BEST 2 Conference
Portland, Oregon
April 12, 2010

LESLIE L. SHEPHERD, AIA
GSA CHIEF ARCHITECT
The U.S. General Services Administration leverages the buying power of the federal government to acquire best value for taxpayers and our federal customers. We exercise responsible asset management. We deliver superior workplaces, quality acquisition services, and expert business solutions. We develop innovative and effective management policies.
Largest civilian landlord in the U.S. Government
Over 1 million Federal employees housed in PBS space

PBS Inventory
1,497 owned properties: 224 million sq.ft.
7,276 leased properties: 184 million sq. ft.
408 million sq. ft.

1/3 of owned properties are Historic

Primary Building Types
Federal Buildings
Courthouses
Land Ports of Entry
CHRONOLOGICAL DISTRIBUTION of GSA BUILDINGS

EARLY HISTORY 1810-1940: 23%
WAR YEARS 1941-1949: 10%
MODERN ERA 1950-1979: 34%
CONTEMPORARY 1980-1993: 12%
DESIGN EXCELLENCE 1994-PRESENT: 18%
U.S. Custom House – Portland, ME
Alexander Hamilton U.S. Custom House – NY, NY
FEDERAL BUILDINGS

FDA Campus
White Oak, MD
Homeland Security
St. Elizabeth Campus
Washington, DC
FEDERAL COURTHOUSE PROGRAM
U.S. Courthouse
San Diego, CA
LANDPORTS OF ENTRY PROGRAM

Sweetgrass, MT

Blaine, WA

Raymond, MT
San Ysidro, CA
LOOKING FORWARD

- American Recovery and Reinvestment Act (ARRA)
- Carbon Accounting
- Changes to P100
- Updated Lease Language
- Building Tracking
- Technology Pilot Program
$ 5.5 Billion

254 Projects

50 states plus DC, PR, VI

18 months to obligate the funds

+ Average Annual Budget of $1.5 Billion
WHAT DO WE HAVE TO WORK WITH

- EISA—Energy Independence and Security act
- EPACT
- EO13423 with the Guiding Principles for High Performance Federal Buildings.
- EO13514 Federal Leadership in Environmental, Energy, and Economic Performance
- Assessing Green Building Performance Report
ENERGY INDEPENDENCE SECURITY ACT

- Apply sustainable design principles in siting, design, and construction of prospectus-level new construction (including built-to-suit leases) and major renovations (Sec. 433).
ENERGY INDEPENDENCE SECURITY ACT

- Reduce fossil fuel consumption over CBECS 2003 in designs for prospectus-level new construction (including built-to-suit leases) and major renovations (Sec. 433):
  - 55% in FY2010
  - 65% in FY2015
  - 80% in FY2020
  - 90% in FY2025
  - 100% in FY2030
- EPACT05 - require energy consumption levels that are at least 30% below the 2004 ASHRAE standard 90.1
GUIDING PRINCIPLES FOR HIGH PERFORMANCE & SUSTAINABLE BUILDINGS

- Energy Efficiency 30% better than ASHRAE 90.1.
- Energy Star Benchmarking
- Indoor water efficiency of 20%.
- Outdoor water efficiency of 50%.
- Ventilation and comfort to meet ASHRAE 55 and 62.1.
1999 Adopted LEED with requirement all new construction be LEED certifiable.

Owned new construction and major renovation must achieve a certified LEED rating.

The 2010 plan call raises this requirement to a GOLD LEED rating.

All build to suite leases must achieve a SILVER LEED rating.
SUSTAINABLE IMPROVEMENTS TO THE P-100

- Lower building energy targets to meet EPact 2005 and EISA 2007
- Require improved lighting designs
  - Reduced power density requirements for lighting.
  - Programmable ballasts,
  - more efficient lighting controls, occupancy sensors,
  - exterior LED lighting.
- Enhanced daylighting requirements.
- Added renewable energy goals
- Added solar water heating mandates.
- Improved envelope designs
  - air barrier design and QA standards
  - ASHRAE 160 compliance
- Improved roofing design requirements.
- Upgraded energy modeling parameters.
- Photovoltaic requirements included
- Upgraded water saving plumbing and landscaping irrigation requirements.
- Added recycled content and bio-based content requirements.
- Increase LEED requirement from certified to GOLD
With the use of BIM (req. since 2006), GSA seeks to strengthen the reliability, consistency, and usability of predicted energy use and energy cost results. Benefits include: more complete and accurate energy estimates earlier in the design process, improved life-cycle costing analysis, increased opportunities for measurement and verification during building occupation, and improved processes for gathering lessons learned in high performance buildings.
GSA is using BIM in the design and fabrication of the courthouse, for example, to test for clash detection of building elements. Also, GSA is exploring the possibility of using BIM to fabricate the structural steel and ductwork, and for the production of 3D shop drawings.
<table>
<thead>
<tr>
<th>Year</th>
<th>LEED Rated Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>SSA Building Woodlawn, MD (NC2-O-02)</td>
</tr>
<tr>
<td></td>
<td>U.S. Courthouse Youngstown, OH (NC2-O-02)</td>
</tr>
<tr>
<td></td>
<td>EPA New England Reg. Lab Chelmsford, MA (NC1-L-03)</td>
</tr>
<tr>
<td></td>
<td>EPA Science &amp; Tech. Center Kansas City, KS (NC2-L-03)</td>
</tr>
<tr>
<td>2003</td>
<td>SSA Child Care Center Woodlawn, MD (NC2-O-03)</td>
</tr>
<tr>
<td></td>
<td>EPA New England Reg. Lab Chelmsford, MA (NC1-L-03)</td>
</tr>
<tr>
<td></td>
<td>EPA Science &amp; Tech. Center Kansas City, KS (NC2-L-03)</td>
</tr>
<tr>
<td>2004</td>
<td>DOT Office Building Lakewood, CO (NC2-L-04)</td>
</tr>
<tr>
<td></td>
<td>U.S. Border Station Sweetgrass, MT (NC2-O-05)</td>
</tr>
<tr>
<td></td>
<td>Scowcroft Building (IRS) Ogden, UT (NC2-L-05)</td>
</tr>
<tr>
<td></td>
<td>EPA Computer Center Res. Triangle Park, NC (NC2-L-05)</td>
</tr>
<tr>
<td>2005</td>
<td>U.S. Border Station Sweetgrass, MT (NC2-O-05)</td>
</tr>
<tr>
<td></td>
<td>Scowcroft Building (IRS) Ogden, UT (NC2-L-05)</td>
</tr>
<tr>
<td></td>
<td>OSHA Salt Lake Tech. Center Sandy, UT (NC2-L-05)</td>
</tr>
<tr>
<td></td>
<td>EPA Computer Center Res. Triangle Park, NC (NC2-L-05)</td>
</tr>
<tr>
<td></td>
<td>NPS Midwest Regional HQ Omaha, NE (NC2-L-05)</td>
</tr>
<tr>
<td>2006</td>
<td>Metzenbaum Courthouse Cleveland OH (NC2-O-06)</td>
</tr>
<tr>
<td></td>
<td>Potomac Yard I Arlington, VA (NC2-L-06)</td>
</tr>
<tr>
<td></td>
<td>Potomac Yard II Arlington, VA (NC2-L-06)</td>
</tr>
<tr>
<td></td>
<td>OSHA Salt Lake Tech. Center Sandy, UT (NC2-L-05)</td>
</tr>
<tr>
<td></td>
<td>EPA Computer Center Res. Triangle Park, NC (NC2-L-05)</td>
</tr>
<tr>
<td></td>
<td>NPS Midwest Regional HQ Omaha, NE (NC2-L-05)</td>
</tr>
<tr>
<td></td>
<td>DHS/CIS Lincoln, NE (NC2-L-06)</td>
</tr>
<tr>
<td></td>
<td>W.L. Morse Courthouse Eugene, OR (NC2-O-06)</td>
</tr>
</tbody>
</table>
NOAA SATELLITE OPERATIONS CENTER
SUITLAND, MD

- 84% Site area restored with native and adaptive plants
- 99.9% Non equipment roof area is planted
- 100% Landscape is not irrigated

Green Facts

LEED-NC rating out of 69

Gold 40

Sustainable Sites 10/14
Water Efficiency 3/5
Energy & Atmosphere 6/17
Materials & Resources 5/13
Indoor Environmental Quality 11/15
Innovation & Design 5/5

USGBC LEED-NC rated Oct. 26, 2007
NPS MIDWEST REGIONAL HEADQUARTERS
OMAHA, NE

- 39% Water savings from low flow fixtures, dual flush toilets, and waterless urinals
- 59% Wood from FSC sustainability managed forests
- 100% Green power purchase for more than 2 years

Green Facts

<table>
<thead>
<tr>
<th>LEED-NC rating out of</th>
<th>69</th>
</tr>
</thead>
</table>

**Gold**

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Sites</td>
<td>8/14</td>
</tr>
<tr>
<td>Water Efficiency</td>
<td>4/5</td>
</tr>
<tr>
<td>Energy &amp; Atmosphere</td>
<td>6/17</td>
</tr>
<tr>
<td>Materials &amp; Resources</td>
<td>6/13</td>
</tr>
<tr>
<td>Indoor Environmental Quality</td>
<td>11/15</td>
</tr>
<tr>
<td>Innovation &amp; Design</td>
<td>5/5</td>
</tr>
</tbody>
</table>

USGBC LEED-NC rated May 3, 2005
Does Sustainable Design Deliver?
Two of the points, Sweetgrass and Sault Ste. Marie are both ports and were not included in this study.
ENERGY PERFORMANCE

CBECS - Commercial Building Energy Consumption Survey
HOW MUCH DID THE 12 BUILDINGS SAVE IN MAINTENANCE COSTS OVER THE PAST YEAR?

$892,000
26% LESS ENERGY USE

13% LOWER MAINTENANCE COSTS
27% HIGHER OCCUPANT SATISFACTION
33% FEWER CO2 EMISSIONS
Lutron® shades automatically position to let in useful daylight. Lights near windows dim to save energy.

Shades automatically lower to block harsh low-angled winter sun.
A | Add 700kW array (40,000 sf) to existing 7th floor roof

B | Add solar hot water generating system to serve domestic and kitchen hot water
<table>
<thead>
<tr>
<th>Item</th>
<th>Energy Savings (% of total)</th>
<th>Payback (years)</th>
<th>Cost</th>
<th>Y / N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Array on Roof</td>
<td>7.01%</td>
<td>23</td>
<td>$4,200,000</td>
<td>Y</td>
</tr>
<tr>
<td>Solar Hot Water</td>
<td>1.28%</td>
<td>20</td>
<td>$575,000</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Current Building</td>
<td>100% Documents</td>
<td>Proposed Enhancements</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>Annual Energy Cost ($ / year)</td>
<td>$1,977,209</td>
<td>$1,158,802</td>
<td>$903,866</td>
<td></td>
</tr>
<tr>
<td>Annual Energy Use (kBTU / sf / year)</td>
<td>82.958</td>
<td>48.620</td>
<td>37.924</td>
<td></td>
</tr>
<tr>
<td>Reduction in Energy Use (over current building)</td>
<td>41.4%</td>
<td></td>
<td>54.0%</td>
<td></td>
</tr>
<tr>
<td>Energy Savings (over current building / 25 years)</td>
<td>$71,090,000</td>
<td></td>
<td>$94,120,000</td>
<td></td>
</tr>
</tbody>
</table>
Questions ?