

**Ohio Army National Guard
Pamphlet 420-4**

**Construction and Facilities
Management Office**

**Energy and Water
Conservation**

**Office of the Adjutant General
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Construction and Facilities Management Office

Energy and Water Conservation

FOR THE ADJUTANT
GENERAL:



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Proponent. The proponent for this pamphlet is the OHARNG Construction and Facilities Management Office (CFMO).

Suggested improvements. Users are invited to send comments and suggested improvements to the Office of the Adjutant General, ATTN: NGOH-IMR-EE, 2825 W. Dublin Granville Road, Columbus, OH 43235.

History. This publication is a new OHARNG pamphlet.

Summary. This pamphlet provides guidance and information on conserving energy and water for all Ohio Army National Guard (OHARNG) facilities.

Applicability. This pamphlet applies to all tenants of OHARNG facilities.

Distribution. This publication is available in electronic media only. It is available on TAGNET under the Environmental and Energy web page

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Section I

General

1-1. Purpose

This regulation establishes a single source for the Assistant to the Adjutant General for Army's (ATAG's) policies and procedures that establish efficient and economical consumption of utilities, services, and fuels. It provides the basic centralized facility guidance necessary to measure conservation of energy and water on a day-to-day basis, including energy and water expenditure metrics, monitoring and analysis. The program also adheres to the Ohio Army National Guard (OHARNG) environmental Management System (eMS) which involves continual improvement in managing environmental impacts and seeks opportunities to improve the integration of the core business mission with environmental performance. The program is directive upon OHARNG occupied facilities as listed in the OHARNG Facilities and Installation Stationing Plan (FISP).

1-2. Applicability

The provisions of this regulation apply, and are prescriptive to, all OHARNG occupied and supported facilities (per NGR 5-1), installations, activities, operations, and personnel, under the authority of The Adjutant General, State of Ohio. It is to be applied in conjunction with AR 420-1, Chapters 22 and 23.

1-3. Objectives

a. The overall program objective is to increase energy and water efficiency, reduce consumption and ensure a secure and reliable energy source by implementing a sustainable long-term energy and water conservation program. This is to ensure that the OHARNG meets or exceeds the mandated goals set by federal and state laws and executive orders (EOs) without adversely affecting OHARNG military training and operational mission requirements, and maintaining or improving the well-being of Soldiers.

b. Ensure command emphasis on continuous evaluation and revitalization of energy and water conservation programs. Evaluation and analysis includes the use of benchmarking to measure compliance and success per facility.

c. Provide awareness through mandatory annual energy and Facility Manager training. This training will focus on measures necessary for successful sustainment and energy conservation as developed and outlined in general energy and water reduction guidance and/or armory specific energy management plans.

d. Foster a climate ensuring individual awareness by leaders, Soldiers, employees and contractors of the OHARNG of their energy and water conservation responsibilities.

e. Support the Ohio National Guard (OHNG) eMS when applicable by aligning with the established targets, objectives, and action plans developed within the OHNG eMS.

1-4. Goal

The OHARNG will continue to maximize its energy and water conservation, keeping within Department of Army, the State of Ohio and National Guard Bureau (NGB) overall energy reduction initiatives, without degrading military readiness or care of the Soldier.

Energy Management Goals and Executive Orders:

- a. Require the annual energy reduction goal to be 2.5% per year through FY 2025. The overall goal is a 25% reduction compared to an FY 2015 baseline by FY 2025.
- b. Require the reduction of water usage by 2% annually through FY 2025. The overall goal 36% reduction compared to an FY 2007 baseline by FY 2025.
- c. Target electrical needs at federal facilities to be supplied by renewable energy. The goals for this order are 10% in FY 16-17 and 5% per biennium to 30% by FY 24-25.
- d. Require the reduction of greenhouse gas emissions per mile from the fleet, relative to the 2014 baseline to 4% by FY 17, 15% by FY 21, and 30% by FY 25.
- e. Require advanced (15 minute increment) metering of natural gas, steam, and water in addition to electricity on the top 75% of utility consumption by OHARNG.
- f. Require new federal buildings and major renovations to reduce fossil fuel generated energy consumption as compared to FY 2003 baseline by 55% in 2010 and rising to 100% by 2030.
- g. At least 30% of hot water demand in new or substantially modified federal buildings is met using solar water heaters.

1-5. Policy

- a. All governmental and non-governmental employees of the OHARNG will direct all efforts toward maximizing the application of energy and water saving actions and requirements.
- b. OHARNG commands and directorates will include the energy conservation program and its efforts as a special review topic during staff visits and command inspections (both formal and informal) to readiness centers where assigned facility managers are subordinate to their command or directorate.
- c. Command emphasis will be placed on energy and water conservation programs and positive actions will be taken to ensure compliance with directives and regulations.

Section II

Responsibilities

1-6. The Assistant Adjutant General for Army of Ohio

- a. Responsible for ensuring compliance with all aspects of the Department of the Army's energy and water regulations.
- b. Is responsible for ensuring compliance with all Federal, State, and local energy and water policies and executive orders.

1-7. Chief of Staff (Army)

- a. Chairs the Energy Advisory Committee (EAC) in accordance with the (IAW) OHARNG Energy Conservation Policy CS-19-001. The EAC will serve as the forum to report energy and water usage, analysis, and eMS-linked initiatives on a quarterly basis.
- b. Ensures programs including energy and water conservation guidance, which will include: goals are developed and measures are implemented for and by the OHARNG.

1-8. Energy Advisory Committee (EAC)

- a. This committee makes appropriate recommendations to the CFMO and the Environmental and Energy Branch Chief regarding the management of energy and water resources program and our eMS.
- b. Meetings serve as an open forum for planning, executing, and monitoring actions programs detailed in this policy.
- c. Committee membership is composed of the senior leadership of each MSC, all OHARNG

Directorates, and chaired by the Army COS. See Appendix F.

1-9. Environmental and Energy Branch Chief

- a. Serves as the senior staff's advisor and as the eMS facilitator.
- b. Implements and maintains eMS in accordance with the ISO 14001 standard and The Adjutant General of Ohio's eMS policy.
- c. Advises the OHARNG COS and CFMO, and oversees the day-to-day management and implementation of eMS.
- d. Develops and executes for senior leadership's approval energy policies, processes, procedures, and regulations.
- e. Recommends changes to existing and proposed policies, processes, procedures, and regulations.

1-10. Facility Operations Specialist – Energy and Energy Manager

- a. Briefs EAC quarterly and receives input from the State Energy Manager on all energy and water conservation practices, metrics, and CFMO related projects.
- b. Monitors and briefs the Environmental and Energy Branch Chief regularly on progress, current status of energy and water conservation goals, and objectives, practices, metrics, and construction projects.
- c. Monitors and briefs Facilities Management and Design and Project Management staff quarterly on energy and water conservation practices, metrics, and construction projects.
- d. Monitors and posts to the Energy and Environmental Management web page the quarterly energy and water consumption for individual facilities as well as Major Subordinate Command summaries.
- e. Conducts energy and water analyses on 25% of the square footage that comprises 75% of the energy and water consumption on an annual basis, analyzes facilities falling outside of this range where the seasonally adjusted Energy Use Index (EUI) is notably greater than (over 20%) the OHARNG EUI average for that building type that year.
- f. Reports all analyses in the Army Energy and Water Reporting System (AEWRS) database.
- g. Verifies compliance with federal mandates and guidelines on energy and water conservation practices of facilities including modifications, alterations, and additions to existing facilities and new construction.
- h. Researches, identifies, develops, submits implementation and funding packages. Monitors and verifies savings used for implementation programs for energy and water conservation projects.
- i. Contributes to annual conservation training for assigned Facility Managers (FMs).
- j. Provides the FMs with facility utility consumption data and assists in benchmarking the facility.
- k. Coordinates the development of energy and water conservation graphics for facility use.
- l. Maintains OHARNG utility consumption database.
- m. Maintains (archives) energy and water conservation files for ten years.
- n. Conducts cyclical utility rate negotiations on behalf of the Adjutant General.

1-11. Area Buildings and Grounds Superintendent

- a. Conducts annual Facility Survey Report with FMs (Appendix B).
- b. Assists the Facility Operations Specialist-Energy, State Energy Manager and FMs in development of the Facility Energy and Water Management Plan (Appendix C) for each facility.
- c. Assists the Administrative Officers (AOs) and the FMs in the adherence to energy and

water conservation procedures and responsibilities outlined in regulations and policy memorandums.

d. Keeps the AOs and the FM informed of all projects, work orders, and any other related energy conservation measures that are being planned or in place at the facility.

e. Coordinates directly with the FM on all issues affecting facility operations.

1-12. Major Subordinate Commands (MSC)

a. Ensure personnel are appointed and attend FM training upon appointment.

b. MSC AOs will serve as members of the EAC and provide input on subordinate units' abilities to meet metrics.

c. Commanders at all levels will ensure that energy and water initiatives are understood and that conservation principles are applied at their facilities.

1-13. Facility Managers

a. Each unit will have a designated FM per OHARNG 420-10 para 1-12 and OHARNG 200-1 para 1-24 who assumes the following duties, unless these responsibilities are delegated in writing to another full time member of the unit staff and equivalent in rank and/or authority.

(1) Participate in training and education programs that includes the exchange of energy and water conservation awareness information.

(2) Provide the MSC AO with information relative to facility operations in utility consumption and resources needed to meet metrics.

(3) Conduct an initial Facility Survey Report (FSR), or review previously completed FSR, with the Area Superintendent of the facility to identify potential energy and water waste areas (Appendix B, Facility Survey Report) within 90 days from appointment and annually thereafter. The initial and subsequent assessments will be placed on the Energy and Environmental Management web page.

(4) Ensure completion of the FM's Conservation Checklist each quarter and places it on the Energy and Environmental Management web page.

b. Develops an Energy and Water Conservation Management Plan (Appendix C) for the reduction of energy and water consumption within 90 days of appointment. It is not intended that the plan be lengthy or complex, but only effective in reducing the amount of energy and water being utilized at a facility. The plan will be placed on the Energy and Environmental Management web page and the FM shall notify the Facility Operations Specialist-Energy, State Energy Specialist, and Area Superintendent of the assessments included on the web page. Appendix C provides a sample plan that may be used or modified per facility.

1-14. All Personnel (Governmental and Non-Governmental Employees)

a. Adhere to energy and water conservation directives and management plans.

b. Make on-the-spot corrections when appropriate.

c. Report violations of policy to the FM, Superintendent, and/or AO.

2-15. Incentive Awards

Organizations, facilities, or activities that demonstrate excellence in program management are eligible to receive an award in the form of a letter, certificate, trophy, or plaque. Awards to recipients are the most desirable method. However, in instances of individual Soldier excellence, the existing state and federal military award programs can be utilized.

Chapter 2 Energy and Water Conservation Methods

2-1. Metrics

a. Analysis of energy and water consumption by the Environmental and Energy Branch will benchmark the facility in common terms of measurement. This measured data for each facility, in BTU/SF for energy and KG/SF for water, will provide users with an opportunity to spot potential problems and calculate energy and water savings over time. It also provides the data for analysis and compilation into consumption reports and graphs.

b. The empirical benchmark determines relative energy and water consumption using a Basic Site Data spreadsheet. Energy evaluators use a measure called Energy Utilization Index or Energy Use Index (EUI), a basic measure of a facility's energy performance on a per square foot-year basis over a period of time (monthly/yearly), to enable comparisons between different buildings and energy types by creating an energy use profile. EUI is calculated by converting all energy used in a building during a period of time to a common unit, BTUs, and dividing by the square footage of the heated/cooled space in the building. The EUI is the most common means of expressing the total energy consumption for each building. The EUI can be used to compare energy consumption relative to similar building types or to provide a yardstick of consumption from year to year in the same building. It provides a normalized measurement from which goal reductions and achievement can be applied. A Kgal/square foot evaluation will also be included in the analysis to allow water use comparisons.

c. The calculation Basic Site Data spreadsheet is flexible, allowing for variations in facilities type use during a time period. It can measure in months or years and is normalized using 30 year Ohio weather heating degree day (HDD) and cooling degree day (CDD) averages. The Energy Manager will prepare EUI and water consumption data for each site utilizing utility consumption data for the site and will make the data available to the sites or on the OHARNG GKO Portal.

2-2. Analysis

The OHARNG is required to analyze 25% of its facilities that consume 75% of the energy annually or 100% of those facilities over four years per the Army Comprehensive Energy and Water Evaluation Policy. Additionally, OHARNG shall analyze facilities falling outside of this range where the Energy Use Index (EUI) is notably greater than (over 20%) above the OHARNG EUI average for that building type. This program determines current consumption, assesses potential improvements using life-cycle costing and investment, recommends facility and operational project improvements, and is centrally managed by the CFMO. The results of such analysis will be shared with the facility manager, Buildings and Grounds Area Superintendents, CFMO, and EAC.

2-3. Energy and Water Savings Opportunities

Listed below are low or no cost energy saving methods that will aid in reaching our goals. These are general guidelines and may be modified to the specific needs of the unit or facility. It shall be managed by the FM and supported by the Area Superintendent when repairs, replacement, or modifications are required

a. Building envelope failures, if detected, shall be sealed to prevent drafts from entering facilities. Areas to be reviewed include the heads, jambs, and sills of exterior personnel doors and windows, joints between panels of overhead doors, holes or openings in walls or roofs, etc.

b. If light can be seen coming around the device, air can infiltrate the building. Weather-stripping, door sweeps, caulking between frames and exterior finish materials, and closing openings are necessary to accomplish this.

c. Whenever possible, lights shall be turned off in all areas where no light source is required for a period of ten minutes or longer. Additional measures such as changing lamp types, delamping (the partial removal of lamps from fixtures) and photo/motion detectors are possible and may be used as energy conservation measures (ECMs) by CFMO and the Energy Manager. Fixtures should not be changed out or lamps removed without CFMO approval due to safety and/or security issues.

d. Overhead doors shall be closed at all times when not in use during the heating season to reduce the loss of heat energy. During cooling seasons, the overhead doorways may be opened for ventilation purposes as long as force protection measures allows for it. Air conditioned areas must be secured to ensure energy is not wasted to non-air conditioned spaces.

e. If generators are used, their use shall be consolidated to the fullest extent possible.

f. To conserve fuel and facilitate proper electrical loading, please follow the manufacturer's sizing and loading parameters.

g. Military Ground Vehicles (including GSA):

(1) When possible, engines shall be turned off when vehicles are parked. Engines shall not be left idling when vehicles are standing by for dispatch.

(2) The administrative use of vehicles and other energy-consuming equipment shall be to a level needed to maintain readiness. These items shall be managed to ensure the most energy efficient combination of reduction in vehicle miles, increased carpooling, use of load carrying capacity, and reduction in trips for mission accomplishment, whenever possible.

(3) Trips shall be consolidated whenever possible in order to use the minimum number of vehicles for a given mission.

(4) Don't exceed posted maximum speed limits for commercial vehicles and tactical vehicles

(5) Vehicles shall be used for "Official Use Only." It is the general rule that when transportation is essential to the successful operation of any officially sponsored and supervised activity, such transportation is considered for an official purpose.

(6) Maintenance shall be accomplished to ensure the vehicles are operating at peak efficiency.

h. Facility management shall be IAW OHARNG Regulation 420-10. MSCs and directorates should consider the following:

(1) Consolidate full time force to centralized work locations (reduce the number of operating spaces and remove full-time staff from unapproved areas) if feasible.

(2) Establish facility standardized core (normal) facility operating hours that span no more than 10 hours. Alternative Work Schedules will only result in energy reduction if all employees participate and the facility is placed into an unoccupied mode one day per week.

(3) Identify and coordinate with Area Superintendents what spaces within a facility can be put in a hibernation mode or restricted for limited use for prolonged periods.

i. Electrical Appliances

(1) Refrigerators, microwaves, coffee makers, pizza ovens, hot plates, and other appliances are only authorized in designated break areas, kitchenettes, or kitchens. Designated areas are defined as space authorized in NG PAM 415-12 and NGB DG 415-5. Personal or individual appliances for the sole use of one person are not authorized.

(2) Ensure electrical equipment and appliances (for example; monitors, fans, etc.) are turned off when not being used and during non-duty hours. When units are deployed, all electrical equipment and appliances shall be disconnected or unplugged.

(3) General purpose office equipment, copiers, printing devices, faxes, all-in-one devices, and similar equipment shall be turned off at the end of every business day. Consideration shall be given to using a power strip for all external devices to ease and consolidate turning off the devices.

(4) Computer and peripheral devices used in conference rooms, video-teleconferencing and kiosks environments shall be turned off when not in use. Computer and peripheral devices shall be turned off when not in use for any extended periods of absence such as vacation or holidays.

(5) The central processing unit (CPU) for computers, desktop units, personal computers and laptops can remain on for IT purposes only when the unit is capable of; configured and enabled for energy saving features such as standby or low energy usage modes during periods of operator absence and the mode is activated after 30 minutes of inactivity. Printers and copiers must be set to go into "power save" mode after 15 minutes. This exception to remain on by use of standby or low energy modes of operation is authorized only if the computer or printer meets ENERGY STAR™ compliance and uses 20 watts or less while in that mode. If IT equipment is not capable of operating in this manner, FM shall contact J6 for replacement equipment that is in compliance.

(6) Portable heaters are not authorized and prohibited for use in any office where a working heating system exists. Portable heaters are high energy consuming products (normally using electricity). If abnormal heating or cooling occurs, personnel are encouraged to wear additional clothing to aid in comfortable working conditions until the matter is resolved. Coordination should be made with the Area Superintendent to evaluate the conditions of the working space to ensure existing systems are working properly.

(7) Lights, motors, and appliances shall be turned off when not required or during non-duty hours.

(8) Large motors and other heavy electrical load producing equipment shall be operated during "off peak" periods whenever possible.

(9) Exterior lighting shall be controlled by photocells (PCs) or timers when full night operation is not required to preclude operation during daylight hours. Off hour and exterior lighting shall be eliminated except when essential for safety and security purposes as required by Army Regulation AR 190-1. The FM shall verify that PCs and timers are operational and correct in their settings through a monthly inspection of observing if exterior lights are on during daylight hours. If exterior fixtures are on, the FM shall contact the Area Superintendent to correct the issue.

(10) Utilize task lighting when general ambient lighting levels are insufficient to complete the task and turn the task lighting off when completed.

(11) Reign in "phantom energy utilization" - many idle appliances use energy even when they are not on if they are still plugged in. Unplug these appliances when not in use.

(12) Lighting intensity of the building shall not exceed the authorized standards per OSHA and the Illumination Engineering Society (IES). In general, the following guidelines shall be followed: Unauthorized lamps and lamp sizes shall not be used. Understand the different light levels available from multiple switching and when available, turn on only those fixtures that provide the illumination level necessary to complete the required task.

Table 2-1
Recommended Illumination Levels

Space	Range of Illumination in Foot-candles	Example Spaces	Reference Work Plane
Public space with dark surroundings	2-3-5	Classrooms or auditoriums using projection	General lighting
Simple orientation for short temporary visits	5-7.5-10	Corridors, lobbies	throughout
Working spaces where visual tasks are only occasionally performed	10-15-20	Restrooms, Showers, Storerooms	spaces
Performance of visual tasks of high contrast or large size	20-30-50	Classrooms	Illuminance
Performance of visual tasks of medium contrast or small size	50-75-100	Offices	on task
Performance of visual tasks of low contrast or very small size	100-150-200	Drafting or cutting areas, moderate inspection	Illuminance on task obtained by a combination
Performance of visual tasks of low contrast and very small size over a prolonged period of time	200-300-500	Instrument calibration, exacting inspection	of general and specific local supplementary
Performance of a very prolonged and exacting visual task	500-750-1,000	Precision welding or assembly	task lighting

i. Water

- (1) Irrigation of lawns or landscaping is prohibited unless authorized by the CFMO.
- (2) Hose connections at wash racks shall be equipped with automatic shut-off valves, when possible.
- (3) Leak surveys, including running toilets, dripping faucets, or shower heads, shall be made periodically to ensure the water distribution systems are tight. Personnel shall report leaks immediately to their building facility manager.
- (4) Reduce water consumption where possible. When washing your hands, brushing teeth, or shaving, turn the water off. When washing dishes, do not run water continuously for rinses – turn the water off when not rinsing. All supplementary/booster water heaters for dish washing, etc. shall be turned off when the equipment is not in use. When washing vehicles, use the water only for pre-rinse or final rinsing, don't leave the water run while scrubbing. Do not lay hoses on ground running while cleaning vehicles or equipment, turn the water off while washing or moving items. Washing of POVs is prohibited.

2-4. Operations and Maintenance Opportunities

The Area Superintendent shall inspect the HVAC and plumbing systems for serviceability and efficiency. Items that need to be inspected include, but are not limited to: boiler and chiller systems, heating and chilled water supply, return lines, insulation and pumps, ventilation and exhaust systems including: fans, motors, coils, dampers, filters, ductwork, diffusers, grilles, and insulation. Temperature control systems such as energy management systems, thermostats, gauges, and metering systems. Domestic hot water systems including: heaters, storage tanks, supply and return piping, and insulation. Plumbing to include pumps, valves, piping and insulation. All lighting , ballasts, and controls; panels, motors and their controls.

The following is a list of checks that shall be done to ensure energy conservation methods are properly established:

- a. Inspect the HVAC system to ensure that the system is running efficiently. Making sure there is no major damage or deterioration that would reduce the efficiency of the equipment. Ensure dents in the ductwork are minimal so as not to restrict air flow, filters are regularly changed, the coils are clean and the transfer fins are not bent. That the controls are properly monitoring and controlling operations, set points are within operational parameters and system operations reflect the occupancy and use of the spaces being served.
- b. Boiler and chiller systems shall be inspected to ensure there is a free flow from the system through the supply lines, the boiler/chiller is operating at peak efficiency, that condensers or cooling tower and pumps are effective, controls are monitoring and controlling system operations and temperatures, pipe insulation is in good repair.
- c. Ensure all authorized air conditioning systems are energy efficient models per Department Energy guidelines seasonal energy efficiency ratios, or SEER, per published 10 CFR Ch. II 430.32 tables) and all safety and energy saving features are in good working order and utilized. The Energy Manager will assist in obtaining the current SEER value when requested.
- d. Making sure the domestic hot water system, including the tank and piping, is in good working order. Pump systems, if present, operate only during occupied hours and pipe insulation is in good shape. Verify domestic hot water temperature is between 115-120 F for non-dish-washing areas (comply with codes and equipment manufacturers for dish-washing equipment). Water set above this temperature wastes energy and could become a scalding issue.
- e. Shower heads, sink faucets, toilets, and urinals shall consist of a water saving variety to reduce hot water and potable water consumption.

f. All thermostat controls are maintained within the limits established by OHARNG. Energy management system schedules are maintained and reflect facility occupancies and uses and system control calibrations are maintained at peak efficiency.

g. All heating units shall be turned off when the outdoor temperature stays above 57°F.

h. Furnace and ventilation system filters shall be cleaned and changed IAW manufacturer specifications to ensure proper airflow through them.

i. Ensure OHARNG temperature standards are followed.

Table 2-2

Heating Season: November-April Cooling Season: June- August

Degrees = °F	Heating Season Temperature Maximum		Cooling Season Temperature Minimum	
	Occupied	Unoccupied	Occupied	Unoccupied
Office Areas	72°	55°	74°	85°
Drill Halls	60°	45°	N/A	N/A
Shops and Garage Areas (FMS, CSMS, and AASF)	60°	45°	78°	85°
Hangar Areas (AASF)	60°	45°	N/A	N/A

AR 420-1 Section III, 22-12, pg. 293-Energy Conservation and Management guidelines for Facilities and Buildings

**Chapter 3
Implementing the Program**

3-1. Steps to Success

To establish an effective Facility Energy and Water Conservation Program, the following six steps shall be implemented:

a. One: Command Emphasis, effective energy and water conservation begins with the command. The Environmental Branch of the CFMO has also developed an energy and water conservation awareness presentation to assist commanders and FMs with establishing an effective energy and water conservation program for their assigned facility. For OHARNG to be energy efficient, it is crucial that each facility develops an Energy Awareness Program to teach conservation and encourage facility-based monitoring of energy use. The goal is to reduce energy consumption, conserve resources, and save money.

(1) The appointed FM will educate tenants in energy and water conservation procedures and awareness on an annual basis. Training consists of establishing energy and water conservation programs, identifying energy and water conservation opportunities, and discussing energy and water consumption and trends.

(2) The FM will strive to keep the line of communication open with the MSC AO on facility issues and to the Area Superintendent by providing feedback on mechanical, plumbing, electrical, and building envelope issues.

b. Two: Energy Analysis. The backbone of the Energy and Water Conservation Program will be the ability to produce and analyze energy and water consumption data. This benchmark data will provide an opportunity to spot potential problems, calculate energy savings, and provide reports and graphs. The Energy Manager will utilize facility energy and water consumption data to develop the Basic Site Data spreadsheet and the resulting facility metrics to share with the facility manager and Area Superintendents. Accurate, comprehensive data on energy consumption helps do the following:

- (1) Set preliminary and continuing benchmarks for an energy program.
- (2) Set priorities for action.
- (3) Evaluate the program's success.

c. Three: Operations and Maintenance (O&M) Analysis. The internal O&M Analysis, comprised of the Facility Survey Report (Appendix B) is a structured review of all the energy and water related aspects of the building(s), systems, and site. The goal of the O&M Analysis is to determine ways to provide for minimal unplanned maintenance issues and improve operating efficiencies while maintaining a comfortable and safe environment. The O&M Analysis is the collection of basic information about a facility in order to provide a database for recommended actions. This basic information will include building size, operating procedures and schedules, structural integrity, and equipment design, operation and condition. Upon completion of the inventory of energy and water consuming devices, changes to and/or expansions of operations, and maintenance practices would then be employed. The FM and Area Superintendent will assist with this step. An added outcome of an O&M Analysis should be the development of a Preventive Maintenance (PM) program. The value of a good PM program is twofold. Traditionally, preventive maintenance has been viewed as a way of extending equipment life and reducing costly emergency breakdowns. Additionally, a good PM program can also help reduce energy consumption. Properly adjusted and maintained equipment will operate much more efficiently than equipment receiving little or no maintenance; and more efficient equipment operation means reduced energy consumption.

d. Four: Level 1 Analysis. The OHARNG Energy Manager, in coordination with the Area Superintendent and FM, will conduct an internal Level 1 Analysis, or have an external feasibility study or analysis conducted by an outside agency or consultant, on facilities included in the requirements of OHARNG PAM 420-4 para 1-9 and 2-2. This will provide a detailed study of the existing facility and will identify the energy and water conservation opportunities and projects needed for energy and water savings improvements. The results of the Level 1 Analysis will be consolidated into a Summary of Recommendations that will function as a planning tool for implementing future energy and water conservation projects. The FM may request studies on facilities not included by OHARNG PAM 420-4 para 1-9 and 2-2 to the OHARNG Energy Manager.

e. Five: Develop a Facility Energy and Water Conservation Management Plan. Each FM will review and/or develop a Facility Energy Conservation Management Plan (utilize the sample plan at Appendix C), place the plan on the OHNG TAGNET Energy and Environmental Management web page and the FM shall notify the OHARNG Energy Manager and Area Superintendent of the assessments inclusion on the web page. This plan will identify low cost methods for reducing energy consumption.

f. Six: Develop Implementation Plan. Each Commander and FM will ensure execution of the Facility Energy and Water Conservation Plan, refine as required.

3-2. Milestones

Table 3-1 Milestones

Milestone	Responsibility	Timeline
Energy Use Awareness	FM	FM Training following appointment
Facility Survey Report	Superintendent and FM	Within 90 days of appointment and annually thereafter
Facility and Energy Water Management Plan	FM	Review on appointment and refine as necessary
Quarterly Conservation Checklist	FM	Quarterly

Appendix A References

Federal Energy Policy Act 2005, dated August 2005.

Federal Executive Order 13423, Strengthening Federal Environmental, Energy and Transportation Management, dated January 2007.

Federal Executive Order 13834, Efficient Federal Operations, dated 17 May 2018.

Federal Executive Order 13783, Promoting Energy Independence and Promoting Economic Growth, dated 28 March 2017.

Federal Energy Independence and Security Act of 2007, dated 2007.

Army Energy and Water Campaign Plan for Installations, December 1, 2007. Army Energy Security Implementation Strategy, January 13 2009.

Army Directive 2014-02 Net Zero Installations Policy, dated July 2012.

AR 420-1

Army Facilities Management

NGR 5-1

National Guard Grants and Cooperative Agreements

OHARNG REG 200-1

Environmental Protection and Enhancement

OHARNG REG 420-1

Energy Conservation

OHARNG REG 420-10

Construction and Facilities Management Office Operations

Appendix B

FACILITY SURVEY REPORT

Facility Name:

Date:

Instructions: To be completed annually by the Area Superintendent and FM. Upon completion, report will be placed on OHNG TAGNET Energy and Environmental Management webpage by the FM who shall notify Energy Manager of completion.

EXTERIOR		Reviewed: comments
1	Are there exterior lights on (poles, walls, soffits, ground mounted) during the day or on past prescribed night turn-off times? Do photocells or time clocks require maintenance?	Y N NA
2	Are the exterior walls and roof weather tight; there are no openings in the exterior wall or roof that require repair/closing?	Y N NA
3	Is the weather stripping and caulk around the windows in good shape; there is no infiltration/wind passing through the wall/window? Is the glazing intact, no cracks or missing panes?	Y N NA
4	Is the weather stripping around doors tight? Is the door sweep in good shape? Can light be seen at the jambs or sill when the door is closed? Does the door close quickly and tightly when allowed to close?	Y N NA
5	Do the overhead door(s) close properly? Is the door tight when closed; no light can be seen at the jambs, sill or between sections when closed?	Y N NA
6	Are there issues with piping freezing in the ceiling plenum or when up against an outside wall? Are there are cold drafts falling from ceiling/plenum areas?	Y N NA
7	Are there roof leaks; is the roof insulation wet (squishes when walked on)? Is the roof and parapet flashing functioning properly? Are there wet stains on the ceiling below?	Y N NA
8	Are there hose bibs leaking on the exterior or in the wall behind?	Y N NA
9	If there is a sprinkler system or someone watering lawns or plants? Is the watering authorized in writing by the CFMO?	Y N NA
INTERIOR: GENERAL		Reviewed: comments
10	Are there doors between conditioned spaces with differing occupancies/ schedules? Do the doors have closers? If observation of another space is necessary, does the door have a window in it to facilitate visual security?	Y N NA
11	Do windows have blinds for security and energy conservation? Are window blinds closed when the facility is not occupied and opened when there is available daylight to help illuminate and/or heat the space?	Y N NA
12	Do all gas appliances having non-electronic pilot lights have the gas valves turned completely off when the equipment sets idle for more than a week.	Y N NA
13	Are all non-essential appliances off except those authorized by current condition/priority? This includes deployed units areas that are closed/secured and not used in the facility.	Y N NA
INTERIOR: HVAC		Reviewed: comments
14	Do the temperature controls maintain space temperatures as set; there are no spaces in the facility having problems with maintaining the set temperature?	Y N NA
15	Is the ventilation system operated only when people are present? Does the operating schedule for the ventilation system match actual use? Are ventilated spaces filled with people when the system is on or are they partially occupied?	Y N NA
16	Are the ventilation systems zoned such that unoccupied spaces supplied by the system can be controlled in an unoccupied mode while occupied spaces can operate in an occupied mode?	Y N NA
17	Are restroom/shower exhaust fans used only when people are in the restroom/showers? Are they on an occupancy sensor along with the lights in the restroom/showers?	Y N NA
18	Are there building exhaust fans other than the restroom/shower fans? If so, are they interlocked with a ventilation system and the outside air damper?	Y N NA
19	Are kitchen and dishwashing hoods turned off when there is no cooking or dishwashing occurring?	Y N NA
20	Is the HVAC system is controlled by an energy management system; is the system monitored regularly? Are the operational settings verified as being accurate and in compliance with actual operating	Y N NA
21	Is there a preventative maintenance plan in place for the HVAC systems? Are filters changed, coils cleaned and fins raked on a regular basis? Are belts and bearings checked for wear and alignment? Are control operations verified? Are damper linkages verified? Do outside air dampers close tightly, are they weather-stripped?	Y N NA
22	Are heating/cooling/condensing waters properly treated? Are refrigerant pressures and condition verified and monitored?	Y N NA

Facility Survey Report (continued)		
23	Is there an outdoor reset control for the heating water?	Y N NA
24	Is the boiler tuned annually and the fire tubes inspected (if applicable)? Is the burner calibrated and the jets inspected?	Y N NA
	INTERIOR: PLUMBING	Reviewed: comments
25	Are low flow toilets, urinals, showers and faucets used in restrooms? Are aerators used on faucets in non-restroom areas?	Y N NA
26	Are manual and automatic faucets and flush valve controls and hose bibs checked regularly for leaks and proper operation?	Y N NA
27	The hot water temperature is set between 115° -120°?	Y N NA
28	The pipe insulation on the hot and cold water piping is in good condition?	Y N NA
29	If there is a circulation system, is the pump is turned off by time clock for unoccupied hours? Is the time clock reset before and immediately after drill weekends?	Y N NA
30	Do booster heaters have the disconnect switch or circuit breaker turned off when the dishwasher and/or the deep sinks are not in use?	Y N NA
31	Is the water meter regularly checked to verify that there are no leaks in the water system (the small starred wheel or “leak indicator” on the water meter does not spin when there is no water use)?	Y N NA
	INTERIOR: ELECTRICAL SYSTEMS	Reviewed: comments
32	Are occupancy sensors used to control lighting? If there are occupancy sensors, are they turning the lights off within 10 minutes of vacancy?	Y N NA
33	Is task lighting provided where there are consistent or critical visual requirements to complete a work task?	Y N NA
34	Storage racks are located such that lighting is located over aisles and not over the racks?	Y N NA
35	Is dirt/dust cleaned on a regular basis from the surfaces of lamps and/or light reflecting or diffusing surfaces of fixtures?	Y N NA
36	Are there personal heaters, coffee pots, microwaves, toasters, or refrigerators in use (only facility provided equipment is allowed)?	Y N NA
37	Are smaller refrigerator/freezers being used in lieu of larger unit refrigerators/freezers for normal occupied hours while the larger equipment is turned off? Are ice machines used only for drill weekends and are off during normal occupancy?	Y N NA
38	Are computers, display screens, printers and copiers set in energy savings mode? Are computers, display screens, printers and copiers being turned off during unoccupied hours?	Y N NA
	420-4 SUBMISSION REQUIREMENTS	Reviewed: comments
39	Has the Facility Energy and Water Conservation Management Plan (Appendix C) been completed for the facility and placed on the OHNG TAGNET Energy and Environmental Management webpage?	Y N NA
40	Have quarterly UEO/FM Checklists (Appendix D) been completed for the facility and placed on the OHNG TAGNET Energy and Environmental Management webpage?	Y N NA
41	Has the Energy Manager provided the UEO and posted on a monthly basis the consumption characteristics of this facility?	Y N NA
42	Has an educational program on energy and water conservation awareness and techniques been provided to the building tenants, including weekend drill participants, in the last twelve months? Are tenants being made aware of the OHNG TAGNET Energy and Environmental Management webpage?	Y N NA
43	Are energy and water conservation posters, stickers, and other educational material being used throughout the facility to remind occupants about the ongoing conservation efforts?	Y N NA
44	Does the UEO regularly coordinate occupancy schedules with the Area Superintendent? Are systems operations issues communicated to the Area Superintendent as soon as they are perceived?	Y N NA
45	Does the Area Superintendent conduct regular site visits to verify the integrity of the envelope and the operations and maintenance condition of the facilities environmental systems?	Y N NA
46	Has this survey been completed and placed on the OHNG TAGNET Energy and Environmental Management webpage by the UEO?	Y N NA

**Appendix C
Facility Energy and Water Management Plan**

Sample

OFFICE SYMBOL

Date

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Facility Energy and Water Conservation Management Plan

1. Purpose: The need to establish a set of standards and procedures that will reduce energy consumption and achieve the goal of maximizing the efficient use of energy (gas, oil, steam, and electricity) and water, while at the same time, maintaining an environment that is conducive to the training of Soldiers.

2. Objectives: The federal government has mandated under Executive Order 13423 that federal agencies reduce energy consumption 30% by FY15, based on consumption rates from FY03 and water rates by 16% by FY15 based on consumption rates in FY07. The requirement was continued by Executive Order 13693 such that energy must be reduced by 30% by FY 25 based on consumption rates in FY15 and water reduced by 36% by FY25 based on consumption rates in FY15.

a. To reduce energy and water consumption at this facility in an effort to meet the mandated goals of Executive Order 13834 and other energy and water conservation directives and regulations.

b. To maintain normal military operations and support for the traditional National Guardsmen during the week and during weekend drills.

3. Goals: The FM proposes to take a proactive daily approach to energy and water conservation. Better management, education of tenants, and a reduction in energy and water consumption will achieve monetary savings. The FM proposes—

a. To meet 50% of the mandated reductions via changes in personal practices and use of in the use of the building. The remaining 50% will be met with changes to the environmental and/or envelope systems as completed by the CFMO and Environmental Branch.

b. To decrease usage through inefficient and/or ineffective use of energy and water.

c. To redirect energy and water cost savings to improving/updating facility environmental equipment.

d. To include tenants in energy and water decisions that affect operations, as well as hold them accountable for the way energy and water is consumed.

e. To cultivate support from tenants and Soldiers by exhibiting better practices of proper energy and water conservation.

OFFICE SYMBOL

SUBJECT: Facility Energy and Water Conservation Management Plan

4. Strategies for accomplishing these goals include the following activities:

- a. Purchase energy and water efficient equipment to reduce energy and water consumption and improve efficiency of environmental building controls.
- b. Continue the “best practices” efforts to reduce consumption of resources.
- c. Seek innovative and creative methods to reduce resource consumption.

5. Applicability. This plan applies to all tenants/activities assigned to this armory. Tenants are responsible for ensuring energy and water conservation measures are employed at all times.

6. History of Utility Use. A ten year history of utility use and expenditure for the armory can be found in the Appendix [obtain from the Energy Manager]. The average Energy Use Index (EUI) for the facility is [number] btu/sf/yr [obtain from the history] which is above/below the state wide average for armories. Water consumption has been reduced/increased [choose one] to [number] Kgal/yr.

7. Facility’s Commitment to Reducing Energy and Water Consumption: The leadership of the armory is committed to ensuring that our tenants are aware of, and actively participate in, energy and water conservation and management measures. We all have a responsibility to conserve resources and minimize the costs associated with utility services. The FM has identified [number] initiatives that will be adopted by all tenants upon receipt of this plan in order to achieve 50% of the mandated reductions – [list the measures adopted as appropriate from the list found 420-4 2.3]

a. Hibernation of Spaces. The following areas within the armory will be put into an unoccupied mode when unoccupied as follows – [list the spaces by group having similar uses, edit the following as necessary].

b. Public Assembly Areas will have ventilation units turned off (where applicable) and radiation set back to an unoccupied set point when not in use. All lighting will be switched off, including occupancy sensors, and security lighting will be used for passage.

c. Hallways and vestibules having radiation or convectors will be placed in an unoccupied mode and use security lighting for safe illumination.

d. Inside Motor Vehicle Storage Area will have the heat set back to the unoccupied mode and use security lighting for safe illumination.

e. Classrooms will have ventilation units turned off (where applicable) and radiation setback to an unoccupied set point. Lighting, including occupancy sensors, will be switched off.

OFFICE SYMBOL

SUBJECT: Facility Energy and Water Conservation Management Plan

f. Latrines and locker rooms will be setback to unoccupied temperatures except on drill weekends. Lighting and exhaust fans will be controlled by occupancy sensors.

g. All other spaces within the armory will be considered unoccupied spaces, therefore those spaces will have their ventilation units turned off and the heating sources will be operated at an unoccupied set point. Lighting, including occupancy sensors, will be switched off.

h. The following areas are designated as full-time work locations (offices) and only these spaces are authorized the use of air conditioning during the cooling season, provided it is a certified ENERGY STAR™ product. [List rooms to be considered occupied and that the HVAC systems will operate in an occupied mode during the listed operating hours.]

8. Electrical Devices and Appliances: Inventory of Electrical Devices and Appliances. All personal and government issued electrical devices and appliances being utilized by tenants will be reported to the FM. List will include all pertinent data (i.e., make, model, ENERGY STAR rating, etc.).

9. Energy and Water Awareness Education to Tenants. The facility will provide energy and water awareness briefings to all tenants on an annual basis or as needed. The FM will address those tenants who are neglecting their responsibilities (i.e., departing the armory and leaving the lights on, having personal electrical devices present without authorization, etc.). Delegation of responsibilities and open communication is the secret of success. Properly informed tenants can meet the expectations of the energy and water program for this facility.

10. Facility Energy and Water Management Practices: The Area Superintendent and assigned staff are responsible for implementing and maintaining energy and water management practices and to ensure the goals of the OHARNG energy and water policy are accomplished. The energy and water management program includes the following activities to conserve energy and water and keep energy and water costs as low as possible –

a. Effective monitoring of energy and water use.

b. Designated occupied set point for cooling is 76° in offices and 78° in FMSs, off during unoccupied hours (420-4.2-4.h).

c. Designated occupied set point for heating is 68° in offices and 55° in other areas; unoccupied set point is 55° for offices, 50° for other spaces (420-4.2-4.h).

d. Domestic hot water tanks will have timers installed on circulating pumps and the timers reflect the established occupancy hours.

OFFICE SYMBOL

SUBJECT: Facility Energy and Water Conservation Management Plan

e. Maintain (PM Program) and operate (temperature and operational control systems/EMS) HVAC equipment and systems.

f. Utilize cost-effective technologies to reduce operating and maintenance costs.

g. Operations and maintenance training.

h. Promote energy and water conservation.

i. Maintain and reset occupancy sensors for lighting and exhaust fans to minimize on time when spaces are unoccupied.

j. Monitor water meter on regular basis to detect water leaks.

k. Maintain flush, faucet, hydrants, and shut-off valves to prevent leakage. Monitor automatic valves to verify operations.

11. The value of a good preventive maintenance (PM) program is twofold. Traditionally, PM has been viewed as a way of extending equipment life and reducing costly emergency breakdowns. It will do that; but a good PM program can also help reduce energy and water consumption. Properly adjusted and maintained equipment will operate much more efficiently than equipment receiving little or no maintenance; and more efficient equipment operation means reduced energy and water consumption.

12. Tenant commanders are charged with the aggressive implementation of the energy and water plan. Commanders may delegate responsibilities and enforcement duties, but maintain overall responsibility for the implementation of this plan. The main principle of this plan is to reduce the facility's energy and water consumption in an economical and environmentally sound manner. In pursuit of increased energy and water conservation, both cost savings and a positive environmental impact will result.

13. Any questions or concerns may be directed to the Facility Manager____, at commercial (_____)_____-_____, fax (_____)_____-_____, or e-mail@mail.mil.

FIRST M. LAST
Facility Manager

DISTRIBUTION:
MSC, AO
Area Superintendent Energy Manager

Appendix D

FACILITY MANAGER'S QUARTERLY CONSERVATION CHECKLIST

Facility Name:

Date:

Instructions: To be completed quarterly by the FM. Upon completion, report will be placed on OHNG TAGNET Energy and Environmental Management web page by the FM who shall notify Energy Manager of the assessments inclusion on the web

EXTERIOR		Reviewed: comments
1	Are there any exterior lights on (poles, walls, soffits, ground mounted) during the day or on past prescribed night turn-off times?	Y N NA :
2	Are there any recent exterior envelope (walls, windows, doors and roof) issues that require maintenance?	Y N NA :
3	Are there hose bibs leaking on the exterior or in the wall behind? Are the hose bibs being turned off when not in use and not allowed to run on the ground for any length of time?	Y N NA :
INTERIOR		Reviewed: comments
4	Are doors between conditioned and unconditioned or lesser conditioned spaces being closed?	Y N NA
5	Are window blinds closed when the facility is not occupied? Are lights being turned off when there is adequate daylight to illuminate the space?	Y N NA
6	Are space temperatures being maintained at the authorized settings (420-4 2-4.h.)? Are there hot/cold areas where temperatures do not seem to be effectively controlled?	Y N NA
7	Is the ventilation system operating only when people are present? Does the operating schedule for the ventilation system match actual use? Are the operations hours accurate, are they off schedule?	Y N NA
8	Are window air conditioners turned off when the space is unoccupied? Do window air conditioners get covered during the heating season?	Y N NA
9	Are restroom/shower exhaust fans turning on/off in a timely manner with an occupancy sensor along with the lights in the restroom/showers?	Y N NA
10	Are there any exhaust fans operating during unoccupied hours or in unoccupied spaces?	Y N NA
11	Are there any leaky toilets, urinals, showers or faucets in the restrooms, showers or elsewhere in the facility?	Y N NA
12	Is the water meter showing any flow when there is no water use (the small stared wheel on the water meter does not spin when there is no water use)?	Y N NA
13	Are the occupancy sensors turning the lights off within 10 minutes of vacancy?	Y N NA
14	Are lights turned off when there is adequate daylight to illuminate the space?	Y N NA
15	Is task lighting being turned off when the space is unoccupied?	Y N NA
16	Where there is multiple switching (in-board, out-board for three or four- lamp fixtures or multiple switching patterns), are only those fixtures/lamps necessary to produce the required light level being used?	Y N NA
17	Is emergency/night lighting in corridors being used during occupied hours unless there is drill going on?	Y N NA
18	Are there personal heaters, coffee pots, microwaves, toasters or refrigerators in use (only facility provided equipment is allowed)?	Y N NA
19	Are computers, display screens, printers and copiers set in energy savings mode? Are same being turned off during unoccupied hours or when the desk is vacated for more than 20 minutes?	Y N NA
20	Are the larger kitchen refrigerators and freezers turned off outside of drill weekends and smaller combination refrigerator/freezer units used during normal occupancy periods?	Y N NA
21	Are ice-making machines turned off and drained outside of drill weekends? Are ice cube trays being used during normal occupancy periods in lieu of the ice machines?	Y N NA
Corrective Actions:		

Appendix E

Command Inspection Checklist

COMMAND INSPECTION CHECKLIST

Echelon CO/BN/BDE	Call Number	Critical*	Performance Requirement	Reference
CO	TBD	No	Quarterly checklists are file on Environmental portal page.	OHARNG Pamphlet 420-4
CO	TBD	No	Reduction in EI by 2.5% since previous year.	Executive Order 13693
CO	TBD	No	Reduction in water usage by 2% since previous year.	Executive Order 13693
CO	TBD	No	Energy management plan for facility published on Environmental portal page.	OHARNG Pamphlet 420-4
CO	TBD	Yes	Facility Survey Report completed initial and annually thereafter.	OHARNG Pamphlet 420-4
BN	TBD	No	Reduction in EI by 2.5% since previous year.	Executive Order 13693
BN	TBD	No	Reduction in water usage by 2% since previous year.	Executive Order 13693
BN	TBD	No	Unit fosters a climate of sustainability through command emphasis and tracking of activities	
BDE	TBD	No	Reduction in EI by 2.5% since previous year.	Executive Order 13693
BDE	TBD	No	Reduction in water usage by 2% since previous year.	Executive Order 13693
BDE	TBD	No	Unit fosters a climate of sustainability through command emphasis and tracking of activities	

Appendix F
Energy Advisory Committee (EAC) Memorandum



DEPARTMENTS OF THE ARMY AND AIR FORCE
JOINT FORCE HEADQUARTERS OHIO
OHIO NATIONAL GUARD
2400 WRIGHT STREET
POST OFFICE BOX 8111
MADISON OHIO 53708-8111

WIAR-CS

Date

MEMORANDUM FOR RECORD

SUBJECT: Appointment of Energy Advisory Committee (EAC) Members

1. The following are appointed as additional duty members to the EAC.

OHARNG Chief of Staff	Chair
16 th ENBDE (EN-AO)	Member
37 th IBCT (BCT-AO)	Member
73 rd TC (TAL-AO)	Member
174 th ADA BDE (ADA-AO)	Member
371 st SUS BDE (SUS-AO)	Member
STC-OH (JFZ-AO)	Member
Fort Ohio (TIC)	Member
NGOH-AVO-Z	Member
NGOH-IMO-Z	Member
NGOH-LOG-Z	Member
NGOH-JA	Member
NGOH-IMR-EM	Member
NGOH-IMR-ENV	Member

2. The purpose of the EAC Committee.

a. EAC will help to Plan, execute, and monitor actions and programs with environmental implications IAW AR 420-1, Chapter 22-12.

b. Responsible for establishing the environmental goals and objectives for the OHARNG. The committee will identify issues, make recommendations, and advise TAG.

3. Operation.

a. This committee shall meet at least quarterly according to the schedule established by the Chair.

b. Appointments are effective until the member is relieved by another appointed member of the same office/command or until the committee is dissolved.

FOR THE ADJUTANT GENERAL:

Name / Signature
COL, GS,
OHARNG
Chief of Staff, Army

Glossary (Abbreviations)

AEWRS	Army Energy and Water Reporting System: the data base that NGB uses to track facility energy and water data.
AO	Administrative Officer
ASHRAE	American Society of Heating, Refrigeration and Air-conditioning Engineers: a professional organization that creates policies and procedures that govern HVAC system design.
BDE	Brigade
BN	Battalion
BTU	British thermal unit (Btu): the measurement value used to define energy use herein. It is defined as the amount of work needed to raise the temperature of one pound of water by one degree Fahrenheit.
CDD	Cooling Degree Days: a unit of measurement to define the number of degrees a day's average outdoor air temperature is above 65oF i.e., when air conditioning is normally used.
CFMO	Construction and Facilities Management Office
CI	Command Inspection
CO	Company
COS	Chief of Staff
DMA	Department of Military Affairs
ECM	Energy Conservation Measure: an implementable energy conservation project that will result in reduced energy and/or cost savings.
EI	Energy Index: a measurement tool to compare facility energy efficiency using the average annual BTUs/SF and eliminating temperature and time. It is the EUI divided by the weather variables HDD & CDD.
EMS	Energy Management System: and packaged software and hardware system used to control the HVAC, and sometimes the lighting, systems in a facility. An eMS is also sometimes referred to as a Building Automation System, or BAS.
EO	Executive Order: a Presidential directive to meet defined mandates. In this case mandates related to energy and water conservation, sustainability and renewable energy sources.
EQCC	Environmental Quality Control Committee
EUI	Energy Use Index: a measurement tool to compare facility energy efficiency using the average annual BTUs/SF/YR. The total annual electrical and thermal energy consumption is divided by the facility area. The units for the value can be either BTUs/SF/YR or KBTUs/SF/YR.
FISP	Facilities and Installations Stationing Plan: the official OHARNG force structure database of populations statewide.
FM	Facility Manager
FMS	Fleet Maintenance Shop
FSR	Facility Survey Report: a walkthrough cursory review of a facility and its environmental systems to identify possible energy and water savings opportunities. See Appendix B.
FY	Fiscal Year: October 1 to September 30.
GSA	General Services Administration

HDD	Heating Degree Day: a unit of measurement to define the number of degrees a day's average outdoor air temperature is below 65oF i.e., when heating is normally used.
HVAC	Heating Ventilation and Air Conditioning: generally references the mechanical systems used to heat, cool, and ventilate a facility.
IES	Illuminating Engineering Society: a professional organization that creates policies and procedures that govern lighting system design.
IT	Information Technologies
KGal	Thousands of gallons
MSC	Major Subordinate Command
NA	Not applicable
NGB	National Guard Bureau
O&M	Operations and Maintenance: normal procedures and policies regarding the operation and maintenance of the buildings environmental systems.
PC	Photo-cell: a control device that switches exterior fixtures on/off depending on the level of available natural light.
PM	Preventative maintenance: an O&M practice that anticipates possible maintenance issues and addresses them before they become a problem.
POV	Privately owned vehicle
SEER	Seasonal energy efficiency ratio: the cooling output during a typical cooling-season divided by the total electric energy input during the same period. The higher the unit's SEER rating the more energy efficient it is.
SF	Square feet
TAG	The Adjutant General
TBD	To be determined
UEO	Unit Environmental Officer: see Section 1-12.
OHARNG	Ohio Army National Guard
YR	Year