Omaha District Sustainability Program
2014 SAME Conference

Adapting to Secure Energy and Sustainability for the Nation
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Omaha District
Sustainability Coordinator
Presentation Goals

- WHY? Federal Mandates
- Customer Directives
  - DOD
    - Army
    - Air Force
    - DLA
  - Civil Works
  - Environmental Remediation
- Validation Tools or Audit
- Omaha Success
- Omaha SDD Team
- Case Study examples
Key Sustainability Acronyms

- High Performance Sustainable Buildings (HPSB)
- Sustainable Design and Development (SDD)
- US Green Building Council (USGBC)
- Green Building Certification Institute (GBCI)
- Leadership in Energy and Environmental Design (LEED)

“The conservation of natural resources is the fundamental problem. Unless we solve that problem, it will avail us little to solve all others.”

*Theodore Roosevelt*
Why Sustainability (SDD)?

Adapting to Secure Energy and Sustainability for the Nation

- National Security
  - **Energy**
    - Diversify energy sources
    - Reduce dependence on foreign sources
    - Reliable, redundant, and reduce vulnerabilities:
      - Terrorist
      - Solar Flares
      - Computer hacking
      - Electro-Magnetic Pulse, EMP
      - Weather and natural disaster
      - Foreign attack
  - **Water**
    - Insure adequate clean supply
  - **Natural Resources**
    - Insure access to materials vital to our interests

* Saves all of us $ - Saves soldier lives

* Yes, applies to all Federal facilities
Why Sustainability (SDD)?

Adapting to Secure Energy and Sustainability for the Nation

- **Conserve and Protect**
  - **Energy**
    - Reduce CO2
    - Reduce damage to environment getting fuels
  - **Water**
    - Storm water, quality and control (FLOODS)
    - Fresh water supplies
  - **Material Resource**
    - Recycle
    - Reduce

- **Natural Environment**
  - Habitat for the rest of the earth dwellers
- **Safer Living Environments**
  - Reduce VOCs, Toxins, and Noise
- **Light Pollution**
  - Reduce light wasted into the night sky
- **Reduce Waste**
  - Reduce material mining and harvesting
  - Reduce landfill sites

* Saves all of us $ - Saves soldier lives
* Yes, applies to all Federal facilities
Federal Mandates

- Resource and Recovery Act 2002
- Farm Security and Rural Investment Act (FSRIA) 2002
- Energy Policy Act (EPACT) 2005
- Executive Order 13423 (2007)
- Guiding Principles for Federal Leadership in HPSB
- Energy Independence and Security Act (EISA) 2007
- High Performance & Sustainable Buildings (HPSB) 2008
- Executive Order 13514 (2009)

Federal government to be Net Zero Energy by 2020, “new buildings”
NET – ZERO or 100%

- **Water:** a building using water efficient fixtures, rain water and gray water to reduce building/landscape water consumption. 40% Building, 50% Landscaping

- **Waste:** reduction of construction waste thru recycling, re-use, and reduction of material demand. 50% easy, 75% attainable, 97% possible

- **Energy:** Building is able to create as much energy on-site as it consumes. 40% -60%
Federal Mandates

- **USGBC/LEED is a validation “TOOL”**: Attaining USGBC LEED silver does not necessarily mean you meet federal mandates. Verify that all current Federal and customer mandates have been incorporated into the LEED Checklist and Construction Documents. Current federal mandates that match LEED credits include:
  - 50% Construction waste reduction.
  - 20% Building potable water use reduction.
  - 50% Irrigation potable water use reduction.
  - 10% Recycled content.
  - Construction IAQ (Indoor Air Quality) Mgt during construction.
  - Construction IAQ Mgt before occupancy.

- Federal Mandates that relate to LEED Credits but not the same include:
  - Restore predevelopment hydrology (definition).
  - Renewable energy (no minimum %).
  - Day-lighting (requirement differs per critical tasks, LEED credit is acceptable alternative).
  - Low emitting materials, bio-based materials, certified wood (no minimum %).
  - Bio-based materials (no minimum %, rapidly renewable is a subset of bio-based).

- (Most are required to the maximum extent practical and except where precluded by other RFP or directive requirements)
Mandate Failure – What is at risk?

Secure Energy and Sustainability for the Nation

Unacceptable to our Stakeholders/Customers

► Government Audit

Failure to meet the SDD requirements in the contract may result in:

► “Unsatisfactory” ratings for significant disciplines or attributes in ACASS and/or CCASS
► “Unsatisfactory” overall ratings in ACASS and/or CCASS
► Withholding of payments pending completion of corrective measures
► Withholding of Award Fees
► Termination of contracts

COE Project Manager

► Accountable for failure and must report.
► “Don’t plan on waivers”

The process is being monitored with Full LEED Certification or Validation/Audit by the Army or Air Force
Enforcement

2. USGBC LEED Certification, which is third party validation, this may be followed up with HQs, CERL, or other government audit or data call.

- Main goal is reducing energy and water consumption, improving waste recycling, and improving the environment for the occupants and those around the facility.
Current SDD Requirements

**All DOD**
- DOD Memorandum, DOD Sustainable Buildings Policy, dated 10 November 2013
- UFC 3-210-10, Low Impact Development (LID), dated 15 Nov 2010.
- UFC 3-101-01 Architecture, Dated 28 November 2011

**Army**
- US Army Memorandum; Sustainable Design and Development (SDD) Policy Update (Environmental and Energy Performance), dated 16 December 2013
- Numerous Engineering and Construction Bulletins (ECBs)
- USGBC SILVER rating required, plus other mandates

**Air Force**
- Memorandum, Air Force Sustainable Design And Development (SDD) Implementing Guidance, dated 2 June 2011
- USGBC SILVER rating required, plus other mandates

**DLA**
- Memorandum, Defense Logistics Agency (DLA) Sustainability and Energy Efficiency Policy, dated 4 December 2012
- USGBC SILVER rating required on larger, occupied facilities, with smaller facilities having incremental requirements and documentation, plus other mandates

**Civil Works and Environmental Remediation**
- No formal directives yet. Follow customer directives.
- All of the Federal Mandates and related environmental laws apply.
- New facilities as a minimum require documentation as a minimum and HPSB Checklist, and Low Impact Site Development directives
SDD Documentation

- Required on all Federal projects

- Include:
  - HPSB Check List or Air Force MILCON HPSB Check List/Score Cards
  - LEED Check List
  - LEED Narrative (direction or justification)
  - LEED Templates
  - LEED Implementation Plan
  - Energy Model
  - Calculations

- Old
  - Army and Air Force required on all projects.

- New
  - Life Cycle Cost Analysis (LCCA)
  - Shop Drawings
  - Specifications
  - Photos,
  - Drawings
  - SWAR or Waste data for Installation
  - Customer specific data

LEED Silver Certification dependant on customer.

Army and Air Force required on all projects.
So, is all of this possible?

MI- HQ and SCIF – Fort Carson, CO – LEED GOLD,

47.3% energy reduction according to ASHRAE 90.1-2004, with 25% of the energy coming from the PV Array
Primarily it’s all about Team Work!

**THE CONSTRUCTION INDUSTRY**
- Architects
- Engineers
- Builders

**ARMY & AIR FORCE CLIENT's**
- Commands
- Post or Base Facility Staff
- Facility User

**USACE**
- Project Managers
- Engineering Staff
- Construction Staff

BUILDING STRONG®
Omaha District Success
As of March 2014

- NWD has approx. 62 APs and 25 Green Associates, Omaha has 17 APs and 4 Green Associates.
- Omaha has approx. 40% of the certified projects/buildings in NWD. NWD has a majority of the certified projects in the US Army.
- Fort Carson is still probably the largest concentration of LEED Certified buildings in the US.
- NWD Envision Sustainability Professionals = 3
- NWD Certified Passive House Consultants = 8+
Omaha District Team Credentials

USGBC

- LEED APs, plus BD+C = 17
- Green Associates = 4

TOTAL = 21

- Waste Cap APs = 2
- Geothermal Designer = 1
- AEE Cert. Energy Manager = 1
- Flood Plain Management = 8
- Air Barrier Instructor Specialist = 3
- Enhanced Commissioning Specialist = 1
- Water Reduction Specialist = 1
- Cert. Passive House Consultant = 1
- Energy Modeling Specialist = 2
- Certified Passive House Consultants = 3
Omaha District Success

- 6 In-house design projects have been certified by USGBC. The Historic Air Force Dorm Renovation at FE Warren AFB received Gold certification and 2012 AF Honor Design Award and the C2F HQs at Fort Carson received Silver certification. The C2F was also recognized with a 2010 USACE Environmental Design Award Merit Award and USACE Design Team of the Year. This year, EAB Battalion HQ/ received GOLD certification and EAB COF received Platinum certification. A dozen other projects in progress.

- Fort Carson, our primary Army installation was chosen by the Assistant Secretary of the Army to be pilot installation for Net Zero waste, water and energy by 2020 and is one of 3 installations with all three focus areas. Fort Carson also has the distinction for having one of the largest concentration of LEED Certified projects in the US.
Omaha District Success with LEED

March 2014 for Fort Carson:
- From 51 fully LEED certified projects:
- Total: 77 total buildings
  - Silver: 37
  - Gold: 38
  - Platinum: 2

* ADDITIONALLY: Including other Air Force, Homeland Security, US Forest Service, BIA, and AF/Army Reserve, we have 104 fully LEED certified buildings.

* North Western Division: Omaha, Seattle and KC Districts combined has 257 buildings constructed under 158 projects fully LEED Certified.
Air Barrier Testing

- Required on all Air Force and Army Facilities.
- Omaha District is a Center of Expertise for Air Barrier Testing.
- Omaha District has 3 Instructors for the USACE Prospect Class.
Building Fan Pressurization Testing

Determining Air Leakage Rates

- Single Zone
  - ASTM E779
  - ASTM E1827
  - CGSB 149.10
  - CGSB 149.15 (HVAC)
Building Air tightness - Buildings are full of holes

Warm air escapes around:
1. attic hatch
2. baseboards and molding
3. chimney flue
4. doors and windows
5. dropped ceilings
6. exterior and partition walls
7. lighting fixtures
8. plumbing penetrations
9. wall switches and electrical outlets

Cold air infiltrates around:
10. doors and windows
11. rim joists
12. other cracks and holes
## How does it compare?

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Requirement</th>
<th>cfm/ ft² at 75Pa</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ASHRAE 189</td>
<td></td>
<td>0.40</td>
</tr>
<tr>
<td>UK</td>
<td>TS-1Commercial Best Practice</td>
<td>5 m³/h/m² at 50 Pa</td>
<td>0.36</td>
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<tr>
<td>USA</td>
<td>LEED</td>
<td>1.25 in² EqLA @ 4 Pa / 100 ft²</td>
<td>0.30</td>
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<tr>
<td>Germany</td>
<td>DIN 4108-2</td>
<td>1.5 l/h at 50 Pa</td>
<td>0.28</td>
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<tr>
<td>UK</td>
<td>TS-1Commercial Tight</td>
<td>2 m³/h/m² at 50 Pa</td>
<td>0.14</td>
</tr>
<tr>
<td>CAN</td>
<td>R-2000</td>
<td>1 in² EqLA @10 Pa /100ft²</td>
<td>0.13</td>
</tr>
<tr>
<td>Germany</td>
<td>Passive House Std</td>
<td>0.6 l/h at 50 Pa</td>
<td>0.11</td>
</tr>
</tbody>
</table>

**USACE Requirement** is 0.25 cfm/ft² at 75 Pa

For a 4 story building, 120 x 110 ft, n=0.65
Case Studies

2 Megawatt PV Array at Fort Carson
Project Types

- Dorms/Barracks
- Dining Halls
- HQ’s
- Data Centers
- Company Operations Facilities (COF)
- Tactical Equipment Maintenance Facilities (TEMF) (Jiffy Lube)
- Chapel Facilities
- Clinics
- Hospitals
- Access Control Points (ACPs)
- Aircraft Control Towers

- Aircraft Hangars
- Fire Stations
- Child Care Centers
- Soldier Residential Housing
- US Border Stations
- Fueling facilities
- Historic Buildings
- New or Renovation
- Civil Works – existing building water and energy upgrades
PN65478 - Command and Control Facility (C2F), FY 07

Recreation Amenities
Site utilized water efficient landscaping, rain gardens, heat island roof, and reduced light pollution credits

First Army facility to achieve USGBC LEED Silver Certification, v2.2 by in-house design staff

Exemplary water reduction and maximized outdoor space

Low VOC emitting interior materials and excellent waste diversion by contractor

Main Lobby

Joint Operations Center (JOC)

Briefing Room

BUILDING STRONG®
### Description of Project:
- LEED NCv2.1 Silver Certified with USGBC; achieved 33 points
- 4th Infantry Division Headquarters for Fort Carson; 135,000 square feet; PA = $37.7 mil;
- Construction Management at Risk Partnership with Omaha District in-house design staff and PCL Inc. Contract awarded Aug 2006; Occupied Dec 2008; Duration 28 months.

<table>
<thead>
<tr>
<th>Category</th>
<th>Savings</th>
<th>Technology</th>
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</thead>
<tbody>
<tr>
<td>Exemplary water use reduction within building</td>
<td>54%</td>
<td>Low flow and Ultra-low flow fixtures, kitchen sinks, showers, and lavatories</td>
</tr>
<tr>
<td>Water use reduction for irrigation</td>
<td>63%</td>
<td>Native grasses and seed in lieu of sod &amp; high performance irrigation system</td>
</tr>
<tr>
<td>Indoor Environmental Quality—attained 11 Credits</td>
<td>NA</td>
<td>Use of low VOC materials, control of lighting, and thermal design &amp; comfort</td>
</tr>
<tr>
<td>Diversion of Waste</td>
<td>73%</td>
<td>Construction material waste separation</td>
</tr>
<tr>
<td>Material w/ recycled content</td>
<td>12.5%</td>
<td>Total material value</td>
</tr>
<tr>
<td>Material purchased within a 500 mile radius</td>
<td>45%</td>
<td>Material manufactured within 500 miles</td>
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<tr>
<td>2 Innovation credits</td>
<td>NA</td>
<td>Exemplary water reduction &amp; Exemplary maximize open space</td>
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</table>
Site utilized water efficient landscaping, rain gardens, heat island roof, and reduced light pollution credits.

First Army MCA facility to achieve USGBC LEED Platinum Certification, v2.2

Low VOC emitting interior materials and excellent waste diversion by contractor

Exemplary water and energy reduction with maximized outdoor space in a LEED Campus

480 KW PV Array
**PN71176 – Wilderness Road BBHQ, FY 09**

**Description of Project:**
- LEED NCv2.2 Platinum Certified with USGBC; achieved 52 points
- Infantry Brigade Combat Team, Brigade Battalion Headquarters for Fort Carson;
- 147,000 square feet; PA = $46.0 mil, Final Construction cost $32.5
- Design Build Contract with RSP Architects and M.A. Mortenson Construction . Date Completed, 23 Sept 2011

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</tr>
</thead>
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<tr>
<td>Exemplary water use reduction within building</td>
<td>41%</td>
<td>Low flow and Ultra-low flow fixtures, kitchen sinks, showers, and lavatories</td>
</tr>
<tr>
<td>Water use reduction for irrigation</td>
<td>64%</td>
<td>Native grasses and seed in lieu of sod &amp; high performance irrigation system</td>
</tr>
<tr>
<td>FCS Certified wood</td>
<td>69%</td>
<td>Use of FSC certified wood</td>
</tr>
<tr>
<td>Diversion of Waste</td>
<td>75%</td>
<td>Construction material waste separation</td>
</tr>
<tr>
<td>Material w/ recycled content</td>
<td>31%</td>
<td>Steel; precast; pavements; gypsum</td>
</tr>
<tr>
<td>Exemplary optimized energy reduction</td>
<td>71%</td>
<td>Below base line of ASHRAE 90.1-2004</td>
</tr>
<tr>
<td>4 Innovation credits</td>
<td>NA</td>
<td>Exemplary water reduction, maximize open space, on-site renewable energy, and optimized energy.</td>
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Omaha District Sustainability Coordinator

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