WBDG
WHOLE BUILDING DESIGN GUIDE

Beyond Green™
Employing the WBDG to Achieve High Performance Buildings

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Sustainable Buildings Industry Council
www.SBICouncil.org

BASF The Chemical Company

Steven Winter Associates, Inc.

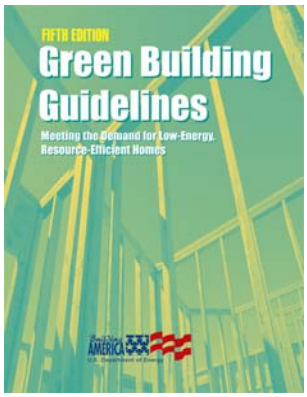
National Institute of BUILDING SCIENCES

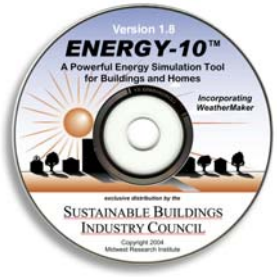
The Sustainable Buildings Industry Council

Our mission: We unite and inspire the building industry toward higher performance-through education, outreach, advocacy and the mutual exchange of ideas.

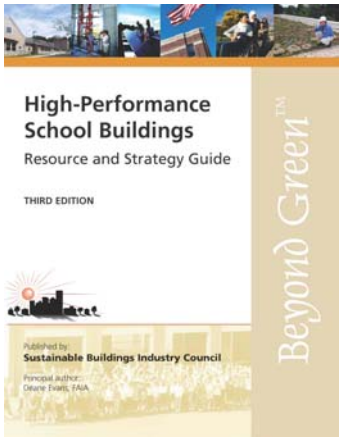
Our vision: To dramatically improve the long-term performance and value of buildings by advancing a whole building approach to design, construction and operation.

Residential & Small Commercial Buildings

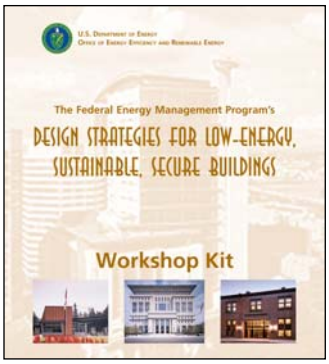




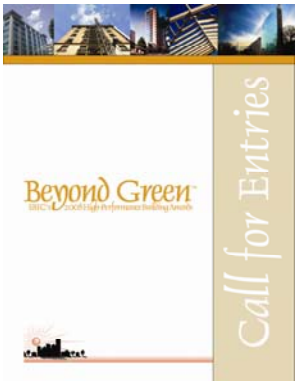
K-12 School Buildings



Federal Buildings



Beyond Green™ High-Performance Building Awards



Welcome to the

Sustainable Buildings Industry Council

On February 26th, SBIC will bring the winners of our 2008 Beyond Green™ High-Performance Buildings Awards Program to Capitol Hill for a special, educational briefing. We will explore the challenges and opportunities for building better buildings with the new Congress.

SBIC Members and members of the public will be invited to attend contribute to the conversation.

Please save the date!

Sustainable Buildings Industry Council

Beyond Green™

A High Performance Approach to Building Design, Construction and Operations

Sustainable Buildings Industry Council

What Is a High Performance Building?

Energy Policy Act, Section 914. Building Standards

- A building that integrates & optimizes all major high-performance building attributes, including energy efficiency, durability, life-cycle performance, and occupant productivity.

Energy Independence & Security Act of 2007, Title IV, Energy Savings in Buildings and Industry, Section 401, Definitions

- A building that integrates and optimizes on a life cycle basis all major high performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.

High-Performance Buildings

- Achieve long-term value and performance
- Are enduring assets in their communities
- Support and enhance human performance
- Reduce operating costs
- Are safe, secure, accessible
- Protect the environment
- Are the result of using a whole building approach

High-Performance Bldg Design Strategies

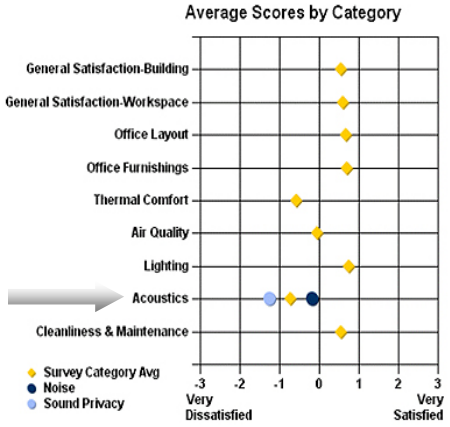
- Design and build a better building envelope
- Reduce water runoff and water pollution
- Build tight – Ventilate right
- Right-size the HVAC system (do the real calcs, not rules of thumb)
- Reduce paths of air and water penetration
- Provide daylighting and views to occupants
- Specify high efficiency HVAC equipment
- Specify plumbing fixtures that use less or no water
- Specify high efficiency lighting fixtures and controls with occupancy sensors and daylighting controls
- Specify materials that pollute less
- Investigate design alternatives with energy modeling
- Use Total Building Commissioning of all building systems
- Use proven technologies - no gadgets or high costs

What are we getting now?

- Building codes are minimum
- One attribute is prominent while others are overlooked or trivialized
- Low Occupant satisfaction
- Lawsuits
- Premature failures of materials & systems
- Value of investment decreases while costs of operations & maintenance increase

Acoustical Satisfaction Low

- CBE's analysis of 15 buildings by 4096 respondents
- over 60% of occupants in cubicles think acoustics interfere with their ability to get their job done



The Center for the Built Environment (CBE) at UC Berkeley

Green buildings: What's working, what's not – HOK Post Occ. Report

Occupants of green buildings generally show a higher level of satisfaction with their built environment than do occupants of standard buildings, but their buildings fall short in some key areas.

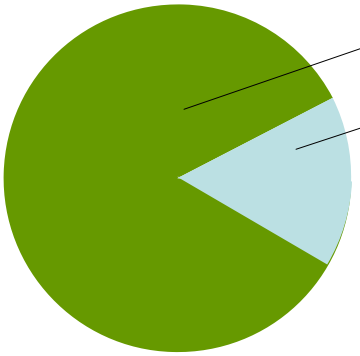
Common complaints had to do with:

- acoustics (too noisy, not enough privacy),
- thermal comfort (limited temperature control), and
- daylighting (too much glare and light spill).

[HOK Post Occupancy Evaluation Report of 7 HOK-designed green buildings as reported in BD&C June 9, 2006]

Business Rationale for Better Buildings

Personnel costs represent the most significant portion of total life cycle cost

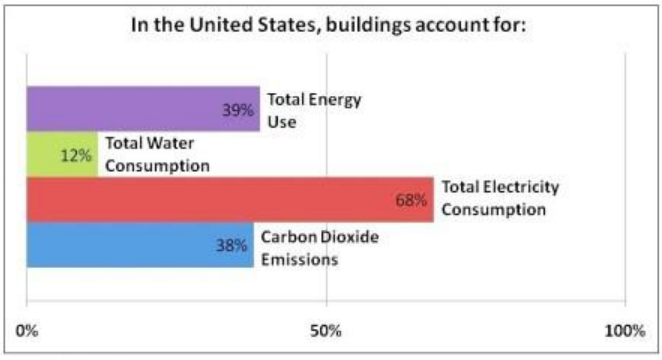


Personnel Cost:
85% – 92%

Construction, maintenance and operational costs
8% - 15%

Total Expenditures over a 30 year life of a commercial building.

Environmental Impact of Buildings



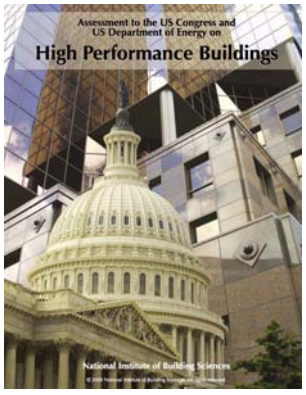
Source: EPA, 2004

Goal: Reduce Environmental Impact

- Optimize Site Potential
- Optimize Energy Use
- Protect and Conserve Water
- Use Preferable Products
- Enhance IEQ
- Optimize Operational/Maintenance Practices

WBDG Sustainable Design Objectives

High-Performance Building Council



National Institute of BUILDING SCIENCES

Release date: June 18, 2008
More information: www.SBICouncil.org

Rating Systems

How do you measure the performance of your building?
Who can you trust with confidence to certify critical aspects of your building?

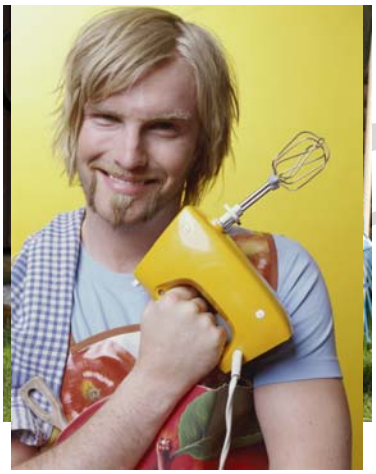
- Green Buildings
  - LEED
  - Green Globes
  - Energy Star
- Building Security
  - PLUS/BSC
- Others

Also Professional Accreditations: AIA, PE, CEM, LEED AP, BSCP, Bd Cert NCE, etc.

To Do a Job Well
It Takes the Right Tools

- Building a Home
- Planting a Garden
- Baking a Cake

- If You are planning, designing, constructing, operating or maintaining a building …



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Federal Bldg.
Oakland, CA

Walter Reed Army Institute
of Research, Forest Glen, MD

Bldg. 33,
Washington Navy Yard

The Whole Building Design Guide

www.wbdg.org

The Whole Building Design Guide (WBDG) as a Tool

Your Complete Internet Resource to Integrated, 'Whole Building', Design Information and Tools.

The WBDG condenses the vast amount of Web-based data on building design, products, & systems Into usable, up-to-date information.

Single Point Access!

What is Whole Building Design?

- It is an **Integrated Design Approach** and a
- **Integrated Team Process** to achieve high-performance buildings

'Whole Building' Approach

NREL Solar Laboratory
Golden, CO

- Materials, systems, and assemblies reviewed from many different perspectives
- Building components, sub-systems and materials are interdependent, can impact the total performance of the whole, and can perform 'double duty'

Integrated Project Team

Mark O. Hatfield U.S. Courthouse
Portland, OR

- Comprehensive Stakeholder involvement throughout the building's life cycle
- Evaluation for cost, quality-of-life, future flexibility, energy efficiency, overall environmental impact, productivity, creativity, and how the occupants will be enlivened

Applying the Integrated Team Process

Who needs to be at the table at the outset of your project to ensure an integrated team process?

- Architect
- Landscape Architect
- Owner, Client, Tenants
- Engineers
- Programmers
- Interior Designer
- Contractor
- Specialists (Security, Telecom, Acoustics)
- Community Members or Other Stakeholders
- Operations and Maintenance Personnel
- Others???? (Real Estate Buyer)

Building Siting Issues

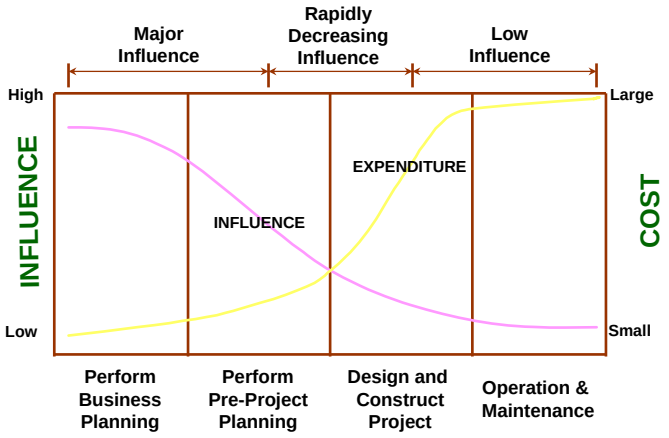
- Solar Access*
- Security (Standoff Distance, CPTED)
- Stormwater Management
- Public Transportation
- Occupant Amenities
- Compatible Functions
- Disaster Avoidance

*Building orientation for passive solar heating, daylighting, natural ventilation, views

*[Real Estate Buyer **must** be informed!!!]*

Cost / Influence Over the Quality of a Project

Influence early for optimal design outcome and reduced life-cycle cost.



WBDG Goal

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... to provide centralized access and use of facility information in a knowledge based management environment, from a 'whole building' perspective.

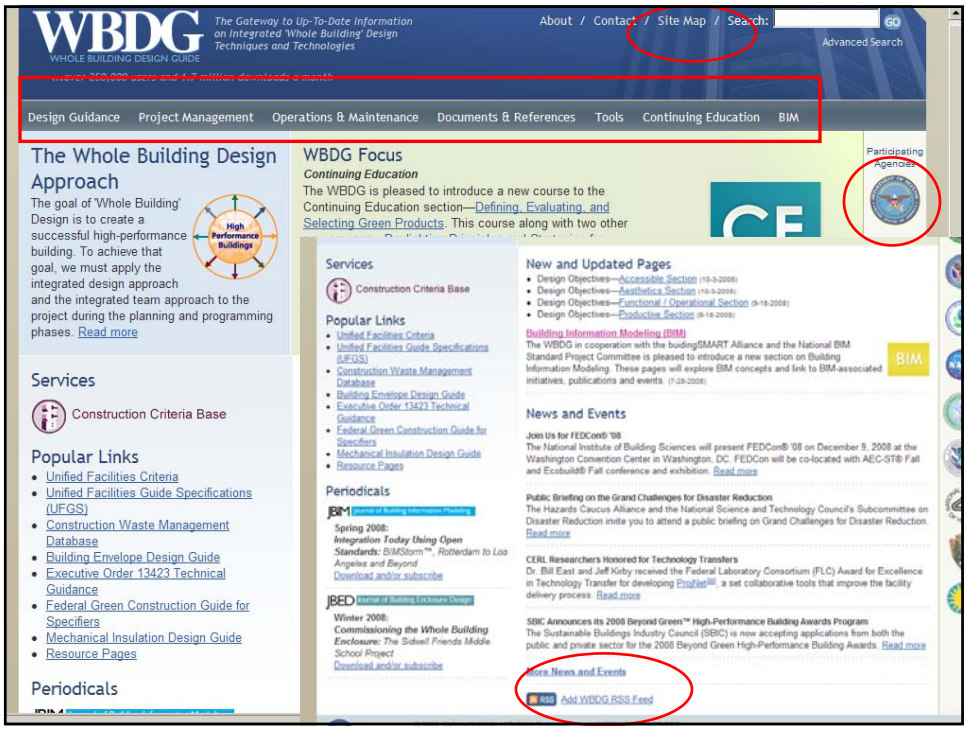
WBDG Building Type Page on Research Laboratory
w/ direct links to: Govt. Lab; Vivarium; Therapeutic Envi. RP; **Sustainable Lab Design RP**, Security & Safety in Labs RP, etc.

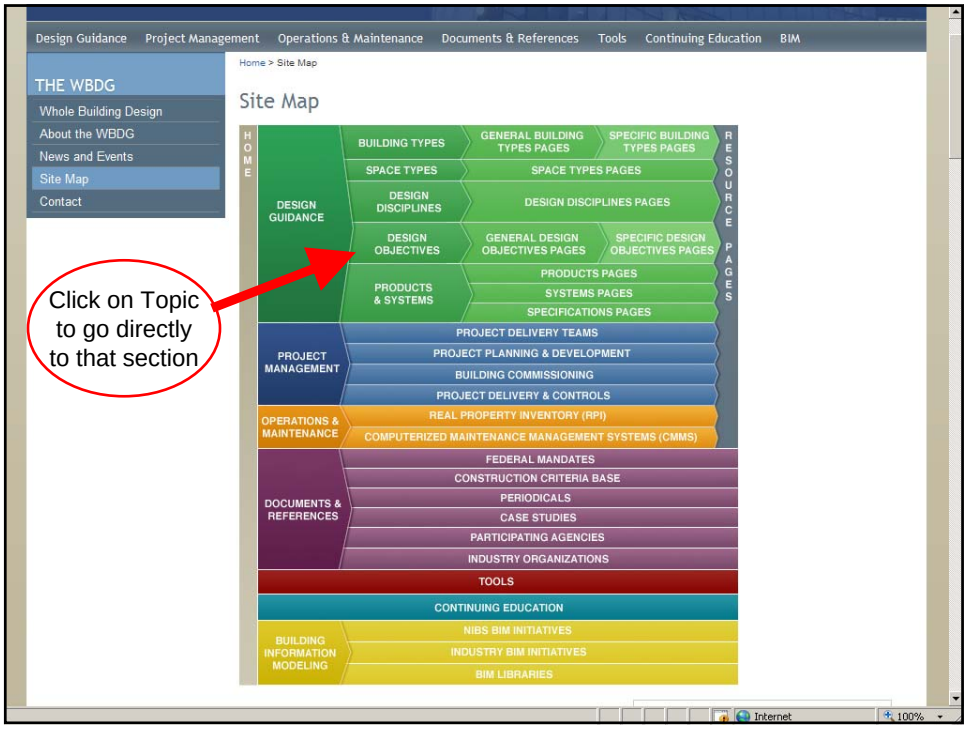
w/ DIRECT LINKS to Other Resources & Pubs.
Labs21
Design and Planning of Research and Clinical Laboratory Facilities

CCB Documents
VA Research Laboratory Des. Guide
NIH Design Policy and Guidelines
HHS Biosafety in Microbiological and Biomedical Laboratories

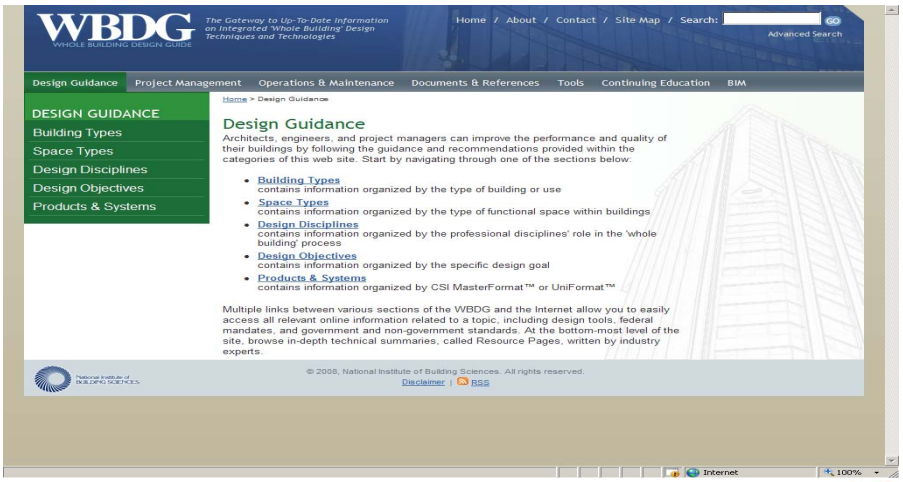
NGS
ISEA Z358.1—Emergency Eyewash and Shower Equipment
ANSI/AIHA—Z9.5 for Laboratory Ventilation
NFPA 45—Fire Protection for Laboratories using Chemical

Sustainable Buildings Industry Council

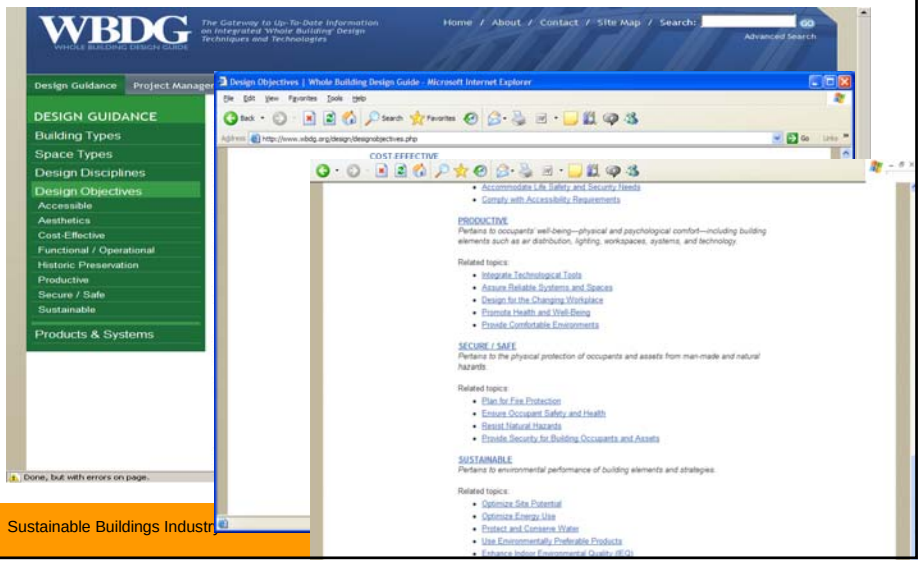




Design Guidance



Design Objectives



Sustainable Buildings Industry

Secure/Safe Branch

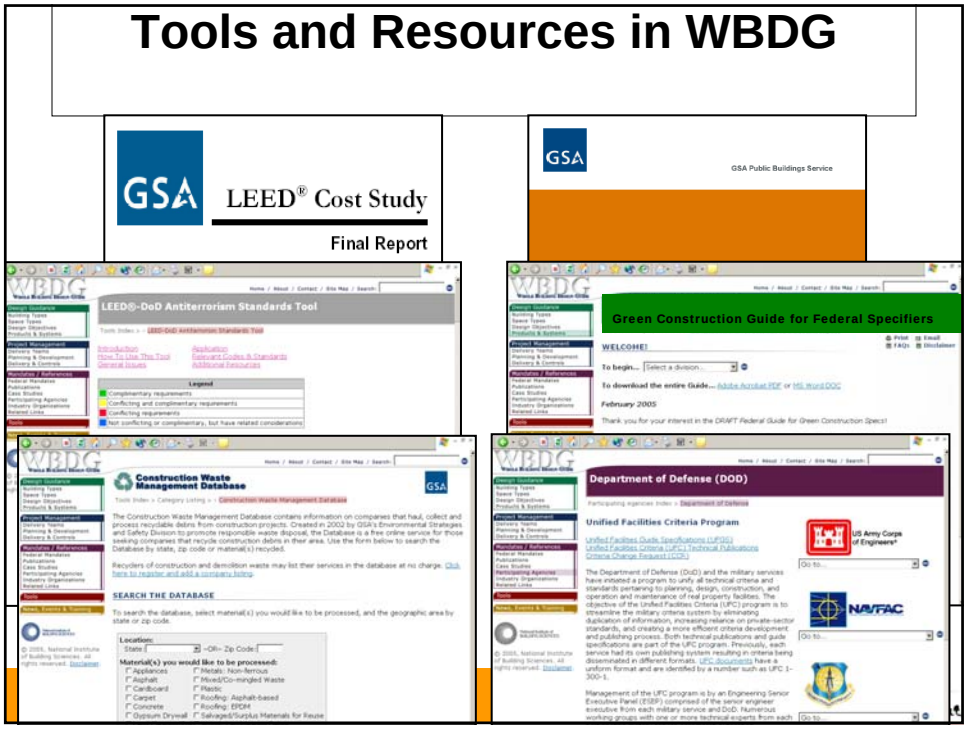
Resource Pages

- Concise summaries
- Written by industry experts
- Format:
  - Introduction
  - Description
  - Application
  - Relevant Codes & Standards
  - Emerging Issues
  - Additional Resources

Sustainability- and Security/Safety-Related Pages in WBDG

- **Achieving Sustainable Site Design through Low Impact Development**
- **Air Barrier Systems in Buildings**
- **Air Decontamination**
- **Balancing Security/Safety & Sustainability Objectives**
- **Building Integrated Photovoltaics**
- **Cost Impact of the ISC Security Criteria**
- **Daylighting**
- **Designing Buildings to Resist Explosive Threats**
- **Distributed Energy Resources**
- **Electric Lighting Controls**
- **Energy Efficient Lighting**
- **Evaluating and Selecting Green Products**
- **Glazing Hazard Mitigation**
- **High-Performance HVAC**
- **Life Cycle Cost Analysis (LCCA)**
- **Low Impact Development Technologies**
- **Mold and Moisture Dynamics**
- **Security and Safety in Laboratories**
- **Sun Control and Shading Devices**
- **Sustainable Laboratory Design**
- **Sustainable O&M Practices**
- **Threat/Vulnerability Assessments and Risk Analysis**
- **Water Conservation**
- **Windows and Glazing**

Tools and Resources in WBDG



Impact of WBDG as a Tool

In 2008, WBDG is averaging:

250,000 visitors a month

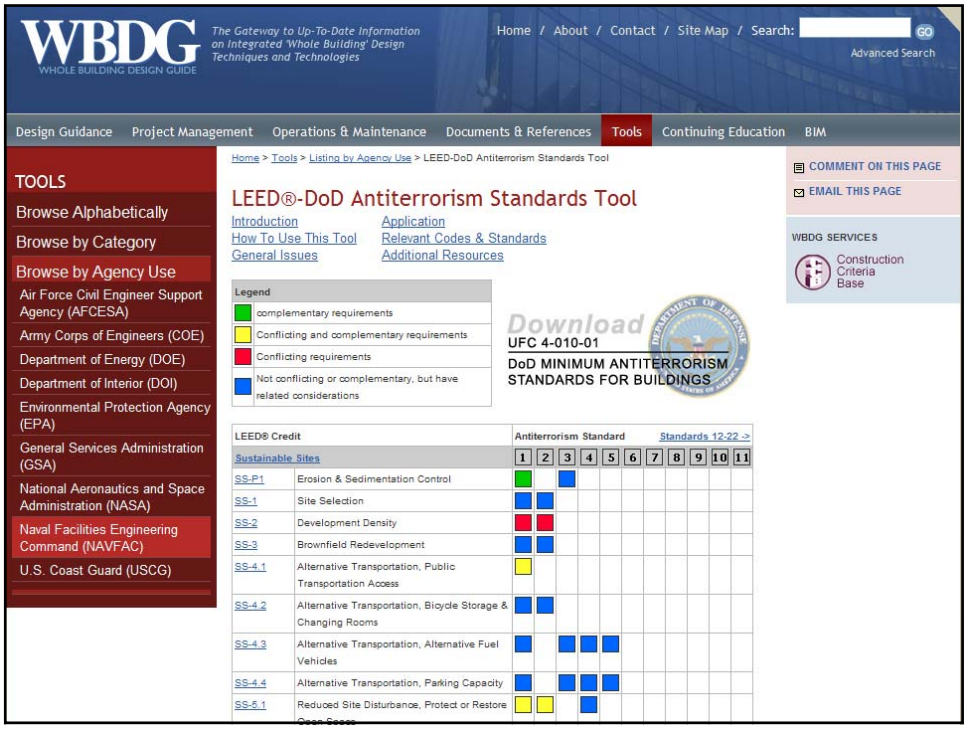
and

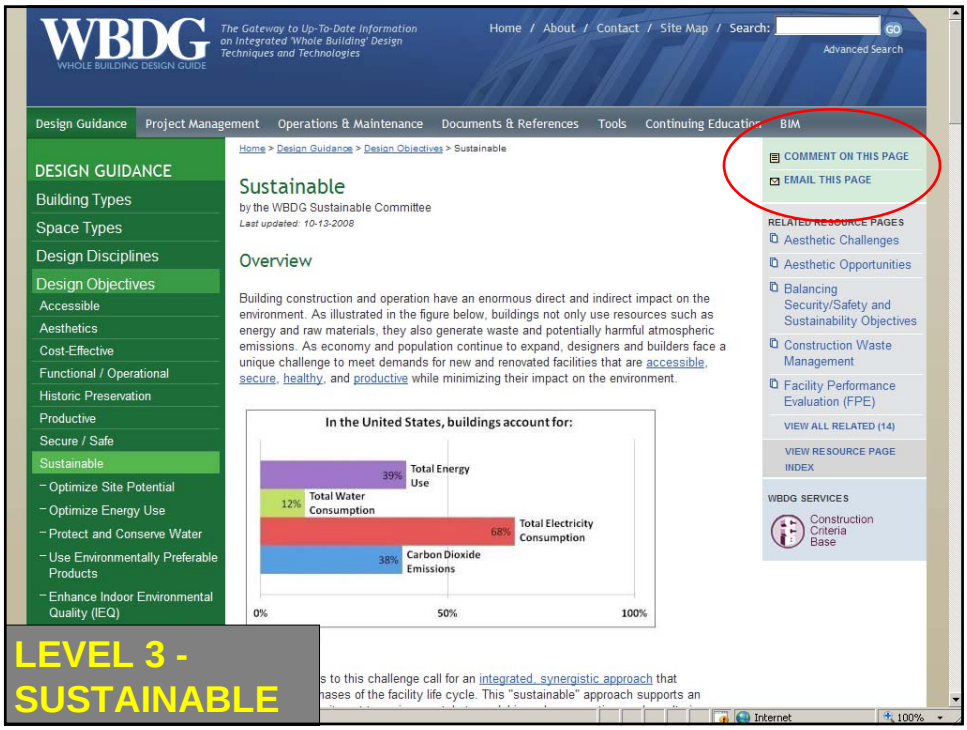
1.7 million pdf downloads a month

High Performance Buildings

CONSTRUCTION CRITERIA BASE

CONTINUING EDUCATION AIA





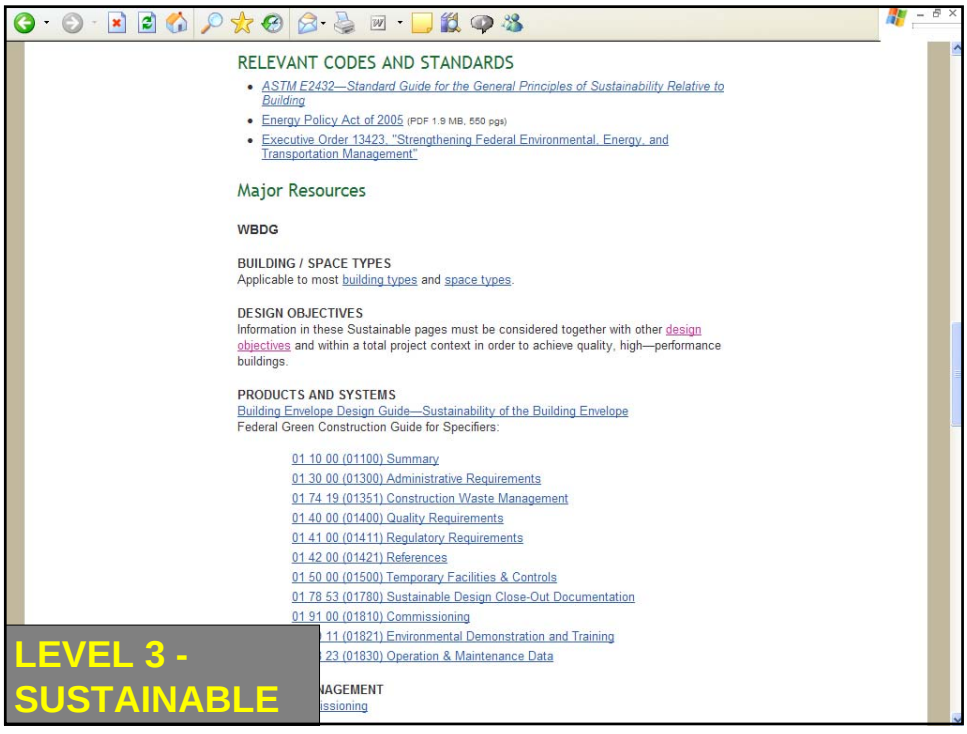
LEVEL 3 - SUSTAINABLE

Sustainable Design Objectives

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

EPA's New England Regional Laboratory (NERL) achieved a LEED Version 1.0 Gold rating. From conception the project was charged to "make use of the best commercially-available materials and technologies to minimize consumption of energy and resources and maximize use of natural, recycled and non-toxic materials." Chelmsford, MA

LEVEL 3 - SUSTAINABLE



RELEVANT CODES AND STANDARDS

- *ASTM E2432—Standard Guide for the General Principles of Sustainability Relative to Building*
- Energy Policy Act of 2005 (PDF 1.9 MB, 550 pgs)
- Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management"

Major Resources

WBDG

BUILDING / SPACE TYPES
Applicable to most building types and space types.

DESIGN OBJECTIVES
Information in these Sustainable pages must be considered together with other design objectives and within a total project context in order to achieve quality, high—performance buildings.

PRODUCTS AND SYSTEMS
Building Envelope Design Guide—Sustainability of the Building Envelope
Federal Green Construction Guide for Specifiers:

- 01 10 00 (01100) Summary
- 01 30 00 (01300) Administrative Requirements
- 01 74 19 (01351) Construction Waste Management
- 01 40 00 (01400) Quality Requirements
- 01 41 00 (01411) Regulatory Requirements
- 01 42 00 (01421) References
- 01 50 00 (01500) Temporary Facilities & Controls
- 01 78 53 (01780) Sustainable Design Close-Out Documentation
- 01 91 00 (01810) Commissioning
- 11 (01821) Environmental Demonstration and Training
- 23 (01830) Operation & Maintenance Data

NAGEMENT
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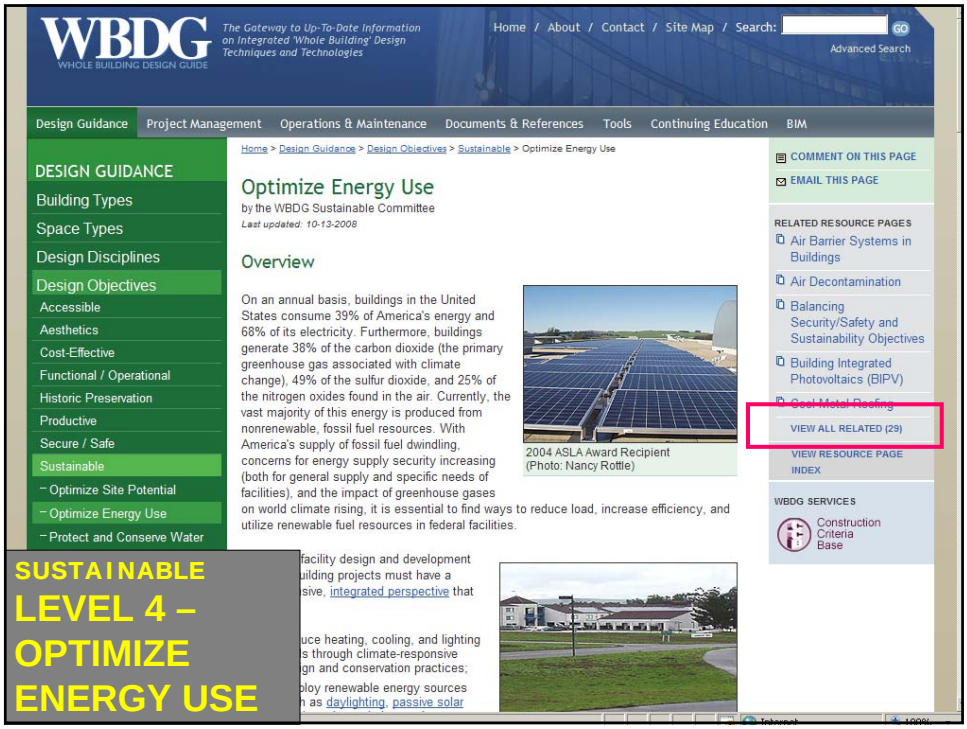
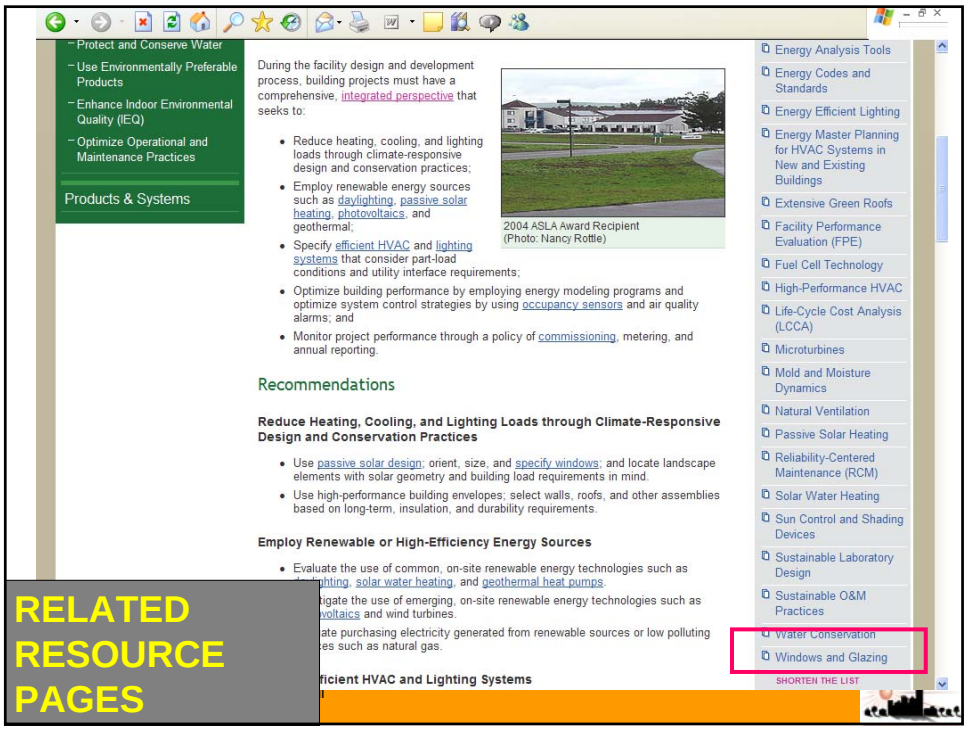
LEVEL 3 - SUSTAINABLE

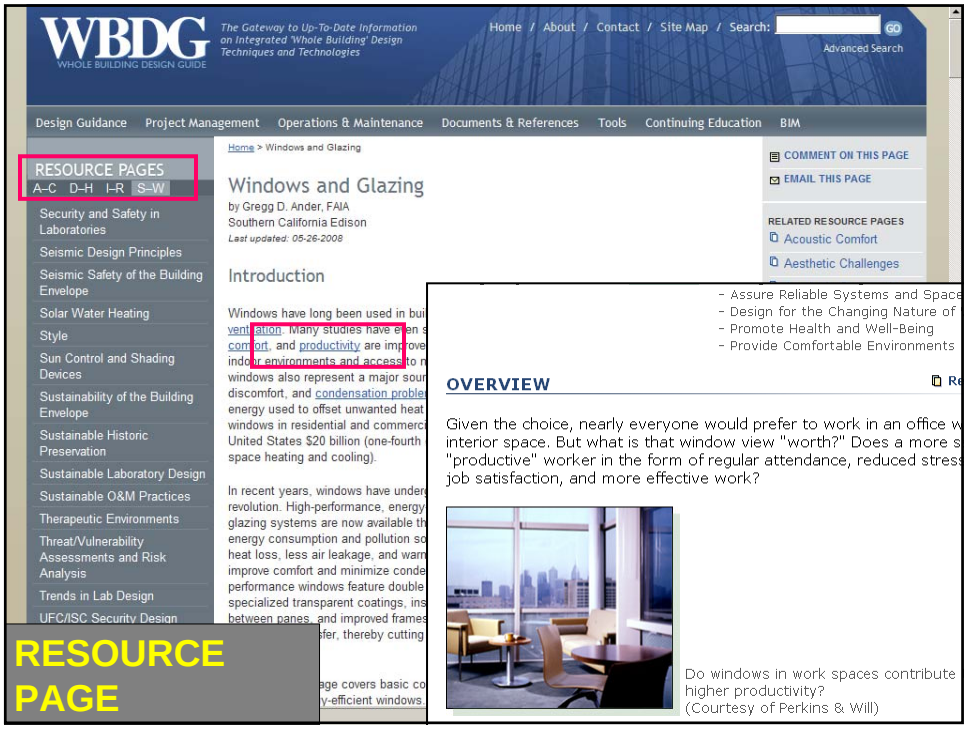


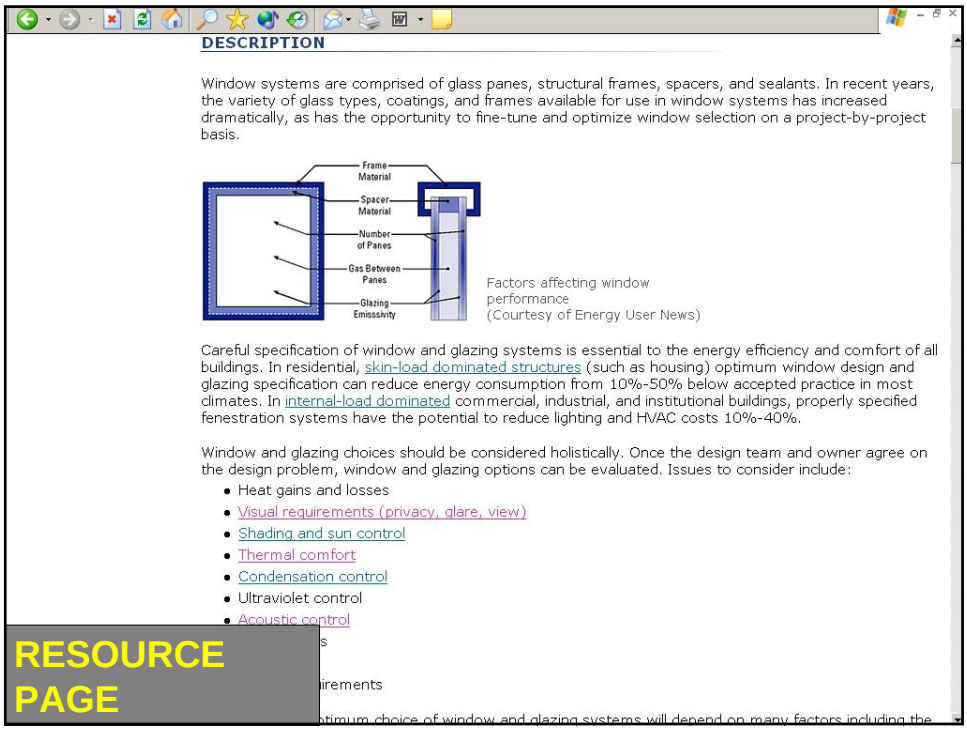
SUSTAINABLE

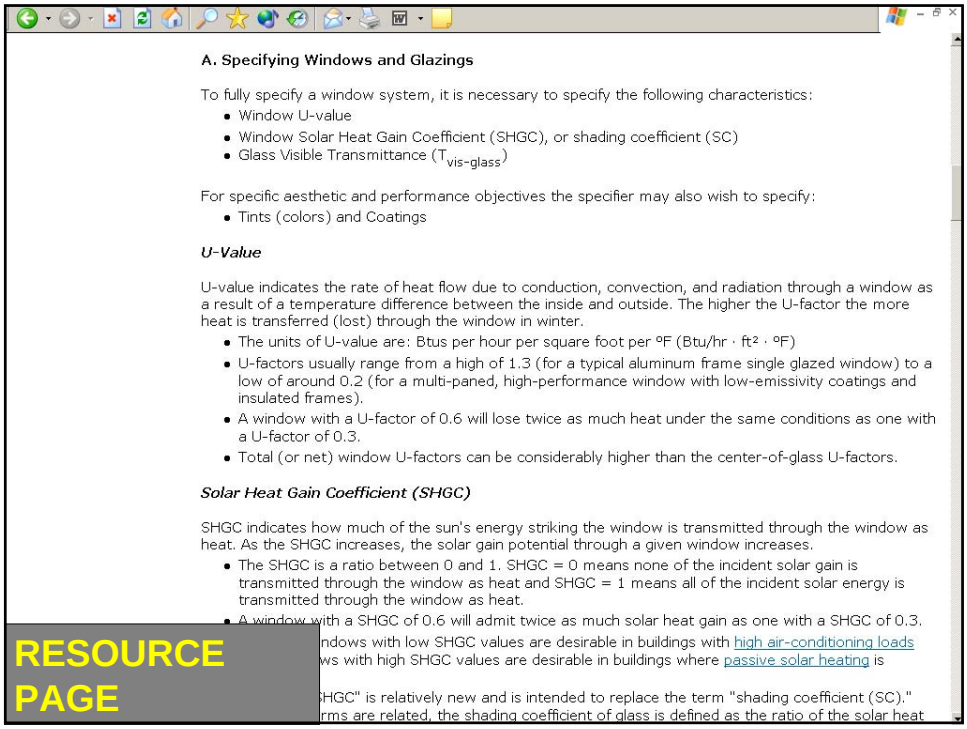
LEVEL 4 – OPTIMIZE ENERGY USE



RELATED RESOURCE PAGES


WBDG
WHOLE BUILDING DESIGN GUIDE
The Gateway to Up-To-Date Information on Integrated 'Whole Building' Design Techniques and Technologies
Home / About / Contact / Site Map / Search:
Advanced Search
Design Guidance
Project Management
Operations & Maintenance
Documents & References
Tools
Continuing Education
BIM
RESOURCE PAGES
A–C D–H I–R S–W
Security and Safety in Laboratories
Seismic Design Principles
Seismic Safety of the Building Envelope
Solar Water Heating
Style
Sun Control and Shading Devices
Sustainability of the Building Envelope
Sustainable Historic Preservation
Sustainable Laboratory Design
Sustainable O&M Practices
Therapeutic Environments
Threat/Vulnerability Assessments and Risk Analysis
Trends in Lab Design
UFC/ISC Security Design
Home > Windows and Glazing
Windows and Glazing
by Gregg D. Ander, FAIA
Southern California Edison
Last updated: 05-26-2008
Introduction
COMMENT ON THIS PAGE
EMAIL THIS PAGE
RELATED RESOURCE PAGES
Acoustic Comfort
Aesthetic Challenges
- Assure Reliable Systems and Space
- Design for the Changing Nature of
- Promote Health and Well-Being
- Provide Comfortable Environments
OVERVIEW
Given the choice, nearly everyone would prefer to work in an office w
interior space. But what is that window view "worth?" Does a more s
"productive" worker in the form of regular attendance, reduced stress
job satisfaction, and more effective work?
Do windows in work spaces contribute higher productivity?
(Courtesy of Perkins & Will)
RESOURCE PAGE


DESCRIPTION
Window systems are comprised of glass panes, structural frames, spacers, and sealants. In recent years, the variety of glass types, coatings, and frames available for use in window systems has increased dramatically, as has the opportunity to fine-tune and optimize window selection on a project-by-project basis.
Frame Material
Spacer Material
Number of Panes
Gas Between Panes
Glazing Emisssivity
Factors affecting window performance
(Courtesy of Energy User News)
Careful specification of window and glazing systems is essential to the energy efficiency and comfort of all buildings. In residential, skin-load dominated structures (such as housing) optimum window design and glazing specification can reduce energy consumption from 10%-50% below accepted practice in most climates. In internal-load dominated commercial, industrial, and institutional buildings, properly specified fenestration systems have the potential to reduce lighting and HVAC costs 10%-40%.
Window and glazing choices should be considered holistically. Once the design team and owner agree on the design problem, window and glazing options can be evaluated. Issues to consider include:
Heat gains and losses
Visual requirements (privacy, glare, view)
Shading and sun control
Thermal comfort
Condensation control
Ultraviolet control
Acoustic control
RESOURCE PAGE



A. Specifying Windows and Glazings

To fully specify a window system, it is necessary to specify the following characteristics:

- Window U-value
- Window Solar Heat Gain Coefficient (SHGC), or shading coefficient (SC)
- Glass Visible Transmittance ($T_{vis\text{-}glass}$)

For specific aesthetic and performance objectives the specifier may also wish to specify:

- Tints (colors) and Coatings

U-Value

U-value indicates the rate of heat flow due to conduction, convection, and radiation through a window as a result of a temperature difference between the inside and outside. The higher the U-factor the more heat is transferred (lost) through the window in winter.

- The units of U-value are: Btus per hour per square foot per °F (Btu/hr · ft² · °F)
- U-factors usually range from a high of 1.3 (for a typical aluminum frame single glazed window) to a low of around 0.2 (for a multi-paned, high-performance window with low-emissivity coatings and insulated frames).
- A window with a U-factor of 0.6 will lose twice as much heat under the same conditions as one with a U-factor of 0.3.
- Total (or net) window U-factors can be considerably higher than the center-of-glass U-factors.

Solar Heat Gain Coefficient (SHGC)

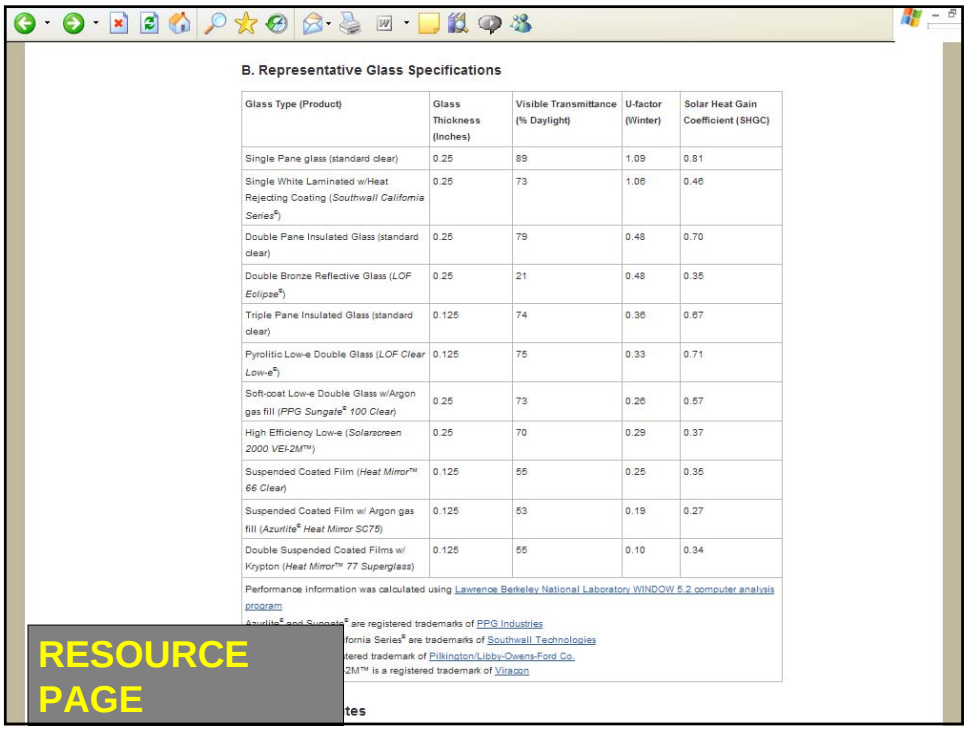
SHGC indicates how much of the sun's energy striking the window is transmitted through the window as heat. As the SHGC increases, the solar gain potential through a given window increases.

- The SHGC is a ratio between 0 and 1. SHGC = 0 means none of the incident solar gain is transmitted through the window as heat and SHGC = 1 means all of the incident solar energy is transmitted through the window as heat.
- A window with a SHGC of 0.6 will admit twice as much solar heat gain as one with a SHGC of 0.3.

ndows with low SHGC values are desirable in buildings with high air-conditioning loads
ws with high SHGC values are desirable in buildings where passive solar heating is

HGC" is relatively new and is intended to replace the term "shading coefficient (SC)."
rms are related, the shading coefficient of glass is defined as the ratio of the solar heat

RESOURCE PAGE



B. Representative Glass Specifications

Glass Type (Product)	Glass Thickness (Inches)	Visible Transmittance (% Daylight)	U-factor (Winter)	Solar Heat Gain Coefficient (SHGC)
Single Pane glass (standard clear)	0.25	89	1.09	0.81
Single White Laminated w/Heat Rejecting Coating (*Southwall California Series*®)	0.25	73	1.06	0.46
Double Pane Insulated Glass (standard clear)	0.25	79	0.48	0.70
Double Bronze Reflective Glass (*LOF Eclipse*®)	0.25	21	0.48	0.35
Triple Pane Insulated Glass (standard clear)	0.125	74	0.36	0.67
Pyrolitic Low-e Double Glass (*LOF Clear Low-e*®)	0.125	75	0.33	0.71
Soft-coat Low-e Double Glass w/Argon gas fill (*PPG Sungate*® *100 Clear*)	0.25	73	0.26	0.57
High Efficiency Low-e (*Solarscreen 2000 VEt-2M*™)	0.25	70	0.29	0.37
Suspended Coated Film (*Heat Mirror*™ *66 Clear*)	0.125	55	0.25	0.35
Suspended Coated Film w/ Argon gas fill (*Azurlite*® *Heat Miror SC75*)	0.125	53	0.19	0.27
Double Suspended Coated Films w/ Krypton (*Heat Mirror*™ *77 Superglass*)	0.125	55	0.10	0.34

Performance information was calculated using Lawrence Berkeley National Laboratory WINDOW 5.2 computer analysis program

Azurlite® and Sungate® are registered trademarks of PPG Industries

fornia Series® are trademarks of Southwall Technologies

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2M™ is a registered trademark of Viracon

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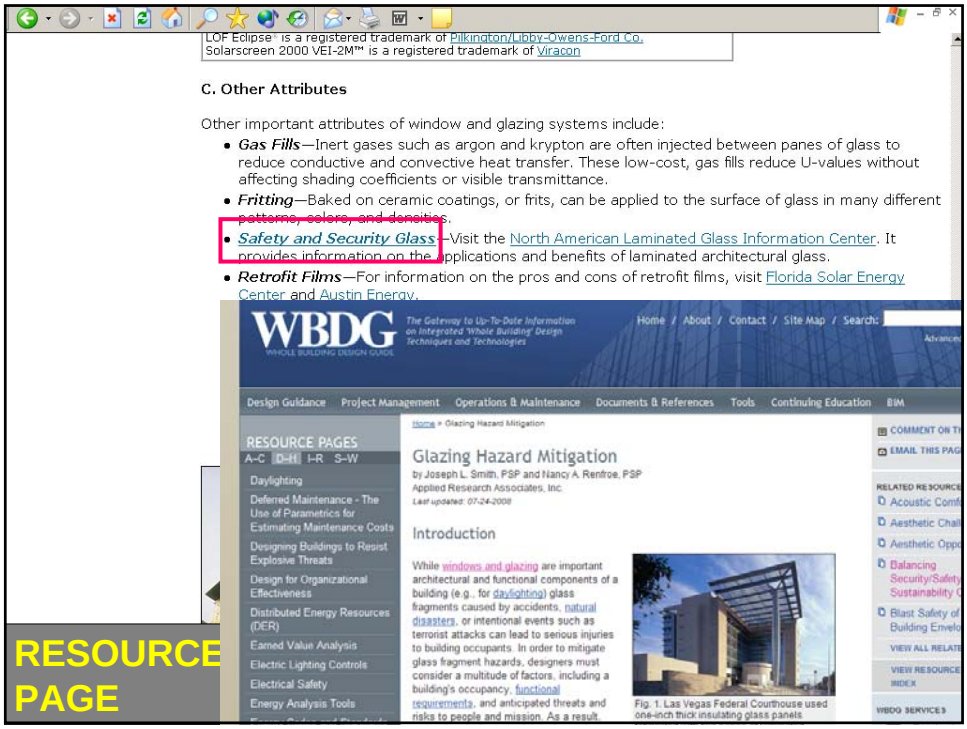
RESOURCE PAGE


LOF Eclipse® is a registered trademark of Pilkington/Libby-Owens-Ford Co.
Solarscreen 2000 VEI-2M™ is a registered trademark of Viracon
C. Other Attributes
Other important attributes of window and glazing systems include:
Gas Fills—Inert gases such as argon and krypton are often injected between panes of glass to reduce conductive and convective heat transfer. These low-cost, gas fills reduce U-values without affecting shading coefficients or visible transmittance.
Fritting—Baked on ceramic coatings, or frits, can be applied to the surface of glass in many different patterns, colors, and densities.
Safety and Security Glass—Visit the North American Laminated Glass Information Center. It provides information on the applications and benefits of laminated architectural glass.
Retrofit Films—For information on the pros and cons of retrofit films, visit Florida Solar Energy Center and Austin Energy.
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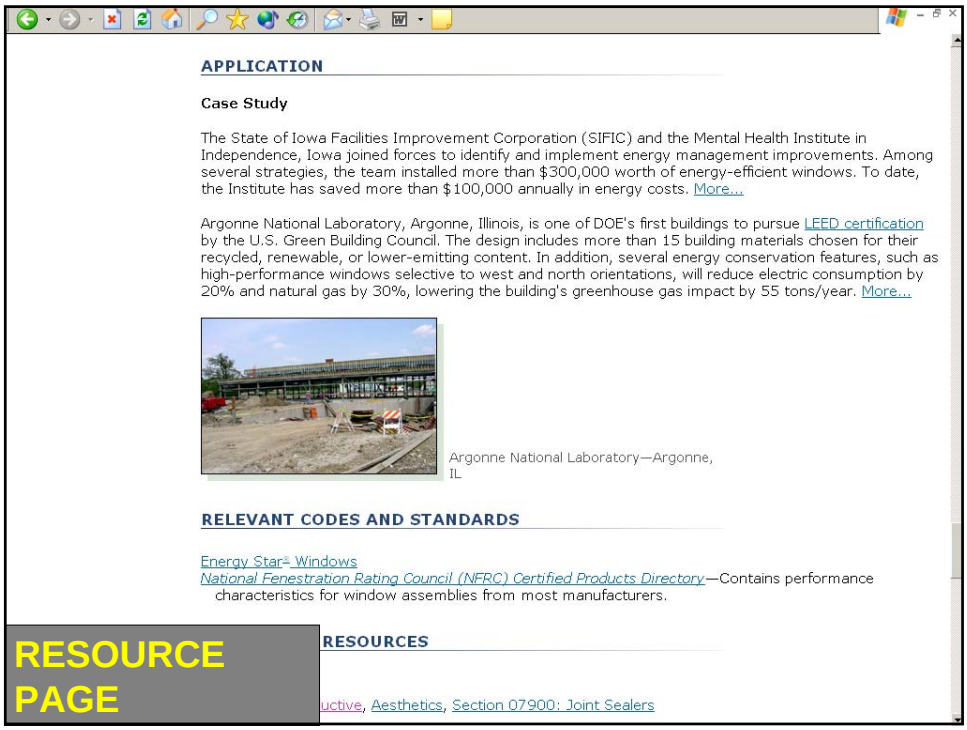
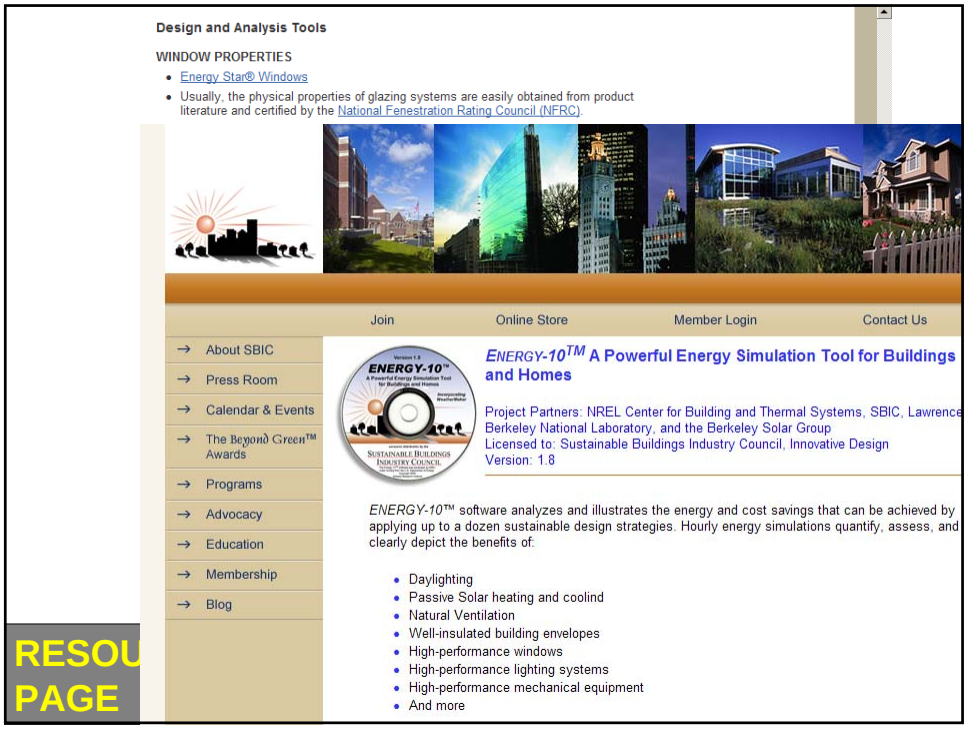
Glazing Hazard Mitigation
by Joseph L. Smith, PSP and Nancy A. Renfroe, PSP
Introduction
RESOURCE PAGE


APPLICATION
Case Study
The State of Iowa Facilities Improvement Corporation (SIFIC) and the Mental Health Institute in Independence, Iowa joined forces to identify and implement energy management improvements. Among several strategies, the team installed more than $300,000 worth of energy-efficient windows. To date, the Institute has saved more than $100,000 annually in energy costs. More...
Argonne National Laboratory, Argonne, Illinois, is one of DOE's first buildings to pursue LEED certification by the U.S. Green Building Council. The design includes more than 15 building materials chosen for their recycled, renewable, or lower-emitting content. In addition, several energy conservation features, such as high-performance windows selective to west and north orientations, will reduce electric consumption by 20% and natural gas by 30%, lowering the building's greenhouse gas impact by 55 tons/year. More...
Argonne National Laboratory—Argonne, IL
RELEVANT CODES AND STANDARDS
Energy Star® Windows
National Fenestration Rating Council (NFRC) Certified Products Directory—Contains performance characteristics for window assemblies from most manufacturers.
RESOURCES
uctive, Aesthetics, Section 07900: Joint Sealers
RESOURCE PAGE


Design and Analysis Tools
WINDOW PROPERTIES
Energy Star® Windows
Usually, the physical properties of glazing systems are easily obtained from product literature and certified by the National Fenestration Rating Council (NFRC).
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ENERGY-10™ A Powerful Energy Simulation Tool for Buildings and Homes
Project Partners: NREL Center for Building and Thermal Systems, SBIC, Lawrence Berkeley National Laboratory, and the Berkeley Solar Group
Licensed to: Sustainable Buildings Industry Council, Innovative Design
Version: 1.8
ENERGY-10™ software analyzes and illustrates the energy and cost savings that can be achieved by applying up to a dozen sustainable design strategies. Hourly energy simulations quantify, assess, and clearly depict the benefits of:
Daylighting
Passive Solar heating and coolind
Natural Ventilation
Well-insulated building envelopes
High-performance windows
High-performance lighting systems
High-performance mechanical equipment
And more
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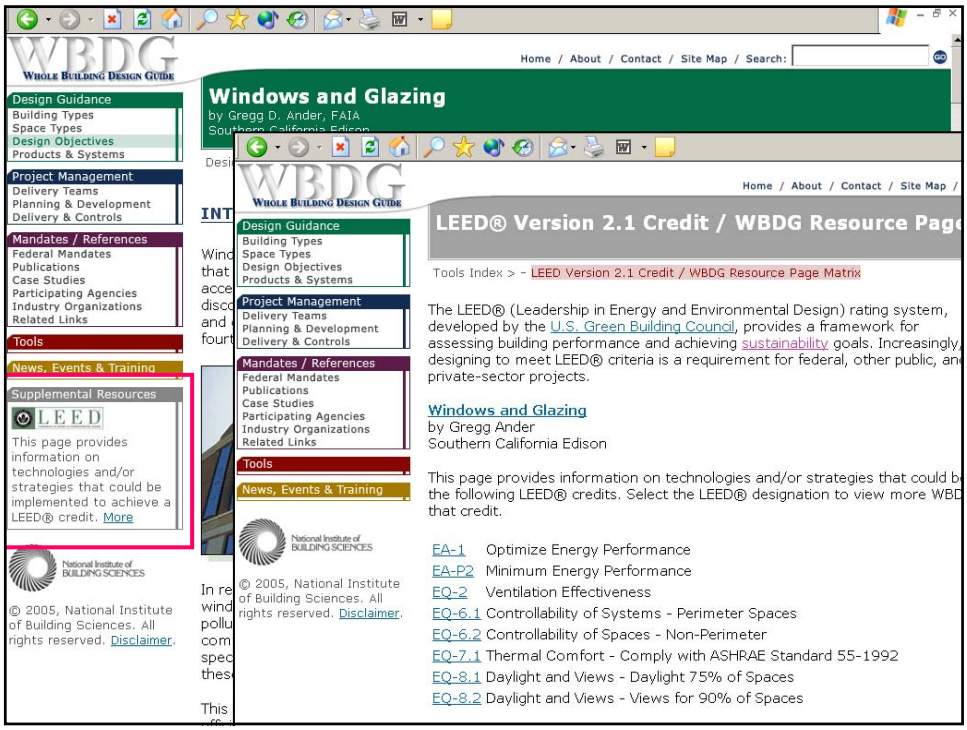
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LEED
This page provides information on technologies and/or strategies that could be implemented to achieve a LEED® credit. More
National Institute of Building Sciences
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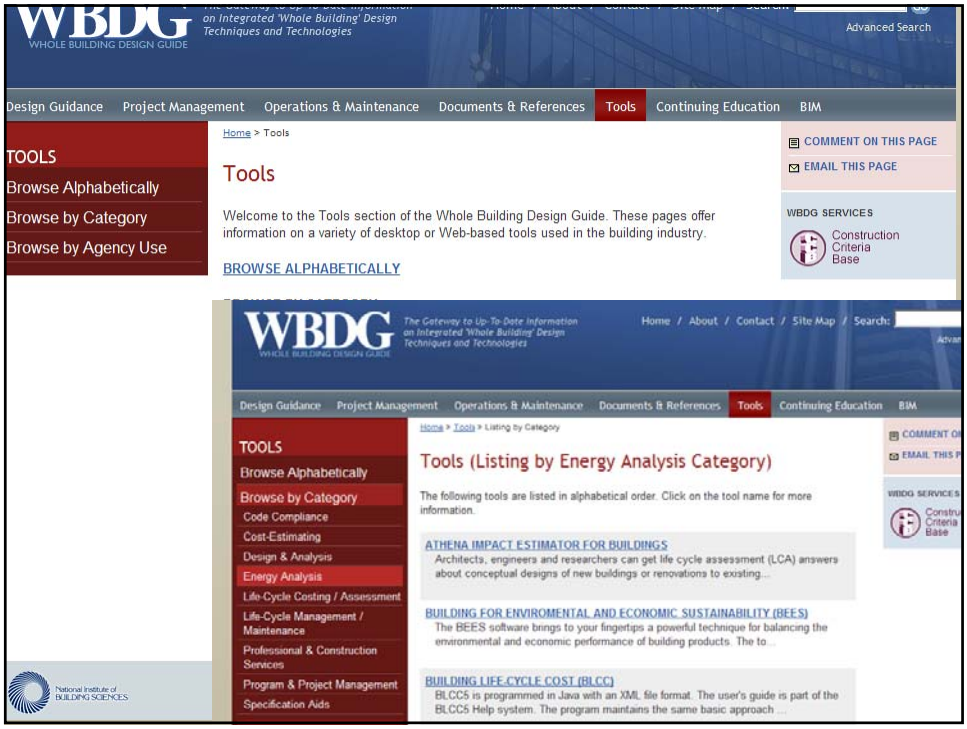
Windows and Glazing
by Gregg D. Ander, FAIA
Southern California Edison
LEED® Version 2.1 Credit / WBDG Resource Page
Tools Index > - LEED Version 2.1 Credit / WBDG Resource Page Matrix
The LEED® (Leadership in Energy and Environmental Design) rating system, developed by the U.S. Green Building Council, provides a framework for assessing building performance and achieving sustainability goals. Increasingly, designing to meet LEED® criteria is a requirement for federal, other public, and private-sector projects.
Windows and Glazing
by Gregg Ander
Southern California Edison
This page provides information on technologies and/or strategies that could b
the following LEED® credits. Select the LEED® designation to view more WBD
that credit.
EA-1 Optimize Energy Performance
EA-P2 Minimum Energy Performance
EQ-2 Ventilation Effectiveness
EQ-6.1 Controllability of Systems - Perimeter Spaces
EQ-6.2 Controllability of Spaces - Non-Perimeter
EQ-7.1 Thermal Comfort - Comply with ASHRAE Standard 55-1992
EQ-8.1 Daylight and Views - Daylight 75% of Spaces
EQ-8.2 Daylight and Views - Views for 90% of Spaces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Tools
Welcome to the Tools section of the Whole Building Design Guide. These pages offer information on a variety of desktop or Web-based tools used in the building industry.
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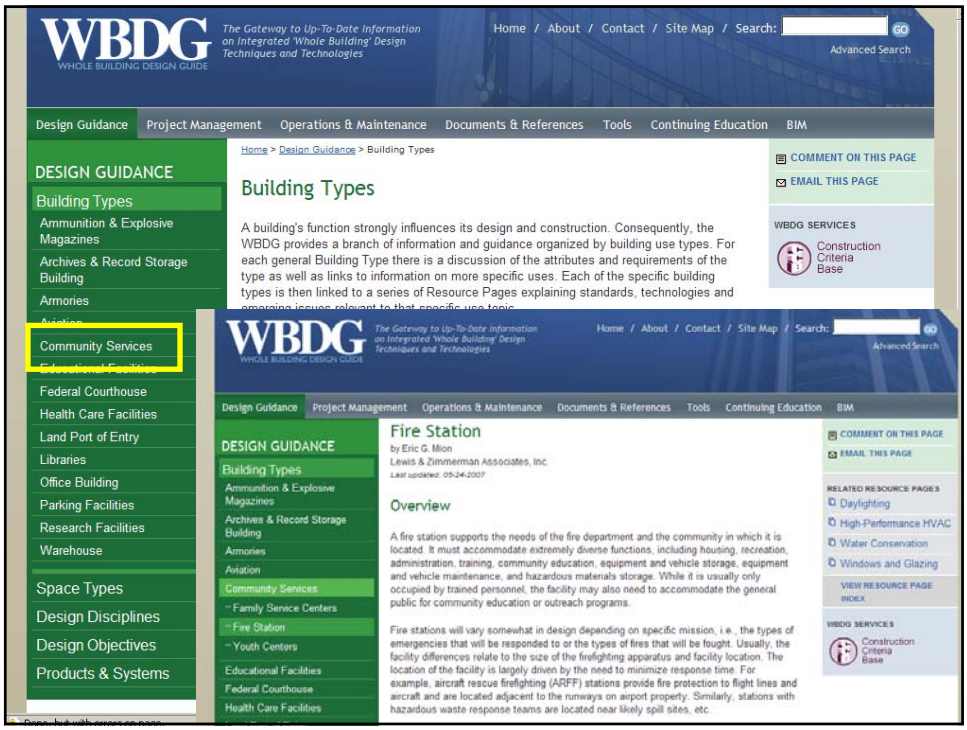
Tools (Listing by Energy Analysis Category)
The following tools are listed in alphabetical order. Click on the tool name for more information.
Code Compliance
Cost-Estimating
Design & Analysis
Energy Analysis
Life-Cycle Costing / Assessment
Life-Cycle Management / Maintenance
Professional & Construction Services
Program & Project Management
Specification Aids
ATHENA IMPACT ESTIMATOR FOR BUILDINGS
Architects, engineers and researchers can get life cycle assessment (LCA) answers about conceptual designs of new buildings or renovations to existing...
BUILDING FOR ENVIROMENTAL AND ECONOMIC SUSTAINABILITY (BEES)
The BEES software brings to your fingertips a powerful technique for balancing the environmental and economic performance of building products. The to...
BUILDING LIFE-CYCLE COST (BLCC)
BLCC5 is programmed in Java with an XML file format. The user's guide is part of the BLCC5 Help system. The program maintains the same basic approach ...
National Institute of Building Sciences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Home > Design Guidance > Building Types
Building Types
A building's function strongly influences its design and construction. Consequently, the WBDG provides a branch of information and guidance organized by building use types. For each general Building Type there is a discussion of the attributes and requirements of the type as well as links to information on more specific uses. Each of the specific building types is then linked to a series of Resource Pages explaining standards, technologies and
COMMENT ON THIS PAGE
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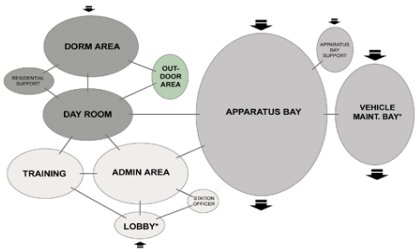
WBDG SERVICES
Construction Criteria Base
Fire Station
by Eric G. Mion
Lewis & Zimmerman Associates, Inc.
Last updated: 05-24-2007
Overview
A fire station supports the needs of the fire department and the community in which it is located. It must accommodate extremely diverse functions, including housing, recreation, administration, training, community education, equipment and vehicle storage, equipment and vehicle maintenance, and hazardous materials storage. While it is usually only occupied by trained personnel, the facility may also need to accommodate the general public for community education or outreach programs.
Fire stations will vary somewhat in design depending on specific mission, i.e., the types of emergencies that will be responded to or the types of fires that will be fought. Usually, the facility differences relate to the size of the firefighting apparatus and facility location. The location of the facility is largely driven by the need to minimize response time. For example, aircraft rescue firefighting (ARFF) stations provide fire protection to flight lines and aircraft and are located adjacent to the runways on airport property. Similarly, stations with hazardous waste response teams are located near likely spill sites, etc.
Ammunition & Explosive Magazines
Archives & Record Storage Building
Armories
Aviation
Community Services
Family Service Centers
Fire Station
Youth Centers
Educational Facilities
Federal Courthouse
Health Care Facilities
RELATED RESOURCE PAGES
Daylighting
High-Performance HVAC
Water Conservation
Windows and Glazing
VIEW RESOURCE PAGE INDEX

The two primary drivers for facility layout and functional space adjacencies in a fire station are the following:

1. Ensure that internal response times can be met (time for a firefighter to reach the apparatus and be ready to depart).
2. Separate the diverse and sometimes conflicting functions such as industrial maintenance spaces and residential spaces.



Sample adjacency diagram for a fire station.
Developed by DMJM Design, Arlington, VA

APPARATUS BAYS

By placing the apparatus bay between the maintenance and support functions and the residential and administrative functions, both primary layout goals can be accomplished. Some of the adjacencies shown above may be accommodated through a hallway rather than a direct entrance/exit from one space to another. This is particularly true with the apparatus bay and the day room as many facility spaces require an adjacency with these two spaces.

This approach to the layout can also accommodate expansion of the apparatus bay on the other side of the support and maintenance areas, although care must be taken to ensure that internal response times can be met after any expansion.

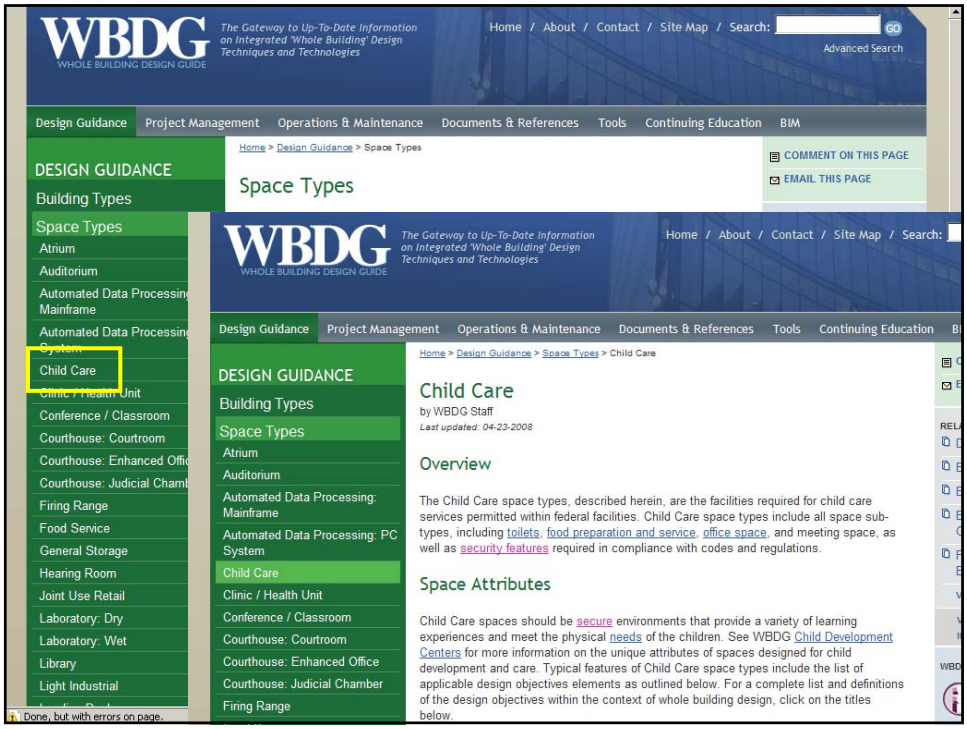
Sizing the apparatus bay is critical, and it should be designed to accommodate variable

Done, but with errors on page. Internet 100%

Sustainable Buildings Industry Council

Use Bldg Types When No Agency Criteria Exists

Shanghai-Jahwa Research Laboratory—Shanghai, China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Automated Data Processing
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Courthouse: Enhanced Office
Courthouse: Judicial Chamber
Firing Range
Food Service
General Storage
Hearing Room
Joint Use Retail
Laboratory: Dry
Laboratory: Wet
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Light Industrial
Home > Design Guidance > Space Types
Space Types
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Home > Design Guidance > Space Types > Child Care
Child Care
by WBDG Staff
Last updated: 04-23-2008
Overview
The Child Care space types, described herein, are the facilities required for child care services permitted within federal facilities. Child Care space types include all space sub-types, including toilets, food preparation and service, office space, and meeting space, as well as security features required in compliance with codes and regulations.
Space Attributes
Child Care spaces should be secure environments that provide a variety of learning experiences and meet the physical needs of the children. See WBDG Child Development Centers for more information on the unique attributes of spaces designed for child development and care. Typical features of Child Care space types include the list of applicable design objectives elements as outlined below. For a complete list and definitions of the design objectives within the context of whole building design, click on the titles below.


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Project Planning, Management and Delivery
Last updated: 10-02-2008
Introduction
Successful project management requires team leadership and coordination, diligent project planning, and effective oversight of the delivery process. Recognizing the importance of these qualities in satisfying clients' expectations, the Project Management section offers guidance for the entire delivery team to successfully and effectively carry out a high performance building project.
While this section is still under development, click on one of the following areas to begin your exploration:
Project Delivery Teams—Contains guidance on assembling and effectively managing the project team.
Project Planning and Development—Contains guidance on how to plan and deliver a project, from inception to turnover.
Building Commissioning—Provides an overview of commissioning drivers, benefits, goals, and principles.
Project Delivery and Controls—Contains descriptions of procedures and practices used to manage project scope, budget, and schedule.
Note: Terminology and processes described within this section of the WBDG typically refer to federal projects, but may be applicable to other public sector institutions with adaptation for local standards of professional practice.
Major Resources
Federal Agency Links


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Plan the Commissioning Process
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Building Commissioning
by the WBDG Project Management Committee
Last updated: 10-02-2008
Introduction
Building Commissioning is a rapidly emerging A-E-C project management practice that is being embraced by public and private organizations because of its benefits in improved project delivery results.
This section of WBDG organizes commissioning information, guidance, and resources under three broad principles, including Determine Project Performance Requirements, Plan the Commissioning Process, and Document Compliance and Acceptance. It is important to note that all three principles are applied over the life-span of a capital design and construction project, and that it takes a multi-disciplined effort involving owners, design professionals, constructors, and commissioning providers to achieve optimal results from the commissioning process.
This WBDG page provides an overview of commissioning drivers, benefits, goals, and principles and general commissioning guides, standards, and resources.
Definition
ASHRAE Guideline 0, The Commissioning Process, defines commissioning as "a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meets defined objectives and criteria". Commissioning is therefore an "umbrella" process for all the planning, delivery, verification, and managing risks to critical functions performed in, or by, facilities. Commissioning uncovers deficiencies in design or installation using peer review and field verification. Commissioning also accomplishes higher energy efficiency, environmental health, and occupant safety and improves indoor air quality. Commissioning is a quality assurance-based process that
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RELATED RESOURCE PAGES
Balancing Security/Safety and Sustainability Objectives
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Construction Phase Cost Management
Facility Performance Evaluation (FPE)
Indoor Air Quality and Mold Prevention of the Building Envelope
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Federal Mandates
The Whole Building Design Guide has identified key federal mandates that apply to the areas of building design, construction and management. Select from one of the categories below to view those documents or links.
EXECUTIVE ORDERS
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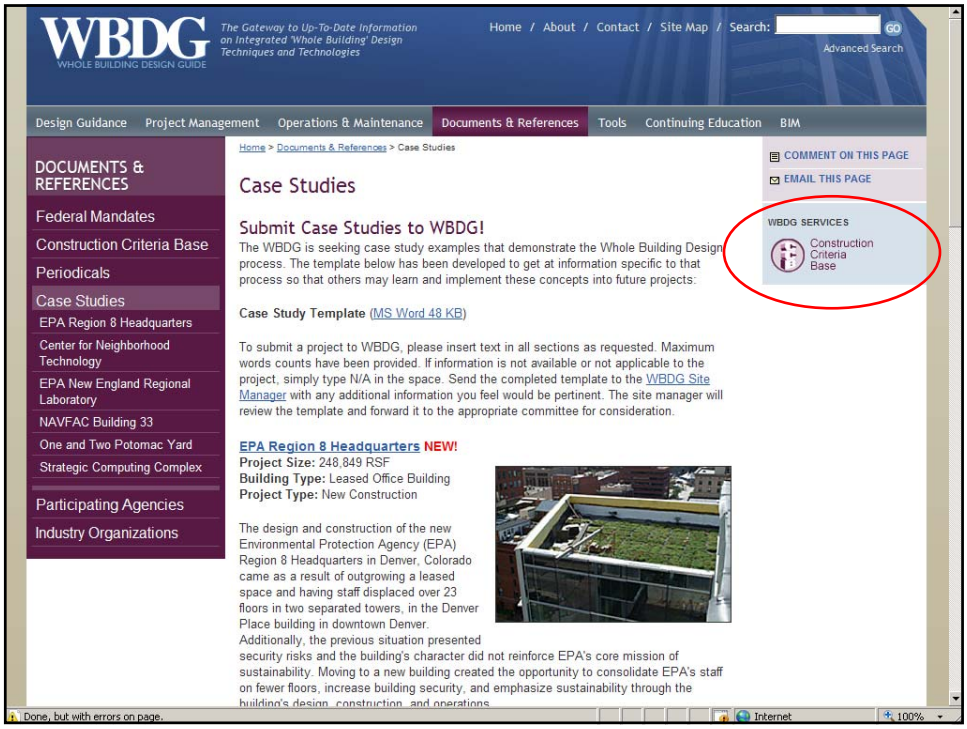
FEDERAL ACQUISITION REGULATIONS
OMB CIRCULARS
U.S. CODES
Done
Sustainable Buildings Inc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Center for Neighborhood Technology
EPA New England Regional Laboratory
NAVFAC Building 33
One and Two Potomac Yard
Strategic Computing Complex
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Submit Case Studies to WBDG!
The WBDG is seeking case study examples that demonstrate the Whole Building Design process. The template below has been developed to get at information specific to that process so that others may learn and implement these concepts into future projects:
Case Study Template (MS Word 48 KB)
To submit a project to WBDG, please insert text in all sections as requested. Maximum words counts have been provided. If information is not available or not applicable to the project, simply type N/A in the space. Send the completed template to the WBDG Site Manager with any additional information you feel would be pertinent. The site manager will review the template and forward it to the appropriate committee for consideration.
EPA Region 8 Headquarters NEW!
Project Size: 248,849 RSF
Building Type: Leased Office Building
Project Type: New Construction
The design and construction of the new Environmental Protection Agency (EPA) Region 8 Headquarters in Denver, Colorado came as a result of outgrowing a leased space and having staff displaced over 23 floors in two separated towers, in the Denver Place building in downtown Denver. Additionally, the previous situation presented security risks and the building's character did not reinforce EPA's core mission of sustainability. Moving to a new building created the opportunity to consolidate EPA's staff on fewer floors, increase building security, and emphasize sustainability through the
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a service of the Whole Building Design Guide
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For document inquiries or additional information, please contact us either by phone at 877-CCB-5667 or by email at ccbsupport@nibs.org.
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NAVFAC STANDARD SPECIFICATIONS
NAVFAC GUIDE PERFORMANCE WORK STATEMENTS
VA MASTER SPECIFICATIONS
DOE GENERAL DESIGN CRITERIA
NIBS SPECIFICATIONS
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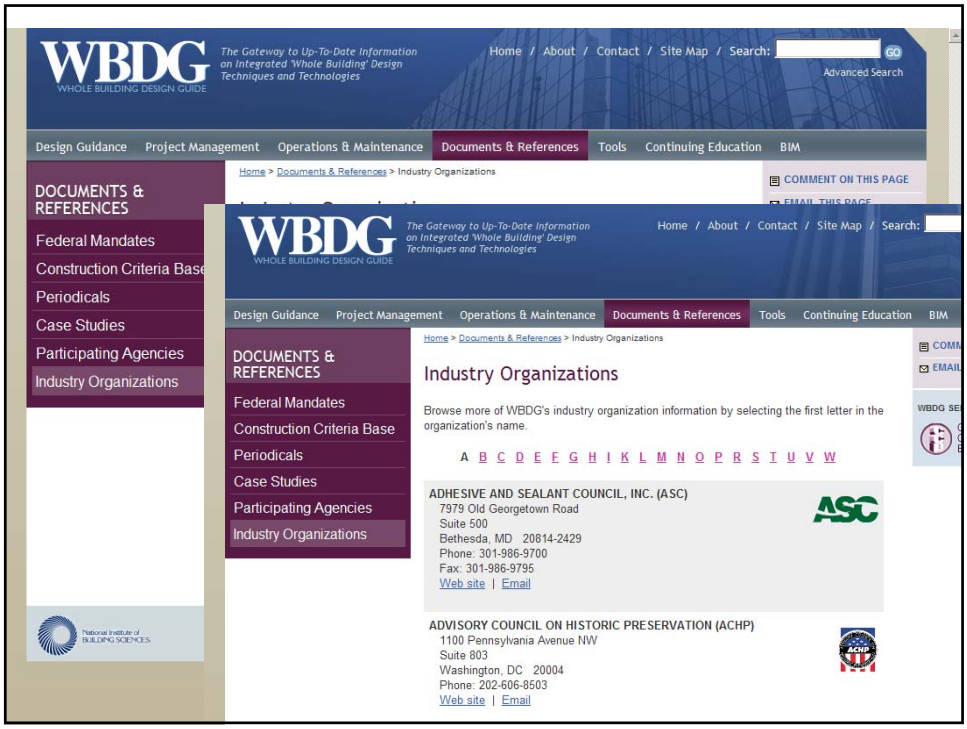
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7979 Old Georgetown Road
Suite 500
Bethesda, MD 20814-2429
Phone: 301-986-9700
Fax: 301-986-9795
Web site | Email
ADVISORY COUNCIL ON HISTORIC PRESERVATION (ACHP)
1100 Pennsylvania Avenue NW
Suite 803
Washington, DC 20004
Phone: 202-606-8503
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Environmental Protection Agency (EPA)
National Aeronautics and Space Administration (NASA)
Administrative Office of the United States Courts (AOUSC)
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Smithsonian Institution
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Unified Facilities Criteria (UFC) Technical Publications
Criteria Change Request (CCR)
Unified Facilities Spreadsheets
US Army Corps of Engineers®
NAVFAC
Go to...
The Department of Defense (DoD) and the military services have initiated a program to unify all technical criteria and standards pertaining to planning, design, construction, and operation and maintenance of real property facilities. The objective of the Unified Facilities Criteria (UFC) program is to streamline the military criteria system by eliminating duplication of information, increasing reliance on private-sector standards, and creating a more efficient criteria development and publishing process. Both technical publications and guide specifications are part of the UFC program. Previously, each service had its own publishing system resulting in criteria being disseminated in different formats. UFC documents have a uniform format and are identified by a number such as UFC 1-300-1.
Internet
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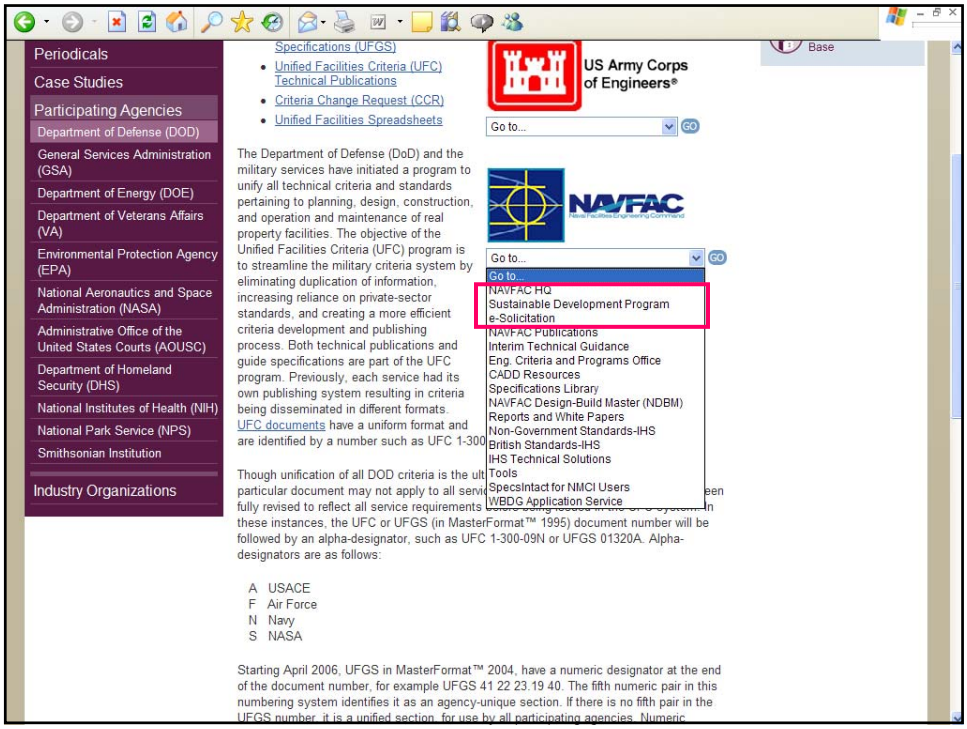
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Department of Veterans Affairs (VA)
Environmental Protection Agency (EPA)
National Aeronautics and Space Administration (NASA)
Administrative Office of the United States Courts (AOUSC)
Department of Homeland Security (DHS)
National Institutes of Health (NIH)
National Park Service (NPS)
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SpecsIntact for NMCI Users
WBDG Application Service
The Department of Defense (DoD) and the military services have initiated a program to unify all technical criteria and standards pertaining to planning, design, construction, and operation and maintenance of real property facilities. The objective of the Unified Facilities Criteria (UFC) program is to streamline the military criteria system by eliminating duplication of information, increasing reliance on private-sector standards, and creating a more efficient criteria development and publishing process. Both technical publications and guide specifications are part of the UFC program. Previously, each service had its own publishing system resulting in criteria being disseminated in different formats. UFC documents have a uniform format and are identified by a number such as UFC 1-300
Though unification of all DOD criteria is the ult
particular document may not apply to all serv
fully revised to reflect all service requirements
these instances, the UFC or UFGS (in MasterFormat™ 1995) document number will be followed by an alpha-designator, such as UFC 1-300-09N or UFGS 01320A. Alpha-designators are as follows:
A USACE
F Air Force
N Navy
S NASA
Starting April 2006, UFGS in MasterFormat™ 2004, have a numeric designator at the end of the document number, for example UFGS 41 22 23.19 40. The fifth numeric pair in this numbering system identifies it as an agency-unique section. If there is no fifth pair in the UFGS number, it is a unified section, for use by all participating agencies. Numeric


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National Institutes of Health (NIH)
National Park Service (NPS)
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Home > Participating Agencies > Department of Defense (DOD) > NAVFAC Sustainable Development Program
NAVFAC Sustainable Development Program
The purpose of this Web site is to provide access to sustainable resources and report outcomes of the NAVFAC Sustainable Development Program to advance the program goals and objectives. For more information, contact NAVFAC.
Policy and Mandates
Criteria
Specifications
Contract Documents
NAVFAC Sustainable Team Meetings
NAVFAC's Corporate USGBC Membership
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U.S. Green Building Council Corporate Member
Pictured: NAVFAC Building 33 Washington, D.C.
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NAVFAC
Naval Facilities Engineering Command
Sustainable Development
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NAVFAC
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Password:
Login
Register Now
Forgot your password?
Technical Support
Site Requirements:
Internet Explorer 5+
Windows Media Player 9+
(for video content)
Welcome to NAVFAC's Sustainable Development Online Training!
This online training has been designed especially for NAVFAC's Project Acquisition Team to help integrate principles of sustainable development into the acquisition process. Courses are tailored for each of the 13 project team members who comprise the facility development team.
The NAVFAC Business Lines - Project Team Members
Environmental Specialist
Real Estate Specialist
Base Development
Facility Planner
Project Developer
Capital Improvements
Project Manager
Cost Engineer
In-house Designer
Construction Manager/Resident Officer in Charge of Construction (ROICC)
Public Works Specialist/Facility Manager
Acquisition/Contract Specialist
"This online training course carries out the Navy's commitment to incorporating sustainable development into its facility design and renovation processes to reduce costs and to deliver facilities that incorporate the latest industry standards for planning, design and construction."
Former NAVFAC Chief Engineer
Windows Media Player
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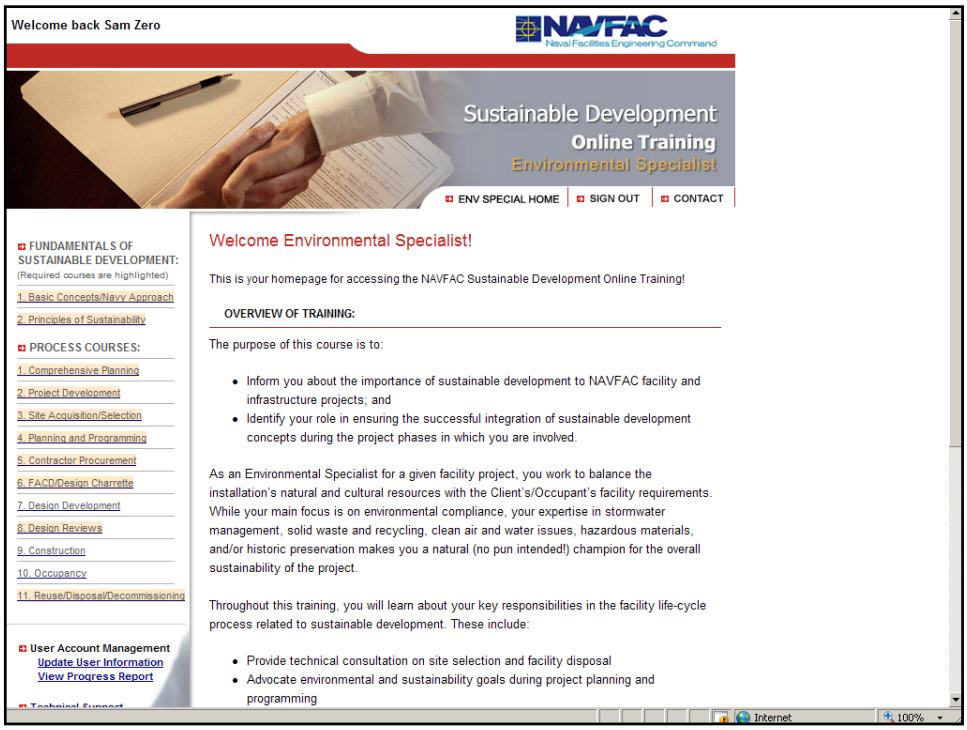
Welcome back Sam Zero
NAVFAC
Naval Facilities Engineering Command
Sustainable Development
Online Training
Environmental Specialist
ENV SPECIAL HOME
SIGN OUT
CONTACT
FUNDAMENTALS OF SUSTAINABLE DEVELOPMENT:
(Required courses are highlighted)
1. Basic Concepts/Navy Approach
2. Principles of Sustainability
PROCESS COURSES:
1. Comprehensive Planning
2. Project Development
3. Site Acquisition/Selection
4. Planning and Programming
5. Contractor Procurement
6. FACD/Design Charrette
7. Design Development
8. Design Reviews
9. Construction
10. Occupancy
11. Reuse/Disposal/Decommissioning
User Account Management
Update User Information
View Progress Report
Welcome Environmental Specialist!
This is your homepage for accessing the NAVFAC Sustainable Development Online Training!
OVERVIEW OF TRAINING:
The purpose of this course is to:
Inform you about the importance of sustainable development to NAVFAC facility and infrastructure projects; and
Identify your role in ensuring the successful integration of sustainable development concepts during the project phases in which you are involved.
As an Environmental Specialist for a given facility project, you work to balance the installation's natural and cultural resources with the Client's/Occupant's facility requirements. While your main focus is on environmental compliance, your expertise in stormwater management, solid waste and recycling, clean air and water issues, hazardous materials, and/or historic preservation makes you a natural (no pun intended!) champion for the overall sustainability of the project.
Throughout this training, you will learn about your key responsibilities in the facility life-cycle process related to sustainable development. These include:
Provide technical consultation on site selection and facility disposal
Advocate environmental and sustainability goals during project planning and programming
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Building Envelope Design Guide
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Below Grade Systems
Wall Systems
Fenestration Systems
Roofing Systems
Atria Systems
This section supported by:
Building Enclosure Council
Home > Design Guidance > Building Envelope Design Guide
Building Envelope Design Guide
BEDG
BUILDING ENVELOPE DESIGN GUIDE
The National Institute of Building Sciences (NIBS) under guidance from the Federal Envelope Advisory Committee has developed this comprehensive guide for exterior envelope design and construction for institutional / office buildings. The Envelope Design Guide (EDG) is continually being improved and updated through the Building Enclosure Councils (BECs). Any edits, revisions, updates or interest in adding new information should be directed to the BEDG Review Committee through the 'Comment' link on this page.
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Foundation Walls
Floor Slabs
Plazas, Tunnels, Vaults
Wall Systems
Cast-In-Place Concrete
Exterior Insulation and Finish System (EIFS)
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Precast Concrete
Thin Stone
Fenestration Systems
Glazing
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Design Disciplines
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Home > Design Guidance > Design Disciplines > Fire Protection Engineering
Fire Protection Engineering
by Morgan Hurley, P.E., SFPE
Last updated: 07-08-2008
Introduction
Fire protection engineers use science and technology to protect people and property from fire. When designing new buildings or renovations to existing buildings, fire protection engineers develop the plan for fire protection
Fire protection engineering has evolved significantly over the past several centuries. Early application of fire protection engineering was intended to prevent conflagrations, which could destroy entire cities. Until the early 1900s, the primary objective of fire protection engineering was to limit a fire to its building of origin. As fire protection engineering advanced, this objective was refined to limit a fire to its object or room of origin.
However, it wasn't until the later part of the 20th century that fire protection engineering had matured to the point that it included the fundamental tenets of a distinct, professional discipline (Lucht, 1989).
Description
A. Professional Definition


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05: Metals
06: Wood, Plastics, and Composites
07: Thermal and Moisture Protection
08: Openings
09: Finishes
10: Specialties
11: Equipment
12: Furnishings
14: Conveying Equipment
22: Plumbing
23: Heating, Ventilating, and Air Conditioning
26: Electrical
31: Earthwork
Home > Design Guidance > Federal Green Construction Guide for Specifiers
Federal Green Construction Guide for Specifiers
Last updated: 12-27-2007
Welcome!
To begin, either select a division in the left-hand navigation or browse the entire index.
To download the entire Guide: Adobe Acrobat PDF or MS Word DOC
Thank you for your interest in the Federal Green Construction Guide for Specifiers!
To address the need for a comprehensive guide for procuring green building products and construction services within the Federal government, EPA has partnered with the Federal Environmental Executive and the Whole Building Design Guide (WBDG) to develop the Federal Green Construction Guide for Specifiers.
Guide Objectives
To help federal agencies meet their project-specific environmental goals & mandates including:
Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding
EPA's Final Guidance on Environmentally Preferable Purchasing
Greening of Government Executive Orders
EPA's Comprehensive Procurement Guidelines for recovered content
USDA's Biobased Purchasing Program
ENERGY STAR® & DOE Federal Energy Management Program (FEMP) Product Efficiency Recommendations
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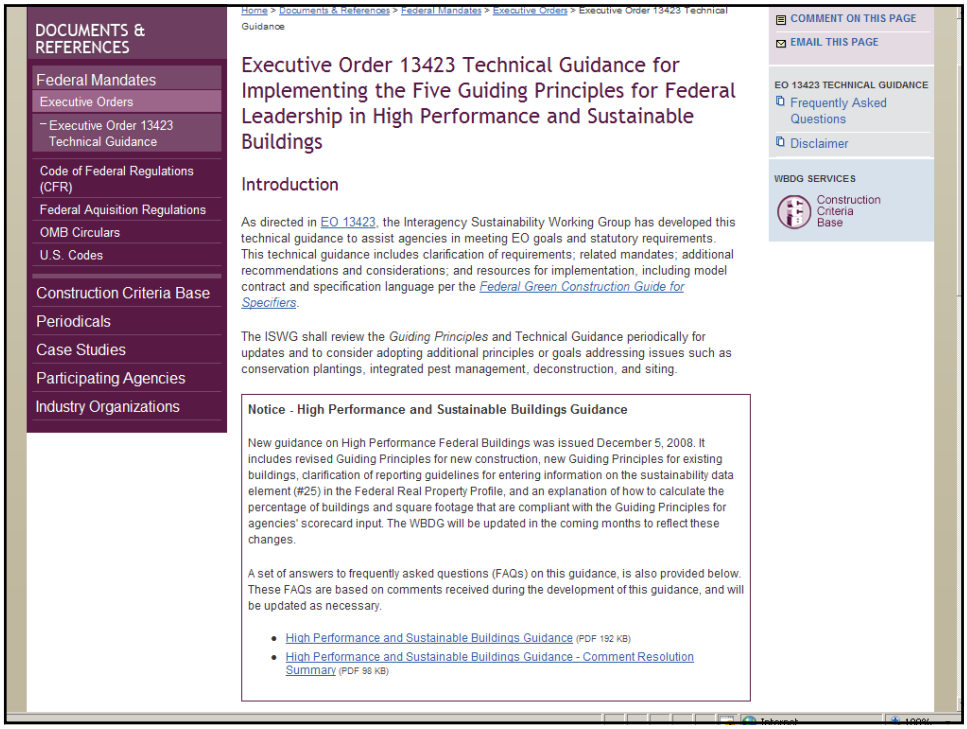
FEDERAL GREEN GUIDE
Federal Green Construction Guide for Specifiers
Last updated: 05-25-2007
01 57 19.11 (01352) Indoor Air Quality (IAQ) Management
This is a guidance document with sample specification language intended to be inserted into project specifications on this subject as appropriate to the agency's environmental goals. Certain provisions, where indicated, are required for U.S. federal agency projects. Sample specification language is numbered to clearly distinguish it from advisory or discussion material. Each sample is preceded by identification of the typical location in a specification section where it would appear using the SectionFormat™ of the Construction Specifications Institute; the six digit section number cited is per CSI Masterformat™ 2004 and the five digit section number cited parenthetically is per CSI Masterformat™ 1995.
SPECIFIER NOTE:
This section includes requirements for IAQ management during construction. Coordinate with requirements of other sections; verify that products and installation methods specified in other sections are environmentally appropriate. Edit to suit location and project.
For more information on IAQ, refer to the U.S. EPA Green Indoor Environments Program
http://www.epa.gov/iag/greenbuilding/index.html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Executive Order 13423 Technical Guidance for Implementing the Five Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings
Introduction
As directed in EO 13423, the Interagency Sustainability Working Group has developed this technical guidance to assist agencies in meeting EO goals and statutory requirements. This technical guidance includes clarification of requirements; related mandates; additional recommendations and considerations; and resources for implementation, including model contract and specification language per the Federal Green Construction Guide for Specifiers.
The ISWG shall review the Guiding Principles and Technical Guidance periodically for updates and to consider adopting additional principles or goals addressing issues such as conservation plantings, integrated pest management, deconstruction, and siting.
Notice - High Performance and Sustainable Buildings Guidance
New guidance on High Performance Federal Buildings was issued December 5, 2008. It includes revised Guiding Principles for new construction, new Guiding Principles for existing buildings, clarification of reporting guidelines for entering information on the sustainability data element (#25) in the Federal Real Property Profile, and an explanation of how to calculate the percentage of buildings and square footage that are compliant with the Guiding Principles for agencies' scorecard input. The WBDG will be updated in the coming months to reflect these changes.
A set of answers to frequently asked questions (FAQs) on this guidance, is also provided below. These FAQs are based on comments received during the development of this guidance, and will be updated as necessary.
High Performance and Sustainable Buildings Guidance (PDF 192 KB)
High Performance and Sustainable Buildings Guidance - Comment Resolution Summary (PDF 98 KB)
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EO 13423 TECHNICAL GUIDANCE
Frequently Asked Questions
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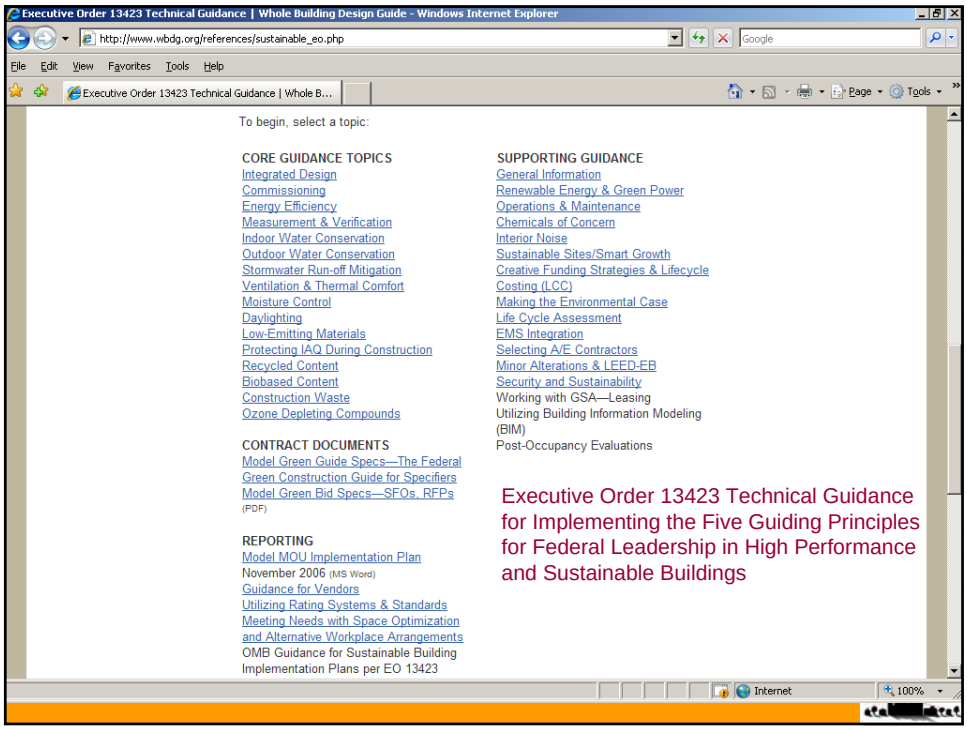
Executive Order 13423 Technical Guidance | Whole Building Design Guide - Windows Internet Explorer
http://www.wbdg.org/references/sustainable_eo.php
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CORE GUIDANCE TOPICS
Integrated Design
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Measurement & Verification
Indoor Water Conservation
Outdoor Water Conservation
Stormwater Run-off Mitigation
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Biobased Content
Construction Waste
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CONTRACT DOCUMENTS
Model Green Guide Specs—The Federal Green Construction Guide for Specifiers
Model Green Bid Specs—SFOs, RFPs (PDF)
REPORTING
Model MOU Implementation Plan
November 2006 (MS Word)
Guidance for Vendors
Utilizing Rating Systems & Standards
Meeting Needs with Space Optimization and Alternative Workplace Arrangements
OMB Guidance for Sustainable Building Implementation Plans per EO 13423
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Sustainable Sites/Smart Growth
Creative Funding Strategies & Lifecycle Costing (LCC)
Making the Environmental Case
Life Cycle Assessment
EMS Integration
Selecting A/E Contractors
Minor Alterations & LEED-EB
Security and Sustainability
Working with GSA—Leasing
Utilizing Building Information Modeling (BIM)
Post-Occupancy Evaluations
Executive Order 13423 Technical Guidance for Implementing the Five Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings
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E.O. 13423 Technical Guidance Five Guiding Principles

The five Guiding Principles address:

- **Employing integrated design;**
- **Optimizing energy performance;**
- **Protecting and conserving water;**
- **Enhancing indoor environmental quality; and**
- **Reducing the environmental impact of materials.**

To build from this and other accomplishments and to pave the way for future success, the President signed **Executive Order 13423 "Strengthening Federal Environmental, Energy and Transportation Management"** on January 24, 2007. This Executive Order (EO) consolidates and strengthens a number of prior EOs by establishing new and updated goals, practices, and reporting requirements for environmental, energy, and transportation performance and accountability.

In the area of sustainable design and high performance buildings, **the new EO makes mandatory the five Guiding Principles of the MOU for all new construction and major renovations** and sets an aggressive goal for applying these practices to existing capital assets over the next decade.


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Real Property Inventory (RPI)
Computerized Maintenance Management Systems (CMMS)
Home > Operations & Maintenance
Facilities Operations & Maintenance
by Don Sapp, Plexus Scientific
Last updated: 06-13-2008
Introduction
The operations and maintenance (O&M) of facilities covers all that broad spectrum of services required to assure the built environment is available to and will perform the functions for which they were designed and constructed. O&M is comprised of the day-to-day activities necessary for the built entities to perform their intended function. Operations and maintenance are combined into the one term O&M because an entity cannot operate without being maintained; therefore the two are discussed as one.
At this time the Operations and Maintenance section offers guidance in the following areas:
Real Property Inventory (RPI)—Provides an overview on the type of system needed to maintain an inventory of an organization's assets and manage those assets.
Computerized Maintenance Management Systems (CMMS)—Contains descriptions of procedures and practices used to track the maintenance of an organization's assets and associated costs.
Future updates to the Operations and Maintenance section will provide additional guidance in the areas described below.
The scope of O&M includes the activities required to keep the entire built environment as contained in the organization's Real Property Inventory of buildings and structures and their supporting facilities such as utility systems, parking lots, roads, drainage structures and grounds in condition to be used to meet their intended function during their life cycle. These activities include routine and breakdown maintenance and repairs, operations of utility systems and grounds care. It varies from O&M of a single building to a complex of many buildings and structures or groups of complexes. As the number of buildings and
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Computer Aided Facilities Management (CAFM)
Computerized Maintenance Management Systems (CMMS)
Home > Operations & Maintenance > Real Property Inventory (RPI)
Real Property Inventory (RPI)
by Don Sapp, Plexus Scientific
Last updated: 06-05-2008
Introduction
WITHIN THIS PAGE
Introduction
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Application
Emerging Issues
Relevant Codes and Standards
Major Resources
Know Your Assets and What They Cost!
A system to maintain an inventory of an organization's assets/real property is required not only to know what assets the organization has that must be maintained but also to manage those assets and meet asset record and reporting requirements placed on an organization. At one time inventory records were maintained only in paper files with a list of assets, their value and limited other information maintained for ready reference. With the dawn of the Computer age things have changed. Inventory records for ready reference have become easier to prepare and maintain as they are recorded in a computer database. These ready reference records have grown to include more information on each asset. As the inventory database/records have grown their use has expanded because the information can be more easily included in manage reports and other management documents and can be made available for use in other databases such as an operations and maintenance organization's Computerized Maintenance Management Systems (CMMS). Because of the expanded use of real property inventories (RPIs) they have become an important part of an organizations asset management. In fact in the federal government all agencies are required by Executive Order 13327, Federal Real Property Asset Management, to identify and categorize all real property owned, leased, or other-wise managed by the agency.
Description
In today's business environment RPIs are or should be maintained in computer databases
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RELATED RESOURCE PAGES
Construction Operations Building Information Exchange (COBIE)
Deferred Maintenance - The Use of Parametrics for Estimating Maintenance Costs
Facility Performance Evaluation (FPE)
Life-Cycle Cost Analysis (LCCA)
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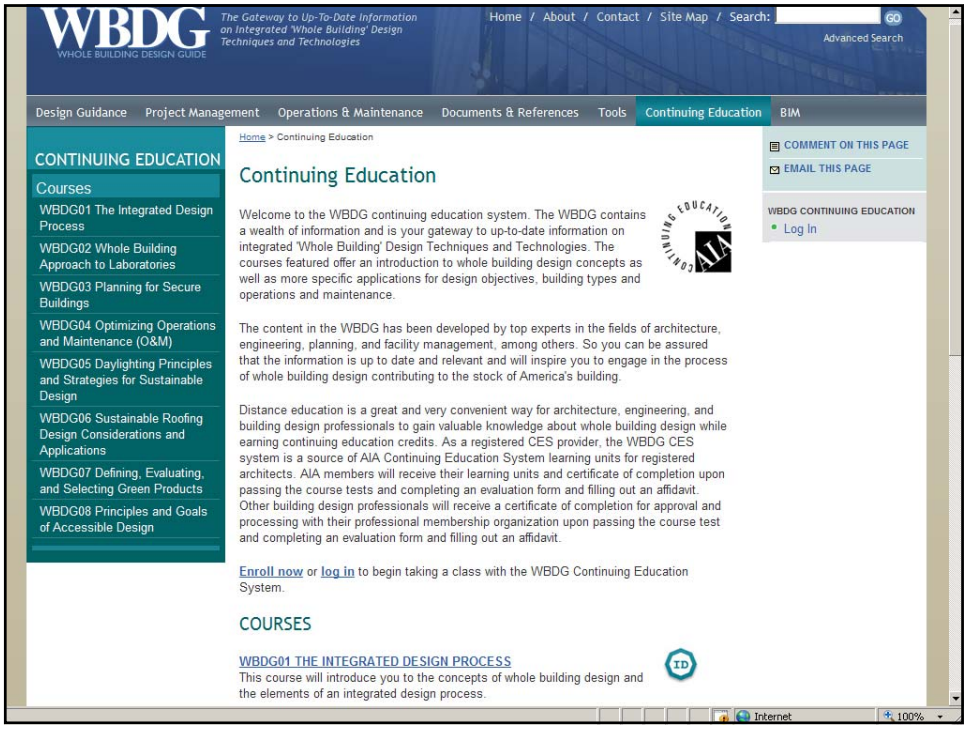
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WBDG03 Planning for Secure Buildings
WBDG04 Optimizing Operations and Maintenance (O&M)
WBDG05 Daylighting Principles and Strategies for Sustainable Design
WBDG06 Sustainable Roofing Design Considerations and Applications
WBDG07 Defining, Evaluating, and Selecting Green Products
WBDG08 Principles and Goals of Accessible Design
Home > Continuing Education
Continuing Education
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WBDG CONTINUING EDUCATION
Log In
Welcome to the WBDG continuing education system. The WBDG contains a wealth of information and is your gateway to up-to-date information on integrated 'Whole Building' Design Techniques and Technologies. The courses featured offer an introduction to whole building design concepts as well as more specific applications for design objectives, building types and operations and maintenance.
The content in the WBDG has been developed by top experts in the fields of architecture, engineering, planning, and facility management, among others. So you can be assured that the information is up to date and relevant and will inspire you to engage in the process of whole building design contributing to the stock of America's building.
Distance education is a great and very convenient way for architecture, engineering, and building design professionals to gain valuable knowledge about whole building design while earning continuing education credits. As a registered CES provider, the WBDG CES system is a source of AIA Continuing Education System learning units for registered architects. AIA members will receive their learning units and certificate of completion upon passing the course tests and completing an evaluation form and filling out an affidavit. Other building design professionals will receive a certificate of completion for approval and processing with their professional membership organization upon passing the course test and completing an evaluation form and filling out an affidavit.
Enroll now or log in to begin taking a class with the WBDG Continuing Education System.
COURSES
WBDG01 THE INTEGRATED DESIGN PROCESS
This course will introduce you to the concepts of whole building design and the elements of an integrated design process.
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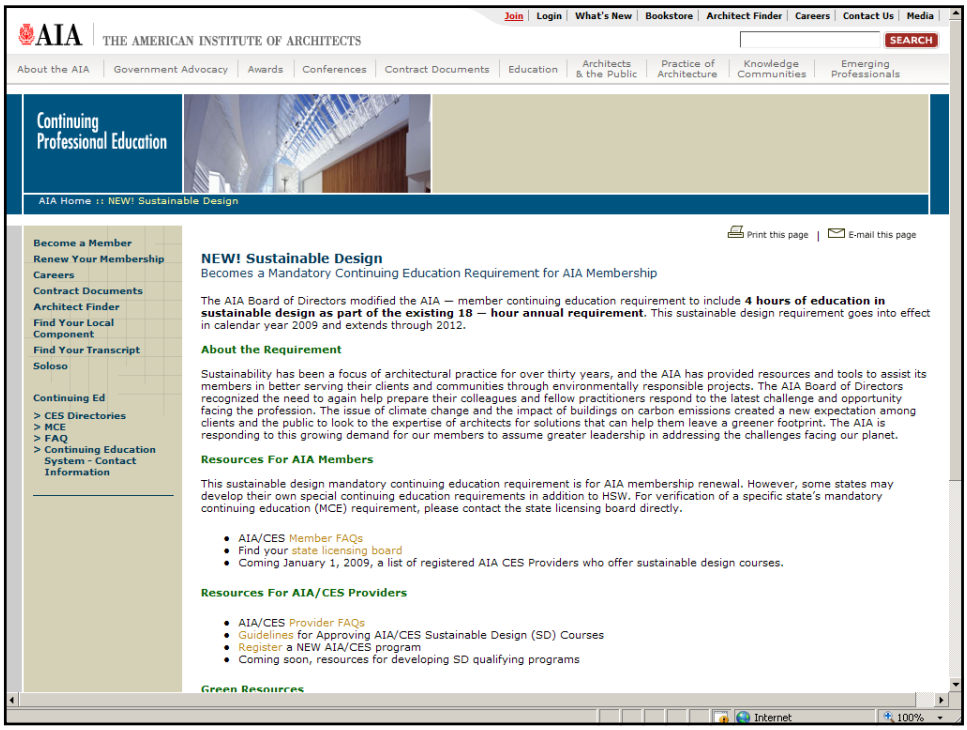
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NEW! Sustainable Design
Becomes a Mandatory Continuing Education Requirement for AIA Membership
The AIA Board of Directors modified the AIA — member continuing education requirement to include 4 hours of education in sustainable design as part of the existing 18 — hour annual requirement. This sustainable design requirement goes into effect in calendar year 2009 and extends through 2012.
About the Requirement
Sustainability has been a focus of architectural practice for over thirty years, and the AIA has provided resources and tools to assist its members in better serving their clients and communities through environmentally responsible projects. The AIA Board of Directors recognized the need to again help prepare their colleagues and fellow practitioners respond to the latest challenge and opportunity facing the profession. The issue of climate change and the impact of buildings on carbon emissions created a new expectation among clients and the public to look to the expertise of architects for solutions that can help them leave a greener footprint. The AIA is responding to this growing demand for our members to assume greater leadership in addressing the challenges facing our planet.
Resources For AIA Members
This sustainable design mandatory continuing education requirement is for AIA membership renewal. However, some states may develop their own special continuing education requirements in addition to HSW. For verification of a specific state's mandatory continuing education (MCE) requirement, please contact the state licensing board directly.
AIA/CES Member FAQs
Find your state licensing board
Coming January 1, 2009, a list of registered AIA CES Providers who offer sustainable design courses.
Resources For AIA/CES Providers
AIA/CES Provider FAQs
Guidelines for Approving AIA/CES Sustainable Design (SD) Courses
Register a NEW AIA/CES program
Coming soon, resources for developing SD qualifying programs
Green Resources
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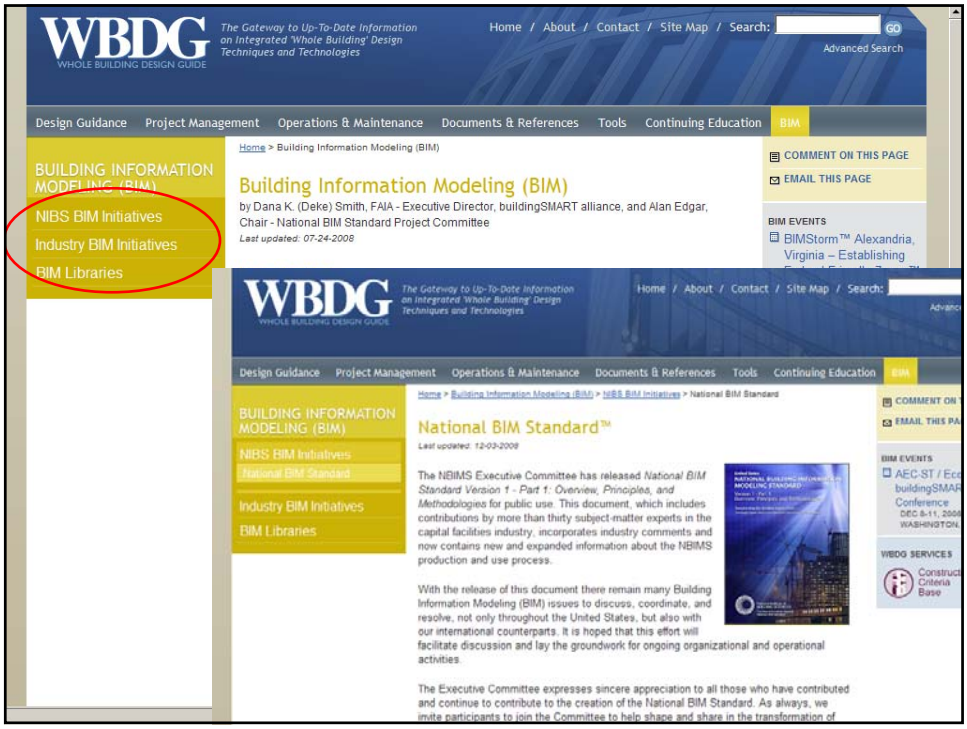
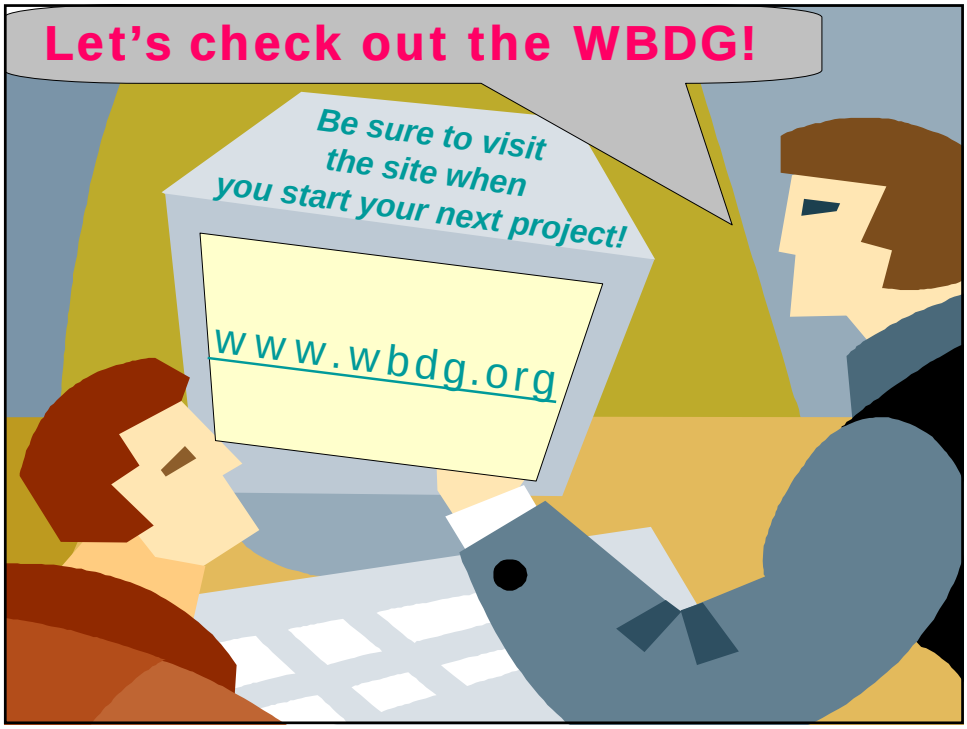


Charrettes/Project Team Meetings

- A high-performance building cannot be achieved unless the integrated design approach is employed.
- Conduct charrettes & project team meetings from concept through planning, design & construction (include O&M folks)
- Use the Whole Building Design Guide as a tool to achieve high-performance buildings

Emerging Issues

- Building Information Modeling (BIM)
- Design for deconstruction
- Smart building technology
- Passive Survivability
- Focus on Existing Buildings
- Carbon footprint / greenhouse gas reduction
- Net Zero Energy Buildings



Thank you for your time!

QUESTIONS??

Richard R. Paradis, P.E., BSCP, Bd. Cert. NCE
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