High Performance and Sustainable Buildings

A Historic Preservation Perspective

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U.S. General Services Administration
Public Buildings Service
Memorandum of Understanding

Federal Leadership in High Performance and Sustainable Buildings

• Signed January 24, 2006 by 21 individuals representing 17 agencies and over 95% of all Federal buildings
Federal Government Commitment

- ... to designing, locating, constructing, maintaining, and operating its facilities in an
  - energy efficient and sustainable manner that
  - strives to achieve a balance that will realize
    - high standards of living,
    - wider sharing of life’s amenities,
    - maximum attainable reuse and recycling of depletable resources, in an
  - economically viable manner,
  - consistent with Department and Agency missions.
MOU Goals

• Reduce the total ownership costs of facilities;
• Improve energy efficiency and water conservation;
• Provide safe, healthy, and productive built environments; and,
• Promote sustainable environmental stewardship.
I. Employ Integrated Design Principles

• Integrated Design.
  – Initiates and maintains an integrated project team . . .
  – Establishes performance goals . . .
  – Considers all stages of the building’s lifecycle . . .
I. Employ Integrated Design Principles
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• Commissioning.
  – Employ total building commissioning practices . . .
I. Employ Integrated Design Principles
II. Optimize Energy Performance

• Energy Efficiency.
  – Establish a whole building performance target that takes into account the intended use, occupancy . . .
  – For new construction, reduce the energy cost budget by 30 percent . . .
  – For major renovations, reduce the energy cost budget by 20 percent . . .
II. Optimize Energy Performance
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II. Optimize Energy Performance
II. Optimize Energy Performance

• Measurement and Verification.
  – . . . install building level utility meters in new major construction and renovation projects . . .
  – . . . measure all new major installations using Energy Star . . .
  – Enter data and lessons learned from sustainable buildings into the High Performance Buildings Database
II. Optimize Energy Performance
III. Protect and Conserve Water

• Indoor Water.
  – Employ strategies that in aggregate use a minimum of 20 percent less . . .
III. Protect and Conserve Water
III. Protect and Conserve Water

• Outdoor Water.
  – Use water efficient landscape and irrigation strategies . . . to reduce outdoor potable water consumption by a minimum of 50 percent . . .
III. Protect and Conserve Water
IV. Enhance Indoor Environmental Quality

• Ventilation and Thermal Comfort.
  – Meet the current ASHRAE Standard 55 . . . and ASHRAE Standard 62.1 . . .
IV. Enhance Indoor Environmental Quality
IV. Enhance Indoor Environmental Quality

• Moisture Control.
  – Establish and implement a moisture control strategy . . .
IV. Enhance Indoor Environmental Quality
IV. Enhance Indoor Environmental Quality

- Daylighting.
  - Achieve a minimum daylight factor . . .
  - Provide automatic dimming controls or accessible manual lighting controls . . .
IV. Enhance Indoor Environmental Quality
IV. Enhance Indoor Environmental Quality

• Low-Emitting Materials.
  – Specify materials and products with low pollutant emissions . . .
IV. Enhance Indoor Environmental Quality
IV. Enhance Indoor Environmental Quality

- Protect Indoor Air Quality during Construction.
  - Follow . . . Indoor Air Quality Guidelines for Occupied Buildings under Construction . . .
  - After construction and prior to occupancy, conduct a minimum 72-hour flush-out . . .
IV. Enhance Indoor Environmental Quality
V. Reduce Environmental Impact of Materials

• Recycled Content.
  – . . . use products meeting or exceeding EPA’s recycled content recommendations . . .
V. Reduce Environmental Impact of Materials

• Biobased Content.
  - ... use products meeting or exceeding USDA’s biobased content recommendations
    ... use biobased products made from rapidly renewable resources and certified sustainable wood products.
V. Reduce Environmental Impact of Materials
V. Reduce Environmental Impact of Materials

• Construction Waste.
  – During a project’s planning stage, identify local recycling and salvage operations . . . recycle or salvage at least 50 percent construction, demolition and land clearing waste . . .
V. Reduce Environmental Impact of Materials
V. Reduce Environmental Impact of Materials
V. Reduce Environmental Impact of Materials

• Ozone Depleting Compounds.
  – Eliminate the use of ozone depleting compounds . . .
V. Reduce Environmental Impact of Materials
MOU & LEED

Integrated Design.
• EA p1 – Fundamental Commissioning
• EA 3 – Enhanced Commissioning

Optimize Energy Performance.
• EA 1 – Optimize Energy Performance

Protect and Conserve Water.
• WE 3.1 – Water Use Reduction
• WE 1.1 – Water Efficient Landscaping
MOU & LEED

Enhance Indoor Environmental Quality.
- EQ p1 – Minimum IAQ Performance
- EQ 8.1 – Daylight and Views: Daylight 75% of Spaces 1 pt.

Reduce Environmental Impact of Materials.
- MR 2.1 – Construction Waste Management: Divert 50% 1 pt.
- EA p3 – Fundamental Refrigerant Management

16 pt.
Financing Historic Federal Buildings
An Analysis of Current Practice

• GSA Draft Report, May 1999
• Overall, the operating costs per rentable square foot for historic buildings were 10 percent less than non-historic buildings. The cleaning costs were 9 percent less. The maintenance costs were 10 percent less. The utility costs were 27 percent less.
Financing Historic Federal Buildings

Figure 9 - Utility Cost 1998

<table>
<thead>
<tr>
<th>Owned Office-like Buildings</th>
<th>Rentable Square Feet</th>
<th>Useable Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic</td>
<td>$1.10</td>
<td>$1.69</td>
</tr>
<tr>
<td>Non-Historic</td>
<td>$1.49</td>
<td>$2.08</td>
</tr>
</tbody>
</table>
Financing Historic Federal Buildings

Figure 10 - Utility Costs of Compared to Industry Standard 1998

Wt. Avg: $1.10
25.9 Million RSF
193 Buildings

Wt. Avg: $1.49
56.0 million RSF
287 Buildings

INDUSTRY STANDARD

HIGH
WITHIN
LOW

RSF = Rentable Square Feet
Financing Historic Federal Buildings

Figure 14 - Efficiency of Buildings Compared to Utility Costs 1998

RSF = Rentable Square Feet
Efficiency = Usable SQFT/Rentable SQFT
Ariel Rios Building
Washington, DC
Howard M. Metzenbaum U.S. Courthouse
Cleveland, OH
Howard M. Metzenbaum U.S. Courthouse
Scowcroft Building
Ogden, UT
Scowcroft Building
GSA LEED Registered Historic Buildings

- John McCormack Building, Boston, MA
- Martin Luther King, Jr. Federal Building, Atlanta, GA
- Potter Stewart U.S. Courthouse, Cincinnati, OH
- 536 S. Clark, Chicago, IL
- Federal Building/U.S. Courthouse, Davenport, IA
- U.S. Courthouse, Little Rock, AR
- William Nakamura U.S. Courthouse, Seattle, WA
- Mary Switzer Building, Washington, DC
- Main Department of the Interior, Washington, DC
- Eisenhower Executive Office Building, Washington, DC
- Herbert Hoover Building, Washington, DC
- Lafayette Building, Washington, DC
- 1800 F Street, Washington, DC
- . . .
GSA Building
Washington, DC
GSA Building
GSA Building
Eisenhower Executive Office Building
Washington, DC
Embodied Energy

Preservation and Energy Conservation

The Advisory Council on Historic Preservation

ASSESSING the
ENERGY CONSERVATION BENEFITS of
HISTORIC PRESERVATION:
Methods and Examples

ADVISORY COUNCIL on HISTORIC PRESERVATION
Life-Cycle Assessment

Exhibit 1-1. Life Cycle Stages (Source: EPA, 1993)
Life-Cycle Assessment Approach

• Define the scope
• Consider energy, materials, emissions
• The historic building is already there
• No upstream profile for historic building
Sustainable Design = Good Design
Historic Preservation = Good Maintenance
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