ENGINEERING AND CONSTRUCTION BULLETIN

US Army Corps of Engineers

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Subject: High Performance Energy and Sustainability Policy

Applicability: Directive and Guidance

References:

a. Engineering and Construction Bulletin (ECB) 2010-14, 28 Jun 2010, Subject: Improving Building Performance through Enhanced Requirements for Energy Performance and Selected LEED Credits

b. Memorandum of Understanding (MOU), 06 Mar 06, *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*

c. Memorandum, DUSD (I&E), 25 Oct 10, subject: Department of Defense Sustainable Buildings Policy

d. Memorandum, ASA (IE&E), 27 Oct 10, subject: Sustainable Design and Development Update (Environmental and Energy Performance)

e. U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) NC rating tool v2.2 and 2009/v3

1. The purpose of this Engineering and Construction Bulletin (ECB) is to implement new policies and procedures into the Military Construction, Army (MCA) program. This ECB is effective when issued and, together with ECB 2010-14 (Reference a), defines the Energy and Sustainability performance requirements for projects in the various phases of the Planning, Programming, Budgeting, and Execution process. ECB 2010-14 was intended to start the process by taking advantage of the good bid environment to fund additional energy enhancements for projects that were already authorized and appropriated. After the FY13 Program, ECB 2010-14 will no longer be applicable.

2. National energy security and sustainability concerns continue to drive construction programs to build higher performance buildings than ever before. Building more energy efficient and sustainable facilities is a mission objective of the US Army. We must continue to implement improved energy standards and sustainability objectives that are cost effective over the life of our facilities, installations, and infrastructure to meet energy security and independence goals.

3. Project Delivery Teams (PDT) are authorized and encouraged to aggressively enhance the energy and sustainability performance of our projects. Project features referenced by Attachment A that accomplish this objective whether programmed or incorporated by change during design or construction are to be considered technical requirements and not User Requested Changes. The PDT should be aware of how these features affect the scope of projects

that have a congressionally approved DD1391, as well as how they affect the PDR/3086 process for projects under design.

4. PDTs are to perform a Life Cycle Cost Analysis (LCCA) on energy-related design decisions of major systems and features that will exceed 1% of the Programmed Amount (PA) in cost. This Life Cycle Cost Analysis shall be documented as part of design analysis and/or basis of design files and kept available for review.

5. This ECB is intended to enhance conformance with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* (Reference b) which continues to be in effect. See also *High Performance and Sustainable Buildings Guidance* issued by Office of Management and Budget in December 2008 for further information.

6. All MCA projects will comply with the Department of Defense Sustainable Buildings Policy (Reference c) and the Department of the Army Sustainable Design and Development Policy Update (Reference d) pursuant to the following implementation plan by program year:

a. **Guidance for All Program Years**: Studies by the Department of Energy in conjunction with our own Construction Engineering Research Laboratory have shown the energy and sustainability enhancements listed in Attachment A to be consistently cost effective for multiple facility types and climatic regions. Therefore, project teams are to incorporate as many of these enhancements as practicable at the discretion of the PDT as a mandatory change without further approval necessary, provided the following conditions are met. The PDT is responsible for selecting a comprehensive suite of enhancements that work in concert to achieve a low energy consumption facility as a whole and with respect to the facility type and climatic region of the site.

(1) No energy enhancement can result in the project exceeding the total of any unit attribute (such as Square Feet, Linear Feet, etc,) of any line item within the Primary Facility portion of an approved DD Form 1391.

(2) For projects in Planning: Energy enhancements that affect the scope of a DD Form 1391 should be addressed in the Project Definition Report (PDR) and coordinated with HQUSACE and HQDA.

(3) For projects in Design: If the Current Working Estimate (CWE) with energy enhancements added exceeds the authorized Programmed Amount (PA), per existing guidance, the PDT must identify bid options. These options shall not include the required Energy Enhancements listed in Attachment A.

(4) For projects in Construction: Energy and sustainability enhancements referenced in Attachment A may be incorporated into the project by the PDT using funds available. If additional funding is required, the PDT shall submit the requested change to Headquarters with a supporting LCCA. If the change is authorized, update the Design Analysis to include the Life Cycle Cost Analysis (LCCA) to document the change.

(5) Energy and sustainability enhancements not referenced in Attachment A are to be considered User Requested Changes and follow the approval process already established.

If the installed feature exceeds 1% of the Programmed Amount (PA) request should be supported by a LCCA documented in the design analysis and/or basis of design. The LCCA shall show the enhancements will either reduce source Green House Gas (GHG) emissions or pay for themselves within the life cycle of the facility or both.

b. **FY11 and Prior Year Programs**: ECB 2010-14 (Reference a) continues to apply. For clarification, note that the use of the Bid Option to achieve 50% better energy savings as described in ECB 2010-14 is not automatically included by use of the RFP wizard, but needs to be included manually in the CLIN table added to each new RFP. This option shall be listed after all base options. If the Current Working Estimate (CWE) exceeds the Program Amount (PA) the approval must be obtained from HQDA prior to advertising. Likewise, HQDA approval must still be obtained to Award in excess of PA per existing guidance. HQDA will continue to have the final decision regarding Below or Above Threshold Reprogrammings. When performing Site Selection and Master Planning activities, teams are encouraged to review the requirements of the SDD policy (Reference d) as well as local Renewable Energy availability data from the Department of Energy's National Renewable Energy Laboratory (NREL) at http://www.nrel.gov/. Use this information to generate future development plans with respect to energy and sustainability.

c. **FY12 Program:** ECB 2010-14 (Reference a) continues to apply to the FY12 MCA program; specifically, applicable projects are to be designed to achieve energy performance 40% better than as prescribed in ASHRAE 90.1-2007. Further, an Option to achieve 50% better shall be included in the CLIN table added to each new RFP. Headquarters has worked with DA to adjust the allowable square footage shown on the current DD Form 1391s to accommodate some energy and sustainability strategies such as thicker exterior walls. These adjustments in allowable square footage will not change current PA or early gross square-footage based CWE. If the final approved DD Form 1391s reflect this change the PDT is expected to incorporate these energy enhancements; e.g. include the additional wall thickness and insulation as a design requirement. The additional square footage authorized shall not be used for any other purpose than to increase energy and sustainability performance.

d. **FY13 Program**: Design projects to fully comply with the SDD policy (Reference d) and include energy enhancements from Attachment A, as appropriate to the project site and facility type. The PA and square footage will be adjusted by DA after the 3086 review to incorporate energy enhancements in Attachment A to fully comply with the SDD policy. Installations have opportunities to gain better financial efficiency and other benefits by consolidating the renewable energy requirements of multiple buildings into a larger-scale "central plant" type projects. Therefore, the SDD policy (Reference d) contains language in Paragraph 5.b that allows an exemption to installing renewable energy systems on each building per ASHRAE 189.1 in favor of aggregating the requirements installation-wide or program-wide. Centralized Renewable Energy plants used to meet consolidated renewable requirements of ASHRAE 189.1 are not required to be built concurrently in FY13, but may be planned to be executed in FY15 to allow for the additional master planning and design required. Additional energy enhancements, such as renewable energy systems, that can be easily separable from the base design may be included as contract options or alternates.

PDTs, the Centers of Standardization, HQUSACE will work together to determine the best acquisition strategy to maximize energy innovation. The use of Waiver requests to the Standard Designs is encouraged if necessary to facilitate innovation.

e. **FY 14 program**: The renewable energy components of the SDD policy (Reference d) will begin to be addressed by aggregating the requirements of multiple facilities into larger scale renewable energy projects to the extent practical and that funding allows. Installations are encouraged to seek partnerships with the private sector, including using power purchase agreements (PPA), enhanced-use leases (EUL), energy savings performance contracts (ESPC), and utilities energy service contracts (UESCs) as vehicles to optimize renewable energy sources and leverage Federal, State, and local utility incentives. USACE will continue to pursue low energy models and will issue additional guidance.

f. **FY 15 Program and beyond:** Starting with the FY 15 Program, all projects will be planned and programmed to achieve the renewable energy component of ASHRAE 189.1 (per Paragraph 5(b) of Reference d) either within each project's scope or by a consolidated renewable energy solution for an aggregate of multiple project requirements.

7. Sustainability Certification:

a. All MCA projects meeting the Minimum Program Requirements (MPR) for the Leadership in Energy and Environmental Design (Reference e) program shall be planned, designed, and built to be certified at the SILVER level or higher from the Green Building Certification Institute (GBCI)

(1) Projects previously registered under LEED 2.2 may continue to pursue the version 2.2 points and seek USGBC certification under LEED 2.2 scoring at the discretion of the PDT, subject to GBCI approval.

(2) Any project not registered under 2.2 shall register and seek certification with GBCI under LEED NC/MR version 2009/3.0 or later.

(3) At its discretion, the PDT may pursue achieving Gold level certification and is authorized to seek certification at the highest attainable level of certification within available funding provided that doing so continues to reduce the total cost of ownership over the life cycle of the facility.

(4) In accordance with the Department of Defense Sustainable Buildings Policy (Reference c) at least 40% of the minimum points required for Silver level certification shall be earned in any combination of these credit categories:

(a) SS 7.1 Heat Island Effect, Non-Roof

(b) SS 7.2 Heat Island Effect, Roof

(c) SS 8 Light Pollution Reduction

(d) WE 1.1 Water Efficient Landscaping - Reduce Potable Water Use by 50%

(e)	WE 1.2	Water Efficient Landscaping - No Potable Use or No Irrigation
(f)	WE 2	Innovative Wastewater Technologies
(g)	WE 3	Water Use Reduction
(h)	EA 1	Optimize Energy Performance
(i)	EA 2	On-Site Renewable Energy
(j)	EA 3	Enhanced Commissioning
(k)	EA 5	Measurement & Verification
(l)	EA 6	Green Power
(m)	IEQ 1	Outside Air Delivery Monitoring
(n)	IEQ 8.1	Daylight & Views - Daylight 75% of Spaces
(o)	ID 1.1-1.5	Innovative Design, if achieved for energy and/or water savings
(p)	RP 1.1-1.4	Regional Priorities, if achieved for energy and/or water savings

(5) In addition to the prerequisites, the following LEED-NC/NR credits shall be included in all MCA projects where applicable:

(a)	SS 6.1	Stormwater Design, Quantity Control
(b)	SS 6.2	Stormwater Design, Quality Control
(c)	WE 1	Water Efficient Landscaping: No potable water used for irrigation.
(d)	WE 3	Water Use Reduction: earn at least two points under this credit
(e)	EA 1	Optimize Energy: earn at least 15 points under this credit
(f)	EA 3	Enhanced Commissioning
(g)	EA 5	Measurement and Verification
(h)	MR 2	Construction Waste Management
(i)	MR 4	Recycled Content
(j)	IEQ 3.1	Construction IAQ Management Plans
(k)	IEQ 3.2	Construction IAQ Management Plans
(l)	IEQ 7.1	Thermal Comfort Design

b. Army Family Housing projects may be certified at the LEED for Homes SILVER level or higher from the GBCI or Energy Star Qualified New Homes, or will be designed to achieve energy consumption levels 45% below the baseline set by International Energy Conservation Code (IECC) 2009.

c. The definitions and guidance on the LEED minimum program requirements are provided in a document, titled Supplemental Guidance, available on the USGBC website (http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2102)

d. Projects not falling within the scope of the LEED program will be designed and built to incorporate the maximum LEED components or equivalent sustainable design features available as allowed by project scope. If such a project is of a significant size, has high visibility or public interest, the use of alternative standards and certification systems available to the project is encouraged, such as Green Globes or Host Nation programs.

8. A request for an exemption through HQ USACE may be made for any specific requirement included herein or by reference that the PDT determines would adversely affect mission performance, security requirements, health, safety, or welfare. The exemption shall only apply to the specific requirements in conflict. Any approved exemptions to this policy shall be documented with reference to the specific requirement in conflict and included in the project documentation.

9. Reporting and documentation of Energy and SDD performance: New energy enhancements above our current standard design or criteria included in a solicitation, or incorporated through the modification process, must be reported to HQUSACE. A list of these enhancements, and any associated costs and Life Cycle Cost Analyses available will be kept to further our knowledge about the costs associated with these enhancements, and to answer inquiries about the Army's progress towards the Energy mandates and requirements that will come from HQDA, OSD, and Congress. The District (through the MSC) will submit to their Regional Integration Team (RIT) a list of new energy enhancements with the estimated costs shown on a new tab of an updated Current Working Estimate (CWE) worksheet and include a brief descriptive justification with pertinent design details. All projects shall report the following information, at a minimum:

a. LEED credits earned, with percentage in Water and Energy

b. Gross percentage of anticipated energy savings versus baseline

c. Gross percentage of anticipated water savings versus baseline

10. The Headquarters USACE point of contact is Eric Mucklow, at 202-761-0522 or eric.mucklow@usace.army.mil. The Army Program Manager is Gary Skusek, 202-761-5749.

ENCL

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ATTACHEMENT A
VIABLE ENERGY AND SUSTAINABILITY ENHANCEMENTS

The following enhancements may be considered viable for a wide range of building types and climactic regions. From these, a comprehensive suite of enhancements may be selected that work in concert to achieve a low energy consumption facility as a whole and with respect to the facility type and climatic region of the site. These enhancements are to be implemented by the PDT as practicable with respect to the project's scope, schedule, and existing conditions.

The list below contains only brief descriptions representing strategies and design criteria that enhance the energy performance or sustainability of facilities. It is assumed members of the design team will be familiar with these concepts. More in-depth guidance regarding specific criteria and implementation information can be found by consulting the *Energy and Water Conservation Design Guide (for Sustainment, Restoration and Modernization (SRM) and MILCON Projects)* on the Whole Building Design Guide site at http://www.wbdg.org/references/pa_dod_energy.php

1. Optimize building orientation (East-West Axis with Passive Solar shading geometry)
2. Tight construction with Infiltration less than .15 cfm per square foot of exterior envelope area at 75 PA
3. Added insulation to high performance 'Passivhaus' levels (See the Building Envelope section of the *Energy and Water Conservation Design Guide* referred to above for minimum R/U values per climatic zone)
4. Design detailing to avoid thermal bridges that allow heat to bypass insulation
5. Windows: Triple-pane, Energy Star, with low-E coatings appropriate to climatic zone.
6. Lighting: lower lighting consumption to average 0.75W/ft2 or less. To achieve this performance, consider the following:
    a. Low maintenance, low wattage-per-lumen technologies, e.g. SSL/LED fixtures
    b. Occupancy, Vacancy, and Daylighting sensors for active ambient light control
    c. Increase vertical glazing by 50% over standard designs
    d. Increase Skylight to Floor Area (SFA) fraction to 3% over corridors, admin areas and office areas
    e. Use digital multi-zone lighting controls with individually addressable fixtures
7. 'Cool Roof' finishes where cooling load exceeds heating (e.g. Climate Zones 1-5)
8. Top Tier Energy Star or FEMP rated appliances and equipment
9. Demand/user controlled High Efficiency HVAC equipment per ASHRAE 189.1
10. Optimize HVAC zones with respect to user schedules and occupancy
11. Include Energy Recovery Ventilation (ERV) systems with >75% efficiency

12. Dedicated Outside Air System (DOAS) for ventilation with heat recovery for assembly and heat/fume generating activities

13. Indirect Evaporative Pre-Cooling (IEPC or IDEC) for Dry Climates (Climate Zones *x*B)

14. HVAC equipment efficiency ratings (e.g. COP) that exceed ASHRAE 189.1 (C) requirements

15. High Efficiency condensing boilers with >90% efficiency and/or incorporate Ground-Source Heat Pump technology

16. NEMA MG1 Premium Efficiency/ Electronically Commutated Motors (ECM) motors

17. Variable Air Volume (VAV) or hydronic distribution; consider:

    a. radiant heating systems, especially in maintenance bays, and

    b. "Radiant" cooling systems in ceilings

18. Measurement and Verification (M&V) systems

19. On-site Renewable Energy elements:

    a. Transpired Solar Collectors in Climate Zones 2A to 8.

    b. SSL/LED parking and street lighting; site-specific light distribution patterns

    c. Prepackaged pole-mounted solar site lighting solutions

    d. Include 30% demand solar water heating in areas where the average sun exposure is equal or greater than 4.0 kWh/m^2 per day according to the National Renewable Energy Lab (http://www.nrel.gov/gis/solar.html) in accordance with the SDD policy (Reference d.)

20. Maximum flow rates for plumbing fixtures per ASHRAE 189.1

    a. Dual-flush toilets

    b. Waterless Urinals: urinals that use either no water or no potable water (e.g. may use harvested rainwater or reclaimed greywater)

21. Stormwater management: Meet local codes and Low Impact Development (LID) best practices (e.g. pervious pavement, rainwater harvesting, swales, bioretention ponds)

See the Whole Building Design Guide (http://www.wbdg.org/) and the USACE Centers of Standardization website at https://eportal.usace.army.mil/sites/COS/Pages/Default.aspx for more information about these technologies. As projects progress, PDT members may find peers who have shared their success stories and share your own on the Energy Hall of Fame website at https://www.us.army.mil/suite/page/639754 (AKO login required.)