U.S. Department of Energy
Energy Efficiency and Renewable Energy

federal energy management program

# High Performance and Sustainable Buildings

## A Historic Preservation Perspective

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GSA

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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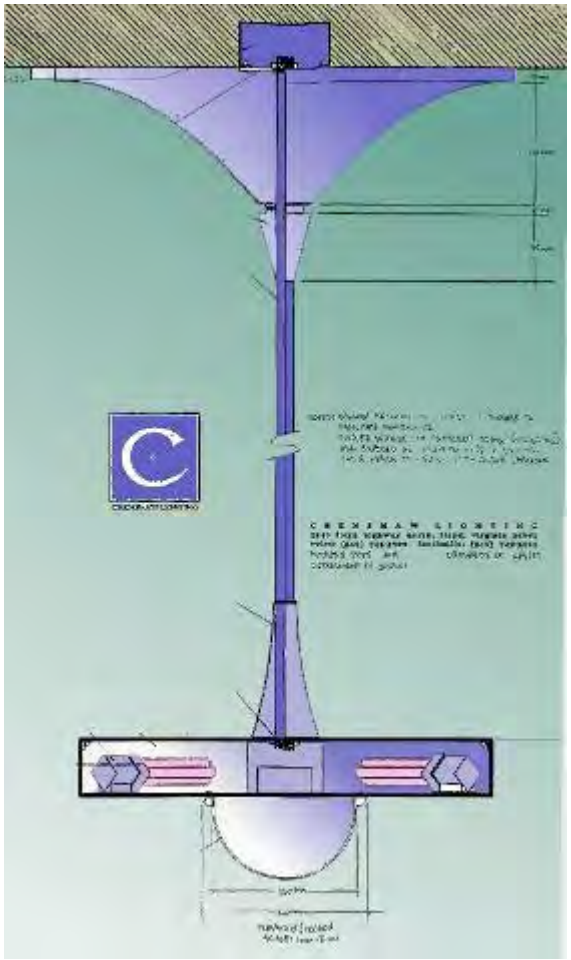
- Commissioning.
  - Employ total building commissioning practices . . .

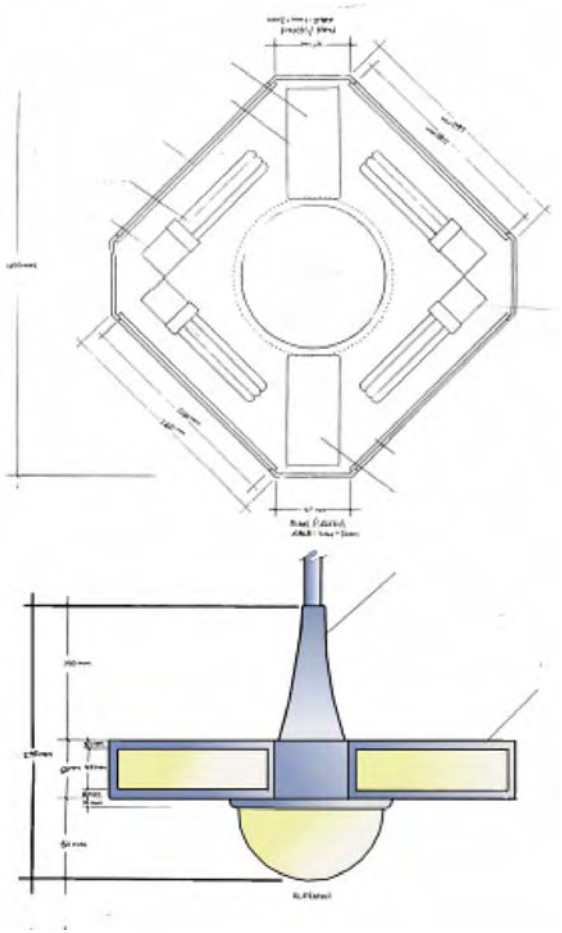
# I. Employ Integrated Design Principles

# 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





# II. Optimize Energy Performance

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- 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 . . .

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- 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

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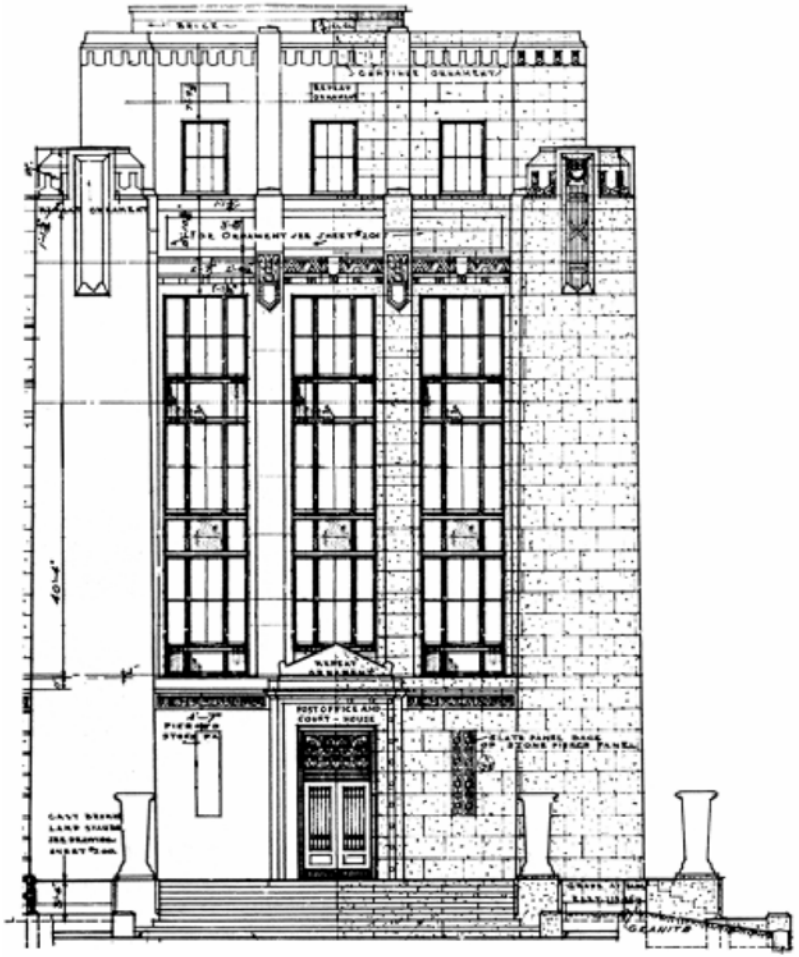
- Moisture Control.
  - Establish and implement a moisture control strategy . . .

# 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

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- Low-Emitting Materials.
  - Specify materials and products with low pollutant emissions . . .

# IV. Enhance Indoor Environmental Quality

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- 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

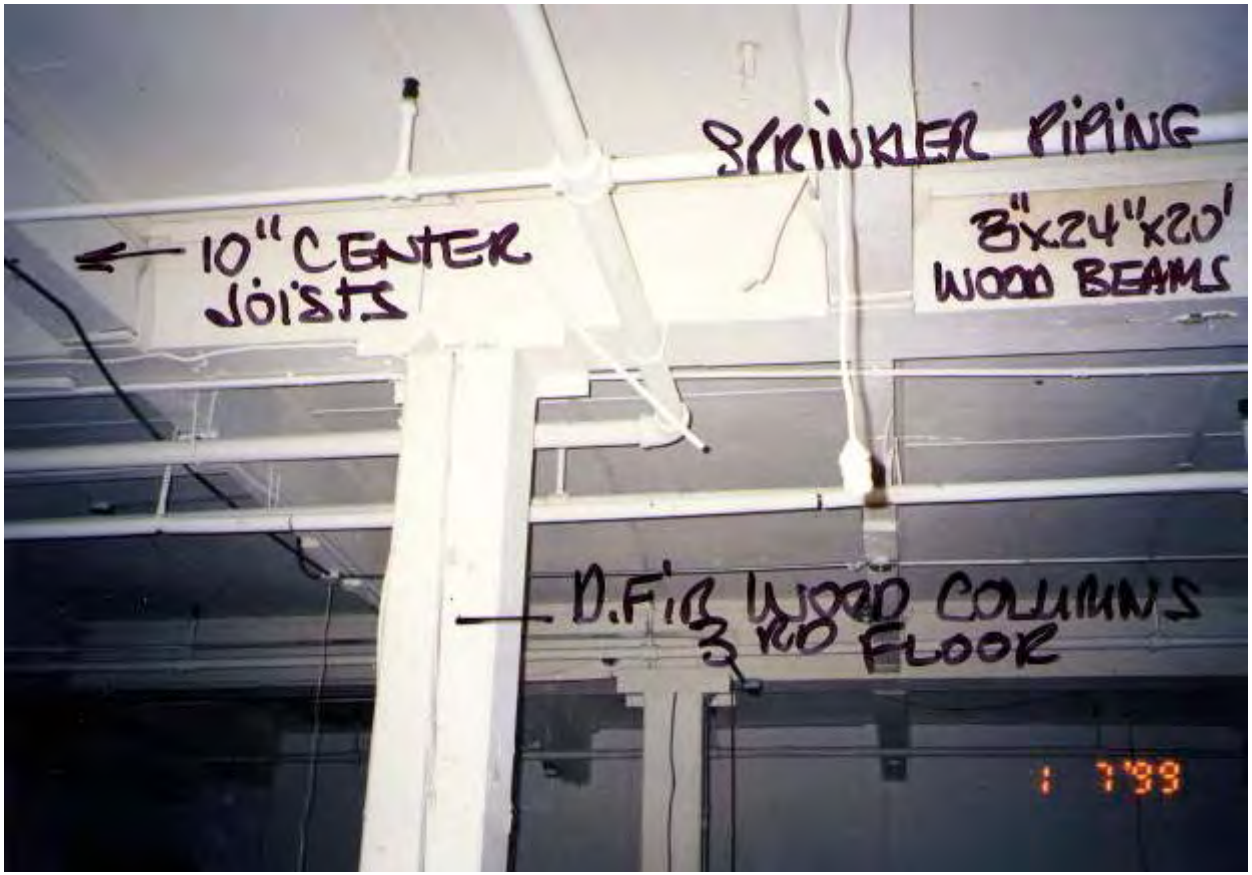
- Biobased Content.
  - . . . use products meeting or exceeding USDA's biobased content recommendations . . . use biobased products made from rapidly renewable resources and certified sustainable wood products.

# 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 Commissioining — 1 pt.

Optimize Energy Performance.

- EA 1 – Optimize Energy Performance — 5 pt.

Protect and Conserve Water.

- WE 3.1 – Water Use Reduction — 1 pt.
- WE 1.1 – Water Efficient Landscaping — 1 pt.

# MOU & LEED

Enhance Indoor Environmental Quality.

| | |
|---|---|
| • EQ 7.1 – Thermal Comfort | 1 pt. |
| • EQ p1 – Minimum IAQ Performance | |
| • EQ 8.1 – Daylight and Views: Daylight 75% of Spaces | 1 pt. |
| • EQ 4.1 – Low-Emitting Materials: Adhesives & Sealants | 1 pt. |
| • EQ 4.2 – Low-Emitting Materials: Paints & Coatings | 1 pt. |
| • EQ 4.3 – Low-Emitting Materials: Carpet Systems | 1 pt. |
| • EQ 3.1 – Construction IAQ Management Plan: During Construction | 1 pt. |

Reduce Environmental Impact of Materials.

| | |
|---|---|
| • MR 2.1 – Construction Waste Management: Divert 50% | 1 pt. |
| • EA p3 – Fundamental Refrigerant Management | |
| • EA 4 – Enhanced Refrigerant Management | 1 pt. |
| | 16 pt. |

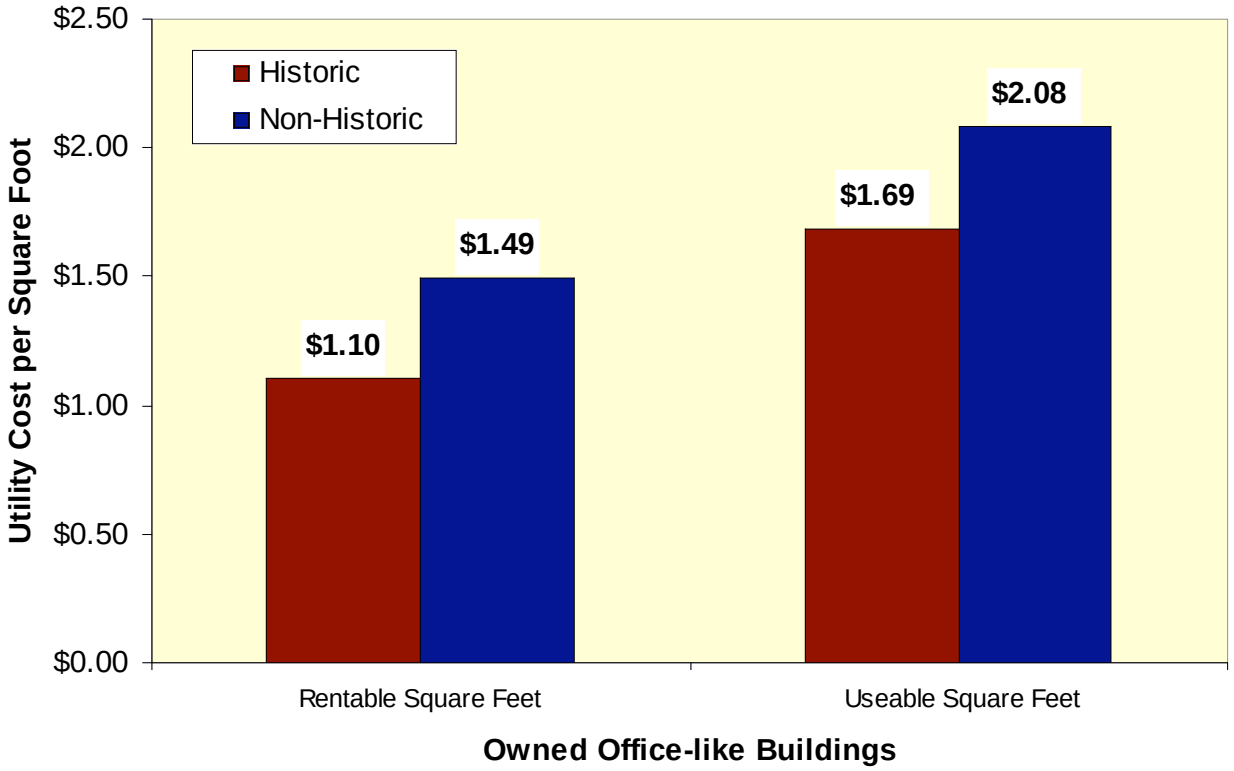
# Financing Historic Federal Buildings

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.

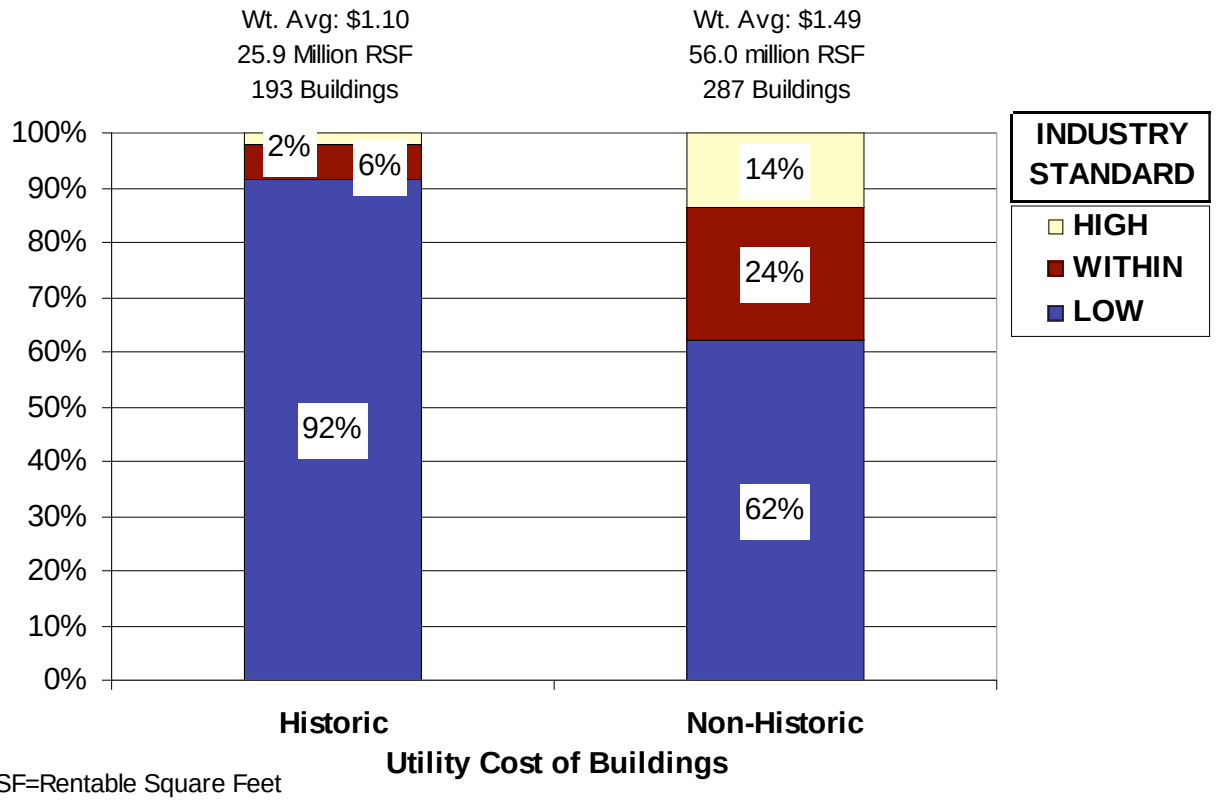
# Financing Historic Federal Buildings

**Figure 9 - Utility Cost 1998**



# Financing Historic Federal Buildings

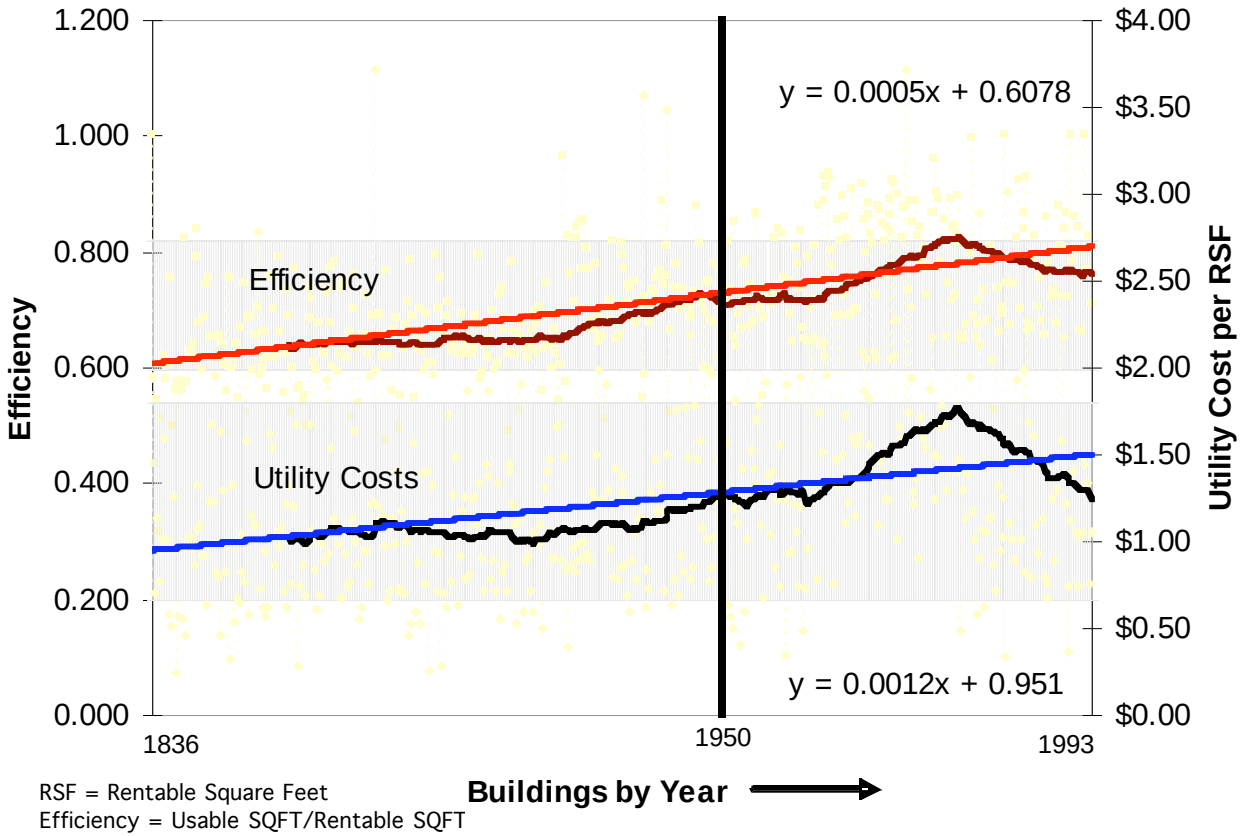
**Figure 10 - Utility Costs of Compared to Industry Standard 1998**




RSF=Rentable Square Feet

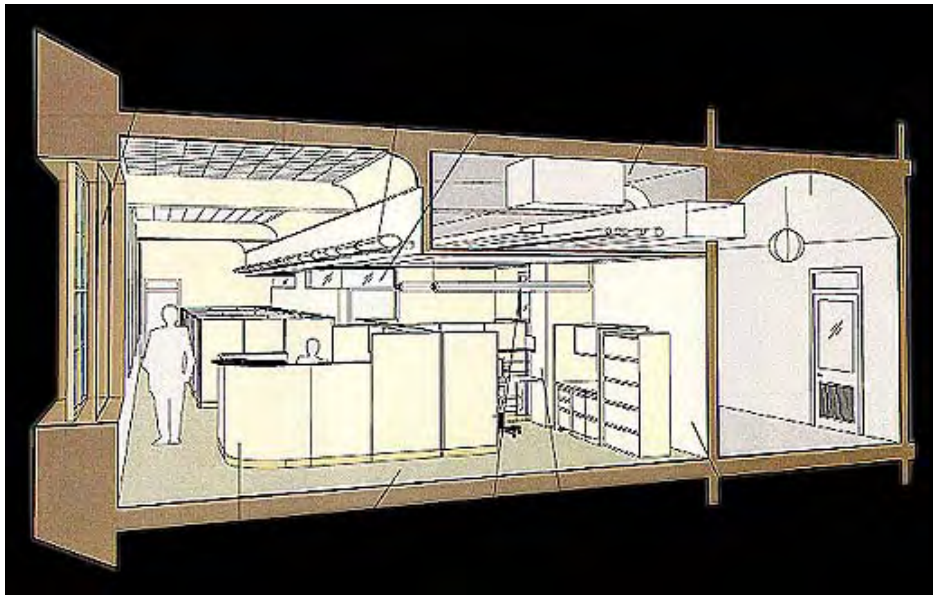
# Financing Historic Federal Buildings

**Figure 14 - Efficiency of Buildings Compared to Utility Costs 1998**




RSF = Rentable Square Feet
Efficiency = Usable SQFT/Rentable SQFT

# Ariel Rios Building
# Washington, DC

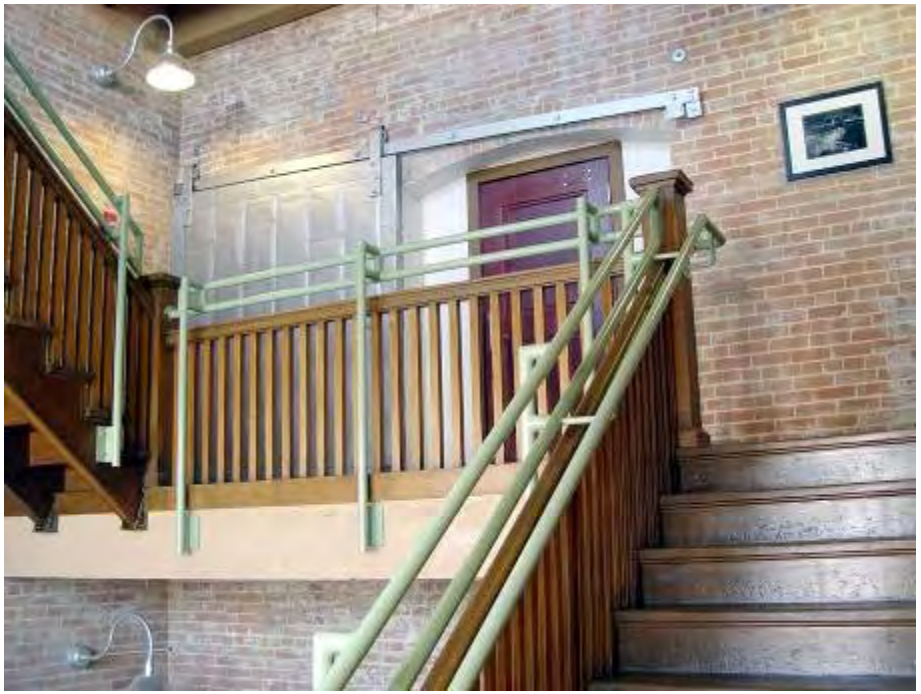


# Howard M. Metzenbaum U.S. Courthouse
# Cleveland, OH

# Howard M. Metzenbaum U.S. Courthouse

# Scowcroft Building
# Ogden, UT

# Scowcroft Building



# GSA LEED Registered Historic Buildings

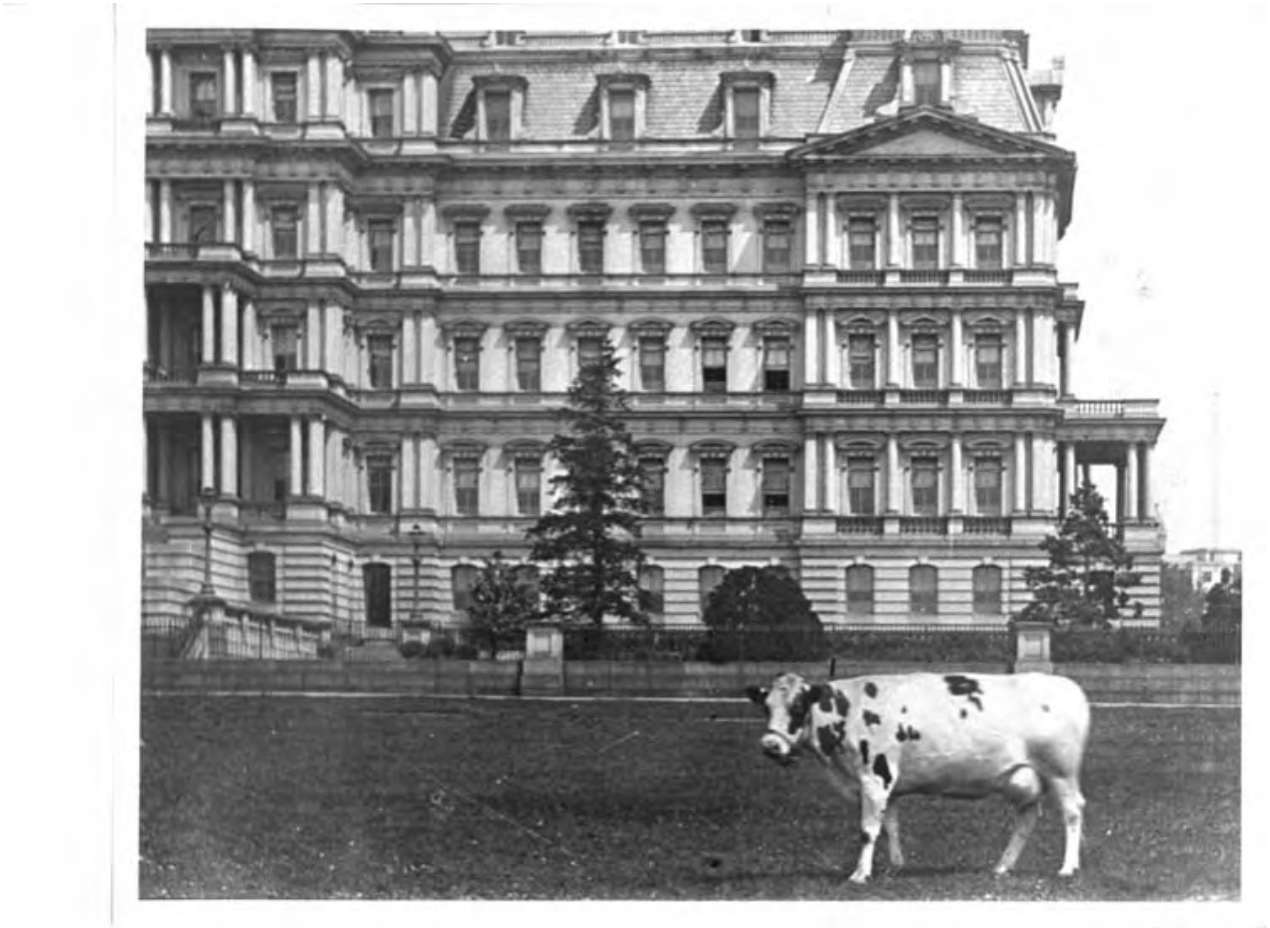
- John McCormack Building, Boston, MA
- Martin Luther King, Jr. Federal Building, Atlanta, GA
- Potter Stewart U.S. Courthouse, Cincinnati, OH
- 536 S. Clark, Chicago, IL
- Federal Building/U.S. Courthouse, Davenport, IA
- U.S. Courthouse, Little Rock, AR
- William Nakamura U.S. Courthouse, Seattle, 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

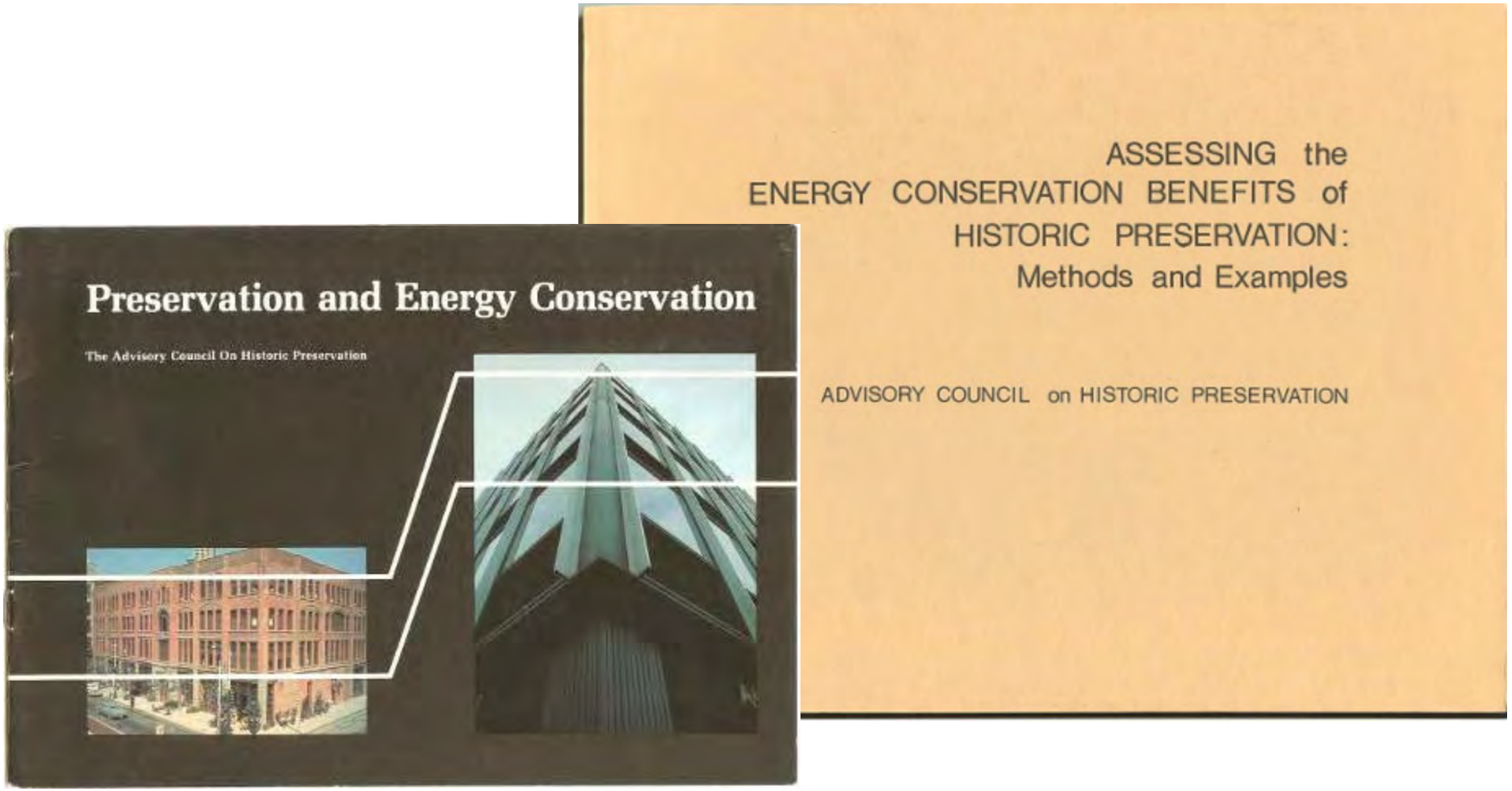
# GSA Building

# GSA Building

# Eisenhower Executive Office Building Washington, DC



# Embodied Energy



# Life-Cycle Assessment

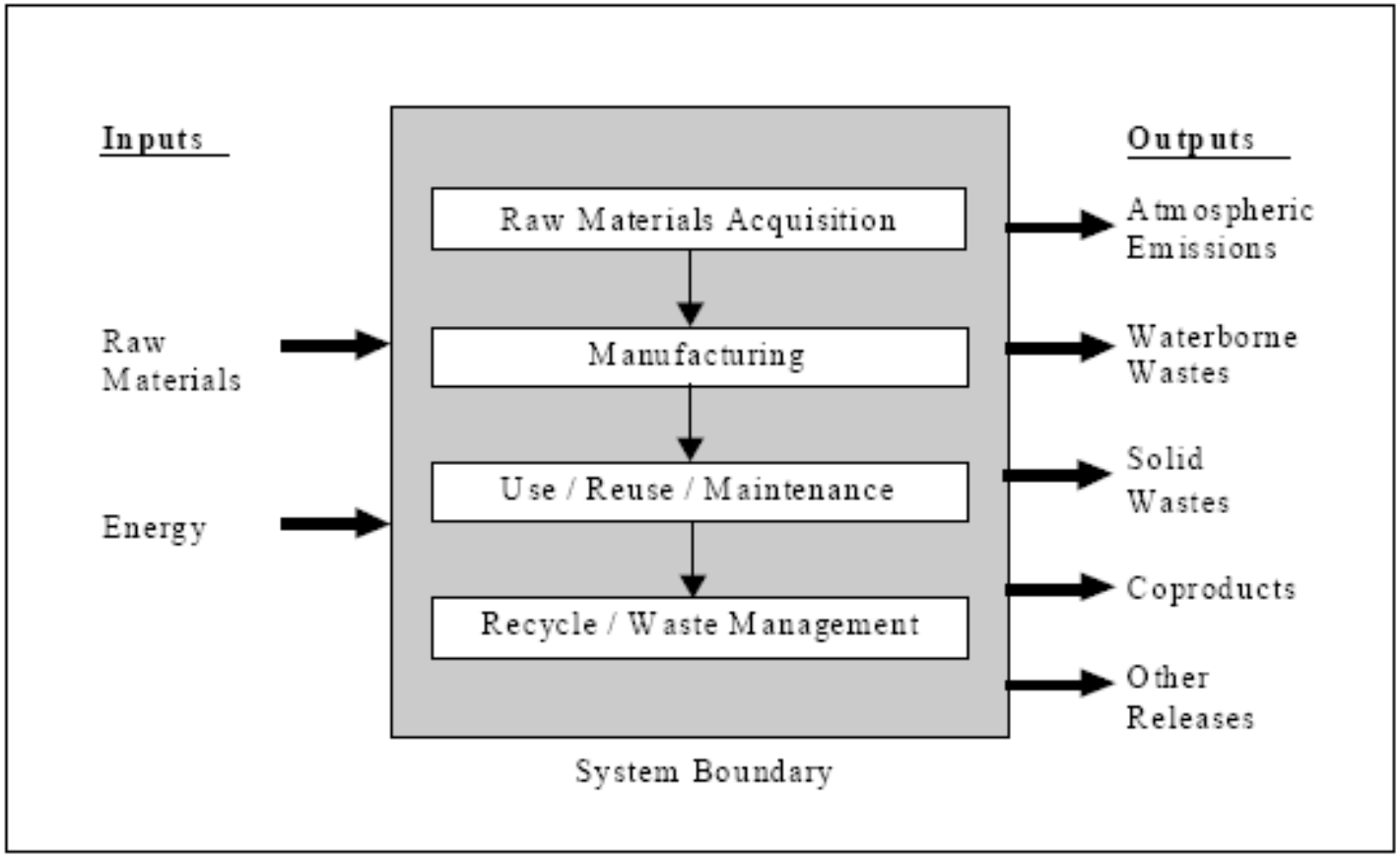



Exhibit 1-1. Life Cycle Stages (Source: EPA,1993)

# 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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