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# Next Frontiers for Sustainable Facilities!!

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Engineer Research and Development Center  
HENAAC Green Engineering Initiative  
11-13 October 2007, San Diego, CA



# Army Definition of Sustainability

## Sustainability

“a sustainable Army simultaneously meets current as well as future mission requirements worldwide, safeguards human health, improves quality of life, and enhances the natural environment.”

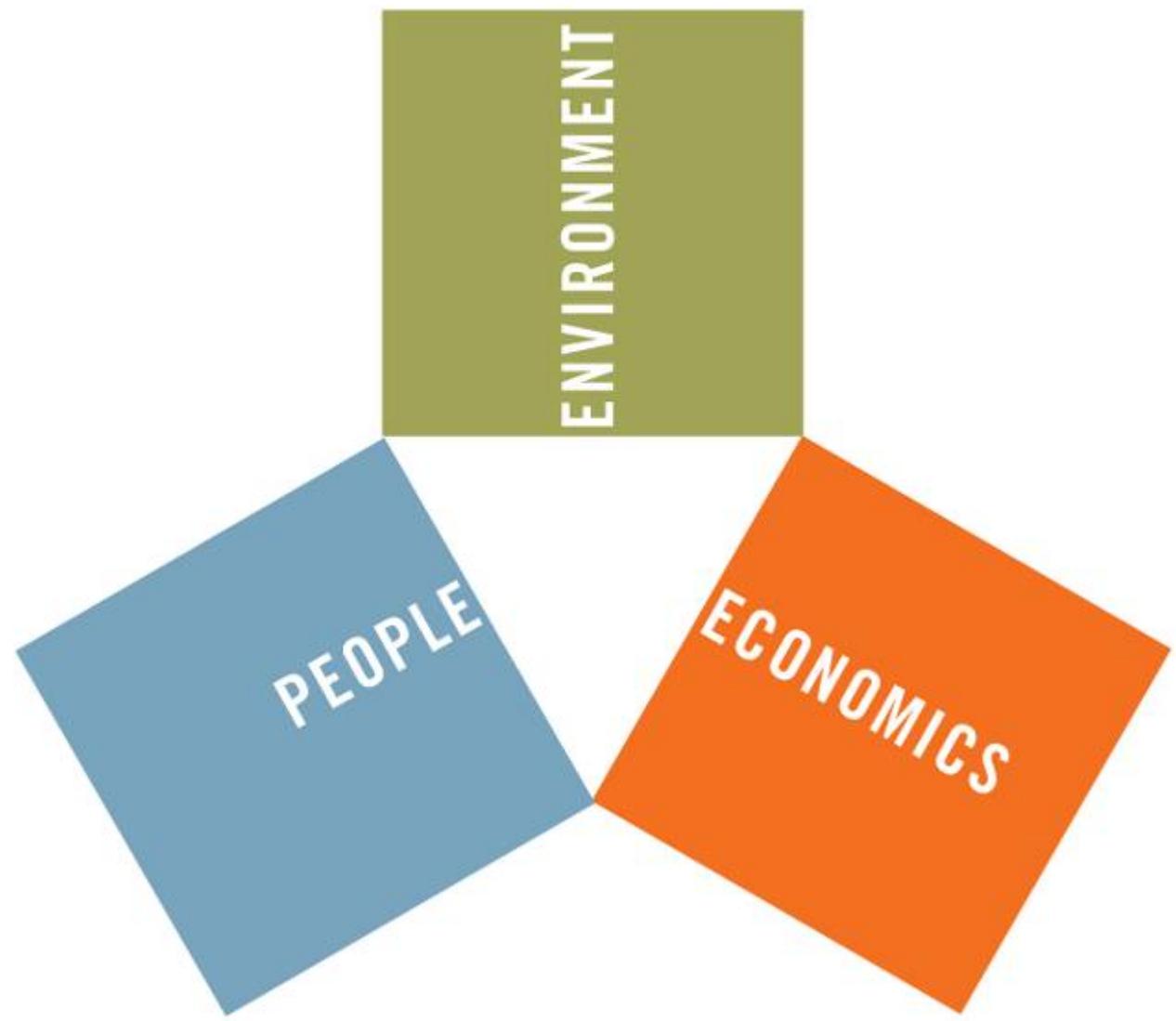
<http://www.sustainability.army.mil/>

*Army Strategy for the  
Environment, 2004*



# The Triple Bottom Line.

Reduced Environmental Impact.  
Peak Efficiency.  
Improved Capitalization Rates.  
Increased Marketability.  
Higher Lease Rates.  
Improved Productivity.  
Reduced Absenteeism.  
Build Green.  
Everyone Profits.



# Army Definition of Triple Bottom Line



# Army Facilities

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- Statistics on Army facilities
- Square foot of buildings
- Miles of roads and rails
- Energy use





**Architects**

**Builders/Contractors**

**Product  
Manufacturers**

**Federal,  
Local,  
and State  
Governments**

**Nonprofit Leaders**

**Building  
Owners**

**Planners**

**USGBC**

**Engineers**

**Interior  
Designers**

**Landscape  
Architects**

**Utility  
Managers**

**Financial  
Planners**

**Code  
Officials**

**Property  
Managers**

**Building  
Tenants**



# LEED

GREEN BUILDING RATING SYSTEM

## Leadership in Energy & Environmental Design®

A leading-edge system for designing, constructing, operating and certifying the world's greenest buildings.

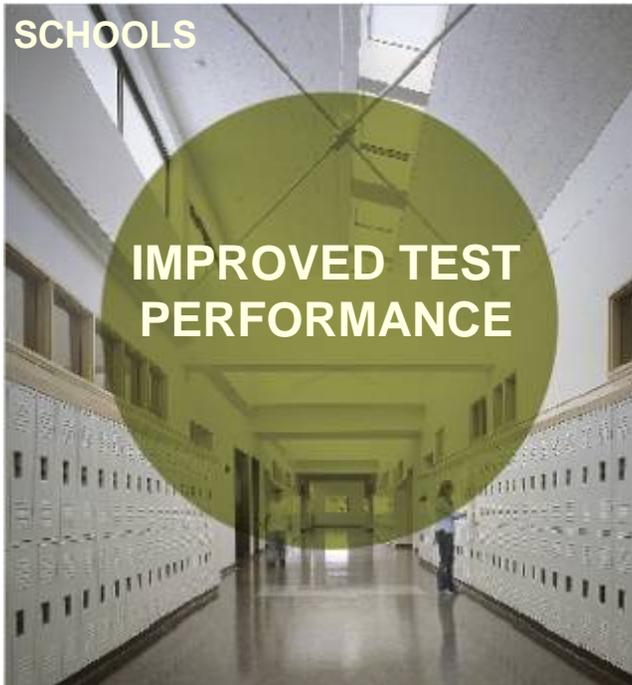


# Increased Productivity.

## LEED ADOPTIONS

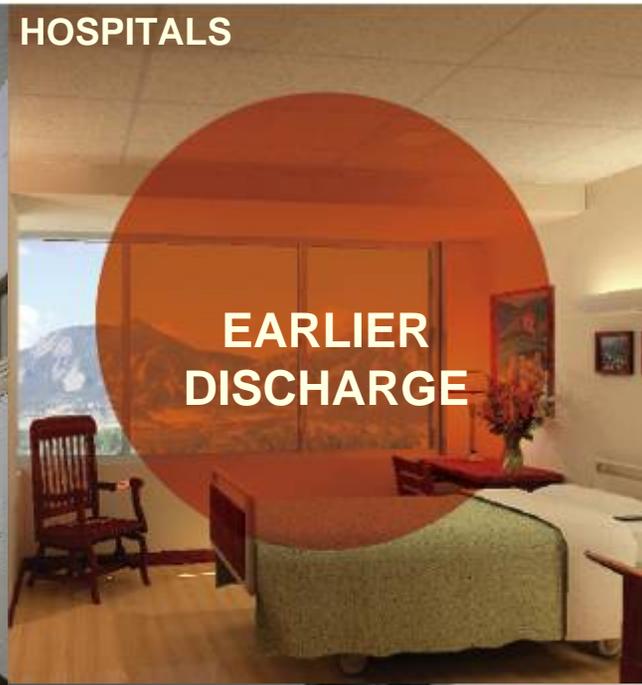
- 8 Countries
- 16 States
- 46 Cities
- 33 Schools
- 9 Federal Agencies

### SCHOOLS



IMPROVED TEST PERFORMANCE

### HOSPITALS



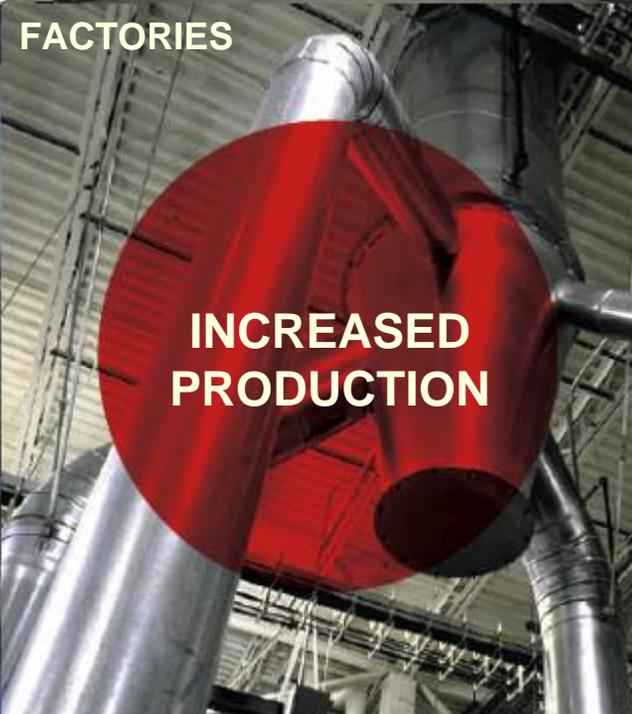
EARLIER DISCHARGE

### RETAIL



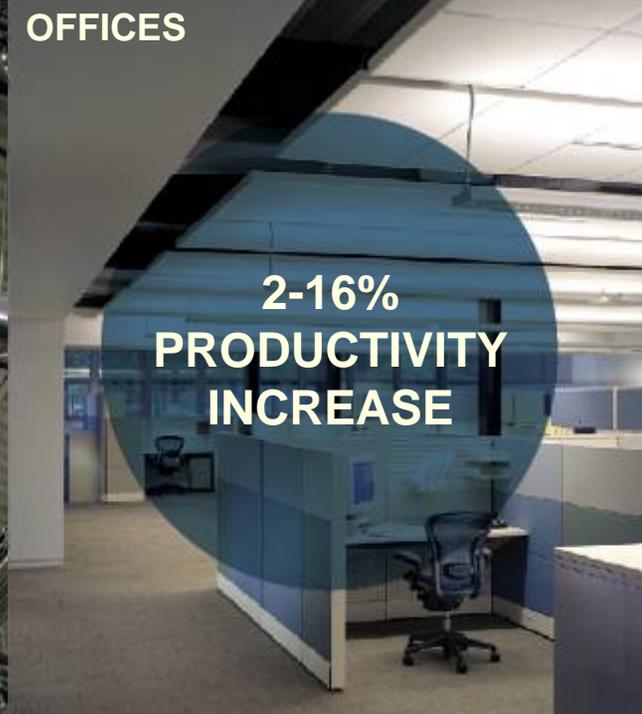
INCREASE IN SALES PER SQUARE FOOT

### FACTORIES



INCREASED PRODUCTION

### OFFICES



2-16% PRODUCTIVITY INCREASE

# Categories of LEED Ratings

**LEED** for New Construction

**Adopted 05 Jan 06**

**LEED** for Commercial Interiors

**LEED** for Existing Buildings

**Adopted 27 Apr 07**

**LEED** for Core & Shell

## NEW PROGRAMS

**LEED** for Homes

**Adopt When Released  
Fall 07**

**LEED** for Neighborhood Development

**Under Consideration  
for Adoption**

**LEED** for Schools

Healthcare  
Laboratories  
Retail  
**Multi-building Campuses**  
Multi-family Residential



# Taking LEED to the Next Level

Bio-regionally Weighted Credits

LCA as Basis for LEED Credits

Smart Credits

Improved Accounting for:

Energy

Ecological Sites

Transport Implications

IEQ

Health

LEED V3





DEPARTMENT OF THE ARMY  
 ASSISTANT SECRETARY OF THE ARMY  
 INSTALLATIONS AND ENVIRONMENT  
 118 ARMY PENTAGON  
 WASHINGTON DC 20310-0118



REPLY TO  
 ATTENTION OF

March 18, 2003

MEMORANDUM FOR THE DEPUTY ASSISTANT SECRETARY OF THE  
 ARMY (PRIVATIZATION AND PARTNERSHIPS)  
 ASSISTANT CHIEF OF STAFF FOR INSTALLATION  
 MANAGEMENT  
 CHIEF OF ENGINEERS  
 DIRECTOR, ARMY NATIONAL GUARD  
 CHIEF ARMY RESERVE

# LEED Silver Starting FY08



DEPARTMENT OF THE ARMY  
 OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY  
 INSTALLATIONS AND ENVIRONMENT  
 118 ARMY PENTAGON  
 WASHINGTON DC 20310-0118  
 05 JAN 2006

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Sustainable Design and Development Policy Update – SPIRiT to LEED Transition

2. All military vertical building construction projects starting with the FY 08 military construction program will achieve the SILVER level of LEED NC (New Construction). This policy includes all new construction projects, regardless of fund source. Horizontal construction, such as ranges, roads and airfields, will continue to incorporate Sustainable Design and Development features to the maximum extent possible. The installation Director of Public Works or the Reserve Component equivalent, supporting Engineer District, designer and constructor will jointly certify the final LEED score and rating.

Mario P. Fiori

4. The Army will adopt LEED Homes for scoring residential housing when released by the USGBC. In the meantime, SPIRiT will continue to be used to rate all Army Family Housing new construction projects and homes built under the Residential Communities Initiative. These projects will continue to attain SPIRiT GOLD.

[http://www.hqda.army.mil/acsim/fd/virlibrary/virtualLibrary/docs/SPIRIT to LEED Memo Jan 06.pdf](http://www.hqda.army.mil/acsim/fd/virlibrary/virtualLibrary/docs/SPIRIT%20to%20LEED%20Memo%20Jan%2006.pdf)

Printed on Recycled Paper

Joseph W. Whitaker  
 Deputy Assistant Secretary of the Army  
 (Installations and Housing)  
 OASA(I&E)



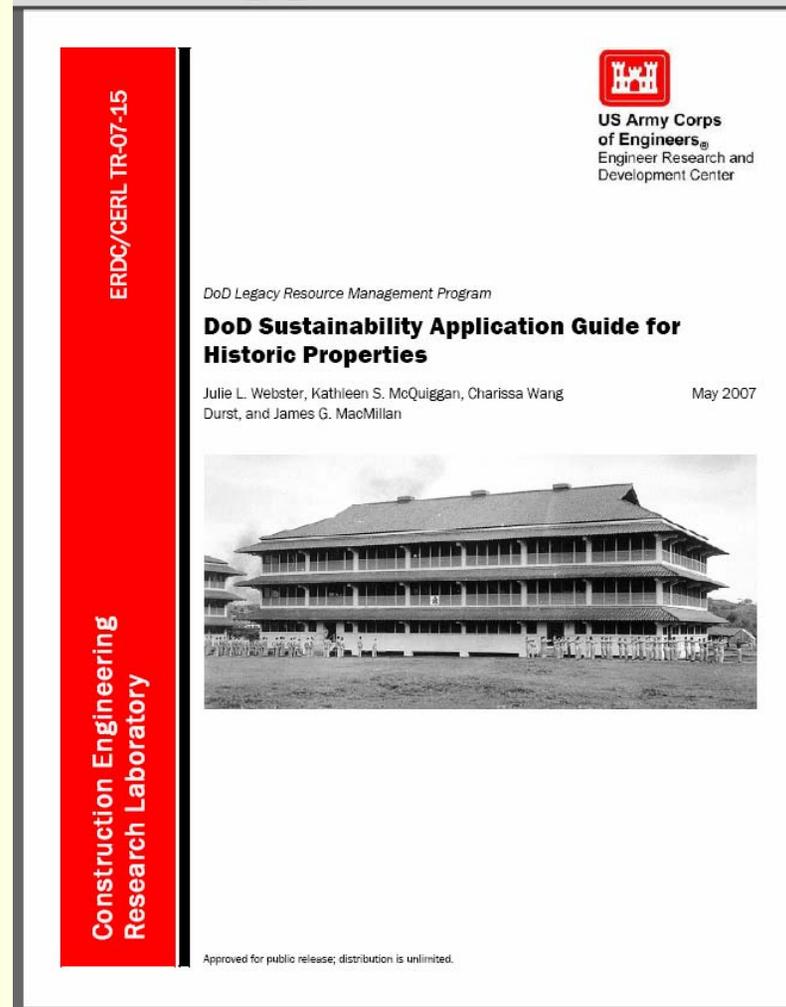
DEPARTMENT OF DEFENSE  
OFFICE OF THE ASSISTANT SECRETARY FOR  
INSTALLATIONS AND  
110 ARMY PENNSYLVANIA  
WASHINGTON, DC 20315-5000  
97 ADD 0000

# Existing Buildings

- The Army is Determining the Appropriate Rating Level and Usage of LEED®-EB
- Interim Policy, Beginning in FY 08:
  - All Major Renovation & Repair (in excess of \$7.5 Mil) Shall be capable of Achieving LEED®-EB 'Certified' Where Life-Cycle Cost Effective;
  - Installation DPW or Reserve Component Equivalent, Supporting Engineer District, and Designer of Record or Prime Construction Contractor Joint Verification of LEED® Score & Rating;
  - USGBC Certification Not Required.

# LEED-EB & Historic Buildings

- **DoD Sustainability Application Guide for Historic Properties**
- Applies LEED-EB Version 2.0, June 2005
- The Report provides specific discussion and strategies relevant both to historic preservation and sustainable design and development.

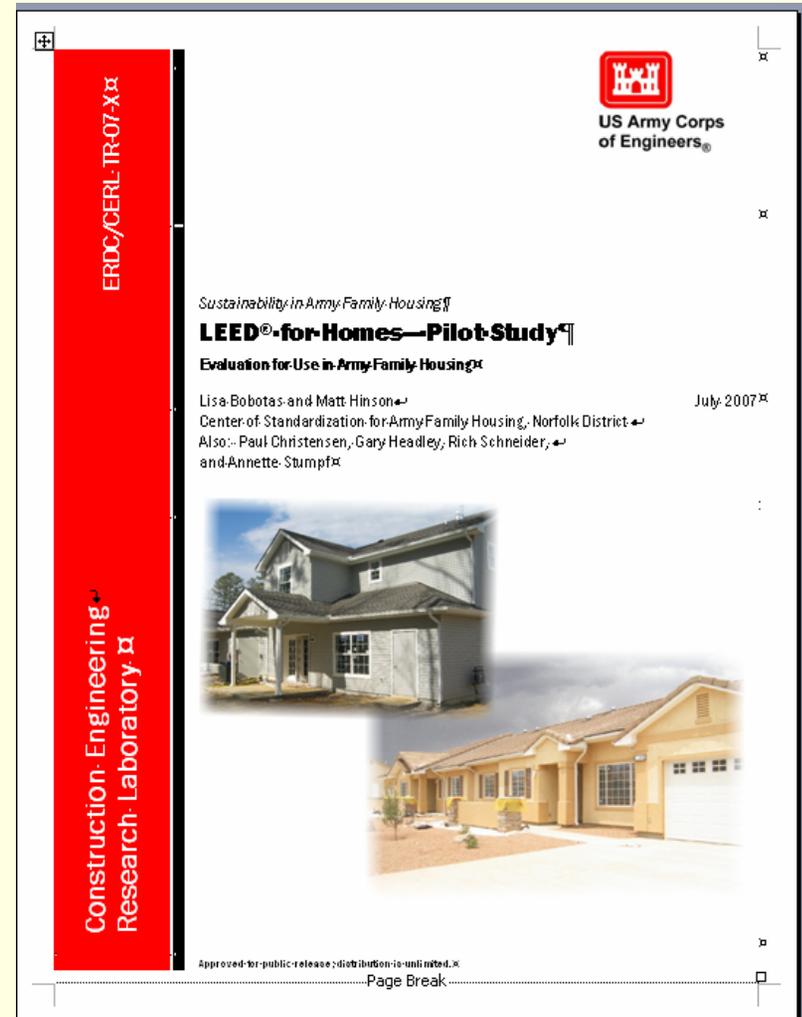


[http://www.cecer.army.mil/techreports/ERDC-CERL\\_TR-07-15/ERDC-CERL\\_TR-07-15.pdf](http://www.cecer.army.mil/techreports/ERDC-CERL_TR-07-15/ERDC-CERL_TR-07-15.pdf)



# LEED for Homes

- Rates individual home sustainability
- Army Pilot LEED-H project evaluated housing at Forts Lee & Huachuca.
- Army is considering adopting LEED-H when it is finalized.
- Report will be on CERL website



# LEED-ND

- Integrates the principles of smart growth, new urbanism, and green building.
- Developed by USGBC in partnership with the Congress for the New Urbanism (CNU) and the Natural Resources Defense Council (NRDC).
- Released in Pilot February 2007



<https://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>

# LEED for Neighborhood Development

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- **Smart Location and Linkage (SLL)**
  - 30 Possible Points
- **Neighborhood Pattern & Design (NPD)**
  - 39 Possible Points
- **Green Construction & Technology (GCT)**
  - 31 Possible Points
- **Innovation & Design Process (ID)**
  - 6 Possible Points

Project Totals: 106 Possible Points



# LEED for Neighborhood Development

## Smart Location and Linkage (SLL)

- Preq 1: Smart Location
- Preq 2: Proximity to Water and Wastewater Infrastructure
- Preq 3: Imperiled Species & Ecological Communities
- Preq 4: Wetland & Water Body Conservation
- Preq 5: Agricultural Land Conservation
- Preq 6: Floodplain Avoidance



# LEED for Neighborhood Development

## Smart Location and Linkage (SLL)

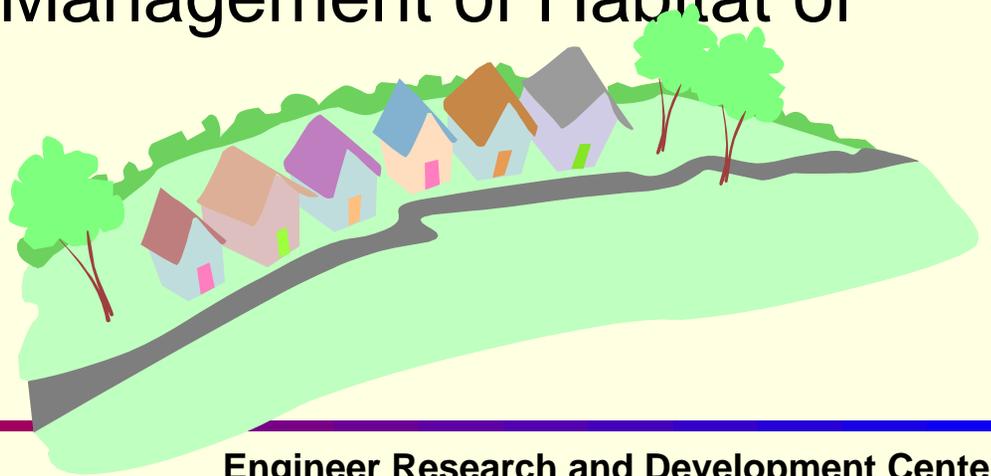
- C1 Brownfields Redevelopment
- C2 High Priority Brownfields Redevelopment
- C3 Preferred Locations
- C4 Reduced Automobile Dependence
- C5 Bicycle Network
- C6 Housing & Job Proximity



# LEED for Neighborhood Development

## Smart Location and Linkage (SLL)

- C7 School Proximity
- C8 Steep Slope Protection
- C9 Site Design for Habitat or Wetland Conservation
- C10 Restoration of Habitat or Wetlands
- C11 Conservation Management of Habitat or Wetlands



# EKO SDD Website

Engineering Knowledge Online - Sustainable Design and Development - Microsoft Internet Explorer

Address <https://eko.usace.army.mil/fa/sdd/index.cfm?>

**EKO ENGINEERING KNOWLEDGE ONLINE™** Login 09/24/2007

What's New • Feedback • Site Map • FAQ Search

Installation Support  
EKO Home  
Automation  
Best Practices  
Career Programs  
Events  
Functional Areas  
Library  
News  
Organizations  
Phonebooks  
Projects  
Search Other Sites  
Services  
Training  
Useful Links  
Virtual Teams  
About EKO Portal

/EKO@Home / Functional Areas of Installation Support /  
**Sustainable Design and Development**  
Welcome to the EKO® Portal Sustainable Design and Development Resource! Integrating Concepts and Application of Sustainability.

SDD Home LEED SPiRiT Project Resources Training TEN Library

**What Is SDD?**

- Meets the needs of the present without compromising the quality of life of future generations.
- Maintains economic growth while producing an absolute minimum of pollution, repairing environmental damages of the past, producing less waste, and extending opportunities to live in a pleasant and healthy environment.
- Meets human needs by maintaining a balance between development, social equality, ecology, and economics.
- Demands systematic considerations of environmental impact, energy use, natural resources, economy, and quality of life.
- Has optimal benefit only when addressed at the inception of a project, and throughout the entire life cycle of a project -- from concept to planning, to programming, design, construction, and ownership.

**Hot News!**

Aug. 15, 2007  
**DoD Sustainability Application Guide for Historic Properties**  
This report presents technical information to incorporate sustainable design principles into historic buildings owned by the Department of Defense (DoD). The study follows the U.S. Green Building Council's Leadership in Energy and Environmental Design rating system for Existing Buildings (LEED-EB), Version 2.0, June 2005, and provides specific discussion and strategies relevant both to historic preservation and sustainable design and development. The intent is to provide technical, feasible ways that the DoD can utilize LEED-EB criteria on historic buildings.

May. 23, 2007  
**Decision Support Tools for Green Building**  
New Spreadsheet Available - Decision Support Tools for Green Building, by Elizabeth Keysar, CTC/NDCEE. Intended to help Army project teams achieve LEED-NC Silver ratings. Available in Microsoft Excel for easy distribution and updating.

Jan. 11, 2006  
**The Army has transitioned from SPiRiT to LEED**  
Sustainable Design and Development Policy Update- SPiRiT to LEED (ACSIM memo signed by Mr. Joseph W. Whitaker, Deputy Assistant Secretary of the Army (Installations and Housing) dated 05 Jan 2006)

**Army Sustainability**

- Army Installation Success Stories
- Sustainable Installation Activity
- The Army Strategy for the Environment

**Newest SDD Items**

- Lake County IL C&D Waste Management Guide & Specification
- PWTB 200-1-17 Recycling Interior Finish Materials - Carpet and Ceiling Tiles
- PWTB 200-1-23 Guidance for the Reduction of Demolition Waste Through Reuse and Recycling
- PWTB 200-1-24 Quantifying Waste Generated From Building Remodeling
- PWTB 200-1-26 Market Valuation of Demolition Salvage Materials

**Most Popular SDD Items**

- Sustainable Design and Development Policy Update- SPiRiT to LEED (05 Jan 2006)
- LEED-NC 2.2\*\* (New Construction)
- Sustainable Project Rating Tool SPiRiT (PDF 178.71 KB)
- The Army has transitioned from SPiRiT to LEED
- Army Installation Design Standards (PDF 14.22 MB)

Events within 30 Days

<https://eko.usace.army.mil/fa/sdd/>



US Army Corps  
of Engineers

Engineer Research and Development Center

# WBDG Website

WBDG: Sustainable - Microsoft Internet Explorer

Address: <http://www.wbdg.org/design/sustainable.php>

Home / About / Contact / Site Map / Search:

## WBDG

WHOLE BUILDING DESIGN GUIDE

**Design Guidance**

- Building Types
- Space Types
- Design Objectives
- Products & Systems

**Project Management**

- Delivery Teams
- Planning & Development
- Delivery & Controls

**Mandates / References**

- Federal Mandates
- Publications
- Case Studies
- Participating Agencies
- Industry Organizations
- Related Links

**Tools**

**News, Events & Training**

### Sustainable

by the WBDG Sustainable Committee

Design Objectives Index > **Sustainable**

- Optimize Site Potential
- Minimize Energy Consumption
- Protect and Conserve Water
- Use Environmentally Preferable Products
- Enhance Indoor Environmental Quality (IEQ)
- Optimize Operational and Maintenance Practices

**OVERVIEW** [Related Resource Pages](#) [Print](#) [Email](#)

Building construction and operation have an enormous direct and indirect impact on the environment, as illustrated in the figure below. As economy and population continue to expand, designers and builders face a unique challenge to meet demands for new and renovated facilities that are [accessible](#), [secure](#), [healthy](#), and [productive](#) while minimizing their impact on the environment.

### Environmental Impact of Buildings

Percentage of U.S. nationwide, annual impact

Category	Percentage
Energy Use	42%
Atmospheric Emissions	40%
Raw Materials	30%
Solid Waste	25%
Water Use	24%
Water Effluents	20%
Land Use	15%
Other Releases	12%

(Sources: Worldwatch Institute and U.S. EPA)

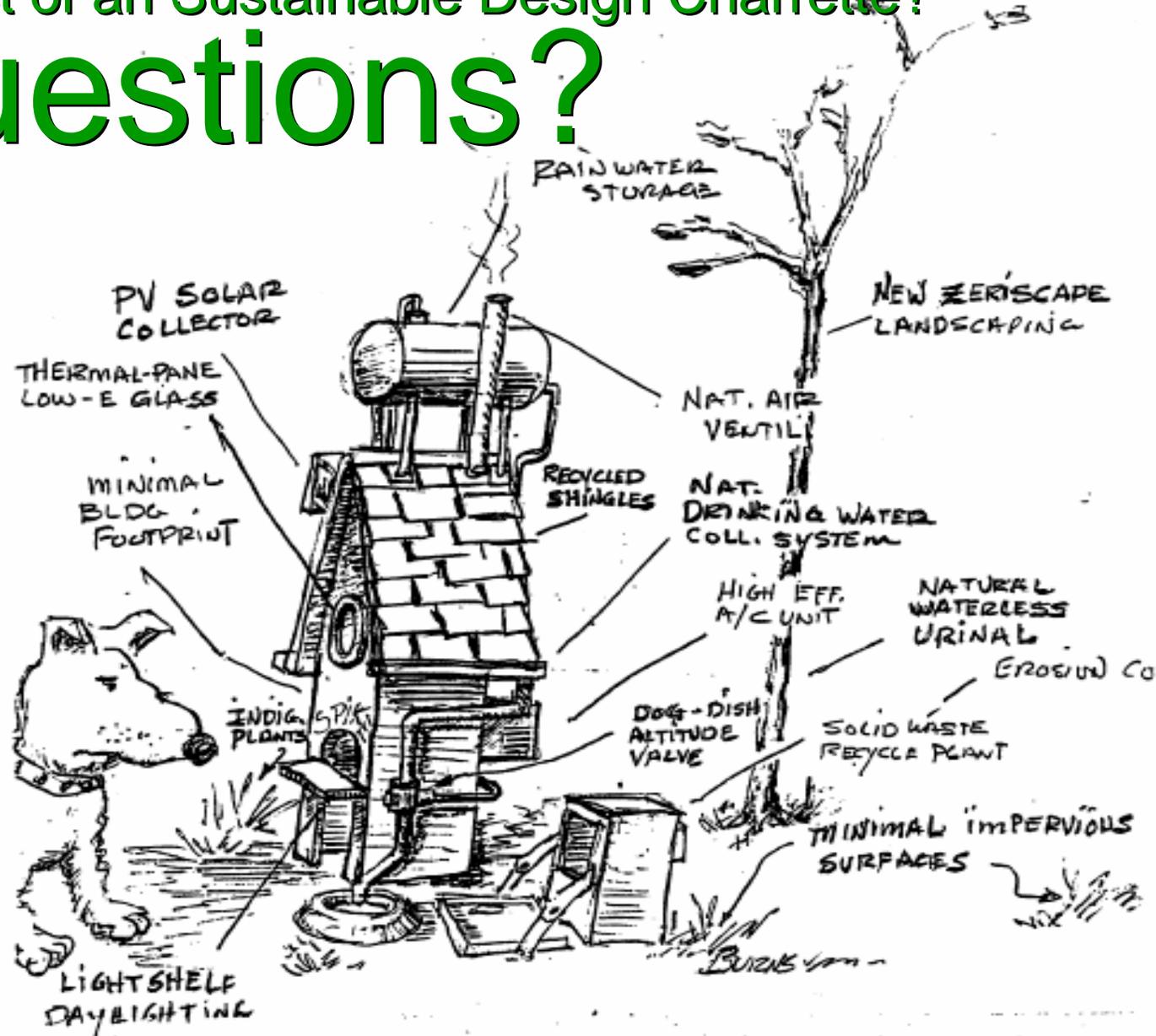
Recent answers to this challenge call for an [integrated, synergistic approach](#) that considers all phases of the facility life cycle. This "sustainable" approach supports an increased commitment to environmental stewardship and conservation, and results in an optimal balance of [cost](#), environmental, societal, and human benefits while meeting the mission and [function](#) of the intended facility or infrastructure.

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# Product of an Sustainable Design Charrette?

# Questions?



SUSTAINABLE DESIGN

# Questions

