WELCOME!

The High Performance and Sustainable Building Requirements UFC Webinar

Speakers:

• Paula Loomis, FAIA, LEED BD&C, PMP, APA, CPHC, Sustainability Program Manager, USACE

• Nadja Turek, P.E., LEED AP BD+C, Director, Sustainable Design Services, Woolpert, Inc.
High Performance and Sustainable Building Requirements Unified Facilities Criteria 1-200-02
Federal Facilities Council Presentation

- UFC Background
- Requirements
- Compliance and Policy
- Future

• Wilderness Road Complex
  Ft Carson, CO, LEED Platinum
Purpose of the UFC

- To drive transformation in the performance of the DoD facility inventory
- To require greater efficiency and water conservation measures that demonstrate a strong return on investment
- To balance building performance with occupant comfort, health, safety and productivity
- To guide compliance with higher level mandates, policies and standards
- Provide minimum unified requirements
- To consolidate UFCs 4-030-01 Sustainable Development and 3-400-01 Energy Conservation

Consolidation was driven by ESEP, Coordinating Panel and UFC system
Tri-Service Sustainability Discipline Working Group (DWG) was responsible for development
- UFC organized in same manner as High Performance Sustainable Building Guiding Principles
- For each sustainability category the DWG compared Guiding Principles, federal laws, executive orders, DoD Policy Directives, other UFC Criteria, ASHRAE 90.1, 189.1 and LEED criteria.
- Referenced mandatory guidance and highlighted most stringent federal/tri-service guidance.
- If mandatory guidance did not exist used non-mandatory guidance most appropriate for military
- Other DWGs participated in the process including architecture, mechanical, electrical, etc.
Use/applicability of the UFC

- Chapter 2 - New construction and major renovations
- Chapter 3 – Minor renovations
- Chapter 4 – Existing buildings
- Chapter 5 – HPSB assessment requirements for existing buildings
- Chapter 6 – Sustainable installations

How it will be used in Federal contracting?
- A requirement on projects.
- A consideration in planning documents
General requirements

ASHRAE 189.1.. its relationship to this document


- The Sustainability DWG carefully compared applicable criteria. In many cases the Guiding Principles contained references to ASHRAE 189.1 and were included in UFC 1-200-02. In some cases references from ASHRAE 189.1 were included as best option for compliance path.

- Many of ASHRAE references were incorporated.
UFC Requirements: Chapters 2-4 and 6

- Highlight any changes from current practice
- Give guidance for practitioners
CHAPTER 2: New Construction and Major Renovation Projects

- Integrated Design
- Commissioning
- Site Selection
- Mitigate Heat Island Effect
- Reduce Light Pollution
- Stormwater Management
- Energy Efficiency
- On-site Renewable Energy
- Energy Compliance Analysis
- Measurement & Verification
- Benchmarking
- Indoor & Outdoor Water Use Reduction
- Water used for heating and cooling
- Measurement of water
- Ventilation and Thermal Comfort
- Moisture Control
- Daylighting
- Low-emitting Materials
- Protect IAQ during construction
- Env. Preferable Products
- Recycled Content
- Biologically-based Products
- Waste and Materials Management
- Ozone Depleting Substances

Blue: ASHRAE 189.1 ref included  Red: ASHRAE 90.1 ref included
Key Changes for Design/Construction:

- Commissioning – requires building envelope Cx and plumbing/irrigation systems
- Heat Island Effect – new requirement for walls
- Energy Efficiency - requirement to perform 30% better than ASHRAE 90.1-2007 remains*. Army gives an option to alternatively do 12% better than 90.1-2010
- On-site Renewables – Army requires “renewable ready” building design per 189.1 Section 7.3.2
  - 6 kBtu/ft2 for single story bldgs and 10 kBtu/ft2 times the roof area for all other bldgs

*New DOE Ruling requires ASHRAE 90.1-2010 as of 9 Jul 2014
Key Changes for Design/Construction:

- “Energy Compliance Analysis” – not new, but more robustly described than before
  - ASHRAE 90.1 Appendix G compliant modeling (ECB Compliance Report)
  - A “separate, concise LCCA narrative” from:
    - Architect, Mechanical Engineer, Electrical Engineer
  - Describe conservation features and provide supporting LCCA calculations
  - Due at “Concept Design”
• Indoor and Outdoor Water Use
  • Adopts IPC/LEED baseline values as maximums (i.e. new WC’s can only be 1.28 gal/flush or less)
  • Sets max water usage for clothes & dish washers
  • HVAC (cooling towers, evap coolers, etc.) water use restrictions, only if LCC effective
  • Limits turf grass to 40% of “improved landscape”
  • No potable water use on golf courses/driving ranges
  • Only 1/3 of “improved landscape” can be irrigated with irrigation design standards; OR only 35% of irrigation water can be potable
Key Changes for Design/Construction:

• Permanent outdoor airflow monitoring/alarm is required
• Increased filtration requirements over ASHRAE 62.1 if in an area with poor air quality
• Entrance mats with scraper, absorption, and finish surfaces
• Building envelope minimums (R-, U-, F-values, SHGC) that are more stringent than 90.1 (except for AF projects)
• Daylighting hand-calculation or model required
  • Note: calculations are different from LEED 2009 or v4
• Furniture, Seating, Ceiling and Wall system have low-emission requirements (same as LEED for Schools v2009)
Key Changes for Design/Construction:

- Building flush out of at least 72 hours is required – longer flush out or air quality testing is required before occupancy.
- Note: these are different calculations from LEED.
Key Take-aways:

- UFC 1-200-02 ≠ LEED
  - LEED is mentioned once – OUSD (Installations & Environment) Memo dated 10 Nov 2013 sets UFC 1-200-02 as the standard
  - Mostly references ASHRAE 189.1
- ASHRAE 189.1 ≠ LEED
  - They are complementary but not identical
  - You could document similar design strategies one way for ASHRAE 189.1 and another way for LEED certification
# UFC vs LEED: An Example

## Mitigate Heat Island Effect

<table>
<thead>
<tr>
<th>Requirement</th>
<th>UFC</th>
<th>Design Strategy</th>
<th>LEED NC v2009</th>
<th>LEED NC v4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Hardscapes: 189.1 Section 5.3.2.1</td>
<td>50% of hardscapes provided with shade, cover, or reflective or permeable materials</td>
<td>Concrete sidewalks, permeable parking areas, shade trees in parking islands</td>
<td>SS credit 7.1 HIE-non-roof: Almost identical to ASHRAE 189.1</td>
<td>SS credit “HI Reduction”: New combined roof and non-roof calculation</td>
</tr>
<tr>
<td>Walls: 189.1 Section 5.3.2.2</td>
<td>E/W facing walls will be shaded or reflective in certain climate zones</td>
<td>Reflective wall materials and/or shade trees within 50 feet of E/W walls</td>
<td>Not addressed by LEED</td>
<td>Not addressed by LEED</td>
</tr>
<tr>
<td>Roofs: UFC 3-110-03 referenced, which references ASHRAE 90.1 no HIE requirement</td>
<td>Reflective roofing material</td>
<td>SS credit 7.2 HIE roof: Different (more stringent) than ASHRAE 90.1</td>
<td>See above</td>
<td></td>
</tr>
</tbody>
</table>

Almost identical to ASHRAE 189.1
# UFC vs LEED: An Example

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<tbody>
<tr>
<td><strong>Measurement and</strong></td>
<td><strong>Utility advanced meter installed for each service (DODI requirement)</strong></td>
<td>Install basic or advanced meters</td>
<td>EA credit 5: M&amp;V Prepare M&amp;V plan that meets requirements of IPMVP</td>
<td>New EA prerequisite: Install building-level energy metering</td>
</tr>
<tr>
<td><strong>Verification</strong></td>
<td><strong>Sub-meter when authorized by installation per 189.1 Section 7.3.3 Gives thresholds for sub-metering</strong></td>
<td>Sub-meter key loads</td>
<td>• Sub-meter or measure loads for ECMs</td>
<td>New EA credit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Compare design vs. operational performance 1 year post occupancy</td>
<td>• Sub-meter energy uses that are more than 10% of total load</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Calibrate design energy model post occupancy</td>
<td>• Record and transmit data</td>
</tr>
<tr>
<td><strong>Benchmarking</strong></td>
<td><strong>Track energy use in Energy Star portfolio manager or similar</strong></td>
<td>Track energy performance and/or do analysis required by IPMVP</td>
<td>New EA prerequisite: Track and share energy data for 5 yrs</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 3: Minor Renovation Projects

• Applies to “all projects with the exception of New Construction and Major Renovations”

• Includes “repair, maintenance, and equipment installations”

• Projects do NOT need to meet all requirements
  • Must meet requirements relative to the scope of work for each project
CHAPTER 3: Minor Renovation Projects

- Integrated Assessment, Operation, and Management
- Commissioning, Re-Cx, or Retro-Cx
- Max. Use of Existing Workplaces
- Integrate with Local Planning
- Mitigate Heat Island Effect
- Reduce Light Pollution
- Stormwater Management
- Energy Efficiency
- On-site Renewable Energy
- Measurement & Verification
- Benchmarking
- Indoor & Outdoor Water Use Reduction

- Water used for heating and cooling
- Measurement of water
- Water-Efficient Products and Services
- Ventilation and Thermal Comfort
- Moisture Control
- Daylighting
- Low-emitting Materials
- Env. Preferable Products
- Recycled Content
- Biologically-based Products
- Waste and Materials Management
- Ozone Depleting Substances

Black: Same/Similar Rqmt as Chapt 2  Red: Different from Chapt 2
Key Changes for Minor Renovations:

- Employ Cx (Re-Cx or Retro-Cx) tailored to the scope
  - Can be done in-house or by contractor but MUST be documented to comply
- Energy Efficiency – three compliance options:
  1. Receive and ENERGY STAR score > 75
  2. Reduce measured energy use by 20% compared to a 2003 baseline*
  3. Reduce modeled energy use by 20% compared to an ASHRAE 90.1 baseline building
- Document LCCA for energy conservation features

* Or year thereafter with metered energy use data
Key Changes for Minor Renovations:

- **Two Options for Indoor Water Use Reduction**
  1. Reduce water use to $\leq$ IPC/UPC 2006 fixture usage
  2. Reduce measured water usage by 20% compared to a 2003 baseline*

- **Two Options for Outdoor Water Use Reduction**
  1. Reduce potable water use by 50%
  2. No potable water use for irrigation

- **Provide daylight in 50% of reg. occupied spaces OR provide occupant individual control of lighting**
  - And provide automated lighting control (UFC 3-530-01)

* Or year thereafter with metered water use data
Key Changes for Minor Renovations:

- Biobased product section includes preference for “certified sustainable wood products” when available and at a “reasonable cost”
- Note: this language is not included in Chapter 2

* Or year thereafter with metered water use data
CHAPTER 4: High Performance And Sustainable Buildings (HPSB) Requirements for Existing Buildings

- Describes the requirements if an agency wants to count an existing building as an HPSB towards its 15% by 2015 goal*
  - An existing building must be assessed according to Chapter 4’s requirements prior to reporting HPSB status (yes or no)

* Required by Executive Order 13514
CHAPTER 4: Existing Buildings – HPSB Reqmts

- Integrated Assessment, Operation, and Management
- Commissioning, Re-Cx, or Retro-Cx
- Reduce Transportation-Related GHG Emissions
- Integrate with Local Planning
- Energy Efficiency
- On-site Renewable Energy
- Measurement & Verification
- Benchmarking
- Indoor & Outdoor Water Use Reduction
- Water used for heating and cooling
- Measurement of water
- Ventilation and Thermal Comfort
- Moisture Control
- Daylighting
- Low-emitting Materials
- Integrated Pest Management
- Env. Tobacco Smoke Control
- Env. Preferable Products
- Recycled Content
- Biologically-based Products
- Waste and Materials Management
- Ozone Depleting Substances

Black: Same/Similar Rqmt as Chapt 3
Red: Different from Chapt 3
Key Changes for Building Managers:

- Building managers need to have:
  - A “building management plan” for sustainable building O&M
  - Get occupant feedback on workplace satisfaction “as needed”
  - Disseminate information about alternative transportation, amenities within walking distance, and alternative workplace arrangements
Key Changes for Building Managers:

• Benchmarking required – compare year over year data using tools such as:
  • EPA’s ENERGY STAR Portfolio Manager
  • Labs21 Benchmarking tool
• Moisture Control - existing buildings should meet the requirements of UFC 3-101-01 Chapter 3, Building Envelope Requirements
• Low Emitting materials requirements include janitorial supplies and furniture
Key Changes for Building Managers:

• Provide recycling services for paper, cardboard, glass, plastic, and metals at a minimum and salvage/reuse/recycle O&M-generated waste “where markets or on-site recycling exist”
  • Many installations do not offer all these services any more
CHAPTER 6: Sustainable Installations

- Section titled “Guiding Principles for Federal Leadership in High Performance and Sustainable Installations”
- Guiding Principles can* be met installation wide
- Reference to the DOD’s Strategic Sustainability Performance Plan (SSPP)

* And in some cases probably SHOULD (Nadja’s opinion only!)
Guiding Principles can* be met installation wide

- Stormwater
- Outdoor water use reduction
- Renewable energy
- Process water
- Maximizing efficient use of workspaces
- Integrate with local and regional planning
- Mitigate the heat island effect
- Integrated pest management
- Env. Tobacco Smoke Control
- **Missing: Reduce light pollution as per UFC 3-530-01**

* And in some cases probably SHOULD (Nadja’s opinion only!)*
Compliance and Policy: Chapter 5

- How to demonstrate compliance?
- What is its relationship to other policy?
- How will it be updated over time?
Federal Facilities Council Presentation

How to demonstrate compliance?

– See Chapter 5
– Each service has a HPSB checklist (p29)
– Services are working toward a tri-service checklist
– These checklists will feed into the Annual Energy Management Report & OMB GP
  HPSB reporting
– Existing Building - Same questions that are in checklist will be in BUILDER

1st BDE, 4th ID Brigade & Battalion HQ
Fort Carson, Colorado, LEED Gold
Relationship to OSD and services’ sustainability policies
- OSD OUSD (Installations and Environment) Memorandum 10 Nov 2013, DoD Sustainable Buildings Policy
- Army – Assistant Secretary of the Army (Installations, Energy & Environment) Memorandum dated 16 Dec 2013
- AF Sustainable Design and Development Implementation Guide 02 Jun 2011

Overseas applies considering host nation agreements
Updates to the UFC 1-200-01 coming
- Comments – submit a criteria change request
- See Whole Building Design Guide
- “Guru” within DoD and each service
  - OSD – Col (sel) Keith Welch
  - Army – Paula Loomis, FAIA, PMP, FSAME, LEED BD&C, PMP, CPHC
  - Navy – Julie Kephart-Jones, RA, LEED AP
  - Air Force – Paula Shaw, PE, LEED AP

Fairfax Village
Fort Belvoir, LEED Platinum
Questions?

Community Emergency Service Station
Fort Bragg, LEED Platinum