Solar PV Array at Chievres Air Base, Belgium

IMCOM Building Energy Monitor Program

Building Energy Monitor Handbook

14 DEC 2016

This handbook incorporates the Army's Building Energy Monitor's Handbook and best practices collected across IMCOM. The intent of this handbook is to educate and guide appointed Building Energy Monitors (BEM).

INTRODUCTION

Energy Management makes good sense and increases comfort, productivity, and savings. Your active involvement is not only good for your unit, but it builds upon the Army's Energy Security and Sustainability Strategy goals. These 5 goals are:

GOAL 1: Inform Decisions

Leverage Army culture to use resources wisely, improve mission effectiveness, and preserve future choice.

Army culture is the foundation that supports all we do. We will leverage those aspects of Army culture that emphasize reducing risk and developing the future force through improved resource use. We will ensure that Army planning and decision-making processes fully consider the current and long-term resource implications. Commanders, program executives, and garrison leadership teams must have knowledge of and access to the information necessary to assess how the direct and indirect consequences of their decisions affect capabilities, resource utilization, and associated vulnerabilities.

GOAL 2: Optimize Use

Minimize demand and increase both efficiency and recovery to maximize resource and mission effectiveness for systems, installations, and operations.

The Army will improve productivity by reducing resource demand, investing in increased efficiency or enhanced recovery, and switching to renewable resources. Improved resource use can increase security and reduce expenses. We will minimize our environmental impacts from systems, installations, and operations by using natural resources more productively.

GOAL 3: Assure Access

Provide reliable access to energy, water, and land resources and protect delivery mechanisms to mission-essential functions and applications, both domestically and to contingency bases during operational deployments.

The Army will continue to ensure that mission essential and supporting assets are available and secure by pursuing options to diversify and expand resource supplies, to increase redundancy and multiple distribution pathways, and to manage vulnerability and risk.

GOAL 4: Build Resiliency

Advance the capability for systems, installations, personnel, and units to respond to unforeseen disruptions and quickly recover while continuing critical activities.

Resilience expands our focus from protecting key systems against specific threats to an outcome orientation that emphasizes flexibility, diversity, and a proactive posture. Resilience requires coordinated action to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. Adopting flexibility and adaptable approaches at all levels, from individual to enterprise, ensures that we can accomplish the mission in the face of both near- and long-term change.

GOAL 5: Drive Innovation

Identify new concepts; develop, test, and field new processes and technologies; and institutionalize and communicate best practices to maximize resource effectiveness.

While we continually seek out technological and doctrinal innovations, we need to link these innovations to more effective use of energy, water, and land to maximize our capabilities. As we invest in new technologies and the capabilities that they create or enhance, we need to ensure that we include the life-cycle energy and water requirements so that we maximize each technology's effectiveness.

Your goal is to assist in identifying and eliminating energy and water waste according to your buildings unique set of efficiency opportunities based on mission requirements and operations.

This guide provides an overview of energy and water conservation measures. Familiarize yourself with these measures, then tailor a program for your assigned building.

Your success and your Command's success 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.

Also, keep in mind that energy management excellence is rewarded through the Secretary of the Army Energy Conservation Awards and the Federal Energy and Water Management Awards programs. These programs recognize both individuals and organizations who do things which make good energy sense. Check with your installation's Energy Manger for more details on these programs and to see if there are any other award opportunities.

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CHAPTER 1: Building Energy Monitor

You are the first line of defense. You physically occupy the buildings that need to be monitored and checked on a regular basis.

If your building has been modernized or recently renovated, it is important to re-educated occupants on how the building operates in order to provide comfort and improved efficiency. If your building has not been modified, look for opportunities that make the building operate as efficiently and comfortably as possible.

RESPONSIBILITIES

Your primary responsibility is to help your organization buildings achieve federal mandates by raising awareness to the building occupants and actively engaging in conservation measures with the installations energy team. Work with the Energy Manager to help focus your efforts toward a common goal. As a Building Energy Monitor (BEM), your responsibilities include:

- Be appointed in writing to serve as your building(s) point of contact for energy conservation matters.
- Initiate and follow-up on work orders for low-cost maintenance and energy conservation measures (ECMs).
- Ensure your organization is complying with applicable Energy Efficiency and Water Policy requirements.
- Ensure all operations involving energy and water use are reviewed and all reasonable conservation measures that do not affect operations or quality of life.
- Monitor the operation of your building.
- Ensure chain of command leadership is briefed on the status of the building(s) and is taking a proactive approach.
- Conduct energy inspections monthly in occupied buildings and bi-monthly in unoccupied buildings using the Building Energy Conservation Checklist provided by your Energy Manager. Maintain checklists for one year.
- Trained annually and within an appropriate timeframe of being appointed.
- Report change in occupancy, especially empty buildings due to deployments. The Energy Manager will be able to adjust the buildings settings to reflect the new usage levels.

To do your job, you will need to know something about the water and energy-consuming components of a building and how they can work more efficiently. The concepts in this handbook will help you get some ideas for ECMs. If you find an ECM, you should discuss it with the Energy Manager. If it is technically sound, you might be requested to prepare and submit a work order or service order. If the idea requires a capital investment or is applicable to a broad range of buildings, the Energy Manager may manage the project. Additionally your organization can fund ECMs or perform self-help items that benefit your co-workers and shows commitment to the program. If you do plan on completing ECMs yourself, coordinate with the Energy Manager and follow local policies. In addition it is recommended to obtain additional training outside the BEM program. There are numerous local and national programs that offer courses and certifications.

COMPLIANCE

The Army is promoting an energy and water stewardship culture. Providing members with the mindset and skills necessary to use energy and water more efficiently and effectively, thus contributing to increased performance in accomplishing Army missions. A culture of energy and water stewardship enhances the Army's ability to project power and to operate in austere environments in response to unforeseen contingences. The follow are the current key Army Policies and Regulations.

- Energy Independence and Security Act of 2007 (EISA07), Section 432, dtd 19 Dec 07
- Energy Policy Act of 2005 (EPAct05). dtd 8 Aug 05
- Executive Order 13514 – "Federal Leadership in Environmental, Energy and Economic Performance" dtd 5 Oct 09
- Executive Order 13693 – "Planning for Federal Sustainability in the Next Decade" dtd 25 March 2015
- AR 420-1, Army Facilities Management, Chapter 22, Army Energy and Water Management Program, dtd 28 Mar 09
- Memorandum from ASA (IE&E), Sustainable Design and Development Policy Update, dtd 16 Dec 2013

CHAPTER 2: Building Envelope

The building envelope is the physical separator between conditioned interior space and the exterior environment. It insulates us against air, water, heat, light and noise.

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 building managers take advantage of passive measures.

Heat is lost or gained due to outside air entering a building through cracks around windows, doors and through the outside shell of the structure. Not only does it cause discomfort to building occupants; it is a major contributor to unnecessary heating and cooling costs and energy losses. The following ECMs will help reduce the rate of infiltration into your building and the associated energy use:

- Ensure that all doors are closed, especially during the heating and cooling seasons. Signs help to remind occupants to close doors.

- Keep doors closed between unheated/uncooled rooms and conditioned areas. Ensure these doors are properly insulated.

- Ensure all windows remain closed during the heating and cooling seasons. If people continuously leave their windows open during the heating or cooling season, then this is an indication that the heating or cooling control system may be broken and needs repair.

- Ensure loading dock doors are closed when not in use and have dock curtains installed.

- Periodically check the weather stripping and caulking. If you can see light or feel a draft, then it needs to be corrected. If it is old and dried, peeling, or missing have it repaired/ installed. Installation self-help centers may have caulking and weather stripping available for your use.

- Report roof leaks and any water/ wind intrusions.

- Inspect for air leakage in and around electrical outlets. Rubber inserts are generally available through self-help to seal any leaky outlets.

- If the building is drafty, check to see if there is insulation in the attic, walls and under the floors if it is above grade.

- Ensure cracked or missing windows are reported and immediately repaired.
- If your building has a significant amount of traffic, a vestibule or revolving door might be installed to reduce infiltration.
- Check for cracks or openings outside the building. Inspect the joints where the foundation meets the siding or wherever exterior walls are penetrated by pipes, ducts and conduits. Such openings are candidates for caulking.
- If your building has many entrances suggest closing some off, fire codes permitting. Likewise, ensure fire exits are not propped open or used as general exits. If these are not alarmed, consider adding a door alarm.
- If your building has window air conditioners (if permitted by local policy), make sure that they are covered and vents are closed during the heating seasons or have them removed whenever possible.
- If people continuously leave their windows open during the heating or cooling season, then this is an indication that the heating or cooling control system may be broken and needs repair.

CHAPTER 3: Ventilation

Ventilation has a significant impact on a building's total energy consumption. Air brought into your building must be heated or cooled and, in some cases, humidified or dehumidified. If more air is used than is needed it translates into energy waste.

Energy savings arise from reducing ventilation rates and/or shutting off the ventilation system when it is not needed. However, you must take some care in looking at these ECMs. Check with the Energy Manager to assure that complete analyses are done and building code requirements are met. The following ECMs will assist you in seeking savings due to excess ventilation:

- Suggest that ventilation units operate only as needed. Consider shutting them off to any area that will remain unoccupied.
- Do not block the ventilation system with cardboard, plastic bags, or other items in an attempt to change the amount of air flow.
- Periodically inspect the condition and operation of outside air dampers. Faulty operation or bad fit causes loss of heated or cooled air.

- Inform the Energy Manager when the ventilation system can be turned off completely.

- Engage with the Energy Manager to investigate the possibility of installing time clocks or motion detecting sensors in common use areas such as toilets so that the fans and lights are not energized all the time.

- Engage with the Energy Manager to learn how dampers on heating and cooling systems should be set for a particular season.

- Check crawl space ventilators to assure they are open in the summer and closed in the winter.

- Know your maintenance schedule to ensure that filters and systems are being serviced timely.

NOTE: If odors or other symptoms of poor ventilation become apparent, bring them to the attention of the DPW.

CHAPTER 4: Water

Hot water generation and its consumption often account for up to 10% of a building's energy use, more if your building has dining, cafeteria, or laundry facilities. There are many opportunities for saving energy, but most will require the installation of new equipment. This work should be done together with your Energy Manager. Hot water temperature is governed by Army Regulations, Energy Directives, and local laws. Check with your Energy Manager to obtain the proper temperatures for your building.

Usually hot water is supplied at a temperature that is too hot to be used directly. Cold water must be mixed with it at the tap. Here are some possible energy savings tips:

- Check with the Energy Manager to see if the DPW can reduce the hot water temperature for domestic, administrative, or general cleaning. Sometimes boosters can be installed where the temperature must be higher (i.e. dishes, laundries, etc.)

- Check to see if self-closing or automatic sensor faucets can be installed.

- Ensure that all of your sinks and showers have low flow aerators. Flow rates should be 0.5 gallons per minute (GPM) for public lavatory faucets, 1.5 GPM for private lavatory facets (such as barracks, housing) and 2.0 GPM for showers. Most aerators have the flow rates marked on them.

- Check toilets for leaks. Any sounds or movement of water, when the toilet is not being flush is an indicator of an issue.
- Check to verify your facility has low-flow plumbing fixtures.
- Inspect and have insulation repaired on hot water piping and tanks.
- Report all leaks, including those at the faucet.
- Shut off the hot water pumps when the building is unoccupied.
- Report unauthorized use of external watering.
- Report leaking fire hydrants.

CHAPTER 5: Heating

A building's energy savings can be best realized through its heating and cooling systems. There are many operational items that you should keep in mind: your building is a unique combination of systems – heating, cooling, and ventilating. Therefore the suggestions that follow should be considered as guidelines only, and any major changes must be cleared with the Energy Manager.

Energy expended to heat your building to comfort level conditions when it is unoccupied is wasted. Save energy by setting back the temperature during the unoccupied times. The below table shows the temperature ranges per Army Regulation 420-1, however check with your Energy Manager for any supplemental policies and special facilities.

HEATING		
Type of Room	**Occupied Temp**	**Unoccupied Temp**
Occupied Working and Living Spaces	72°F + /- 2°F	55°F + /- 5°F
Warehouses and Maintenance Bays Spaces (if frequency occupied on a daily basis)	60°F + /- 5°F	45°F + /- 5°F
Warehouse Spaces (if infrequently occupied on a daily basis, and does not need freeze protection)	Do Not Heat	Do Not Heat
IWA Army Regulation 420-1		

With these temperatures as guides, consider the following:

- Check with your Energy Manager to see if your building has a utility monitoring and control system (UMCS). If so, see if you can get read-only access or get a report on your buildings usage.

- Ensure proper controls/ thermostats are installed in order to operate your building efficiently. Ensure installed equipment is operating properly and not broken or tampered with.

- Ensure that the thermostats in your building are tamperproof. Install cover locks, if necessary. Educate building occupants on Army regulated temperature settings.

- Radiator or heater registers shall be shut off completely in vestibules, corridors, stairwells and lobbies unless necessary for freeze protection.

- If your building is used after-hours, ensure occupied areas are limited to assure that you do not heat the entire building unnecessarily.

- During particularly cold weather, encourage your building's occupants to wear warm clothing.

- Ensure air vents and intakes are not obstructed and lines have proper insulation.

- Space heater are prohibited unless approved by the DPW.

The outside conditions can often cause considerable energy loss due to heat escaping through windows and exterior walls. A few simple ideas are:

- If the winter sun is shining on a window, take advantage of it and use it to partially heat the room. On the other hand, when the winter sun does not shine on windows, recommend that the occupants draw the drapes, shades or blinds to help insulate the room.

- Periodically check to see that windows are tightly closed in winter. Open windows are generally a sign that the building is overheated. Inform the Energy Manager if this occurs. Speak to those occupants with windows open to see if a demand maintenance order is needed to fix a building issue or educate the building occupant on how their actions are contributing to unnecessary energy waste.

- Refer to the section on building envelope to look into weather-stripping and caulking.

- If your building's occupants complain about cold areas, suggest that they rearrange their rooms to place desks away from exterior walls and windows that may cause drafts.
- Keep the windows clean to permit maximum sunlight transmission during the winter.
- As you look at the outside of your building, check to see that foliage is trimmed, especially around the southern, eastern and western walls.
- If you notice any steam or hot water leaking from the heating system, immediately inform the Energy Manager. Such leaks can mean substantial energy losses.
- Check around the radiators of your building and report leaks.
- If insulation is missing or in poor repair, submit a order to correct the problem.

CHAPTER 6: Cooling

Monitoring the cooling system and its operation can save significant amounts of energy. You should control the operational hours of the cooling system while providing the comfort that building's occupants need. Energy used to cool your building during unoccupied periods is wasted. The below table shows the temperature ranges per Army Regulation 420-1, however check with your Energy Manager for any supplemental policies.

COOLING		
Type of Room	**Occupied Temp**	**Unoccupied Temp**
Occupied Working and Living Spaces	74°F + /- 2°F	85°F + /- 5°F
Storage, equipment rooms, garages	Unconditioned	Unconditioned
IAW Army Regulation 420-1		

Other ideas for energy conservation are:

- Check with your Energy Manager to see if your building has a utility monitoring and control system (UMCS). If so see if you can get read-only access or get a report on your buildings usage.

- Ensure proper controls/ thermostats are installed in order to operate your building efficiently. Ensure installed equipment are operating properly and are not broken or tampered with.

- Ensure that the thermostats in your building are tamperproof, install cover locks, if necessary.

- Ensure the air conditioning systems do not run all night or during days when the building is unoccupied.

- Use outdoor air for cooling and natural ventilation especially in the early morning and late evenings.

- If cool outdoor air is available, consider cooling the building during the night and early morning hours using only the outside air with the mechanical A/C off if humidity levels permit.

- During hot weather, adjust the blinds, drapes or shades to prevent sunlight from heating the building.

- If drapes, shades or blinds are not available in your building, check with the Energy Manager about having some installed.

- Treat skylights as you would a window. They may need shading devices installed if they contribute to excessive heat gain.

- Ask building occupants to turn off air conditioning systems or contact UMCS operators if they plan to be out of their office for a considerable period of time.

- As in the heating system, check for leaks and faulty maintenance.

- Keep foliage and plants out of air intakes and air exhausts.

- Schedule clothes washing and drying in cool morning hours which also reduces installation electrical demand contribution.

- Investigate if shade trees can be added to the landscape surrounding the building.

CHAPTER 7: Lighting

There are many possible ways to save on lighting energy. It is especially important for you to recognize that major alterations to the lighting system can have impacts on the building heating and cooling system.

Before making suggestions, you must recognize that lighting is a system. Many elements are interrelated. While energy can be conserved by properly implementing the suggestions offered below, these actions should be taken only after you look into the effects on the entire system.

Turn off a light when not needed -– even for a short period of time. A policy of “Use when needed, otherwise shut them off,” works best. To help execute this policy you may want to consider the following:

- Ensure all switches are placed in visible locations so that occupants will remember to turn off the lights.
- Eliminate lights if not needed in storage rooms and delamp vending machines and bulletin boards. Reduce lights in meeting rooms and unassigned areas (as local policy and safety allows).
- Ensure lights are turned off when the building is unoccupied except those needed for security and emergency egress.
- Automatic lighting controls may need to be recalibrated. If lighting controls are not working properly, inform the DPW.

Another major area for possible lighting savings comes from improving the effectiveness of existing lighting. Most of these savings, as you will see, arise from proper building maintenance.

- Lighting fixtures, especially around fluorescent lamps, should be kept clean.
- Interior building walls should be kept clean and painted using light colored paint.
- If your building is undergoing renovation, use light colors for walls and floors to improve the reflected light.
- If your building has many high partitions, you might look in to the potential for lowering them and “sharing” the light among the occupants.

- Incandescent bulbs are not allowed and shall be replaced with compact fluorescents or LED bulbs.

If possible in your building, suggest to the occupants that they make maximum use of daylight for their lighting. Appropriate use of this source will save electrical energy, decrease the heating requirements and generally not increase the building cooling load.

- To use the daylight, be sure windows and skylights are clean and cleared.

- Check blinds, drapes, and shades – open them to improve the use of daylight, but don't forget how this may affect the cooling system.

- Turn off overhead lights when not needed. Treat them like any other light, turn them off when not needed.

- Just removing tubes from a fluorescent light does not stop the light from using electricity. The ballast, a small transformer that provides the high voltage necessary to strike the tube, needs to be disconnected. Submit a work order or contact the Energy Manager to have them removed.

The lighting suggestions that follow require the assistance of your Energy Manager to help with a survey and the detailed calculations that may be needed.

- Ensure there are no incandescent lights installed in your building (inside and outside). These lights are not allowed. This includes incandescent lights installed by employees in personal lamps.

- Lights in corridors may be eliminated without a significant reduction in lighting levels.

- Ensure all restrooms, hallways, storage rooms are equipped with motion sensors.

- Conduct a walkthrough of the outside of the building to ensure outdoor lights are off during the day. Ensure outdoor lights such as athletic fields and athletic courts are off when not needed.

- If outdoor lights are on switches, request that they be put on light sensors or motion sensors.

- In many areas of a building, storage or corridors, for example, the existing lights can be replaced with lower wattage lights.

- Ensure burnt out lights are replaced with high efficiency lights, including LED retrofits.

- Ensure building occupants use “task” lighting rather than overall room illumination. This gets more of the light where you actually need it rather than lighting the whole room. Task lights shall use CFL or LED bulbs, not incandescent lights.

- Request the installation of dimmers to take advantage of daylighting.

- Overlit areas that are too bright, may be delamped to reduce the light levels and energy consumption. Alternatively lights can be changed to different wattages. Your energy manager can give you guidance on proper lighting levels.

- Some areas with available daylighting may be good candidates for light dimming systems that adjust the electric lighting with the amounts of natural daylighting.

CHAPTER 8: Office Equipment

Office equipment is often overlooked when energy conservation measures are implemented.

- Scanners, copy machines, faxes, printers and other such equipment shall be programmed with sleep modes to activate automatically when not in use. Equipment is required to be Energy Star rated and have a sleep mode. Purchase of equipment that does not meet Energy Star or FEMP designation is not authorized.

- Scanners, copy machines, printers and other such equipment will be turned off at the end of every work day, on weekends and holidays. Eliminate or unplug office equipment no longer being used or rarely used.

- If possible, do not make photocopies or print documents; conduct all business electronically. Reduce the number of printers serving a work area.

- Eliminate and remove all unauthorized refrigerators, microwaves, coffeepots, space heaters, and other appliances that service only one or two persons. Permit only the quantity of appliances needed for the number of personnel. Turn off or unplug all office/home appliances when not in use for extended periods of time.

- Remove non-Energy Star appliances from the workplace. Remove non-complying appliances from the building so that they do not simply move to another office.

CHAPTER 9: Specialty Buildings

There are many special buildings in the Army inventory which have unique needs and requirements. These include laundries, computer facilities, kitchen, etc. The energy conservation techniques suggested in the preceding sections will work in these buildings, but some specialized techniques and things to look for are necessary. We discuss some of them in this section.

Laundry: The laundry is obviously a major consumer of hot water for washing and hot air for drying. There are many opportunities for energy conservation but most will require detailed assistance from the Energy Manager. If these ideas look feasible to you, be sure to suggest them to the Energy Manager so that appropriate analyses can be carried out.

- Combine operations to reduce the number of washers and post signage to encourage washing of full loads.
- Many laundries have installed heat recovery devices. While these devices have a high capital cost, it is often recaptured with the savings in energy.
- Suggest that the laundry use cold water detergents.
- Be sure that water filters are cleaned regularly. Keep the basket and the working parts of the washer clean for maximum efficiency.
- Suggest that clothes be sorted according to type and run washers on the minimum cycle necessary for clothing to become clean. Set timers appropriately.
- Clean lint screens and exhaust blowers at least twice each day.

Computer Facilities (Data Centers): Computers often need very particular environmental conditions for their efficient operation. However, these are often not followed completely. Doing so can save energy for the installation.

- Ensure Energy Star equipment is installed in both data centers and personal computers and equipment (if applicable).
- Check the manufacturer recommendations for temperature levels and humidity requirements and see if they are followed. Ensure your IT personnel are involved in this process.
- Lower lighting levels to those recommended by the manufacturer or lighting code.

- Don’t confuse main frame computers with personal computers. Each have different operating requirements. Turn off personal computers when not in use according to local policy.

Kitchens and Other Similar Facilities: These types of buildings, located throughout the base, are major consumers of energy. Whether they are in the Post Exchange or the Officer’s Club, savings can often be obtained. Again, analyses will often be required; check with the Energy Manager.

- Suggest the reduction or possible elimination of humidification.
- Exhaust fans serving kitchens are often interlocked with outside air fans or dampers. Be sure the staff shuts down the entire system when not needed.
- Combine cooking areas together to reduce ventilation needs.
- Dishwashers are major consumers of hot water. Often the hot water delivery temperature is set for this equipment. Recommend that the overall temperature be dropped and then use a booster if necessary for dishwashing.
- In kitchens, suggest that the serving and cooking staff avoid keeping infrared food warming lamps on when no food is being kept warm.
- Kitchen equipment shall be Energy Star rated where applicable.

CHAPTER 10: Energy Awareness

To be successful, a Building Energy Monitor Program not only requires your hard work, dedication, and commitment, but also support at all levels. Activities throughout the Department of the Army have set up various programs and regular events to actively engage the participation of personnel at all levels. Discuss with your Energy Manager which would be appropriate for your building:

- **Set up a suggestion box for personnel to submit energy and water-saving ideas.** This gets everyone involved. If possible set-up a reward system to go along with the suggestion box. This can award can be in the form of DFMWR credits, unit awards or some other type of incentive. Get creative and tailor your program to your garrison’s needs
- **Conduct joint building energy audits.** Get your organization involved by have occupants join you on your energy walkthroughs. These walk-throughs provide

information on existing conditions and provide “up close and personal” contact with all building personnel. This enhances energy awareness to a larger audience and encourages others to submit their ideas and voice their concerns.

- **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 monthly checklist walk-throughs. Extensive project scope deficiencies and or recommendations are also identified for potential future development.

- **Keep your building occupants informed of the issues and your garrison goals, objectives, programs, and events**. Some garrisons establish a comprehensive network of BEMs 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. This network of building supervisors, energy monitors, and building engineering teams can be engaged to circulate posters and flyers, and prepare Energy Awareness articles. To prepare attractive flyers, energy- and water-saving tips and messages, as well as base and local newspaper articles, take advantage of the tools listed in the online resources chapter.

- **Visually post your progress and goals.** 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.

- **Celebrate Energy Action Month and Earth Day/Week.** What better times to promote energy and water efficiency than October, Energy Action Month and Earth Day, 22 April. These events provide another opportunity to promote energy and water efficiency as part of our environmental responsibility and stewardship. Check with your Energy Manager for details.

Check with your Energy Manager to see if any of these awareness programs are in place and how you can be included.

CHAPTER 11: Net Zero Initiative

Army Net Zero is a holistic strategy founded on long-standing sustainable practices and incorporates emerging best practices to manage energy, water, and solid waste at Army installations. The intent of the Army Net Zero Initiative is to enhance mission effectiveness and increase installation resiliency. The Net Zero initiative directly supports the Army's Energy Security and Sustainability (ES2) Strategy. Net Zero aligns with the ES2 roadmap to foster a more adaptable and resilient force that is prepared for a future defined by complexity, uncertainty, adversity, and rapid change.

The Army defines "Net Zero energy" as an installation that achieves the following: Reduce overall energy use, maximize efficiency, implement energy recovery and cogeneration opportunities, and then offset the remaining demand with the production of renewable energy from onsite sources, such that the Net Zero energy installation produces as much renewable energy as it uses over the course of a year.

The Army defines "Net Zero water" as an installation that achieves the following: Reduce overall water use, regardless of the source; increase efficiency of water equipment; recycle and reuse water, shifting from potable water use to non-potable sources as much as possible; and minimize inter-basin transfers of any type of water, potable or non-potable, such that a Net Zero water installation recharges as much water back into the aquifer as it withdraws.

The Army defines "Net Zero waste" as an installation that achieves the following: Reduce, reuse, recycle/compost, and recover solid waste streams, converting them to resource values, resulting in zero landfill disposal.

CHAPTER 12: Online Resources

Army Energy Program
Provides information and links regarding the strategic energy security goals of the Army's Energy Security and Implementation Strategy
http://army-energy.hqda.pentagon.mil

Department of Energy (DoE)
Offers an overview of the DoE's efforts across the United States
http://www.energy.gov/

Energy Efficiency & Renewable Energy (EERE)
Focuses on efficiency and renewables and describes competitions, successes, manufacturing initiatives, etc. Also shares important information about energy-saving homes and buildings, and renewable electricity generation
http://www.eere.energy.gov/

Energy Saver
Collects energy tips, articles, and guidance on energy savings to include lighting, heating and cooling, building envelopes, seasonal instructions, and more.
This resource is a valuable link to share with those who are being taught how to save energy and money through efficient habits
http://energy.gov/energysaver/

Federal Energy Management Program (FEMP)
Focuses on energy used in federal facilities, with an eye for changing the behaviors of entire organizations to increase efficiency. The site includes educational materials, laws and regulations, and training modules
http://www1.eere.energy.gov/femp/index.html

Buildings Energy Data Book
Includes statistics on residential, commercial, and federal building energy consumption as well as statistics related to construction and building technologies
http://buildingsdatabook.eren.doe.gov/

U.S. Energy Information Administration
Provides independent statistics and analysis of the status of energy — fossil fuels, renewables, utilities, and more — across the United States
http://www.eia.gov/

Environmental Protection Agency (EPA)
Shares important information related to initiatives such as the Clean Power Plan and national water issues, with additional focus on how energy use impacts the environment
http://www.epa.gov/

ENERGY STAR — Buildings and Plants
Features tools to build energy management programs, improve building performance, earn recognition for energy efforts, and learn more about ENERGY STAR products and how they can be used
http://www.energystar.gov/buildings/home?c=business.bus_index

American Council for an Energy- Efficient Economy
Shares extensive information about energy policy, energy efficiency in buildings, and opportunities for behavior change
http://www.aceee.org/

APPENDIX A: Sample Checklist

The Building Energy Monitor shall conduct energy inspections monthly in occupied buildings and bi-monthly in unoccupied buildings using the Building Energy Conservation Checklist provided by your Energy Manager. The below checklist is a sample checklist. Check with your Energy Manager confirm that it is the correct version. BEMs shall maintain checklists for one year.

IMCOM BEM -
Sample Checklist.xls

APPENDIX B: Sample Appointment Letter

The Building Energy Monitor shall be appointed in writing to serve as the point of contact for energy conservation matters. Below is the appointment letter sample that can be utilized for appointments.

IMCOM BEM -
Sample Appointmen