awards ceremony in Washington, DC, hosted by the Assistant Secretary of the Navy for Installations and Environment. Eight awards were presented to Navy and Marine Corps winners in the categories of facilities, ships, and air squadrons. In August 2001, Active Army, U.S. Army Reserve, and Army National Guard commands were presented with Secretary of the Army's Energy and Water Management Awards for FY 2000 accomplishments in energy management. Air Force major commands have annual energy award programs that distribute funds to their base winners. The Services also participate in the Department of Energy (DoE) Federal Energy and Water Management Awards Program. For FY 2001, DoD received twenty-six awards [Army (6), DoN (16), and Air Force (4)]. In addition to DoE and Service energy award

programs, the White House recognized the Department of the Navy with two of four Presidential Energy Awards for Federal Energy Management, and the General Services Administration (GSA) Achievement Award for Real Property Innovation was presented to the Army's Sustainable Design and Development policy initiative. Energy User News recognized Tobyhanna Army Depot for "Retrofit Project of the Year" and "Energy Manager of the Year" during the World Energy Engineering Congress in Atlanta, GA in October 2001. Additionally, the Defense Commissary Agency (DeCA), the National Imagery and Mapping Agency (NIMA), Washington Headquarters Service (WHS), and the National Security Agency (NSA) incorporate on-the-spot awards and incentive awards to recognize exceptional performance and participation in the energy management 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. To ensure the inclusion of management provisions, action items are established in the DoN shore energy plan, while the Army conducts scheduled assistance visits to installations.

3. Training and Education

Awareness and training programs are a critical part of DoD's efforts to achieve and sustain energy-efficient operations at the installation level. In FY 2001, a total of 2,676 personnel were trained through either commercially available or in-house-generated technical courses, seminars, conferences, software, videos, and certifications. The U.S. Army Logistics Integration Agency (USALIA), Civil Engineer Corps Officer School (CECOS), Air Force Institute of Technology (AFIT) Civil Engineering School, Air Force Civil Engineer Support Agency (AFCESA), and DeCA sponsored in-house courses, workshops and seminars. Certified Energy Managers (CEM) training was provided by Association Energy Engineers (AEE) instructors. The Services held installation energy management conferences and DoD personnel attended the Energy 2001 Workshop in Kansas City, Missouri. DoD was a co-sponsor of Energy 2001, with WHS being an active participant in the planning committees for both Energy 2001 and Energy 2002 (content creation, speaker and vendor recruitment and presentation arrangements). The Components utilized CDs, Internet homepages, newsletters, emails of success stories, satellite downlinks and videos to enhance their energy awareness programs.

DoD has an active program to identify and procure energy-efficient products, specifically through the Defense Logistics Agency (DLA). DLA and GSA product catalogs are widely used, as well as the Construction Criteria Base (available on CD-ROM and the Internet).

4. Showcase Facilities

DoD continues to be a leader in DoE-designated showcase facilities demonstrating new and innovative energy saving technologies. Continuing showcase facilities include:

- *United States Naval Academy, Annapolis, MD*, features a variety of administrative, dormitory, athletic, and family housing facilities. These facilities incorporate a 200 kilowatt (kW) fuel cell, a compressed natural gas (CNG) fueling station and CNG vehicles, high efficiency chillers, lighting, steam traps, and low flow showerheads and faucets. Training for operations and maintenance personnel was also conducted.

- *Naval Base Ventura County, Port Hueneme, CA*, includes a variety of administrative and family housing facilities. The public works department's office building utilizes day-lighting features such as light shelves and photosensitive dimmable fixtures, energy efficient lighting, motors and variable speed drives, Heating, Ventilation and Air Conditioning (HVAC) heat recovery, digital controls, solar hot water and photovoltaics, and rain water recovery. A self guided audio tour, web page kiosk, and informative posters make this facility a learning and evaluation center, as well as a working administration facility. Other technologies include a 200kW fuel cell, lighting, motors, variable speed drives, HVAC controls, family housing whole house upgrades (including lighting and appliances), de-centralized heating systems, compressed natural gas and electric vehicles and fueling stations.

- *Hill AFB, UT*, has an administration facility incorporating lighting (T-8s with electronic ballasts, compact fluorescent lamps and LED exit lights) and an upgraded HVAC system with Direct Digital Controls (DDC) and new low kW/ton chillers.

The following locations have been identified as potential candidates for new showcase recognition:

- *Bldg 33, Washington Navy Yard, Washington, DC*, is a historic administration building incorporating sustainable design and development.
- *Naval Base Coronado, San Clemente Island, CA*, features 675 kW wind turbine.
- *Bachelor Officers Quarters, Great Lakes, IL*, includes high levels of insulation in the roof, walls and slab perimeter, high-performance windows, high-efficiency electric lighting, utilization of existing steam system for heating, a DDC control system with setback, variable speed drive motors, dual level switching on lights, and energy-efficient transformers.
- *Navy Region Southwest, San Diego, CA*, a 750 kW photovoltaic array will cover the roof of a parking garage and will be one of the largest photovoltaic systems in the United States.
- *Commissary, Twentynine Palms MCA, CA*, includes water source heat pumps and water-cooled refrigeration compressor systems. The same water source will be used on the heat pumps and the refrigeration systems. The design will also incorporate solar technology in use of skylights in staging/receiving and sales areas and insulated, translucent wall glazing.
- *Commissary, Grand Forks AFB, ND*, features commercial heat pump technology.
- *Roberdeau Hall, NIMA, Bethesda. MD*, renovation will replace antiquated steam traps and utilize energy efficient lighting, room occupancy sensors, and low-flow toilets.

II. Energy Efficiency Performance

A. Energy Reduction Performance

1. Standard Buildings

DoD's sustained progress toward the energy reduction goals was impeded by severe weather and substantial escalation in natural gas prices resulting in use of less efficient alternative fuels. In FY 2001, DoD's standard building energy consumption was 105,034 Btu/GSF, a 23.04 percent reduction in energy consumption as compared to the FY 1985 baseline of 136,476 Btu/GSF. This percent reduction while only 0.2 percent below the 105,243 Btu/GSF in FY 2000, still keeps us on track to meet the President's goal of 35 percent reduction by FY 2010.

2. Industrial and Laboratory Facilities

The newly added category of industrial, laboratory, research and energy intensive facilities consumption was 169,945 Btu/GSF in FY 2001, a 20.34 percent reduction as compared to the 1990 baseline of 213,349 Btu/GSF. While this was an increase of 4.9 percent as compared to the FY 2000 energy consumption of 162,005 Btu/GSF, DoD has already surpassed the FY 2005 goal set by EO 13123 and has achieved 81 percent of FY 2010 goal. Severe weather, substantial escalation in natural gas prices, and closing of two industrial bases (Kelly AFB and McClellan AFB) in FY 2001 attributed to the lost ground on reducing consumption in this category

Because the relationship between energy consumption and production is generally non-linear, making it difficult to establish a consistent baseline with which to compare progress, DoD has decided to use energy usage per gross square foot as the performance measure for the industrial and laboratory facility category. Additionally, to simplify data collection, and the associated metering and reporting costs, DoD considers an entire base an industrial facility if 60 percent or more of the base-wide energy use is for industrial purposes. A list of industrial bases is provided in part IV, D.

3. Exempt Facilities

DoN is the only component in DoD to list facilities classified as exempt. DoN exempts mission critical, concentrated energy use transmitters, simulators, cold iron support to ships, and some private party facilities. These are non-production-oriented facilities with little or no square footage, making conventional performance measures meaningless. The mission criticality of these end users is such that energy efficiency measures are evaluated on a case-by-case basis. A complete list of exempt facilities is provided in part IV, E.

4. Tactical Vehicle and Equipment Fuel Use

Total tactical vehicle fuel usage was 524,969 billion Btu (BBtu) in FY 2001, increasing 1.7 percent from FY 2000. The increase usage is attributed to mission surges increasing jet fuel consumption (3.2 percent from FY 2000), despite reductions in automobile gasoline (24.2 percent from FY 2000) and diesel-distillate (3.3 percent from FY2000) through improved fuel efficiency of equipment and energy conserving operating procedures. New missions and surges in operations will continue to drive jet and motor vehicle fuel consumption. These factors are not considered in meeting the petroleum reduction goals of E.O. 13149 "Greening the Government Through Federal Fleet and Transportation Efficiency." However, DoD continues to make steady progress towards meeting the requirements of EO 13149, despite obstacles such as the availability of suitable alternative fuel vehicles (AFV) models and the availability of adequate alternative fuel infrastructure.

The Army issued an AFV policy and developed a power and energy strategy. There strategy establishes goals and policy for tactical vehicles, establishes policy framework, provides a means to measure improvement, and recommends activities to better synchronize investment, acquisition, sustainment, and disposal based upon energy implications. The Air Force's strategy relies on expanding use of biodiesel fuel (B20) and flex-fuel (E-85) capable vehicles. Auto manufacturers are projecting to produce new E-85 flex-fuel vehicles in quantity and at reasonable cost. In FY 2001, *Scott Air Force Base, Il*, began testing biodiesel as their primary vehicle diesel fuel option with promising results. Additionally, the Air Force is currently working with GSA and the Defense Energy Support Center (DESC) to make B20 the primary diesel fuel used in their operated vehicles (leased or purchased) at bases worldwide when it is available.

B. Renewable Energy

DoD plans to install renewable energy technologies and purchase electricity from renewable sources when life-cycle cost-effective. Since DoD policy is to privatize utility systems whenever economical, power generation systems will generally be contractor-owned or located at remote, grid independent sites.

1. Self-Generated Renewable Energy

As these technologies have become more cost-effective, DoD has integrated photovoltaic power systems, solar water heating systems, and transpired solar collectors (solar walls) into its facilities. Self-generated power is often coupled with ground-source heat pumps, solar water heating systems and photovoltaic arrays to generate electricity at isolated locations, 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 is developing portable photovoltaic (PV) technology to serve as the primary power source of a Battalion size Tactical Operations Center.

In FY 2001, the Army funded the installation of 10 kW wind turbines at *Fort*

Huachuca, AZ, and at the *Headquarters, Arizona National Guard.* Projects installed include solar domestic hot water heaters for barracks, heads and mess halls at *Hale Moku Pearl Harbor, HI* (2.62 BBtu/yr); *Hokulani Pearl Harbor, HI* (1.58 BBtu/yr); *Pearl City, Hi* (1.78 BBtu/yr); and *MCLB 29 Palms, CA* (1.96 BBtu/yr). Geothermal heat pumps were installed at *MCAS Beaufort, SC* (91.03 BBtu/yr); *NTTC Corry Station, FL* (12.00 BBtu/yr); and *NAS Pensacola, FL* (0.09 BBtu/yr). Solar photovoltaics were installed at *RAF Mildenhall, UK* to power remote oil interceptor alarm indicators; *Altus AFB, OK* to power remote radio equipment and windsock illumination (409kWh/yr); and *Hickam AFB, HI* to power exterior lights (3,650 kWh/yr).

Photovoltaic technology was utilized on the Boat House's solar roof at *Ford Island, HI* (0.02 BBtu/yr) and for the outdoor warning system at *Goodfellow AFB, TX* (56 kWh/yr). The *Pentagon Heating and Refrigeration Plant Complex* operates a 30-kW photovoltaic array (58,600 kWh/yr).

2. Purchase of Renewable Energy

Since renewable sources of electricity generation generally have higher capital equipment costs, they usually do not compete well with the conventional utility supplier of electricity. Renewable purchases are further complicated with the passage of California bill AB1X, restricting open access in purchasing to only the local utility. Pending further guidelines, this bill has effectively placed future purchases of renewable power by installation in the west on hold. Despite these barriers, the Armed Services have made significant progress in the purchase of renewable energy generated from solar, wind, geothermal, and biomass sources when cost-effective. For example, in FY 2001, the Army purchased 65,367 megawatt-hours (MWh) of electrical power generated from renewable sources and DoN purchased 155,381 MWh of renewable electricity and 1,262,597 BBtu of renewable thermal energy. Within DoN, *Portsmouth Naval Shipyard, VA*, purchases electricity and steam from a privatized waste to energy plant, while *Naval Air Station, Keflavik, Iceland* purchases hot water from geothermal wells, and electricity from hydroelectric plants (Iceland considers hydroelectric as renewable). The Air Force purchased a total of 17,724 MWh of renewable energy, with *Hanscom AFB, MA* and *Edwards AFB, CA* purchasing 2,400 MWh and 12,100 MWh, respectively.

3. Million Solar Roofs (MSR)

DoD is committed to the MSR initiative and continues to emphasize 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, are already being implemented in a variety of building types and new facility construction. DoD anticipates more growth in the implementation of renewable energy and active solar technologies due to the availability of DoE's technology-specific energy savings performance contracts (ESPC). In addition, active solar heating applications have been expanded to include maintenance facility solar walls, swimming pool heating, and hot water heating in family housing. The Army has approximately 3,100 "solar roofs" in use at its installations, and has requested assistance from the Department of Energy's Sandia National Laboratory to bring existing inoperable photovoltaic systems back to operational status.

C. Petroleum

Petroleum-based fuel use in facilities has decreased 59 percent from the FY 1985 baseline. Facility consumption was 101.4 TBtu in FY 1985 (Buildings/Facilities and Excluded Buildings/Industrial/) and 41.8 TBtu in FY 2001 (Standard Buildings/Facilities, Industrial/Laboratory/Research/Other Energy-Intensive Facilities, and Exempt Facilities). Reductions were accomplished primarily through fuel switching (to natural gas), tune-ups, steam trap replacements and improved controls in boiler plants. A significant factor in this reduction was Defense Energy Support Center's (DESC) Natural Gas Competitive Procurement Program. The objective of this program is to obtain cost-effective supply of natural gas for DoD installations while maintaining supply reliability, thereby assisting the Components to minimize their reliance on petroleum products. In FY 2001, DESC competitively procured 48.5 TBtu of natural gas for the 180 DoD installations that participated in the program (approximately 62% of the DoD total annual natural gas consumption) and achieved over $13.9 million in cost avoidance. Cost avoidance was considerably less in FY 2001 compared to FY 2000 due to exceptionally high gas market prizes, resulting in decreased natural gas consumption, and causing significant increase in petroleum usage. As natural gas prices rose during the winter 2000, installations switched from using natural gas to fuel oil in central boiler plants. The switching to fuel oil helped buffer the installation's heating costs and freed up natural gas supplies for usage by residential consumers. Fuel oil use in facilities increased 6.6 TBtu compared to FY00, while natural gas consumption decreased 1.9 TBtu. The net increase of 4.7 TBtu in the combined fuel oil and natural gas consumption was a result of a colder and longer winter heating season.

D. Water Conservation

In FY 2001, DoD consumed 206,837 million gallons of potable water and spent $330.9 million on water related services. The Services are striving to increase water conservation awareness and reduce its water use—particularly where tight water supplies may potentially impact mission accomplishment and personnel morale. Although DoD water use has decreased steadily, the costs associated with its use have not come down proportionately, due to an increase in the unit cost of water in many regions. 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. Additionally, some installations that purchase their water are increasingly likely to be on rate schedules designed to encourage conservation, such as increasing block rates or summer peak-demand charges. Thus, water conservation efforts, in addition to being environmentally responsible, can help installations stretch dwindling Operation and Maintenance (O&M) dollars. For instance, the Marine Corps audited two installations for water projects. Since 1997, these audits have identified and fixed over 486 million gal in water leaks, and projects totaling $15M were identified.

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.

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.

A. Life-Cycle Cost Analysis

DoD 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 generally prioritized for capital funding and execution 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. For example, the Air Force used life-cycle analysis for a $4.5 million wind generation project on *Ascension Island* and a $10.9 million decentralized heat plant at *Mt. Home AFB, ID*. In FY 2001, DeCA revised its Design Criteria Handbook emphasizing use of life cycle cost requirements in design of commissaries and NSA established an Energy Team to develop a detailed energy implementation plan using life cycle cost analysis for investment decisions regarding products, services, and construction.

B. Facility Energy Audits,

Comprehensive audits were conducted on 180,813 thousand square feet (ksf) (14 percent of facility square footage) in FY 2001. Since 1992, comprehensive audits were completed on a total of 939.614 ksf (69.9 percent of facility square footage). Auditing 10 percent of facilities annually has been cost prohibitive and many Components have been unable to fully fund the audit program. To make up for part of this shortfall, components obtain audits as part of alternative-financed energy savings projects whenever feasible.

C. Financing Mechanisms

Partnerships with the private sector through Utility Energy Service Contracts (UESC) and Energy Savings Performance Contracts (ESPC) are a crucial tool 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. In FY 2001, DoD through a decentralized approach awarded 44 UESC and 30 ESPC task orders/contracts producing a total life-cycle savings of $729 million with the contractors' share being $431 million (including interest charges). These contracts include many 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. Savings generated over time (estimated to be about 59 percent of total savings) are returned to the contractor to pay for the improvement measures. Normally, cost savings are used to first pay the contractor, and then are used to offset other base operating support expenses. In some cases, however, installations decide to seek a shorter contract term and defer all Government cost savings until contract completion. In these cases, the savings generated by UESCs and ESPCs help to reduce the energy consumption, but do not reduce the total costs of operation until the contracts expire. After contract expiration and the retrofits are paid for, DoD will be able to obtain full cost savings.

DoE, Naval Facilities Engineering Command (NAVFAC), Huntsville Engineering and Support Center, and DESC all provide alternative financing contracting vehicles to installations and major commands. A few commands and installations use their own internally developed ESPC contracts. In FY 2001, ESPCs were awarded for the following installations; *Hanau Germany, Fort Bragg NC (2), Fort Sam Houston TX, US Army Garrison Alaska, Fort Gordon GA, Picatinny Arsenal NJ, West Point NY, Fort Eustis/Fort Story VA, Fort Monroe VA (2), Walter Reed AMC DC, Fort Jackson SC, Bolling AFB DC, Hill AFB UT, Luke AFB AZ, Mt Home AFB ID, Grand Forks AFB ND, Minot AFB ND, Eielson AFB AK, Travis AFB, CA, NB Coronado CA, NS San Diego CA, NAS Fallon NV, MCAS Miramar CA, MAGTFTC 29Palms CA, MCAS Beaufort SC, NSB Bangor WA, MCB Hawaii , DeCA Headquarters Building and Commissary Fort Lee VA*.

UESCs were awarded for the following installations; *Fort Lee VA, Fort Leonard Wood MD, Offutt AFB NE (4), Ellsworth AFB SD, Whiteman AFB MO (2), Langley AFB VA, Minot AFB ND, Seymour Johnson AFB NC, Shaw AFB SC, NSWC CSS Panama City FL (2), NAS Jacksonville FL (3), MCAS Beaufort SC (2), MCRD Parris Island SC, NSCS Athens GA, NTC Great Lakes IL, Naval Reserves New Orleans LA, HSA Norfolk VA, NSY Norfolk VA, NAES Lakehurst NJ, MCAS Yuma AZ, NAS Whidbey Island WA (2), NAS Oceana VA, NB Point Loma CA, CNR Southwest CA, NUWC Keyport WA , NS San Diego CA, NB Ventura County CA (2), NMC San Diego CA, SPAWAR San Diego CA, NB Coronado CA, NAS Lemoore CA, NSA Operations Building MD.*

In recent years, Congress has shown an upward trend in appropriating funding for the Department's Energy Conservation Investment Program (ECIP). After zeroing out DoD's request for $50 million for ECIP in FY 2000, Congress appropriated $15 million of the requested $33.5 million in FY 2001 and $27 million of the requested $35 million in FY 2002. Additionally, DoD received a Congressional add of $4 million to facilitate implementation of ESPC contracts in FY 2001.

D. ENERGY STAR® and Other Energy-Efficient Products

When life-cycle cost-effective, the Defense Components 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 being incorporated into the sustainable design and development of new and renovated facilities. The components invest in energy efficient technologies, such as high-efficiency lighting and ballasts, energy efficient

motors, 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.

Army procurement regulations were updated and are now in compliance with President Bush's directive of May 3, 2001 to procure only energy-consuming products which are in the upper 25 percent of energy efficiency as designated by the Federal Energy and Management Program. Navy energy managers utilized the DLA lighting CDROM and Washington State Energy Office MotorMaster database to assist in purchasing energy efficient equipment. One example of promoting energy-efficient products is NAVFAC's specifications for transformer efficiencies that exceed industry standards. Another example is DeCA's Contracting Business Unit which procures energy efficient products such as paper and plastic grocery bags made up of minimum 35 precent pre-consumer or post-consumer recycled products. New or replacement cardboard balers are purchased for DeCa's commissaries in consideration of efficient disposal of cardboard products.

E. ENERGY STAR® Buildings

DoD currently does not have any ENERGY STAR® certified buildings, because our buildings generally are not metered and temporary metering schemes are cost prohibitive. This program, developed by the U.S. Environmental Protection Agency (EPA) to promote energy efficiency in buildings, requires measured building data and a comparison with archetypes in various regions of the country. However, a memorandum of understanding (MOU) signed in June 1997 between DoD, DoE, and EPA allows military installations to self-certify buildings as ENERGY STAR® equivalents if comprehensive audits were conducted and all projects with a 10-year or better payback were implemented. In February 2001, Navy and EPA signed an MOU certifying that Navy Family Housing construction criteria meets or exceeds Energy Star Homes requirements. All homes built to the criteria will be certified Energy Star Homes. In mid-FY01, a team was formed in an effort to facilitate the incorporation of the Energy Star® Action Plan into the Pentagon Renovation Program.

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. DoN co-sponsored the development of the Whole Building Design Guide, and a commissioning guide, in cooperation with the Passive Solar Industries Council, which incorporates US Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) criteria. Navy Family Housing criteria includes Sustainable Planning and Development standards and an interim Sustainable rating worksheet based on industry and local programs. NAVFAC championed the adoption of the ASHRAE/IESNA Standard 90.1 as the Tri-Service energy criteria for new construction and developed standard contract clauses to ensure sustainable development is incorporated in all

new construction and major renovation. Additionally, the U.S. Army Corp of Engineers has developed a 3-day sustainable workshop to train DoD personnel in sustainable design and conducted 5 sustainable workshops, training approximately 450 design engineers and installation personnel during FY 2001.

Naval Sea System Command at the Washington Navy Yard was completely renovated using sustainable principles highlights the use of sustainable design within DoN. The project converted high bay naval gun factories and additions into one million square feet of administrative space while retaining the historical aspects of the facility. The Air Force used sustainable design concept on several of its projects. *Cape Canaveral AFS, FL* used plastic timbers and pilings with fiberglass rebar to replace wooden 12"x12" timbers and 13" piles. This project went from a five-year life cycle to a 20-year life cycle and almost zeros maintenance. *Hickam AFB, HI* renovated 146 housing units using a hybrid generation system combining the heat exchange of high efficiency air conditioning with domestic hot water. Light steel construction was incorporated into the original recycled CMU structure. NSA's *Operations Building* renovation included a Flexi-watt fluorescent electronic-ballast which utilizes daylight harvesting near an exterior window. Additionally, every effort has been made to incorporate sustainable design initiatives in all phases of the *Pentagon Renovation Program*. These initiatives include environmentally preferred products (furniture, carpet, paint, etc.) and equipment choices for the building envelope, electrical, and mechanical systems.

G. Energy Efficiency in Lease Provisions

DoD emphasizes energy and water conservation in leased facilities and each Service has issued guidance directing that all leased spaces comply with the energy and water efficiency requirements of the EPAct. It is DoD's intent 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 GSA to ensure the above provisions are included in buildings that they lease for DoD. As an example, DeCA incorporated the use of current commercial energy efficient design standards with set back thermostats and new low flow plumbing fixtures for their headquarters leased through GSA**.**

H. Industrial Facility Efficiency Improvements

Several major initiatives for industrial facility efficiency improvements are under way including the decentralization of the central heat plant at *Grand Forks AFB ND* with energy savings of 82,504 million Btu (MBtu) per year. The Army utilized the Process Energy and Pollution Reduction software developed by and available from CERL to evaluate their energy reduction potential in industrial facilities. DeCA, with a large inventory of commissary stores, installs dual-path air conditioning to control humidity as an alternative to natural gas or propane fired desiccant dehumidification systems. DeCA also uses and plans to increase the use of heat-pipe technology for dehumidification and heat reclaim. Domestic hot water heat

reclaim systems are standard in most large commissary store systems. Remote diagnostic monitoring of Refrigeration Monitoring and Control Systems is used at approximately 175 individual commissaries to assure that refrigeration and lighting systems are being operated and maintained at their design specification. Lighting controls were monitored and discrepancies were forwarded to DeCA's maintenance contractors on a daily basis for correction. This surveillance resulted in improved contractor maintenance and improved equipment operation and less energy consumed.

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 Army is currently in the fourth year of a five-year, $300 million central boiler plant modernization program. The goals of this program are to update the aging central boiler plant infrastructures that are currently found on many Army installations. These projects have resulted in upgraded or new boilers, new distribution systems, improved high efficiency pumps and motors, and updated system controls in all of these plants. Base Support Battalions (BSB) were used to execute several of these retrofit projects. The 414th BSB replaced 8 boilers, converted 15 oil-fired burners to new, more energy efficient and environmentally friendly gas-fired units, and linked 2 facilities to the local community's district heating network in lieu of boiler replacement. This work saved the Army $166 thousand and 21 BBtu. The 222nd BSB installed a Energy Monitoring Control System and replaced 17 oil-fired boilers plants, 140 domestic hot water generators, and associated valves and piping. This work saved the Army $2.5 million in energy costs, and 208 BBtu. The Navy used an ESPC to install a 7.5 MW gas turbine with 30,000 lb/hr heat recovery steam generators at *MAGTFTC 29 Palms, CA,* with a projected savings over the life of the project of $40 million. Several Air Force projects have included the use of geothermal systems. *Bolling AFB, MD*, installed a thermal storage system and new chillers with an energy savings of 39.6 TBtu per year and *Peterson AFB, CO*, installed a heat plate exchanger in the AFSPC headquarters building. DeCA's new refrigeration systems utilize electronic controls, heat reclaim and "floating head" to reduce energy usage.

J. Off-Grid Generation

DoD is pursuing off-grid generation where it is life-cycle cost-effective. The Army's *Fort Hood* is harvesting the sun's energy by using two new innovative energy reduction technologies: solar parking lot lighting and an active day lighting system. Each of the 174 units of active day lighting installed produces the equivalent of approximately 600 to 800 watts of florescent light—virtually eliminating all daytime electric lighting—equating to more than 1.4 BBtu of renewable energy. The solar parking lot lighting system uses just two panels to produce 800 kilowatt-hours per year, eliminating more than 1 ton of pollution in emissions. These 2 projects combined to produce a total of approximately 2.5 BBtu, and saved the installation $106.2 thousand in FY 2001. Navy Region Southwest contracted for a parking garage mounted 750 kW photovoltaic system that will be one of the largest grid connected systems in the United States. The Air Force installed two solar panel roofs that supply domestic hot water at *RAF Mildenhall, UK*. The Wilford Hall Medical Center (WHMC) Total Energy Plant at *Lackland AFB, TX* runs natural gas turbines to generate 8MW electrical power

with the waste heat captured for absorption chillers, domestic hot water heating, and facility heating.

The following are self-generating renewable energy projects implemented and operating on Army Installations:

Solar Lighting units

- *Fort Hood, TX* - 174 solar lights in parking lots adjacent to barracks and training areas.
- *Fort Gillem, GA* - 60 solar security lights in four vehicle-parking areas.
- *Fort Irwin, CA* - 41 solar lights for exercise track and playground areas in Family Housing.
- *Fort McPherson, GA* - 40 solar lights in recreation areas and remote parking areas.
- *Torii Station, Okinawa* - 17 solar lights to provide security lighting in parking lots.
- *Schofield Barracks, HI* - 13 solar outdoor lights adjacent to their Dental Clinic.
- Yuma Proving Grounds, AZ - 17 solar lights in parking lots and recreation area.
- *Fort Huachuca, AZ* - 8 solar lights in parking lots.
- *Fort Dix, NJ* - 8 solar range markers.
- *Fort Riley, KS* - 8 solar lights in parking lots.

Photovoltaic Power System Projects.

- *Fort Carson, CO* - 30 kW for water pumping, off-grid lighting, and telecommunication.
- *Fort Huachuca,* AZ - 55 kW for grid-connection and off-grid lighting.
- *Fort Dix, NJ* - 20 kW for grid-connection and off-grid lighting.
- *Yuma Proving Ground,* AZ - 900 kW for grid-connection, off-grid lighting, and remote off-grid facility.
- *Yuma Proving Ground, AZ* - 225 kW for off-grid lighting and remote off-grid facility.
- *Pohakuloa Training Area, HI* - 50 kW for range targets, control towers, and airstrip lighting.
- *Fort Irwin, CA* - 20 kW for remote off-grid facility and stand-alone lighting.
- *Fort Polk, LA* - 10 kW for training range field instrumentation.
- *White Sands Missile Range, NM* - 60 kW for grid-connection, weather data equipment, and telecommunication.
- *Fort Greely, AK* - 10 kW for training range field instrumentation.
- *Fort Dix, NJ* - 18 kW for administrative building.
- *Fort Bragg, NC* - 200 kW for special operations power supply (20-kW panels).
- *Yakima Firing Range, WA* - 18 kW for water pumping, off-grid lighting, and telecommunication.

K. Electrical Load Reduction Measures.

DoD installations in the West responded to the President's Memorandum of May 3, 2001 and reduced summer peak demand. In May 2001, DoD announced a plan to reduce the electricity demand from the California commercial electricity grid by a combination of energy conservation, peak demand reduction investments and power generation. The goals of this California Electrical Demand Reduction Program were to reduce DoD's peak electricity

demand 10 percent by summer 2001 and 15 percent by Summer 2002 from a Summer 2000 baseline. The Department received $45.7 million in the FY 01 Supplemental Appropriation Act which consisted of $28.7 million to execute 89 investment projects estimated to save 70MW and $17 million to conduct energy and sustainability audits, an energy generation siting study and a geothermal test wells at China Lake.

The Services meet the conservation challenge by instituting an aggressive energy awareness campaign and monitoring program, installing vending machine misers, adjusting energy management control system set points, and hiring regional efficiency managers. California commissaries turned off 50 percent of sales area lighting during load reduction warning periods. Peak demand reduction investments for the program included installation of automating controls, demand meters, compact fluorescent lighting, solar reflective window film, and thermal energy storage systems. Additional investments included utilizing passive sky lighting in hangars and upgrading/repairing energy intensive equipment. Back-up generators were used for peak load shedding operations. The Services procured additional generators and invested in Distributed Energy Resources (DER) such as micro turbines, fuel cells, and solar PV systems. As a result of this program the Department reduced its peak demand from August 2000 to August 2001 by an average of 9.4 percent. The reduction rate was lower than anticipated because local utilities did not request peak saving generation from our three large fix plants in California.

L. Water Conservation

While DoD water usage decreased slightly from FY 2000, the costs associated with water and water disposal increased at a rate greater than inflation at many DoD installations. In certain regions, lack of rainfall has resulted in water shortages and adversely impacted the mission and morale at the installations. The lack of adequate rainfall also resulted in wildfires that blazed out of control, devastating countless acres in mid-western states. Defense Components concentrated on water conservation methods such as early leak detection and repair, installation of low-flow water-efficient fixtures in housing and administration buildings, and public awareness programs. Water conservation methods in the Army are concentrated on water-saving technologies for toilets, urinals, showerheads, and faucets in housing barracks and other administration buildings. *Fort Carson, CO* for example, maintains a comprehensive water conservation program consisting of sound environment management, special projects, outreach, and education to protect and conserve water resources. Water-saving projects at *Fort Carson* include centralizing its vehicle wash facility, using wastewater to irrigate its 180-acre golf course, installing composting toilets that are almost waterless, practicing beneficial landscaping and more. These projects reduced water-use by 17 percent and saved more than $1.8 million in water and wastewater treatment costs. Most notable about the work at *Fort Carson* was that this reduction in water use took place while troop strength increased and a sizable increase in water use for irrigation took place.

The Navy performed leak detection on distribution systems, reviewed water management operating procedures, and corrected system maps. Through FY 2001, over 486 million gallons per year in leaks have been identified and fixed, and cost-effective projects worth over $15 million have been identified. The Air Force awarded a $4 million water main

replacement project at *RAF Lakenheath, UK*. This project will replace much of the leaking, undersized and obsolete distribution system. *F E Warren AFB, WY,* installed water timers on hose bibs in military family housing saving 85 million gallons per year at a savings of $190 thousand. DeCA required low consumption toilets and urinals with electronic flush sensors for new and renovated commissaries. DeCA also requires use of electronic sensor controlled lavatories with mixing valves and flow control devices. Commissaries on *Nellis AFB, NV; Davis Monthan AFB, AZ;* and *Yuma Proving Ground, AZ,* utilize "waterless" urinals. The *Pentagon Renovation Program* includes water efficient plumbing fixtures and infrared controllers. Also, a comprehensive survey of the federally owned water mains was completed and the resulting information is being used to formulate a project implementation plan and funding request.

IV. Data Tables and Inventories.

A. OMB Circular A-11, Exhibit 55. See attached.

B. Energy Scorecard for FY 2001. Submitted January 16, 2002 to OMB.

C. Goals of Executive Order 13123 and NECPA/EPACT. See attached.

D. Industrial and Laboratory Facility Inventory. See attached.

E. Exempt Facilities Inventory. See attached.

IV.A. OMB Circular A-11, Exhibit 55

IV.B. Energy Scorecard for FY 2001

Previously submitted to OMB and DoE on January 16, 2002

IV.C. Goals of Executive Order 13123 and NECPA/EPACT

Executive Order 13123

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	0% improvement by 2005 5% improvement by 2010	Base year is 1985
Industrial and Laboratory Facilities	0% improvement by 2005 5% improvement by 2010	Base year is 1990
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 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	Installation of Federal solar energy systems will help support the Million Solar Roofs initiative
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

IV.D. Industrial and Laboratory Facility Inventory

The following buildings/facilities were classified as process buildings.

Facility	Location
Holston Army Ammunition Plant	Kingsport, TN
Radford Army Ammunition Plant	Radford, VA
AAFES Food Processing Plant	Grünstadt, Germany
Laundry Facility	Ft. Leonard Wood, MO

The following entire bases were designated as industrial, based on 60 percent or more of the base-wide energy use being for industrial purposes.

Installation	Installation
SIMA PASCAGOULA MS	FISC PEARL HARBOR HI
COMOPTEVFOR NORFOLK VA	FISC SAN DIEGO CA
NAVSPASURFLDSTA CHULA VISTA CA	FISC YOKOSUKA JA
NAVSPASURFLDSTA HAWKINSVILE GA	NAVSHIPREPFAC YOKOSUKA JA
NAVSPASURFLDSTA HOLLANDALE MS	NSY PEARL HARBOR HI
NAVSPASURFLDSTA MARICOPA AZ	SIMA SAN DIEGO CA
NAVSPASURFLDSTA SAVANNAH GA	NAVPBRO MAGNA UT
NAVSPASURFLDSTA WETUMPKA AL	NIROP PITTSFIELD MA
NAVSPASURFLDSTAELPHAB TRORC NM	NIROP SUNNYVALE CA
NAVSPASURFLDSTAKIKLK ACH CT TX	POMFLANT CHARLESTON SC
NAVSPASURFLDSTAREDRVR LWSV AR	SWFLANT KINGS BAY GA
TRIREFFAC KINGS BAY GA	SWFPAC BANGOR WA
MCLB ALBANY GA	AMFORRDRESINS BETHESDA MD
MCLB BARSTOW CA	NWS YORKTOWN SJC ANNEX
NAVAVNDEPOT CHERRY POINT NC	NSC JACKSONVILLE FL
NAVAVNDEPOT JACKSONVILLE FL	NSC NORFOLK VA
NAVAVNDEPOT NORTH ISLAND CA	NSC OAKLAND CA
NAVORDMISTESTSTA WHITESANDS NM	NSC PENSACOLA FL
NAVWPNINDRESPLNT TOLEDO OH	NSC PUGET SOUND BREMERTON WA
NWIRP BETHPAGE NY	NSD GUAM GQ
NWIRP BLOOMFIELD CT	INTCOMBATSYSTESTFAC SANDIEGOCA
NWIRP DALLAS TX	UNISERUOFHEASCN BETHESDA MD
NWIRP MCGREGOR TX	HILL AFB UT
NSWC DIV INDIAN HEAD MD	TINKER AFB OK
NSY NORFOLK VA	ROBINS AFB GA
NSY PORTSMOUTH NH	KELLY AFB TX (closed)
NSY PUGET SOUND BREMERTON WA	McCLELLAN CA (closed)
NUWC DIV KEYPORT WA	ARNOLD AFB TN
WV ABL MINERAL CO	

The following Commissary Stores were designated as industrial facilities.

Commissary Stores	City	State/Country
ABERDEEN	Baltimore	MD
ALBANY	Albany	GA
ALTUS	Altus	OK
ANCHORAGE	Anchorage	AK
ANDERSEN AFB	Yigo	Guam
ANDREWS AFB	Camp Springs	MD
ANNAPOLIS	Annapolis	MD
ARDEC	Patterson	NJ
ARNOLD AFB	Tullahoma	TN
ATHENS NSCS	Athens	GA
ATSUGI	Yokohama	Japan
BANGOR	Silverdale	WA
BANGOR ANGB	Bangor	ME
BARBERS POINT	Pearl City	HI
BARKSDALE AFB	Bossier City	LA
BARSTOW MCLB	Barstow	CA
BEALE AFB	Marysville	CA
BOLLING AFB	Washington	DC
BREMERTON	Bremerton	WA
BROOKS AFB	San Antonio	TX
BRUNSWICK NAS	Portland	ME
C. E. KELLY	Pittsburgh	PA
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	Hiroshim	Japan
CAMP LEJEUNE	Jacksonville	NC
CAMP MERRILL	Dahlonega	GA
CAMP PAGE	Taegu	South Korea
CAMP PENDLETON	Oceanside	CA
CAMP STANLEY	Uijongbu	South Korea
CAMP ZAMA	Tokyo	Japan
CANNON AFB	Clovis	NM
CARLISLE	Carlisle	PA
CHARLESTON AFB	Charleston	SC
CHARLESTON NWS	Charleston	SC
CHERRY POINT	Havelock	NC
CHINA LAKE	Ridgecrest	CA
CHINHAE NAS	Chinhae	South Korea
COLUMBUS AFB	Columbus	MS
CORPUS CHRISTI	Corpus Christi	TX
CRANE NWSC	Crane	IN
CUTLER	Machias	ME
DAHLGREN	Fredericksburg	VA
DAVIS-MONTHAN	Tucson	AZ
DDC (New Cumberland)	Harrisburg	PA
DOVER	Dover	DE
DSCR	Richmond	VA
DUGWAY	Dugway	UT
DYESS AFB	Abilene	TX
EDWARDS	Rosamond	CA
EGLIN AFB	Niceville	FL
EIELSON AFB	Fairbanks	AK
EL CENTRO	El Centro	CA
ELLSWORTH AFB	Rapid City	SD
F. E. WARREN	Cheyenne	WY
FAIRCHILD	Spokane	WA
FALLON	Fallon	NV
FITZSIMONS	Aurora	CO
FT. BELVOIR	Alexandria	VA
FT. BENNING	Columbus	GA
FT. BLISS	El Paso	TX
FT. BRAGG – NORTH	Fayetteville	NC
FT. BRAGG – SOUTH	Fayetteville	NC
FT. BUCHANAN	San Juan	Puerto Rico
FT. CAMPBELL	Ft. Campbell	KY
FT. CARSON	Colorado Springs	CO
FT. DETRICK	Frederick	MD
FT. DRUM	Watertown	NJ
FT. EUSTIS	Newport News	VA
FT. GILLEM	Atlanta	GA
FT. GORDON	Augusta	GA
FT. GREELY	Delta Junction	AK
FT. HAMILTON	New York	NY
FT. HOOD I	Killeen	TX
FT. HOOD II	Killeen	TX
FT. HUACHUCA	Sierra Vista	AZ
FT. HUNTER-LIGGETT	King City	CA
FT. IRWIN	Fort Irwin	CA
FT. JACKSON	Columbia	SC
FT. KNOX	Louisville	KY
FT. LEAVENWORTH	Leavenworth	KS
FT. LEE	Petersburg	VA
FT. LEONARD WOOD	Waynesville	MO
FT. LEWIS	Tacoma	WA
FT. MCCOY	La Crosse	WI
FT. MCPHERSON	Atlanta	GA
FT. MEADE	Laurel	MD
FT. MONMOUTH	Eatontown	NJ
FT. MONROE	Hampton	VA

Commissary Stores	City	State/Country
FT. MYER	Arlington	VA
FT. ORD (MONTEREY)	Monterey	CA
FT. POLK	Leesville	LA
FT. RILEY	Junction City	KS
FT. RUCKER	Daleville	AL
FT. SAM HOUSTON	San Antonio	TX
FT. SHAFTER	Honolulu	HI
FT. SILL	Lawton	OK
FT. STEWART	Hinesville	GA
FT. WAINWRIGHT	Fairbanks	AK
GOODFELLOW	San Angelo	TX
GRAND FORKS AFB	Grand Forks	ND
GREAT LAKES NTC	Waukegan	IL
GUAM (OROTE)	Agat	Guam
GULFPORT NCBC	Gulfport	MS
GUNTER AFB	Montgomery	AL
HANNAM VILLAGE	Seoul	South Korea
HANSCOM AFB	Bedford	MA
HARIO HOUSING	Hario	Japan
HARRISON VILLAGE	Indianapolis	IN
HICKAM AFB	Honolulu	HI
HILL AFB	Ogden	UT
HOLLOMAN AFB	Alamogordo	NM
HUNTER AAF	Savannah	GA
HURLBURT FIELD	Fort Walton Beach	FL
IMPERIAL BEACH	Imperial Beach	CA
IWAKUNI MCAS	Iwakuni	Japan
JACKSONVILLE	Jacksonville	FL
KADENA AFB	Naha	Japan
KANEOHE BAY	Kaneohe Bay	HI
KEESLER AFB	Biloxi	MS
KEFLAVIK	Keflavik	Iceland
KELLY	San Antonio	TX
KEY WEST NAS	Key West	FL
KINGS BAY NSB	St. Marys	GA
KINGSVILLE	Kingsville	TX
KIRTLAND AFB	Albuquerque	NM
KUNSAN AFB	Kunsan City	South Korea
LACKLAND AFB	San Antonio	TX
LAKEHURST	Toms River	NJ
LANGLEY AFB	Hampton	VA
LAUGHLIN AFB	Del Rio	TX
LEMOORE	Fresno	CA
LITTLE CREEK NAB	Virginia Beach	VA
LITTLE ROCK AFB	Jacksonville	AR
LOS ANGELES AFB	Los Angeles	CA
LUKE AFB	Phoenix	AZ
MACDILL AFB	Tampa	FL
MALMSTROM AFB	Great Falls	MT
MARCH ARB	Riverside	CA
MAXWELL AFB	Montgomery	AL
MAYPORT NS	Atlantic Beach	FL

Commissary Stores	City	State/Country
MCCHORD AFB	Tacoma	WA
MCCLELLAN AFB	North Highlands	CA
MCCONNELL AFB	Wichita	KS
MCGUIRE AFB	Wrighttown	NJ
MEMPHIS NAS	Memphis	TN
MERIDIAN NAS	Meridian	MS
MINOT AFB	Minot	ND
MIRAMAR NAS	San Diego	CA
MISAWA AFB	Misawa	Japan
MITCHEL FIELD	Garden City	NY
MOFFETT FIELD	Mountain View	CA
MOODY AFB	Valdosta	GA
MTN HOME AFB	Mountain Home	ID
NELLIS AFB	Las Vegas	NV
NEW LONDON	Groton	CT
NEW ORLEANS NSA	New Orleans	LA
NEW RIVER MCAS	Jacksonville	NC
NEWPORT	Newport	RI
NORFOLK NB	Norfolk	VA
NORTH ISLAND	San Diego	CA
OCEANA NAS	Virginia Beach	VA
OFFUTT AFB	Bellevue	NE
OSAN AFB	Osan	South Korea
PARRIS ISLAND	Beaufort	SC
PATRICK AFB	Cocoa Beach	FL
PATUXENT	Lexington Park	MD
PEARL HARBOR	Honolulu	HI
PENSACOLA	Pensacola	FL
PETERSON	Colorado Springs	CO
POINT MUGU	Point Mugu	CA
POPE AFB	Fayetteville	NC
PORT HUENEME	Port Hueneme	CA
PORTSMOUTH	Portsmouth	NH
PORTSMOUTH NNSY	Portsmouth	VA
PRESIDIO OF SF	San Francisco	CA
PUSAN	Pusan	South Korea
QUANTICO	Woodbridge	VA
RANDOLPH AFB	San Antonio	TX
REDSTONE ARSENAL	Huntsville	AL
ROBINS AFB	Macon	GA
ROCK ISLAND AR	Rock Island	IL
ROOSEVELT ROADS	Ceiba	Puerto Rico
SAGAMI DEPOT	Tokyo	Japan
SAGAMIHARA	Tokyo	Japan
SAN DIEGO NS	San Diego	CA
SAN ONOFRE	San Clemente	CA
SASEBO	Sasebo	Japan
SCHOFIELD BKS	Wahiawa	HI
SCOTIA	Schenectady	NY
SCOTT AFB	Belleville	IL
SELFRIDGE ANG	Mt Clemens	MI
SEYMOUR JOHNSON	Goldsboro	NC

Commissary Stores	City	State/Country
SHAW AFB	Sumter	SC
SHEPPARD AFB	Wichita Falls	TX
SIERRA	Herlong	CA
SMOKEY POINT NS	Marysville	WA
TAEGU	Taegu	South Korea
TINKER AFB	Oklahoma City	OK
TOBYHANNA	Scranton	PA
TRAVIS AFB	Fairfield	CA
TWENTYNINE PALMS	Twentynine Palms	CA
TYNDALL AFB	Panama City	FL
USAF ACADEMY	Colorado Springs	CO
VANCE AFB	Enid	OK
VANDENBERG AFB	Lompoc	CA
WALTER REED	Washington	DC
WEST POINT	Highland Falls	NY
WHIDBEY ISL NAS	Oak Harbor	WA
WHITE SANDS MR	Las Cruces	NM
WHITEMAN AFB	Knob Noster	MO
WHITING FIELD	Pensacola	FL
WINTER HARBOR	Bangor	ME
WRIGHT-PATTERSON	Dayton	OH
YOKOSUKA NESC	Yokosuka	Japan
YOKOTA AB	Tokyo	Japan
YONGSAN	Seoul	South Korea
YUMA MCAS	Yuma	AZ
YUMA PG	Yuma	AZ

IV.E. Exempt Facilities Inventory

Facility/Function	Location
Cold Iron	SUBASE NEW LONDON CT
Cold Iron	NSY NORFOLK VA
Cold Iron	PWC NORFOLK VA
Cold Iron	WPNSTA CHARLESTON SC
Cold Iron	NAS PENSACOLA FL
Cold Iron	NAS KEY WEST FL
Cold Iron	NAVSTA ROOSEVELT ROADS PR
Cold Iron	SUBASE KINGS BAY GA
Cold Iron	NAVSTA MAYPORT FL
Cold Iron	WPNSTA EARLE COLTS NECK NJ
Cold Iron	NAVSTA GUANTANAMO CUBA
Cold Iron	NSWC COASTSYSTA PANAMA CITY FL
Cold Iron	NAVPHIBASE LITTLE CREEK VA
Cold Iron	NETC NEWPORT RI
Cold Iron	NAVSTA ROTA SP
Cold Iron	NAVSTA PASCAGOULA
Cold Iron	NAVSTA INGLESIDE TX
Cold Iron	NUSC NEW LONDON LABORATORY
Cold Iron	NSC OAKLAND CA
Cold Iron	NAVSTA SAN DIEGO CA
Cold Iron	NAS NORTH IS SAN DIEGO CA
Cold Iron	NSY PUGET SOUND BREMERTON WA
Cold Iron	NSY PEARL HARBOR HI
Cold Iron	SUBASE PEARL HARBOR HI
Cold Iron	FLEASWTRACENPAC SAN DIEGO CA
Cold Iron	FLEET ACTIVITIES CHINHAE SK
Cold Iron	WPNSTA CONCORD CA
Cold Iron	COMFLEACT YOKOSUKA JA
Cold Iron	NAVSTA GUAM GQ
Cold Iron	CBC PORT HUENEME CA
Cold Iron	NAVSHIPREPFAC GUAM GQ
Cold Iron	COMFLEACT SASEBO JA
Cold Iron	PWC PEARL HARBOR HI
Cold Iron	NAVSTA PEARL HARBOR HI
Cold Iron	SUBASE SAN DIEGO CA
Cold Iron	NAVRESREDCOMREG 22 SEATTLE WA
Cold Iron	SUBASE BANGOR WA
Cold Iron	NAVSTA EVERETT WA
Simulator	WPNSTA CHARLESTON SC
Simulator	NAS PENSACOLA FL
Simulator	NAS JACKSONVILLE FL
Simulator	NAS DALLAS TX
Simulator	NAS KINGSVILLE TX
Simulator	NAVAIRDEVCEN WARMINSTER PA
Simulator	NAS LEMOORE CA
Simulator	NSWC DIV PT HUENEME CA
Simulator	MCAS MIRAMAR CA
Transmitter	NAS JACKSONVILLE FL
Transmitter	NAVSECGRUACT WINTER HARBOR ME
Transmitter	NRTF DIXON
Transmitter	RADTRANF ANNAPOLIS MD
Transmitter	NAVRADTRANFAC SADDLEBUNCH KEYS

Transmitter	NAVSECGRUACT SABANA SECA PR
Transmitter	NAVCOMMSTA JACKSONVILLE FL
Transmitter	NAVRADSTA /T/ JIM CREEK WA
Transmitter	NAVSECGRUACT GALETA IS PN
Private Party	NAS DALLAS TX
Private Party	NAVCOMMU WASHINGTON DC
Private Party	NAF EL CENTRO CA
Private Party	NSWC COASTSYSTA PANAMA CITY FL
Private Party	COMFLEACT YOKOSUKA JA
Private Party	NAVOBSY WASHINGTON DC
Private Party	NAF ATSUGI JA
Private Party	CBC PORT HUENEME CA
Private Party	CBC GULFPORT MS
Private Party	MCAS IWAKUNI JA
Private Party	PWC PEARL HARBOR HI
Private Party	NAVSTA ROTA SP
Private Party	NAS KEFLAVIK IC
Private Party	NAVCOMMSTA KEFLAVIK IC
Private Party	DOD SCHOOLS KEFLAVIK ICELAND
Private Party	HDQTRS 4TH MARDIV NEW ORLEANS
Private Party	NAVSTA PASCAGOULA MS

EXHIBIT A
Format for Reporting Green Energy Purchases To Receive Credit Toward Executive Order Goals

PURCHASES OF GREEN ELECTRICITY

						Fuel Mix of Electricity Purchase (percent)						
		Annual Consumption	Annual Cost (Thou. $)	State	All Facilities (Y or N)	Coal	Natural Gas	Oil	Nuclear	Hydro Bio-mass	Geo.-thermal	Solar/ Wind
Elec. Purchase 1	MWH	42,017	1679	AZ	N							100
Elec. Purchase 2	MWH	23,350	849	AZ	N							100
Elec. Purchase 3	MWH	155,381	5,382	VA	Y					100		
Elec. Purchase 4	MWH	12,100	962	CA	Y		45			40		15
Elec. Purchase 5	MWH	2,400	130	MA	Y					97		3
Elec. Purchase 6	MWH	3,164	279	CA	Y	13			22	60.5		4.5
Elec. Purchase 7	MWH	60	2	CO	Y	76.8	13.5			9.3		0.4
(Add additional purchases as necessary)												
Total Purchases	MWH	238,472	$9,283									

PURCHASED BIOMASS OR LANDFILL GAS (RENEWABLE ENERGY SOURCES)

		Annual Consumption	Annual Cost (Thou. $)	State
Gas Purch. 1	Thou. Cu. Ft.			
Gas Purch. 2	Thou. Cu. Ft.			
Gas Purch. 3	Thou. Cu. Ft.			
(Add additional purchases as necessary)				
Total Purchases	Thou. Cu. Ft.			

PURCHASED THERMAL ENERGY FROM RENEWABLE ENERGY SOURCES

		Annual Consumption	Annual Cost (Thou. $)	State
Purchase 1	BBtu	649.0	5,804	VA
Purchase 2	BBtu	613	6,895	Iceland
Purchase 3	BBtu	0.1	1	TX
(Add additional purchases as necessary)				
Total Purchases	MWH	1,262.1	12,700	