Implementation by DeCA facilities of Executive Order (EO) 13693 – Planning for Federal Sustainability in the Next Decade.

BACKGROUND

Executive Order (EO) 13423 – Strengthening Federal Environmental, Energy, and Transportation Management, (signed January 24, 2007) provided for specific guidance concerning efficiencies to be incorporated into all federal facilities. This EO rescinded *EO 13101 - Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition* and *EO 13123 - Greening the government Through Efficient Energy Management*. These two EOs were baseline documents for the implementation of efficiencies in facilities as measured by Leadership in Energy and Environmental Design [**LEED**]. Many federal agencies, including DeCA, adopted the LEED's ratings guidelines to measure elements contained in their facilities to acquire various levels of compliance with EOs 13101 and 13121. In response to EO 13423, DeCA re-evaluated the requirements and measurements of its facility program. They were further clarified in the UFC 4-030-01 Sustainable Design Requirements document.

EO 13514 – Federal Leadership in Environmental, Energy, and Economic Performance, (signed October 5th 2009) contained numerous requirements on greenhouse gas and energy reduction, water use efficiency, pollution prevention and waste reduction, sustainable acquisition, electronic stewardship, and other sustainability aspects. EO 13514 built on the requirements contained in EO 13423. EO 13514 made mandatory the five Guiding Principles of the Memorandum of Understanding for all new construction and major renovations and set an aggressive goal for applying these practices to existing capital assets.

EO 13693 - Planning for Federal Sustainability in the Next Decade, (signed March 19, 2015), EO 13693 Implementing Instructions (June 10, 2015), and the Guiding Principles for Sustainable Federal Buildings and Associated Instructions issued by the Council on Environmental Quality (CEQ) in February 2016, among other things, require that beginning in fiscal year (FY) 2020, all new construction of Federal buildings greater than 5,000 gross square feet that enters the planning process is designed to achieve energy net-zero and, where feasible, water or waste net-zero by fiscal year 2030. E.O. 13693 reconfirmed that green building work is an important part of Federal efforts to protect the environment, support communities, and address climate change.

In addition to meeting the requirements of the EOs described above, design and administer construction for all New and Add / Alt Projects to meet the requirements of LEED Silver with an initial design target of 55 points. Do not register the Project through LEED. The design team shall submit a completed LEED scorecard to DeCA during the early design phase of the project indicating the credits to be pursued as part of the design process in addition to the required pre-requisites and minimum program requirements (MPR's). At the end of the project, the design team shall submit a report showing compliance with the targeted LEED credits to DeCA.

IMPLEMENTATON PLANNING

DeCA facilities will implement 13693 using the *DeCA Commissary Design Guidance*, as the basis of all commissary designs. All current sustainable design requirements for compliance with EO 13693 are available to all users on the DeCA Facilities website and can be accessed at www.decafacilities.com.

DESIGN CRITERIA

1. DeCA Sustainable Design Requirements

A. The Defense Commissary Agency is committed to sustainable design and construction practices that comply with the Guiding Principles for Sustainable Federal Buildings and Associated Instructions (CEQ – Feb 2016), the Energy Policy Act of 2005, and EO 13693 *Planning for Federal Sustainability in the Next Decade*. Consistent with the above, EO 13693 directs Federal Agencies to ensure that new construction and major renovation of federal facilities comply with the Guiding Principles for Sustainable Federal Buildings. These principles require designers to incorporate the following goals during project design:

1. Reflect the evolution of sustainable building design, construction, and operating practices since 2008,
2. Incorporate other building-related EO 13693 requirements,
3. Increase the economic and environmental benefits of Federal investments in facilities,
4. Enhance occupant health, wellness, and productivity
5. Include climate resilience in building design, construction, and operations, and protect Federal facilities investments from the potential impacts of climate change, and
6. Provide information on tracking agency green building performance.

These principles are to be followed in order to reduce the total ownership cost of facilities; improve the energy efficiency and water conservation; provide safe, healthy, and productively built environments; and, to promote sustainable environmental stewardship. EO 13693 can be viewed at www.fedcenter.gov.

B. As an Agency of the Department of Defense, DeCA fully recognizes the economic and environmental benefits of sustainable design and construction practices. The Agency also recognizes that certain objectives for the sustainability goals may be harder to achieve than others. The designer of DeCA facilities is to identify the sustainable design features and requirements early in the design process so that these features can be incorporated into the design at the lowest possible cost. A 30% energy reduction over ASHRAE 90.1-2004 **must** be achieved in all new building projects. LEED Silver Design requires comparison with ASHRAE 90.1-2007 for energy savings results. Since ASHRAE 90.1-2007 has stringent energy design requirements, the energy reduction over ASHRAE 90.1-2007 may be less than 30%. Design teams must provide DeCA with predicted energy savings thresholds from an energy model compared to both the ASHRAE 90.1-2004 and 2007 baselines for the building to validate compliance.

C. Designers are to review the following Guiding Principles and incorporate them in designs. These outlines are intended to provide an example guide to implement the goals of EO 13693. Designers should review these principles at http://www.wbdg.org/sustainableEO/ and complete the February 2016 *Determining Compliance with the Guiding Principles for Sustainable Federal Buildings.*
https://www.whitehouse.gov/sites/default/files/docs/determining_compliance_with_the_guiding_principles_for_sustainable_federal_buildings_february_2016.pdf

D. For building evaluation purposes, “not applicable” may be used where the building’s inherent function, mission, safety, or designation prevents compliance with a specific guiding principle, element, or sub-element. However, for existing buildings, criteria that are determined to be

"not applicable" do not count toward the total number of required metrics for an individual building. Documentation of all non-applicability determinations is required.

Guiding Principles for Sustainable Federal Buildings. The following outlines issues to be addressed during the design stage.

GUIDING PRINCIPLES
FOR
SUSTAINABLE FEDERAL BUILDINGS

Federal Agencies are required to incorporate the Guiding Principles for New Construction and Major Renovations into **all new construction, major renovation, or repair and alternation of Federal Buildings**. This set of Guiding Principles is linked below, with additional links to technical guidance on specific topics covered in the WBDG.

http://www.wbdg.org/references/fhpsb_new.php

DeCA Implementation Plan
The revised Guiding Principles shall be implemented consistent with applicable law and regulations, and subject to the availability of appropriations or other authorized funding. The revised Guiding Principles do not supersede or invalidate any existing laws, regulations, or other legal requirements. If there is any conflict between the revised Guiding Principles, and a statute, regulation, or executive order, the statute, regulation, or executive order governs. Additional requirements specific to DeCA Projects are listed below.

TABLE OF CONTENTS

5. – Reduce the Environmental Impact of Materials
5. a. –Material Content and Performance
5. b. –Waste Diversion and Materials Management

6. – Assess and Consider Climate Change Risks
6. a. –Mission Criticality
6. b. –Floodplain Considerations
6. c. –Facility Design
6. d. –Facility Adaptation

B. Guiding Principles for Existing Buildings

1. - Employ Integrated Assessment, Operation, and Management Principles

1. a. - Integrated Assessment, Operation, and Management

- **Requirement:** Use a collaborative, integrated process and team to plan, program, design, construct, commission, and transition to operation and maintenance policies that improve building environmental performance, support occupant health and wellness, and improve the climate resilience of facilities and operations.
- **Application:** To ensure consistency, every effort will be made to maintain the same members of the project development team from the programming and charrette through completion of construction. The team will not only comply with all relevant codes and laws, but will incorporate into the project the essence and intentions of EO 13693 *Planning for Federal Sustainability in the Next Decade*. The team will develop and implement an overall strategic plan to implement to the highest degree possible, the goals of this EO.
- **Suggested Steps:**

    1. Integrate the use of OMB's Circular A-11, Part 7 *Capital Programming Guide.*
    2. Assess existing condition and operational procedures of the building and major building systems, adequacy of electric vehicle charging infrastructure, in accordance with applicable laws and regulations, and identify areas for improvement.
    3. Establish operational performance goals for energy, water, material use and recycling, indoor environmental quality, and daylighting along with other comprehensive design goals and ensure incorporation of these goals throughout the design and life cycle of the building and verify that they are being met.
    4. Follow sustainable landscape and water conservation design principles including protection and promotion of pollinator habitat.
    5. Consider design choices that improve the environmental performance, protect historic properties, enhance indoor environmental quality, support health, and wellness of building occupants, and address climate risks, including wildfire.
    6. Consider all stages of the building's life cycle based on International (Organization for Standardization) ISO 14044.

- **Submittal:** Provide documentation by a responsible professional demonstrating and stating performance goals have been achieved. Integrate strategies into commissioning report.

1. b. - Commissioning

- **Reference:** Appendix C - COMMISSIONING. The referenced source will be the guide for completing this requirement.

- **Requirements:** The commissioning process activities shall be completed by the commissioning team, in accordance with Appendix C. Some of the requirements of that document will be:
    - Designate an individual as the Commissioning Agent to lead the commissioning process activities. This individual must have the minimum defined experience level and be independent, as defined in the Commissioning Reference.
    - Clearly document the owner's project requirements and the basis of design for the building's energy related systems. Updates to these documents shall be made during design and construction by the design team.
    - Develop and incorporate commissioning requirements into the construction documents.
    - Develop and utilize a commissioning plan.
    - Verify that the installation and performance of systems being commissioned meet the owner's project requirements and basis of design.
    - Complete a commissioning report that confirms identified issues were appropriately addressed.

- **Commissioning Systems:** The systems to be included in the commissioning process activities include as a minimum:
    - Heating, ventilating, air conditioning and refrigeration (HVAC &R) systems (mechanical and passive) and associated controls
    - Lighting controls, including day lighting
    - Domestic hot water systems
    - Renewable energy systems (PV, wind, solar, etc.)
    - Water distribution and conservation

- **Application:** A formal building commissioning program for commissary construction will provide considerable benefits as stated above. DeCA has adopted a policy to require a formal building commissioning process during design and construction. An independent commissioning agent will be designated to lead the commissioning process. Appendix C provides guidance on how the commissioning process must be structured.

- **Suggested Steps:**

    1. Designate a Facility Commissioning Agent to lead facility commissioning activities. The commissioning agent must be independent of the designer or construction manager and qualified to serve as the owner's commissioning representative.
    2. Identify systems that require commissioning during the early stages of project development. Require the commissioning agent to review the design documents and design energy modeling and coordinate with DeCA and the architect-engineer (A-E) on conformance to objectives.
    3. In conjunction with the A-E and DeCA, the Commissioning Agent will ensure that the owner's project requirements are documented and addressed in the design documents.
    4. Require the commissioning agent to coordinate with the A-E designers and DeCA on specific commissioning goals for sustainable design, including water and energy conservation.
    5. Incorporate a review of the building's water and energy related systems into the commissioning process.

6. Have the commissioning agent review and comment on the design documents and design energy model.
7. Develop and coordinate a commissioning report after the commissioning activities have been completed.
8. Plan for and schedule a Post Occupancy Survey to assess building performance with operations and maintenance (O&M) staff and operators within one year of final acceptance and develop a plan for addressing lessons learned, operational issues and outstanding commissioning issues.
9. Provide for verification of O&M training for operational personnel on building performance.

- **Submittal:** As directed by Appendix C, DeCA Commissary Design Guidance.

2 - Optimize Energy Performance

2. a. - Energy Efficiency

- **Reference:** Design Criteria 23 00 00, paragraph 1.05-Efficiency Recommendation Tables from DOE (Department of Energy)/FEMP's (Federal Energy Management Program) Buying Energy Efficient Products.

- **Requirements:** Reduce the proposed building performance rating compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2007 (without amendments), for the total energy consumption within and associated with the building project, as demonstrated by a whole building project simulation using the Building Performance Rating Method in Appendix G of Standard 90.1-2007.

  All building energy loads associated with the project must be included in the energy simulation model. Improvements to non-regulated loads must be documented as described below. Regulated energy systems include HVAC (includes heating, cooling, fans, and pumps), service water heating, and general interior lighting. Process loads for retail may include display lighting, refrigeration equipment, cooking and food preparation, and other major support appliances. Merchandise for sale that is plugged in, and small moveable appliances are not candidates for improved energy performance.

  Appendix G of Standard 90.1-2007 requires that the energy analysis done for the Building Performance Rating Method include ALL of the energy consumption within and associated with the building project.

  To achieve the goal the proposed design must:

  - Must comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4) in Standard 90.1-2007 (without amendments);
  - Must include all the energy consumption within and associated with the building project; and
  - Must be compared against a baseline building that complies with Appendix G to Standard 90.1-2007 (without amendments).

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g. lighting integral to medical equipment) and other (e.g. waterfall pumps). Process energy does not include any lighting (such as for the interior, parking garage, surface parking, façade, or building grounds, except as noted above), nor any HVAC (such as for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.), nor any service water heating for domestic or space heating purposes.

For Process Loads provide cut sheets or other documentation demonstrating budget and proposed equipment. A clear baseline must be described and documented to compare to proposed improvements in process load categories. The baseline and improvements must be documented in the following ways:

- Appliances & Equipment: For appliances and equipment, provide cut sheets of typical budget and proposed equipment that indicates hourly energy use. Provide a spreadsheet calculation estimating the daily use hours for each piece of equipment listed. Use the total estimated energy use in the energy simulation model as a plug load. Reduced use time (schedule change) is not a category of energy improvement in this credit. Energy star ratings and evaluations are a valid basis for performing this calculation.
- Display Lighting: For display lighting, the space by space method of determining allowed lighting power under ASHRAE 90.1-2001 must be used to determine the appropriate baseline for both the general building space and the display lighting. Section 9.3.1.2 of ASHRAE 90.1-2001 describes the methodology for determining a baseline that includes display lighting. Installed lighting in the proposed building, including display lighting is compared to this baseline in the simulation.
- Refrigeration: For hard-wired refrigeration loads, the impact of energy performance improvements must be modeled with a simulation program specifically designed to account for refrigeration equipment. For example, eQUEST has a refrigeration module that can be used to simulate performance improvements in refrigeration equipment. An energy simulation template for DeCA using the eQUEST Refrigeration Model is currently being developed and will be available soon. Included with the template will be spreadsheet tools that are designed to provide an easy means to transfer information from design plans and specifications into a format for ease of inputting into eQUEST. The template will include specific modeling guidelines for commissaries, including how to determine infiltration loads through customer doors, DHW loads and sources for determining appropriate utility rates to apply in the model.

- **Application:** The intent of these performance standards is to ensure that Commissaries facilities are being designed to maximize energy performance of the building envelope and building systems. It is within DeCA's best interest to ensure that facilities are being designed and constructed to maximize energy performance. These objectives provide a good target of opportunity and some results could be achieved without significantly impacting overall project costs above baseline. Other factors to consider:
  - Passive solar features should also be considered for potential commissary application. Not only can these features contribute to the overall reduction of energy use, but they also can have an impact on customer sales. Studies have demonstrated a positive contribution to sales from implementing these features. Use of solar light tubes in the

sales area and warehouse could offer a significant contribution to overall energy reduction.

- High efficiency HVAC systems, refrigeration equipment and various other process and equipment loads and lighting will have the greatest incremental impact on overall energy consumption in commissaries. The greatest amount of design effort should be devoted to improving these systems. The refrigeration process loads are the expected to be the biggest energy use in commissary stores. DeCA typically utilizes heat recovery and heat rejection strategies, high efficiency motors, high efficiency ballasts and high efficiency lamps in display cases to lower total energy use. Designers should coordinate with equipment manufacturers to improve energy efficiency, particularly for volume build applications.
- The designer should look at all equipment and systems that use energy and identify strategies to reduce energy use. Consider first cost verses life cycle cost, maintenance, replacement costs, and any potential benefit or detriment to staff or customers when selecting strategies. Design the building envelope and building systems to maximize energy performance. Use a computer simulation model to assess the energy performance and identify the most cost-effective energy efficiency measures. Quantify energy performance as compared to the baseline benchmark. The designer should use historic utility bills from similar stores, generic retail energy use data, data from their local utility, or computer modeling to assess typical and projected loads. Regardless of the methodology used in setting the energy budget, the credit narrative should include a description of the methodology used and assumptions made.
- The U.S. Environmental Protection Agency's Energy Star Program is working to establish retail energy benchmarks. Benchmark data is available for grocery stores. Beta testing is underway to compile benchmark data for convenience stores and warehouses. Designers should use Energy Star data when determining their energy budget. In the absence of established retail benchmarks, the retailer-specific, relative energy savings credit will meet the intent of increasing energy performance as well as generate retail energy usage data.
- DeCA commissaries are required under the Federal Energy Management Program (FEMP) to provide energy reductions. Consistent with this guidance, DeCA has established a goal to achieve an Energy Use Index (EUI) for commissaries of 137 by 2010 (137,000 BTU/SF/YR). Typical commissary facility project designs are currently rated with a Design Energy Use (DEU) Index in the range of 150 to 200 (150,000 to 200,000 BTU/SF/YR). This is more than the required EUI goal, so additional improvements will be required to meet the Guiding Principles' goal of a 30% reduction for new facilities and a 20% reduction for major renovations.

The following table describes average building and process loads for several categories of retail types. This table provides a guideline as to the anticipated significance of process energy categories in retail projects. (The data is assembled from several national studies and data provided by the LEED^{R}-NC Retail Committee.)

Retail Energy Use Distribution by Retail Type		
Retail Type	Regulated Loads (including display lighting)	Process Loads

Food Service	50-65%	35-50%
Grocery	40-45%	55-60%
Specialty Service	80-90%	10-20%
Merchandise	65-85%	15-35%

- Particular care and attention should be devoted to careful selection of refrigeration equipment and other connected equipment loads to carefully select energy efficient models and to recapture generated heat and cold air. The designer should provide DeCA with equipment cut sheets and other manufacturers or industry literature to demonstrate selection of energy efficient equipment in comparison to normal industry standards.

- **Suggested Steps:**

1. Establish an energy performance baseline for similar-sized and used facilities, considering adjustments for climatic conditions.
2. Incorporate energy performance objectives into architect-engineer design statement of work. Target unit area reductions of 30% under baseline for new buildings and 20% under baseline for existing buildings.
3. Review and assess cost and benefits of identified cost saving opportunities.
4. Select preferred options for incorporation into design documents.
5. Review design documents to assure compliance with design intent.
6. Document achievement of objectives as part of the facility commissioning report.

- **Submittal:** Provide certification by the designer of record that incorporates a quantitative summary table that specifically lists each of the energy saving strategies into the proposed building design and demonstrate how the energy reductions compare with the baseline building. Compare items such as window U-factors, installed lighting wattage per square foot, HVAC and refrigeration equipment efficiencies, etc. and demonstrate the projected energy savings expressed as a percentage of baseline. Demonstrate via a summary printout from an energy simulation model that the building performance rating will be less than the baseline performance rating as defined in ASHRAE/IESNA 90.1-2007, Appendix G for the total energy consumption within and associated with the building. All energy loads must be included in the calculations and simulation.

2. b. - Renewable and Clean Energy

- **Requirement:** Implement life cycle cost-effective renewable electric and thermal energy projects on-site. Consider long-term off-site sources of renewable power or Renewable Energy Certificates (RECs) where on-site opportunities are limited. Utilize clean and alternative energy sources where possible.

2. c. - Metering

- **Requirements:** To track and continuously optimize energy performance, install building level meters for electricity, natural gas, and steam. Install advanced meters as required by statute. Standard meters should be used when advanced meters are not appropriate. FEMP metering guidance is available at http://energy.gov/sites/prod/files/2014/11/f19/metering_guidance.pdf

2. d. - Benchmarking

- **Requirements:** Benchmark building performance at least annually, preferably using ENERGY STAR Portfolio Manager. Regularly monitor building energy performance against historic performance data and peer buildings to identify operating inefficiencies and conservation opportunities.

    - Develop and implement a Measurement and Verification plan consistent with Option D: Calibrated Simulation (Savings Estimation Method 2), or Option B: ECM Isolation, as specified in the *International Performance Measurement & Verification Protocol (IPMVP) Volume III: Concepts and Options for Determining Energy Savings in New Construction, April, 2003.*

    OR

    - Develop and implement a Measurement and Verification plan consistent with Option C: Whole Building, as specified in the *International Performance Measurement & Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy and Water Savings* 2012 http://www.coned.com/energyefficiency/PDF/EVO%20-%20IPMVP%202012.pdf
    - The option selected shall be appropriate for the size and nature of the building.
    - The M&V period shall cover a period of no less than one year of post-construction occupancy.

- **Application:** DeCA provides for substantial metering and verification of energy consumption over time through its refrigeration monitoring and alarm contracts. As an integral part of the facility commissioning and post validation assessment surveys, DeCA can include provisions in these contracted efforts to demonstrate thru measurement and verification that the objectives for reduced building energy consumption over time have been achieved. Other factors to consider:

    - DeCA's current metering policy does not include sub-metering to identify discrete elements of energy performance. In the early stages of the design, sub-metering needs to be discussed and made part of the overall design appropriate to the scope of the project.
    - Sub-metering capabilities, their potential benefits and costs, need to be discussed during the design process.
    - In interpreting the intent of this requirement, it may be assumed that DeCA would not have to implement metering down to individual components. Instead metering would be implemented at the aggregate component portion of load. In other words, load components, such as refrigeration case load, sales area lighting, process energy loads, exterior lighting and other key components would be each be measured in aggregate and provide opportunity to assess load contribution and potential energy reduction strategies for each component.

- **Suggested Steps:**

    1. Comply with DeCA's criteria on type of commissary metering.

    2. Review opportunities for sub-metering to identify discrete components of energy reduction. Include necessary metering and sub-metering devices in the design to measure energy.

3. Incorporate into commissioning procedures and post construction validation assessment procedures to measure and verify anticipated energy reductions.

4. Review design documents and A-E contracts to assure compliance.

5. Document achievement of objectives as part of the facility commissioning report and post-validation assessment survey.

- **Submittal:** Provide certification by a licensed Professional Engineer or Requirements Architect confirming that all necessary metering was been installed per the M&V Plan and that a contract or commitment is in place for the professional services necessary to implement the M&V program. Provide a copy of the M&V Plan following IPMVP Volume III, April 2003, or IPMVP.

3. - Protect and Conserve Water

3. a. - Indoor Water Use

- **Reference:** Guidance, paragraph 5.11-Energy Efficiency and Water Conservation at Federal Facilities.

  - **Requirements**: Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems. Employ strategies that minimize water use and waste including: 1. Water-Efficient Products: Purchase water conserving products, including WaterSense and FEMP-designated products, as required by EO 13693 and EPACT 2005.

    2. Water Meters: Install building level water meters to allow for the management of water use during occupancy, including detecting leaks.

    3. Cooling Towers: Optimize cooling tower operations.

    4. Single Pass Cooling: Eliminate single pass cooling.

- **Application:** Commissary facilities are typically large consumers of potable water as a result of water demands associated with food preparation, processing and sanitation. DeCA has already established target guidelines to reduce water consumption in new and existing facilities. There is a general trend in the food industry toward reduction in the amount of food preparation and processing that occurs on-site in a retail grocery facility. The trend is toward more centralized preparation and processing of food items such as meats, produce and bakery products. Consequently, the process loads in commissaries will be decreasing significantly over the next few years, thus reducing water demand. Preliminary design considerations should examine the potential impact of these trends on store potable water needs and how those needs might be further reduced. Other design considerations include:

  - As with many similar retailing operations, process water (water used to provide a product or service) far outweighs the water used for toilets and hand sinks. Process water also includes water used in cooling systems or any other equipment not directly regulated by the Energy Policy Act of 2005 (which covers faucets, toilets, urinals and showerheads).

- To address process water use, the water calculation spreadsheet template has been expanded for retail projects to include commercial fixtures not covered by EPACT 2005. In addition to specifying water efficient fixtures and appliances, consider reclaimed water for non-potable applications such as toilet flushing, mechanical systems, cleaning, plant irrigation (for plants that are for sale and not part of site landscaping), hosing of dock or processing areas, or other applications that do not require potable water.
- Specify only high-efficiency fixtures for plumbing consistent with DeCA's Commissary Design Guidance Section 22 05 00. The fixtures reduce potable water intake and wastewater generation.
- Consider reclaimed water for flushing systems.
- Treated non-potable water can be used for boiler and HVAC system make-up water.
- A wide variety of fixtures for sinks, lavatories and hose valves are also available in high-efficiency models. Specify only water-conserving fixtures, with electronic operational sensors for hand sinks.
- Specify high efficiency ice makers, pre rinse spray valves, and other processing equipment consistent with water efficiency criteria, including EPACT2005.

- **Suggested Steps:**

1. Review current water consumption records and identify water reduction goals.
2. Identify fixture and equipment requirements and assess application of water reduction methodologies to them.
3. Research and identify high-efficiency fixtures and equipment; document life cycle costs as part of design analysis.
4. Identify installation and local code requirements regarding specification and use of low-flow or dry fixtures, or reuse of storm-water or reclaimed water volumes.
5. Determine water consumption by domestic vs process loads and calculate the energy savings contribution of each. Extra reductions over and above those needed to receive the credit may be applied to Innovation and Design credit.

- **Submittal:** Provide appropriate documentation to substantiate that the required reduction in potable water demand to satisfy Guiding Principle criteria is met. Include documentation and drawings to verify use of high-efficiency fixtures. Provide a spreadsheet to demonstrate a reduction in water demand, compared to baseline conditions. Provide cut sheets and other manufacturer's data to demonstrate efficiency of equipment. For additional equipment for which no benchmark is provided in EPACT 05, provide the following:

1. Manufacturer's data or cut sheets regarding flow rates.
2. Benchmarking data that compares these flow rates with industry averages or the industry standard for that particular equipment type (water research organization study, industry audit data, etc.).

3. b. - Outdoor Water Use

50 Percent reduction in potable water use for landscaping

- **Reference:** Guidance, paragraph 5.11-Energy Efficiency and Water Conservation at Federal Facilities.

- **Requirements:** Use water efficient landscapes that incorporate native, non-invasive, drought tolerant, and low maintenance plant species. Employ water efficient irrigation strategies to reduce outdoor potable water consumption. Water meters and timers should be installed for irrigation systems serving more than 25,000 square feet of landscaping. Base the irrigation reduction goals on base standards.

- **Application:** Commissary landscape features are usually identified during the early design stages of commissaries and integrated into the civil site design. DeCA encourages the use of native landscape materials in site design and minimizes the area requiring landscaping to key areas in the front of the store. The use of native materials and Xeriscape should make this credit achievable under normal circumstances. If irrigation is provided, use high efficiency irrigation technology (e.g. Smart Sensors). If irrigation is not provided collect and reuse water from on the site that would otherwise be released. Other design considerations include:
    - Maximize the extent of surfaces excluding the building footprint with native or adaptive vegetation areas.
    - The A-E's selection of landscape materials requires coordination with the installation to assure selection of native materials and ensure that it conforms to the local landscape plan.
    - Drip irrigation systems and smart sensors afford opportunities to dramatically reduce water consumption over conventional means of irrigation.
    - Consider integration of water collection and storage features into the landscape design.
    - If irrigation systems are used, use only high efficiency irrigation systems that ensure a return on investment due to lower water use and less maintenance.

- **Suggested Steps:**

    1. Review installation landscaping plans and guidelines along with site constraints to identify opportunities for water efficient landscaping.

    2. Unless available from the installation, require the A-E designers to perform a soil and climate analysis and consider Xeriscape and water-efficient irrigation technologies, including high-efficiency irrigation systems and/or reclaimed water systems for irrigation.

    3. Document collaborative decisions with the installation prior to commencing final design.

    4. Perform design analysis and investigative studies to substantiate water savings over conventional design. Include information on native species selected and irrigation equipment used.

- **Submittal:** Provide documentation that necessary analysis has occurred to determine that the project site meets the design criteria. Include appropriate documentation and drawings to depict natural vs landscape areas. Identify irrigation areas and types of systems used.

No Potable Water Use or No Irrigation for Landscaping

- **Reference:** Eliminate the use of potable water, natural surface, or subsurface water resources available on or near the project site, for landscape irrigation.

- **Requirements:** When irrigation is required, use only water collected on site that would otherwise be released from the site, such as captured stormwater, reuse water, or reclaimed water, or a combination of water from these sources to eliminate all potable water use for site irrigation, except as needed for plant establishment.

- **Application:** Commissary landscape features are usually identified during early design stages and integrated into the civil site design. DeCA encourages the use of native landscape materials in site design and minimizes the area landscaped to areas in the front of the store. The sole use of native materials and Xeriscape could make this achievable under normal circumstances. Other design considerations include:
    - Rely solely on native or adaptive vegetation areas as landscape features to the site.
    - The A-E's selection of landscape materials must be coordinated with the installation to assure selection of native materials.
    - Stormwater retained on the site must be incorporated into the landscape plan.
    - Eliminating a permanent irrigation system altogether reduces costs throughout the life-cycle of the facility.
    - Irrigation systems that capture and reuse stormwater runoff, or reclaimed water are more costly to design and may require code variances.

- **Suggested Steps:**

    1. Review installation landscaping plans and guidelines along with site constraints to identify opportunities for water efficient landscaping.

    2. Require the A-E designers to perform a soil and climate analysis and consider Xeriscape and water-efficient irrigation technologies.

    3. Document collaborative decisions with the installation prior to commencing final design.

    4. Provide sustainability analysis of the landscape design without permanent irrigation systems.

- **Submittal**: Provide appropriate documentation in design documents that Requirements necessary analysis has occurred to determine that the project site meets the LEED criteria. Include appropriate documentation and drawings to depict natural areas and landscape areas.

3. c. - Alternative Water

- **Requirements:** Implement cost effective methods to utilize alternative sources of water such as harvested rainwater, reclaimed water, air handler condensate capture, grey water, and reclaimed water, to the extent permitted under local laws and regulations.

3. d. - Stormwater Management

- **Requirements:** Employ design and construction strategies that reduce stormwater runoff and discharges of polluted water offsite to protect the natural hydrology and watershed health. For any new construction per EISA section 438, use site planning, design, construction, and maintenance strategies to maintain hydrologic conditions after development, or to restore hydrologic conditions following development, to the maximum extent that is technically feasible.

4. - Enhance Indoor Environmental Quality

4. a. - Ventilation and Thermal Comfort

- **Requirements:** Provide safe and healthy ventilation and thermal comfort that supports the productivity and well-being of building occupants. Comply with ASHRAE Standards 55-2004, Thermal Comfort Conditions for to Human Occupancy, and 62.1-2007 Ventilation for Acceptable Indoor Air Quality. Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants. Mechanical ventilation systems shall be designed using the Ventilation Rate Procedure. Naturally ventilated buildings must comply with ASHRAE 62.1-2007, paragraph 5.1.

- **Application:** Typical commissary design provides efficient ventilation and thermal comfort for human occupancy. The DeCA Design Criteria has established efficient operating and patron comfort criteria to provide and maintain ventilation and comfort ranges for human occupancy that comply with ASHRAE Standards 55-2004 and 62.1-2007 Ventilation for Acceptable Indoor Air Quality. Commissary ventilation designs conform to ASHRAE standards for Acceptable Indoor Air Quality. Mechanical Ventilation systems are designed using the Ventilation Rate Procedure. Facilities must be designed to conform to Sections 4, 5, 6, and 7 of ASHRAE standard

- **Suggested Steps:**

    1. Address ventilation and thermal comfort control requirements in the early stages of design.

    2. Provide required thermal comfort to building occupants in compliance with ASHRAE Standard 55-2004.

    3. Review A-E design for compliance with these requirements.

    4. Include verification of compliance with these provisions as part of the facility commissioning process.

- **Submittal:** Provide documentation by a responsible design professional demonstrating and stating that the required criteria for ventilation and thermal comfort conform to ASHRAE Standards 55-2004 and 62.1-2007 that all design compliance documentation and performance validation requirements

have been successfully completed or will be provided under existing contracts. Include a summary of calculations in the project Design Analysis, including all assumptions, assumed occupant densities, zone air distribution effectiveness, and ventilation system efficiency

4. b. – Daylighting and Lighting Controls

- **Reference:** Defense Commissary Agency (DeCA) Lighting Review, February 2007.

- **Requirements:** Maximize opportunities for daylighting in regularly occupied space, except where not appropriate because of building function, mission, or structural constraints. Maximize the use of automatic dimming controls or accessible manual lighting controls, task lighting, and appropriate shade and glare control.

- **Application:** This goal is considered achievable in commissary construction without significant change in practices, even though most new commissary construction introduces very little daylight into the occupied space, other than through store front glazing, administrative office windows, or warehouse overhead door openings. There are opportunities to introduce daylight into the sales area through greater use of clerestory windows or other features of the store that are added as architectural features. Concepts for the Store of the Future introduced daylight as an important element of sales area design. The DeCA Design Criteria does not currently address these options and they would have to be considered as separate design objectives at the outset of design. Other factors to consider:

    - Operationally, DeCA has opposed use of daylight features based on three arguments:

        1. The first argument addresses the perceived non-uniformity of light caused by the introduction of daylight into the operating areas of the store. Without control devices, the natural light can introduce glare and heat into the operating space and create bright spots and dark spots throughout the sales space. Provision of daylight redirection and/or glare control devices can overcome this objection and ensure daylight effectiveness.

        2. Additionally, there is also operational concern over the extra heat generated and how this heat might affect refrigerated products such as produce. DeCA studies have demonstrated the heat gain on product to be negligible.

        3. Finally, there are concerns about maintenance and housekeeping requirements for operative light and glare control devices.

    - Clerestory windows in the produce area provide a distinguishable architectural element of the store design. Designers are to investigate methods that are employed to reduce the amount of light leaving the building.
    - Use of extensive storefront glazing, skylights and other light features need to be reconciled with force protection entry and blast resistance standards.
    - Strategies to consider include building orientation, shallow floor plates, increased building perimeter, exterior and interior permanent shading devices, high performance glazing and photo integrated light sensors.
    - Predict daylight factors via manual calculations or model daylight strategies with a physical or computer model to assess foot-candle levels and daylight factors achieved. Modeling must

demonstrate 25 horizontal foot-candles under clear sky conditions, at noon, on the equinox, at 30" above the floor. Any portion of a room achieving the requirements can qualify for this credit.

- Many retail applications may not be able to use perimeter windows for day-lighting, due to display or other security concerns. Skylights, clerestories and light wells may provide more feasible retail alternatives. Depending on the design of a skylight (vertical monitor, horizontal/domed skylight, or saw-tooth) and the transmittance of the glazing, providing skylights at approximately 3-6% of the applicable roof area may achieve this goal. For any project, glazing performance must be carefully balanced for optimum daylight, heat loss and solar heat gain performance.

- **Suggested Steps:**

    1. Introduce use of day-lighting in early design discussions.

    2. Design the building to maximize interior day-lighting when feasible.

    3. Review A-E design for compliance with these recommendations

    4. Verify compliance with these provisions as part of the facility commissioning process.

- **Submittal:** Provide documentation demonstrating that the criteria for day-lighting have been achieved. Provide area calculations that define the daylight zones and provide a summary of daylight factor prediction calculations through manual methods or in a summary of computer simulations illustrating that the foot-candle levels have been achieved.

4. c. – Indoor Air Quality

- **Requirements:** Take actions to ensure optimal indoor air quality, including:

    1. Radon: Test for radon in buildings and mitigate as required.

    2. Moisture Control: Establish policy and implement a moisture control strategy to prevent building materials damage, minimize mold growth, and reduce associated health risks.

    3. Low-Emitting Materials: Use low emitting materials for building construction, modifications, maintenance, and operations. In particular, specify the following materials and products to have low pollutant emissions: composite wood products, adhesives, sealants, interior paints and finishes, solvents, carpet systems, janitorial supplies, and furnishings.

    4. Indoor Air Quality during Construction: Establish a policy and implement necessary protocols to protect indoor air quality during construction and in the finished building.

    5. Environmental Smoking Control: Prohibit smoking in any form within the building and within 25 feet of all building entrances, operable windows, and building ventilation intakes.

6. Integrated Pest Management: Use integrated pest management techniques as appropriate to minimize pesticide usage.

- **Suggested Steps:**

1. Target opportunities to enhance indoor Air Quality during the early stages of design.

2. Include appropriate investigation in A-E design contracts

3. Obtain baseline information from the installation on potential Radon gas residual levels and required mitigation measures.

4. Review design and location of all proposed and/or existing air intake structures for potential impact on indoor air quality.

5. Review design of cooling coil drain pans to ensure complete draining.

- **Submittal:** Provide documentation by a responsible design professional demonstrating that the criteria for maintaining indoor air quality in buildings is met in the design

4. d. – Occupant Health and Wellness

- **Requirements:** Promote opportunities for occupants to voluntarily increase physical movement. Support occupant health by considering options such as providing potable water, daylight, plants, and exterior views.

5. – Reduce the Environmental Impact of Materials

5. a. - Material Content and Performance

Requirements: Procure construction materials and building supplies that have a lesser or reduced effect on human health and the environment over their life cycle when compared with competing products or services that serve the same purpose, including:

1. Recycled Content and Comprehensive Procurement Guidelines: Use Resource Conservation and Recovery Act (RCRA) section 6002 compliant products that meet or exceed EPA's recycled content recommendations for building construction, modifications, operations, and maintenance.

2. Biobased Content: Per section 9002 of the Farm Security and Rural Investment Act (FSRIA), for USDA-designated products, use products with the highest content level per USDA's biobased content recommendations.

3. Other Green Products: Purchase products that meet Federally Recommended Specifications, Standards, and Ecolabels, or are on the Federal Green Procurement Compilation.

4. Non-Ozone Depleting Compounds and Low Global Warming Potential (GWP) Chemicals: Do not use ozone depleting compounds and high GWP chemicals where EPA's Significant New Alternative Policy (SNAP) has identified acceptable substitutes or where other environmentally preferable products are available during construction, repair, or replacement at the end of life.

- **Application:** This goal should be achievable in commissary construction by the specification of materials in the construction documents.

- **Suggested Steps:**

    1. Include requirements for the construction contractor to prepare and implement a Construction Indoor Air Quality Management Plan.

    2. Provide specific requirements for this plan consistent with the requirements stipulated above.

    3. Specify low-VOC materials and require contractors to provide product cut sheets, MSDS data, or other manufacturers documentation that clearly demonstrates that materials qualify as low VOC materials in construction documents.

    4. Assure the contractor's quality control procedures address continual monitoring of materials for compliance.

    5. Require the PMAC construction manager to document with the contractor's adherence with the credit requirements.

    6. Include verification of compliance with these provisions as part of the facility commissioning process.

- **Submittal:** Provide documentation by a responsible design professional that attests to design conformance with the credit criteria including the goal requirements that have been met. Include a list of all building materials and products. List the materials and quantities of materials and products designated as environmentally responsible. Identify their costs and the total costs of materials and products for the project. Provide copies of specifications and contractor submittals to verify that compliant materials and products have been purchased and used on the project.

5. b. - Waste and Materials Management

- **Requirements:** Incorporate appropriate space, equipment, and transport accommodations for collection, storage, and staging of recyclable and, as appropriate, compostable materials in building design, construction, renovation, and operation. During construction, where markets or on-site recycling exist, divert at least 60% (by weight) of construction and demolition materials, excluding land clearing debris and material used as alternative daily cover, from landfills. Maximize reuse or recycling of building materials, products, and supplies wherever possible. Provide reuse and recycling services, including composting, for building occupants where markets or on-site recycling exist and divert at least 50% of non-hazardous and non-construction related materials (by weight), from landfills.

- **Application:** A considerable amount of construction and demolition waste is generated during construction and, unless specified, or provided some economic incentive, the contractor is likely to dispose of all of it in landfills and incinerators. The costs for transporting and disposal are directly passed on to the commissary project. Contractors have recycled concrete and rock directly on site for base, using crushers. Greater care and attention to details during the investigative design stages of a project can identify opportunities for recycling. On large projects, the contractor is required to

submit a construction waste management plan to indicate how he intends to divert construction and demolition wastes. Contractors should recycle cardboard, metal, brick, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation. Designate a specific area or areas on the construction site for separated or commingled collection of recyclable materials, and monitor efforts throughout the construction process. Other factors to consider:

1. The contractor may achieve the objectives of this requirement by diverting wastes to charitable organizations, such as Habitat for Humanity. Documentation of materials and weights diverted, must be reported.

2. Include appropriate investigative studies to confirm the suitability of the materials for diversion. Documentation of studies must be provided.

3. Exclude hazardous materials from being diverted to other uses or other construction sites.

- **Suggested Steps**

1. Identify opportunities for waste diversion during the project planning and design stages.

2. Estimate quantities of waste (by material type) that will be generated during construction.

3. Identify construction haulers and recyclers that could handle the designated materials and include requirements in the criteria.

4. Include verification requirement for the construction contractor that materials have been diverted. Have the contractor specify material types, quantities and final disposition.

Submittal: Provide certification that requirements have been met. Document the estimated total non-hazardous materials, the quantities diverted, and the means of diversion.

6. – Assess and Consider Climate Change Risks

6. a. – Mission Criticality

- **Requirements:** Assess potential impacts and vulnerabilities, from both acute weather events and chronic climate changes, to inform the design of new construction and modernization and facility operations to increase climate resilience. Determine the long-term mission criticality of the physical asset and operations to be housed in the facility.

6. b. – Floodplain Consideration

- **Requirements:** For new construction, avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid floodplain development whenever there is a practicable alternative

6. c. – Facility Design

- **Requirements:** For new construction, based on the most recent National Climate Assessment, determine key potential climate change impacts for the project location, identify projected climate changes, where feasible, during the useful life of the building, and incorporate those projections as performance targets for project design. Consider fire-resistant design and construction to enhance resilience to the impacts of wildfires and reduce risks to the lives of occupants in the event of a wildfire. Balance options to address predicted climate change impacts against mission criticality, cost, and security to determine design parameters. At a minimum, include low or no cost resilience measures to address predicted climate conditions.

6. d. – Facility Adaptation

- **Requirements:** For modernization, focusing on the resilience of the physical facility, take action to mitigate identified physical risks considering mission criticality, potential climate change impacts, security, and cost. Consider phased adaption over time.

END OF SECTION