UNITED STATES MARINE CORPS
MARINE CORPS RECRUIT DEPOT/EASTERN RECRUITING REGION
PO BOX 19001
PARRIS ISLAND, SOUTH CAROLINA 29905-9001

IN REPLY REFER TO:
DepO 4101.3
FMD
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DEPOT ORDER 4101.3

From: Commanding General
To: Distribution List

Subj: BUILDING ENERGY MONITOR PROGRAM

Ref: (a) Executive Order 13423 - Strengthening Federal Environmental, Energy and Transportation Management (24 Jan 2007)

Encl: (1) Navy and Marine Corps Building Energy Monitor Guide
(2) Energy Program Building Assignments
(3) Building Energy Monitor Checklist
(4) Utilities Conservation Violation Report
(5) Consolidated Unit Energy Conservation Report

1. Situation. Per reference (a), by 2015, all government agencies, to include DOD installations, are required to reduce their energy consumption rates by 30% below the 2003 baseline consumption rate. In order to reach this goal, installations are directed to implement aggressive conservation measures to reduce energy consumption and take actions to transition from fossil fuels to renewable energy sources.

2. Mission. MCRD Parris Island will establish a Building Energy Monitor Program in order to monitor energy use, encourage energy conservation, prevent wasteful energy practices and reduce energy used for lighting, heating and air conditioning systems in buildings and facilities.

3. Execution

a. Commander's Intent and Concept of Operations

(1) Commander's Intent. Last year we spent $9.9 million to pay for natural gas, electricity and water, almost 15% of our entire annual operating budget was used to pay utilities bills. If we could save just 10% in energy costs, we could invest

another $1 million per year to improve and upgrade installation facilities. We need to take aggressive conservation actions to eliminate unnecessary waste and ensure our energy and water using systems are operating efficiently. Commanders and civilian supervisors at all levels are expected to become actively engaged in the overall energy reduction effort and take specific interest in the Building Energy Monitor Program. Our long, hot summers and high density barracks buildings make air conditioning systems our biggest energy user. The focus of effort for this program will be to make the use of air conditioning as efficient as possible to include ensuring room and squad bay temperature settings are maintained at 78 degrees, maintaining air conditioning barriers by keeping windows and doors closed, and ensuring temperature settings for squad bays and buildings not in use are maintained at 85 degrees. This program will also establish measures to reduce energy used for lighting, water used for hygiene and irrigation, and steam used for hot water and heating systems. The end state is to achieve a 3% annual reduction in energy consumption between now and 2015.

(2) Concept of Operations

(a) The AC/S G4 is responsible for the execution and oversight of the Building Energy Manager Program and will ensure Energy Monitors are trained, building inspections are conducted on schedule, Consolidated Unit Energy Reports are published, and follow-up actions are taken to correct conservation discrepancies.

(b) Energy Monitors are required to read the Building Energy Monitors Guide in enclosure (1). This guide provides direction on effective conservation measures and will be used as a reference by the Depot Energy Manager during training classes for Energy Monitors.

(c) Building assignments for this program are based on unit areas of responsibility for police and maintenance, and are listed in enclosure (2).

(d) Energy Monitors are required to conduct monthly inspections of their assigned buildings in accordance with the checklist in enclosure (3). Minor discrepancies will be corrected on the spot. If a facilities work request needs to be submitted for a repair or maintenance action, a follow-up

inspection will be conducted within two weeks to confirm the status of the work request.

(e) The Depot Energy Manager will conduct monthly progress meetings with the Energy Monitors. During the meeting, Utilities Conservation Violation Reports (Encl 4) will be submitted by the Energy Monitors. The Depot Energy Manager will review all reports and provide AC/S, G4 a Consolidated Unit Energy Conservation Report in accordance with enclosure (5).

(3) Tasks

(a) Assistant Chief of Staff, G-4

1. Assume overall responsibility and oversight for the Building Energy Monitor Program.

2. Assign the Depot Energy Manager the duties to supervise the training of Energy Monitors, monitor and document the progress of this program, and provide recommendations to improve the program in future.

3. Designate an Energy Monitor for all assigned buildings in enclosure (2) and become actively engaged in energy conservation measures for your assigned buildings.

4. Provide the CG, MCRD Parris Island with a semi-annual energy conservation progress report and program review.

(b) Commanding Officer, Headquarters and Service Battalion (CO, H&S BN). Designate an Energy Monitor for all assigned buildings in enclosure (2) and become actively engaged in energy conservation measures for your assigned buildings.

(c) Commanding Officer, Recruit Training Regiment (CO, RTR). Designate an Energy Monitor for all assigned buildings in enclosure (2) and become actively engaged in energy conservation measures for your assigned buildings.

(d) Commanding Officer, Weapons and Field Training Battalion (CO, WFTBN). Designate an Energy Monitor for all assigned buildings in enclosure (2) and become actively engaged in energy conservation measures for your assigned buildings.

b. Coordinating Instructions

(1) All Energy Monitors identified in enclosure (2) will meet within thirty days of the date of this order for an initial coordination meeting and initial training session.

(2) Building inspections will be conducted within fifteen days of the initial coordination meeting and training. Subsequent inspections and discrepancy reports are required to be completed by the third Friday of each month.

(3) The Depot Energy Manager will provide a Consolidated Unit Energy Conservation Report using the format in enclosure (5) by the first Friday of each month. The report will cover inspection results for the previous month.

4. Administration and Logistics

a. Enclosure (2) provides building assignments for this program. All administrative and inspection material will be provided to the Energy Monitors by the Depot Energy Manager.

b. The Depot Energy Manager is Mr. Richard E. Pierce, (228-2126); email richard.pierce@usmc.mil .

5. Command and Signal

a. Command. This Order is applicable to all personnel aboard MCRD Parris Island.

b. Signal. This Order is effective the date signed.

J. W. FUNTZ
Chief of Staff

DISTRIBUTION: A

Navy and Marine Corps Building Energy Monitor Guide

1. Introduction

a. Congratulations, and thank you for participating in one of the Department of the Navy's most important shore facility operations and maintenance initiatives to reduce costs and prevent pollution through increased energy efficiency. Identify and stop energy waste. It's a presidential mandate. It's an operational imperative. It's the right thing to do.

b. As a Building Energy Monitor (BEM), your goal is to assist in identifying and eliminating energy waste. Clearly, each facility, each activity, each building has its unique set of efficiency opportunities based on mission requirements and building use.

c. This guide provides an overview of energy and water efficiency opportunities. Familiarize yourself with the many opportunities for reducing energy and water waste, then tailor a program that will be most effective in the building or buildings for which you serve as a BEM.

d. Your success and your Command's success in reducing energy use and costs rest heavily on one key ingredient, attitude. Approach your BEM responsibilities with commitment and a desire to share the benefits of increased efficiency with your colleagues and building occupants.

e. Most of us take energy for granted. But the cost and impact of inefficient energy use is startling:

(1) Americans waste upwards of $300 billion a year in energy: more than the entire military budget and enough to increase personal wealth by more than $1,000 per American per year.

(2) Energy production and use account for nearly 80 percent of all pollution and nearly 90 percent of heat trapping greenhouse gas emissions, and more environmental damage than any other human activity.

f. Energy management excellence is rewarded through the Secretary of the Navy Energy Awards, which include monetary rewards, and the U.S. Department of Energy Federal Energy and Water Management (FEMP) Awards. Individuals are also honored as

Energy Champions through the FEMP "You Have the Power" Campaign. These programs recognize both individuals and organizations making a difference through commitment and leadership. We hope that will be you!

2. The Building Energy Monitor

a. Whether your building is new and includes the latest in energy and water efficient technologies, is old but recently retrofitted with new efficiency products, or was designed at a time when there was little concern for resource conservation and is in desperate need of an upgrade, you can have an impact.

b. Energy efficiency retrofits and good design are only a part of the answer. Energy efficiency through education, awareness, and involvement is the key to a successful energy management program. Energy management needs support at all levels, from the Building Energy Monitor to the Commander.

c. A successful energy management program requires a team effort Public Works, ROICC Office, Exchange and Commissary Stores, Office of Comptroller, Security/Military Police, Supply Department, Public Affairs, Energy Managers, Building Energy Monitors and your Commanding Officer.

d. As a BEM, you are on the front lines making it possible for all Navy and Marine Corps personnel to appreciate and be actively involved in a more efficient work place. BEM responsibilities include:

(1) Communicating installation energy goals and objectives.

(2) Observing, informing, and encouraging good energy habits within your monitoring area.

(3) Serving as the point of contact for energy issues, problems, and costs.

(4) Recommending energy saving changes to the building's operating procedures.

(5) Generating work orders for low-cost maintenance and energy efficiency projects.

(6) Monitoring the operation of the building through periodic energy audits.

(7) Recommending energy efficiency projects for the building.

e. We all, on occasion, waste energy unconsciously. Take a new view of your work place. Look at it as if you had to pay the bills electric, gas, water, and sewer. Then look around for ways to save on the utility bills, such as eliminating unconscious or uncaring neglect, or repairing or replacing items in disrepair or that are inefficient. There may be energy and water savers that you wouldn't have thought of, so review the following pages and determine which actions make sense for your monitoring area. And, first and foremost, lead by example.

3. OFFICE ELECTRONIC EQUIPMENT

a. Office equipment is the fastest growing use of electricity in commercial buildings in the United States. They consume more than 30 billion kwh of electricity annually, valued at more than $2.1 billion. A recent study conducted for the U.S. Department of Energy concludes that Energy Star office equipment could save U.S. businesses almost $1 billion per year in energy costs at negligible cost to the consumer.

b. A typical office could save approximately 50% on its electricity bills by using the power management features of Energy Star Office Equipment.

c. Personal computers, monitors, printers, faxes and copiers in the Environmental Protection Agency's voluntary Energy Star Office Equipment Program contain a power management feature which powers down the device after a period of inactivity. In "sleep" mode, the device consumes only a fraction of the electricity it normally uses in regular mode.

d. The office equipment's energy management features must be activated. Make sure office equipment with power management features is activated when possible. If your base uses the NT network software, your network administrators may require energy management features of desktop computers be disabled. If this is the case, make sure computer monitors are manually shut off when not in use. Some computers are shipped in an activated state. Others require the user to enable the power management features. Work with your computer administrator to ensure all

equipment is activated. Sometimes the user turns off the power management features after a bad experience, such as having to wait a long time before the equipment powers back up. Survey the equipment in your building to see which equipment has power management features, and which of these are activated. Find out why the power management features on equipment are not activated. Then offer to work with the user(s) to develop an acceptable solution.

e. Sometimes it's just a matter of lengthening the time before the "sleep" mode kicks in. For example, a computer user who has deactivated the power management features because it turns off after one minute of inactivity may justifiably be annoyed to find the computer sleeping every time he answers the phone. Try adjusting the inactivity time period before the equipment goes into sleep mode. There is no right or wrong setting. The appropriate setting will depend on the user. Explain that you may have to experiment with settings, and that it may take several tries before an acceptable setting is found. Unless the equipment is used constantly, remember, even if the equipment only powers down a few times a day for a total of an hour or so, this is still better than no power down at all.

f. Remember, screen savers do not save energy. They are designed to protect the monitor. (They save the phosphors on the screen.)

g. Even though the power management features are activated, it continues to consume electricity in the "sleep" mode. Be sure equipment is turned off at night, on weekends, and during the day when they are not in use. A 150-watt PC/monitor will cost $105 per year (at 8 cents/KWh) to operate if left on continually. Turning it off at night and on weekends will save $80 per year in energy costs. Turning it off when not in use during the day can save another $15 per year.

h. Let no stone go unturned. Some office equipment, such as fax machines and computer network servers, may need to be left on at all times. This is the exception rather than the rule. Most equipment can and should be turned off at night and during weekends. Identify the equipment that must be left on. Delegate to one person the responsibility of turning off the other equipment. Don't just focus on computers and monitors. Turn off all nonessential equipment, including photocopiers and printers. Many multi-media computers today have speakers that

require a separate turn-off. Rule of thumb, if it plugs into an electrical outlet, then it's a good candidate for turning off when not in use.

i. Adopt strategies that use office equipment in a more resource conserving mode. For example, to reduce printer use, implement paper reduction strategies and use e-mail. Photocopiers use more energy than any other piece of office equipment. Be sure to buy or lease an Energy Star copier that is sized correctly for the job. To reduce its use, use e-mail, web sites, and "paperless faxing" where possible. Use double sided copying when possible. Try to use paper with a high-recycled content. Copying in batches significantly reduces energy consumption because the photocopier spends far less time in high-power mode.

4. HVAC Equipment

a. Heating, ventilating, and air conditioning (HVAC) systems can be the largest energy consumers in buildings. HVAC systems provide heating, cooling, humidity control, filtration, fresh air makeup, building pressure control, and comfort control, all with infrequent interaction between the occupants and the system.

b. Properly designed, installed, and maintained HVAC systems are efficient, provide comfort to the occupants, and inhibit the growth of molds and fungi. Well-designed and efficient HVAC systems are essential for your activity's buildings and employee productivity.

c. HVAC system improvements offer the greatest potential for energy savings in most facilities. Many opportunities, such as replacing equipment with more efficient models, improving controls, and retrofitting existing equipment to operate more efficiently, can require considerable capital expenditures that may be beyond your control.

d. If your facility's HVAC equipment, whether new state-of-the-art or old, is not functioning properly, your actions may be able to achieve considerable energy and cost savings and improved levels of comfort.

e. Your building is a unique set of systems—heating, cooling, and ventilation. Therefore, the suggestions that

follow are guidelines only. Discuss with your Energy Manager the best actions to take to ensure safe and efficient operation of your building's systems.

f. Many buildings are out of control, i.e.; systems and controls are not functioning the way they were intended to perform. Unfortunately, this holds true for new buildings as well as old buildings, because most buildings are not commissioned once construction is complete. Commissioning checks to see that the building is operating the way it was designed to operate, uncovering and correcting design and construction flaws. For example, automatic controls often operate in manual mode, their automatic features being totally wasted.

g. Get to know the building operator staff in charge of operation and maintenance of your building. Discuss how your job as BEM will help them operate the building's systems more efficiently, reducing maintenance requirements over the long term, and thus making their job easier.

h. Until deficiencies are detected and corrected, understand that your reporting of deficiencies will make more work, not less, in the immediate future for the building operator personnel. Don't be confrontational. Show them that you, the BEM, and building occupants want to be part of their team sharing a similar goal, a well functioning, efficient building without repetitive call-backs.

i. Check regularly with your building's occupants about their comfort, noting any problems, including uncomfortable temperature, drafts, mold and mildew, excessive or inadequate humidity, and suspected indoor air quality problems. Depending on the cause of discomfort, undertake simple repairs, or put in a work order request, e.g., to repair or replace broken window panes, install missing blinds on windows, and install plastic strip curtain barriers in industrial open bay applications. If these actions are not practical, report the problems to the appropriate personnel.

j. Periodically check exterior windows and doors to reduce infiltration of outside air entering a building through cracks around doors, windows, and through the outside shell of the building. Infiltration allows unwanted heat loss or heat gain. Replace dried or peeling caulk and weather stripping and apply new material where needed. Infiltration not only causes

discomfort to building occupants, but is also a major contributor to energy losses and unnecessary heating and cooling costs.

k. Make sure all exterior doors and windows are closed when heating or air conditioning is on, and investigate when this is not the case. Sometimes signs help to remind occupants to close doors. As mentioned above, excessive heat and cold may mean adjustment, repair, or replacement if necessary. Be particularly perceptive when the seasons change, and more or less heating/air conditioning is needed. Thermostat adjustments may be in order.

l. Inspect for air leakage in and around electrical outlets. Rubber inserts are generally available through self-help to seal leaky outlets. If your building has any unheated rooms or areas, keep doors closed to prevent infiltration to conditioned spaces.

m. Portable floor heaters are an energy and safety nightmare at a number of facilities. Find out about your Command's policy on floor heaters. If they require a doctor's slip or are outright banned, see that the regulation is enforced. Portable heaters suck up a lot of amps, they are dangerous, and they put a lot of load on the already taxed building electrical system. If they are allowed, consider implementing a campaign to retire them. Naval Surface Warfare Center, Crane's "Help Save Energy" campaign was successful in exchanging electric heaters for coffee mugs.

n. Make sure air conditioning grills and heating vents are not obstructed.

o. Cover or remove window air conditioners during the heating season.

p. Sunlight shining through your building's windows creates a lot of heat. This heat may be welcome, in a cold climate, or undesirable on a summer day. Ensure that window coverings such as drapes, shades, and blinds are adjusted accordingly, drawn in the summer and open in the winter.

q. If your building has a loading dock, make sure its door is closed when not in use.

r. Radiators operating at full output are common in older office buildings. Adding thermostatic valves to control hot water or steam output to each radiator enables occupants to maintain comfort without opening windows in the winter. In some situations, adding radiator controls can cut steam or hot water use by one-third. If you notice any steam or hot water leaking from the heating system, report immediately. A failed open steam trap with a 1/4-inch orifice at 15 psig pressure loses 394,000 pounds of steam annually. If the failed trap discharges into a condensate return line, you may not see the escaping steam. Steam heating systems need insulation. If you see any insulation missing or in poor repair, submit a work order.

s. Checklist Indicating Possible Steam Trap Failure

(1) Abnormally warm boiler room.

(2) Condensate receiver venting steam.

(3) Condensate pump water seal failing prematurely.

(4) Overheating or underheating in the conditioned space.

(5) Boiler operating pressure difficult to maintain.

(6) Vacuum in return lines difficult to maintain.

(7) Water hammer.

(8) Steam in condensate return lines.

(9) Higher than normal energy bill.

(10) Inlet and outlet lines to trap nearly the same temperature.

5. Lighting

a. Lighting accounts for about 20% of all electricity use in the United States and more than 40% of electricity use in offices, stores, and other commercial buildings.

b. As one of the top energy conservation measures energy professionals undertake, lighting offers several clear

advantages over most other conservation measures when planning equipment improvements.

c. High efficiency lighting systems are widely available, offering considerable energy savings over traditional lighting systems. These include a variety of controls capable of reducing light output and amount of time in use. Accurately estimating energy savings from lighting retrofits is usually easier than estimating savings from HVAC systems, because lighting requirements are much less dependent on variable weather conditions.

d. Even in buildings with new efficient systems, there is a lot you can do to cut waste.

(1) Suggest to building occupants that they use energy-efficient "task" lighting, where appropriate, rather than overall room illumination.

(2) Inform personnel to turn off fluorescent lights when not needed. Explain that fluorescent lamps do not use more energy to restart compared to leaving them on and that lights should be shut off any time they won't be needed for 15 minutes or more.

(3) Manual switches, time clocks, photocells, motion sensors, or energy management and control systems may provide control of exterior lighting. By automating controls, users need not manually switch lights on and off each night. Where time clocks are used, check periodically to ensure the time is set correctly and adjusted for changes in time of sunrise and sunset. Where photocells are used, they should be very sensitive to low light levels and placed in open areas, such as on roofs. Report any lights that operate unnecessarily during daylight.

6. Exit Signs

a. Exit signs use a surprising amount of electricity. Older style exit signs contain incandescent lamps. Although the electrical power demand of each sign is small, typically 24-40 watts, since operation is continuous throughout the year, each sign consumes between 210 and 350 kilowatts-hours of electricity per year. Consequently, we spend about $1 billion annually just to operate all the exit signs in buildings in the United States.

b. Replace or retrofit existing incandescent exit signs with more efficient lighting sources. Light-emitting diode (LED) exit signs are rapidly becoming the new standard. LED adapter kits are an economical retrofit based on life cycle cost. They combine extremely long rated life of LED sources (25+ years based on continuous operation) with ultra low consumption (less than 3 watts per face). Screw-in adapter kits are available in several voltages and socket base configurations and simply screw into existing sockets.

7. Compact Fluorescents

a. Compact fluorescent lamps (CFLs) are energy-efficient, long lasting substitutes for incandescent lamps. Introduced in the early 1980s, these lamps use about one-third to one-fourth the energy to produce the same light output, and last up to thirteen times longer than the incandescent lamps they replace, providing an attractive return on investment.

b. As a rule of thumb, 1 watt of compact fluorescent can replace 3 to 4 watts of incandescent lighting. For example, replace a 60-watt incandescent lamp with 15 to 20 watts of compact fluorescent. If the fixture efficiency can also be improved during retrofitting (for example by replacing a bare incandescent lamp in a recessed can fixture with a reflectorized screw-in CFL) up to 5 watts of incandescent can be replaced by 1 watt of fluorescent. Also consider whether a reduced light level would be acceptable, such as in a storage area.

c. Substitute compact fluorescent lamps for incandescent lamps, especially where burn hours are more than one hour per day. Substitution is best done by re-fixturing or re-socketing rather than by screw-in adapters. This will help to ensure that incandescent lamps are not later substituted when the CFL fails.

d. Look for applications with long burn hours. Interior and exterior hallways and walkways provide excellent cost-effective replacements for incandescent fixtures, since these locations typically have long burn hours. Wall packs and sconces containing CFLs make excellent retrofit fixtures for these applications.

e. The National Electric Code forbids the use of incandescent fixtures in small clothes closets and other locations where the heat from incandescent lamps can be a fire

hazard. CFLs can be used in many of these applications due to their low heat generation.

f. When replacing incandescent lamps in existing recessed cans with screw-in CFLs, it is often best to use a CFL with a built-in reflector or a retrofit CFL reflector fixture.

g. Some lamps take a second to turn on and flicker initially, and some do not. Compact fluorescents are available in different sizes and configurations, as well as warm and cool white. Consult your Energy Manager or supplier to select appropriate CFLs for each application.

h. Places to avoid using CFLs:

(1) Where there is a requirement for tight light beam control CFLs cannot focus their output as well as halogens and should be avoided.

(2) In spaces with ceiling height over 20 feet. For high bay spaces, too many CFL fixtures would be required to achieve a satisfactory light level. Consider metal halide lamps instead. For medium bay spaces (12 to 20 foot ceilings) fixtures holding multiple high output CFLs may be appropriate, especially if used with occupancy sensors.

(3) In areas where the temperature is likely to remain below 32°F for extended periods of time, make sure CFLs used are rated for low temperature use.

(4) In exit signs. Replace incandescent lamps with LED retrofits, which are an even more cost-effective alternative.

8. Occupancy Sensors

a. Occupancy sensors are triggered by infrared detection, ultrasonic emissions, microwaves, or sound. The first two technologies are the most popular, and hybrid infrared and ultrasonic sensors are available to combine the best features of both types. Sensors are either wall-mounted at the switch location or ceiling-mounted with remote control modules and relays.

b. Infrared sensors respond to movement of a heat source, such as a person moving in front of its field of view. Small motions, such as typing may not trigger infrared sensors. These

are suitable where there are no obstructions and they are not to be triggered by inanimate moving objects, such as a mobile twisting in an unoccupied classroom.

c. Ultrasonic sensors emit high-frequency energy in the 25 to 40 kilohertz range, well above normal human hearing. Objects moving in the space, even outside the direct line of sight, cause a frequency shift in the returning signal. Ultrasonic detectors are very sensitive to small movements, and may be triggered by windblown curtains or papers. These are suitable where obstructions such as bathroom partitions are present.

d. Wall mounted units are designed to replace standard wall switches, and are so easy to retrofit that facility managers may choose to use them at any time. The best applications are small rooms, such as private offices, bathrooms, copy rooms, and storage closets.

e. Ceiling mounted systems usually control several lighting banks through infrared/ultrasonic occupancy sensors, a remote low-voltage controller, and line-voltage relays.

f. Coverage area of sensors depends on the room arrangement, room geometry, presence of partitions, location of sensors, the sensor's sensitivity setting, the type of sensor, and type of motion. Manufacturers' ratings are very rough guidelines. Facility managers should plan to adjust the sensor's sensitivity for specific applications.

g. The Electric Power Research Institute estimates that occupancy controls save energy:

(1) Private offices 25%.

(2) Open offices 18%.

(3) Conference rooms 35%.

(4) Restrooms 40%

h. If occupancy sensors are not currently installed in infrequently used areas such as restrooms and conference rooms, investigate with the Energy Manager or PWC the possibility of installing them. To ensure occupant satisfaction, pay close attention to occupancy sensor selection and proper placement.

9. Electric Motors and Compressed Air Systems

a. Electric motors consume more than 50% of the total electricity used in the United States three fourths of industrial electricity costing between $70 and $90 billion per year.

b. Turn off unneeded motors. Motors are present in all buildings, not just industrial buildings. Locate and turn off motors that operate needlessly. For example, there may be multiple HVAC circulation pumps operating when demand falls, cooling tower fans operating when target temperatures are met, ceiling fans left on in unoccupied spaces, exhaust fans operating after ventilation needs are met, and escalators operating after closing.

c. Improve compressed air systems. Locate and repair compressed air leaks. Check air tool fittings for physical damage. Turn off air to tools when not in use.

d. Refer to the HVAC section for tips on reducing HVAC system loads, thus reducing the motor requirements for HVAC systems.

10. Water Heating

a. Water heating is a major fuel consumer in facilities with kitchens and laundries. Beyond reducing the use of hot water, various heat recovery and solar technologies can help reduce operating cost.

b. Repair hidden waste from failed shower diverter valves that cause a portion of the water to be dumped at a user's feet. This leakage is usually not reported to maintenance teams.

c. Check the water temperature. Scalding water is a sign of too high a temperature. Discuss with the Energy or Facilities Manager the possibility of turning down the temperature. If your water heater is set at 140 degrees F, set it back to 120 degrees F unless your building has old equipment, such as a dishwasher not equipped with internal heating element to raise the temperature to the required 140 degrees F (the temperature needed for detergents to clean effectively). Turning down the hot water temperature below 120 degrees F, however, may cause indoor air quality problems by allowing Legionella to grow inside domestic water tanks.

d. Conserving hot water not only saves water, but also saves the energy associated with heating that water. Refer to the section on Water Conservation for additional tips on reducing water-heating expenses.

11. Building Envelope. The building envelope or shell is the physical barrier controlling external heat gain and heat loss. The best opportunities for energy efficiency are in facility design, building orientation, and configuration; fenestration; and envelope design. These have substantial impact on building performance. There are many retrofit strategies that can improve the energy efficiency of existing buildings. Window and door treatments can minimize energy transmission through the shell. Understanding the local microclimate can help facility managers take advantage of passive measures. Refer to the HVAC section.

12. Water Conservation

a. It's cheaper to save water than waste it. Every drop that flows down the drain carries a double cost. First, in the form of higher water bills, and second, in the form of higher sewer bills. If wasted water is also heated, we pay a third time, for the energy used to heat that water. Proper water management can lead to substantial financial savings. Remember, when water is conserved, energy consumption is reduced for treating, heating, cooling, and transporting that water. Pollution prevention benefits accrue in two ways, reduced energy means, reduced air pollution, and less water means reduced amounts of chemicals to treat water.

b. Executive Order 13123 "Greening the Government Through Efficient Energy Management" requires DON to reduce water consumption through life-cycle cost-effective measures. The standards established for water consumption by the Energy Policy Act restrict showerheads to 2.5 gallons per minute, and urinals to 1 gallon per flush. Toilets for commercial buildings are required to use no more than 1.6 gallons per flush at 80 psi and faucets shall use no more than 2.2 gallons per minute at 60 psi.

c. Water use in the United States has doubled from about 200 billion gallons a day in 1950 to over 400 billion gallons a day in 1990. Federal agencies collectively spend more than $500 million annually on water and sewer costs.

d. Toilets account for almost one-half of a typical building's water consumption. Americans flush about 4.8 billion gallons of water down toilets each year. A leaking toilet can waste up to 200 gallons of water a day. Constantly running toilets can use 6,000 gallons a day.

e. Check toilets for leaks. If you hear water trickling through the toilet long after it's been flushed, it's leaking. Some leaks, however, are more difficult to detect. The easiest way to check toilets for these slow leaks is by adding several drops of dark food coloring to the toilet's tank. If water in the bowl is tinted 15 minutes later, then the toilet is leaking. Don't let anyone use the toilet when you're conducting this test. For tank-type toilets, a malfunctioning flapper valve, the rubber component of the tank, is the most common cause of leaks. Replacing a leaky flapper valve takes only about 5 minutes.

f. Check for leaking faucets. Repairing a leaky faucet dripping one drop per second can save 36 gallons a day. You may want to suggest having automatic shutoff faucets installed. Replacing a faucet with an automatic shutoff control that delivers a limited amount of water per use can save 5,000 gallons of water a year.

13. Controlling Electricity Demand Charges

a. Unlike your home electric bill, Navy and Marine Corps installations pay for their pattern of electricity use along with the quantity of electricity used. In addition to charging different rates for electricity based on the time of day the electricity is used, (called Time-of-Use-Rates), the utility also imposes a "demand charge" on large customers each month. Demand charges can make up as much as one-half of your facility's electricity bill.

b. Managing demand charges provides one of the best opportunities for Navy and Marine Corps personnel to reduce electricity costs. In an effort to control the total load on their system, the utility charges for electricity based not only on the amount of use, but also on when it is used. A kilowatt-hour used at one time may cost far more than a kilowatt-hour used at a different time. Special electric meters record power consumption at 15-minute intervals to identify peak demand.

c. For example, if the demand charge per kilowatt is $16.44 in the summer and $2.85 in the winter, and your installation reaches a peak of 100,000 kilowatts during a summer month, the "demand charge" is $1,644,000, and that's in addition to the rest of the bill. This charge is assessed even when a load is turned on for just one hour and the rest of the month you don't use any electricity.

d. Some utility companies assess "demand ratchets" which are minimum demand bills based on some percentage of the highest peak power metered over the preceding year. Consequently, one month's high demand can impact monthly charges for an entire year.

14. Load Shedding

a. You can save your installation thousands, if not tens of thousands of dollars, by practicing effective load shedding techniques appropriate to your facility. Load shedding is not designed to reduce energy consumption, but rather to shift usage to reduce or "shave" peak demand, which will result in lower demand charges.

b. First and foremost, familiarize yourself with your installation's load shedding initiatives and programs. Double your efforts at shedding unneeded loads during peak demand times. Minimizing waste can be as simple as turning off lights and equipment when not needed. These simple actions taken during the hottest day of the year when every load contributes to skyrocketing demand charges can make a tremendous impact.

c. Ask your building's personnel to turn loads off during the installation's monthly peak demand interval, or schedule them for periods of lower demand when operational considerations permit.

15. Energy Awareness. To be successful, a Building Energy Monitor Program needs not only your hard work, dedication, and commitment, but also support at all levels, from the building occupants to the Commanding Officer. Activities throughout the Department of the Navy have set up various programs and regular events to actively engage the participation of personnel at all levels. After reviewing the following ideas based on actual DON Building Energy Monitor Programs, discuss with your Energy Manager and/or Energy Management Team which would be appropriate for your building:

16. Navy and Marine Corps Energy Efficiency

a. Set up a suggestion box for personnel to submit energy and water-saving ideas. Marine Corps Logistics Base Barstow has a beneficial suggestions program that is base funded. The "prize" money amount is based on amount of savings realized from the suggestion.

b. Conduct building energy audits on a periodic basis. One on one building energy audits are conducted jointly by the BEM and the Station Energy Manager at Naval Air Station Whidbey Island. These walk-throughs provide information on existing conditions and provide "up close and personal" contact with all facility personnel. This enhances energy awareness as it acquaints monitors with others in the trenches so they know who to contact and what can be done when problems or deficiencies arise or when recommendations or suggestions are made.

c. Follow through with actions based on the results of your energy audits. Self-help jobs, service calls, or "attitude adjustment" initiatives are developed by the BEM/EM team based on the list generated during the walk-through audit of the building at Whidbey Island. Extensive project scope deficiencies and or recommendations are also identified for potential future development.

d. Issue energy waste tickets. Station security personnel, department heads, and building monitors at Miramar issue the tickets for energy wasting actions such as leaving lights or air conditioning on after hours. Ticket recipients are informally asked to explain why the waste occurred and what actions might be taken to reduce or eliminate a recurrence.

e. Keep your building occupants informed of the issues and your base's goals, objectives, programs, and events. The Energy Management Steering Committee at Naval Air Station Whidbey Island established a comprehensive network of Building Energy Monitors to serve as the focal point for distribution of energy information, data gathering and feedback on program progress. The BEM network ensures distribution of awareness materials to military and civilian personnel throughout the base. Keyport uses its existing network of building supervisors, energy monitors, and facility engineering teams to circulate posters, flyers, and Energy Awareness training bulletins. Training bulletins are generated bimonthly and circulated to each Center

supervisor. Supervisors are responsible for ensuring that each employee has access to the information.

17. Celebrate Energy Awareness Week and Earth Day/Week

a. What better times to promote energy and water efficiency than October, Energy Awareness Month, and in particular Energy Awareness Week, the last full week in October? Earth Day, 22 April, provides another opportunity to promote energy and water efficiency as part of our environmental responsibility and stewardship.

b. Your Energy Manager receives promotional materials to support Energy Awareness Week events. Work with your Energy Manager to develop a materials distribution strategy that will maximize the impact.

18 Navy and Marine Corps Energy Efficiency

a. To prepare attractive flyers, energy- and water-saving tips and messages, as well as base and local newspaper articles, take advantage of the tools on the Navy's Energy Awareness website developed to assist you in your awareness and education efforts. Set your browser to http://www.energy.navy.mil and select the Awareness/Awards pick. Among the downloadable material available at the Tools button are clipart with an energy theme, energy and water tips and facts, motivational quotes, a 17-part Flip & Drip advice column, and Building Monitor success stories. On a lighter note, click on the Puzzlers button for humorous treatments of energy and water matters.

b. Develop with your Energy Manager bulletin board messages, Plan-of-the-Day/Plan-of-the-Week messages, e-mail messages, and post or distribute to educate and motivate your building's occupants and keep them informed of important events and happenings.

c. Earth Day is 22 April. Since most events and festivals need to take place on a weekend, Earth Day is normally observed on the weekends before and after 22 April whenever Earth Day falls on a weekday.

d. On 22 April 1970, 20 million Americans celebrated the first Earth Day to create a national environmental awareness. Earth Day 1970 generated widespread public support that led to

swift enactment of far-reaching environmental legislation, including the Clean Air Act, Clean Water Act, and Endangered Species Act, as well as creation of the nation's Environmental Protection Agency.

e. By 22 April 1990, Earth Day's 20th anniversary, Earth Day had extended to a global audience, with 200 million people in 141 nations taking part in the first broadly international Earth Day.

f. Plan events for your building around base and community Earth Day events. Make sure these events have a strong energy and water theme.

Energy Program Building Assignments

Responsible Unit	Building #	Description
H&S Battalion	10	Finance Center/Disbursing
	11	Fiscal/Comptroller
	144	BEQ/Administrative
	145	BEQ/Administrative
	146	BEQ/Administrative
	149	H&S Bn Messhall
	154	Depot HQs
	159	Supply HQs/Property Control
	283	Visitors Center/PAO
	287	Combat Camera
	292	Post Office
	293	Law Office
	295	Food Service
	500	Supply Warehouse
	565	Force Preservation
	566	Band
	602	TMO
	696	Bucket Issue
	697	Bucket Issue
	923	IPAC/Education Center
	1050	G6
	4063	ASP Office
	6001	Armory
	6005	Band
	6007	Depot Clothing
AC/S, I&L G-4	18	Lyceum
	111	Gym/Museum
	115	Pre-school Building
	151	G-4 Building
	157	Dispatch Office
	161	Chapel
	163	NCIS
	172	MCCS Admin
	286	HRO
	330	Osprey Inn I BEQ
	331	NCO Barracks
	332	Osprey Inn II BOQ
	450	FMD
	670	Medical Clinic
	674	Dental Clinic

	854	Religious Ministry Center
	903	6th District HQ
RTR	288	RTR HQ
	737	Recruit Barracks (Wpns Bn)
	738	Recruit Barracks (Wpns Bn)
	739	Recruit Barracks (Wpns Bn)
	751	Recruit Barracks (Wpns Bn)
	929	BEQ
	930	BEQ
	931	BEQ
	942	DI School
	6002	Recruit Chapel
	7001	Recruit Barracks (Wpns Bn)
	7003	Recruit Barracks (Wpns Bn)
	7701/2/3/4	Modular Barracks (Wpns Bn)
RTR (1st RTBn)	589	Recruit Barracks
	590	1st Bn Messhall
	591	Recruit Barracks
	592	1st Bn Hq
	5101/2/3/4	Modular Barracks
RTR (2nd RTBn)	598	2nd Bn HQ
	599	Recruit Barracks
	600	2nd Bn Messhall
	601	Recruit Barracks
	6201/2/3/4	Modular Barracks
RTR (3rd RTBn)	400	3rd Bn HQ
	410	3rd Bn Messhall
	416	Recruit Barracks
	417	Recruit Barracks
	418	Recruit Barracks
	419	Recruit Barracks
	420	Recruit Barracks
	421	Recruit Barracks
	422	Recruit Barracks
	423	Recruit Barracks
	424	Recruit Barracks
	4301/2/3/4	Modular Barracks
RTR (4th RTBn)	926	4th Bn Messhall
	927	4th Bn Female Clothing
	933	4th Bn HQ

	934	Recruit Barracks
	938	Recruit Barracks
	939	Admin Bld/BAS
	941	Recruit Barracks
RTR (Spt Bn)	848	Spt Bn HQ
	6000	Recruit Receiving
	6004	MRP/PCP Barracks
	6008	Training Pool
	6011	Recruit Training Facility
	6100	Leatherneck Sq Admin
WFTBn	700	WFTBn HQs/Barracks
	730	ISMT
	740	WFTBn Messhall
	771	Marksmanship Training Unit
	791	WFTBn Chapel
	4061	WFTBn Crucible

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JUN 18 2009

MCRDPI Building Energy Monitor Checklist

Monitor's Name: _____

Building #: _____

Inspection Date/Time: _____

		Yes	No
1.	Thermostat setting correct at 78°F cooling or 68°F winter		
2.	Unused areas closed off		
3.	Exterior doors/windows closed when A/C or Heat is on.		
4.	Air conditioning or heating system turned off after normal hours		
5.	Air filters are clean		
6.	Are air conditioning vents unobstructed		
7.	No portable electric space heaters in use		
8.	No visible air leaks around doors or windows		
9.	Windows are not broken or cracked		
10.	Steam system intact with no visible leaks		
11.	Lights are off in unoccupied spaces		
12.	Exterior lights are off during daylight hours		
13.	Fixtures are clean		
14.	All lamps working properly with no lamps burnt out or flickering		
15.	All incandescent lamps have been removed/replaced with CFL		
16.	Exit signs work properly		
17.	All exit signs use LED or other energy conserving lamps (no incandescent lamps)		
18.	Lights turned off when daylight is sufficient		
19.	Building occupants are using task lighting where appropriate		
20.	Ambient light levels lowered when task lighting in use		
21.	Task lighting is OFF when not necessary		

22.	Unneeded light bulbs removed from vending machines		
23.	Power management features of computers/monitors activated		
24.	Computers, monitors, photocopiers, and/or printers turned off after normal working hours		
25.	Hot water set at proper temperature		
26.	Hot water pipe insulation is adequate and intact		
27.	Faucets show no signs of leaking		
28.	Faucets are low-flow or have low flow aerators		
29.	Toilets show no signs of leaking		
30.	Low flow showerheads are installed		

Energy Monitor signature:_____

Date:_____

Building POC signature:_____

Date:_____

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JUN 18 2009

MCRD PI Utilities Conservation Violation Report

Date: _____

From: Energy Manager, MCRD Parris Island
To: Officer in Charge, _____(Activity/Unit)

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Locations and Findings:

_____

_____

_____

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Recommendations or Remarks:

_____

_____

_____

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Action Justification Required: Yes ( ) No ( )

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Date: _____
From: Officer in Charge,_____(Activity/Unit)
To: Energy Manager, MCRD Parris Island

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Action/justification:

_____

_____

_____

_____

_____

Signature: Title/Rank:

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Return this Utilities Conservation Violation Report with actions/justification to the Facilities Maintenance Division, Building 450, within 10 working days of the date of issue.

DepO 4101.3

JUN 18 2009

Consolidated Unit Energy Report

H&S Consolidated Unit Report	10	144	145	146	149	163	172	292	293	565	669	274	920	921	922	923
Thermostat setting correct at 78°F cooling or 68°F winter																
Unused areas closed off																
Exterior doors/windows closed when A/C or Heat is on.																
Air conditioning or heating system turned off after normal hours																
Air filters are clean																
Are air conditioning vents unobstructed																
No portable electric space heaters in use																
No visible air leaks around doors or windows																
Windows are not broken or cracked																
Steam system intact with no visible leaks																
Lights are off in unoccupied spaces																
Exterior lights are off during daylight hours																
Fixtures are clean																
All lamps working properly with no lamps burnt out or flickering																
All incandescent lamps have been removed/replaced with CFL																
Exit signs work properly																
All exit signs use LED or other energy conserving lamps (no incandescent lamps)																
Lights turned off when daylight is sufficient																
Building occupants are using task lighting where appropriate																
Ambient light levels lowered when task lighting in use																
H&S Consolidated Unit Report	10	144	145	146	149	163	172	292	293	565	669	274	920	921	922	923
Task lighting is OFF when not necessary																
Unneeded light bulbs removed from vending machines																
Power management features of computers/monitors activated																
Computers, monitors, photocopiers, and/or printers turned off after normal working hours																
Hot water set at proper temperature																
Hot water pipe insulation is adequate and intact																
Faucets show no signs of leaking																
Faucets are low-flow or have low flow aerators																
Toilets show no signs of																

leaking																
Low flow showerheads are installed																

Notes: