

DOE EM - Webinar High Performance Sustainable Building Assessment

June 11, 2008



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- **Introductions**
- **Review of HPSB Guiding Principles**
 - **Overview**
 - **Drivers for DOE? (EO 13423, EISA 07, DOE S-1 Memo)**
 - **DOE Approach for Implementation**
 - **What is the relationship with HPSB and USGBC LEED Criteria**
- **Review HPSB and LEED EB Assessment Checklist**
 - **Review DOE EM Facilities Selection Criteria**
 - **Discuss staff feedback on ease of implementation**
 - **Walk through sample of an eligible building for assessment**
- **Demonstration of LMI Assessment Tool**

Federal Guiding Principles (GPs) for High Performance Sustainable Buildings

Background – From Voluntary Standards to Legislation



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HPSB Guiding Principles

- **Jan 06, DOE joined 16 other Agencies in signing the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (MOU). These Agencies decided to "lead by example" by designing, constructing, and operating their facilities in a green and environmentally sustainable manner.**
- **5 Guiding Principles**
 - **I. Employ Integrated Design Principles**
 - **II. Optimize Energy Performance**
 - **III. Protect and Conserve Water**
 - **IV. Enhance Indoor Environmental Quality**
 - **V. Reduce Environmental Impact of Materials**

5 HPSB GPs
initial
implementing
guidance
aimed at new
construction

HPSB GPs Start off as voluntary MOU



- **Jan 07, President signs EO 13423, which directs federal agencies to**
 - **Ensure new construction and major renovation comply with the Guiding Principles in HPSB MOU**
 - **Demonstrate 15 percent of the existing agency capital asset building inventory incorporates the HPSB Guiding Principles. by the end of fiscal year 2015**

- **Feb 08, Sec DOE issues memo**
 - **New DOE buildings and major renovations will achieve US Green Building Council (USGBC) LEED “Gold” rating**
 - **Existing DOE buildings: develop/implement plan to ensure 15% of enduring buildings are in compliance with HPSB GPs and EO13423**
 - All DOE Programs assess existing buildings
 - Incorporate plan to achieve 15% into 10 year site plans

HPSB Incorporated into EO and DOE Policy Memo



- **Energy Independence and Security Act of 07 (signed Jan 08)**

- **431- Energy Reduction Goals for Federal Buildings –**

- accelerates targets for energy use reductions in federal buildings to 3% per year for FY08-FY15, ending in a 30% reduction in energy intensity by 2015 (v 03), consistent with Executive Order 13423

- **432- Management of Energy and Water Efficiency in Federal Buildings**

- for large buildings, agencies must designate an energy manager
- Agencies must do energy and water evaluations for approximately 25% of facilities of each agency annually, so all appropriate facilities have been evaluated in a 4 year cycle

- **435- Leasing**

- agencies to lease space in buildings that have earned the Energy Star label in the previous year,

- **436 - High-Performance Green Federal Buildings –**

- Establishes in GSA an Office of Federal High Performance Green Buildings to coordinate SDD activities amongst agencies

- **438- Storm Water Runoff Requirements for Federal Development**

- any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow

- **441 - Public Building Life-Cycle Costs –**

- Extends the period for Life Cycle Cost accounting from 25 years to 40 years

Many HPSB GPs incorporated into law...more to come!



- **The US Green Building Council (USGBC) is a non-profit organization that promotes sustainable energy efficient and environmental friendly buildings through a performance based rating system known as Leadership in Energy and Environmental Design (LEED®)**
- **What are the LEED® building rating systems?**
 - **LEED building rating system is a voluntary, consensus-based, market-driven and performance-oriented system that provides owners a mechanism to evaluate the design and performance of their buildings. The various ratings systems are broken into several categories that impact including:**
 - LEED NC – New Construction
 - LEED CI – Commercial Interiors
 - LEED CS – Core and Shell
 - LEED EB – Existing Building, Operations and Maintenance



USGBC LEED Criteria & HPSB Guiding Principles

- **2006 HPSB GPs: “Federal Leadership in High Performance and Sustainable Buildings” has five Guiding Principles:**

- **Employ integrated design**
- **Optimize energy performance**
- **Protect and conserve water**
- **Enhance indoor environmental quality**
- **Reduce the environmental impact of materials**

MOU had general principles with no point system or criteria

- **Industry best practice for measuring facility’s sustainability is USGBC’s LEED-EB Rating System**

- **Sustainable Site Management Practices**
- **Water Efficient Practices**
- **Energy Efficient and Low Air Emissions**
- **Environmentally Sensitive Materials, Resources and Operations**
- **Productive and healthy indoor environment**
- **Best management practices (innovative) facility management**

LEED-EB has established credit scoring system and technical criteria

DOE HPSBWG is recommending using LEED-EB (O&M) credits to demonstrate achieving HPSB principles (still being refined)



DOE EM HPSB Assessment Approach for Existing Buildings



- Buildings > 1,000 gross square feet.
- Exclude building that is excess, shutdown and utility service disconnected.
- Exclude Buildings that are out-granted in their entirety to an entity outside the DOE who is wholly responsible for all costs as long as the out grant exists beyond FY2015.
- Exclude buildings in shutdown pending disposition status as long as the disposition is planned to occur before FY2015.

- Organize assessment team
 - LEED AP
 - Bldg engineer
 - Procurement Officer
 - Energy mgr
 - FIMs/CAS mgr
- Review DOE HPSBWG implementation guidance and LEED EB checklist
- Answer all LEED-EB questions best of ability with existing information (yes, maybe, no)

- Estimate cost (10 year net) and schedule to achieve each LEED-EB credits related to HPSB criteria
- Rank buildings to identify the lowest cost per GSF to achieve HPSB criteria
- Verify documentation and calculations for selected buildings

- Refine project cost estimates and schedule for selected buildings
- Include cost and schedule in 10 Year Site plans

- Implement projects in priority order
- Publish lessons learned
- Track and report performance

Federal Guiding Principles (GPs) for High Performance Sustainable Buildings

HPSB Guiding Principles and Relationship to LEED-EB



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- **Assemble Team**
- **Review HPSB guidance from DOE and LEED References**
 - **I. Employ Integrated Design Principles**
 - **II. Optimize Energy Performance**
 - **III. Protect and Conserve Water**
 - **IV. Enhance Indoor Environmental Quality**
 - **V. Reduce Environmental Impact of Materials**
- **Use DOE Checklist to Assess HPSB Conformance and LEED EB Score**



HPSB GP1 Integrated Design

HPSB Principle	LEED Credit for U.S. Department of Energy*	Assessment Requirement	notes/comments	Relates to other LEED credits	General Comments from Sites/Webinars
1. Employ Integrated Design Principles					
Integrated design	IO Credit 2: LEED Accredited Professional	Create an inter-sustainable team including a LEED AP assigned to project	While LEED AP does not guarantee an integrated design a LEED AP and a project team promotes such an approach		1. Create Project Team. 2. Using LEED process promotes integrated design. 3. GP modification should include LEED AP req. 4. Develop sustainable criteria within 10 year site plan
Commissioning	EA Credit 2.1: Existing Building Commissioning: Investigation & Analysis.	Conduct a commissioning plan and list operating problems and identify operating improvements. In-house personnel or team acceptable. Commissioned buildings in the last 3 years acceptable. Buildings commissioned greater than 3 years ago need to develop a plan to Commission Buildings again before 2015	<input checked="" type="checkbox"/>	Energy. Prereq. 1 Energy Efficiency Best Management Practices	Notes: case study on commissioning
	EA Credit 2.2: Existing Building Commissioning: Implementation	For new systems - immediately rectify issues with installation contractor. For existing systems implement minor improvements and identify planned capital projects to ensure that the buildings major-using systems are repaired, operated and maintained effectively to optimize energy performance. Repair any items related to moisture control.	The GP states, "verification of the installation and performance of systems to be commissioned."		1. Who in-house. 2. Should there be skill level. 3. Site determines responsibility



Optimize Energy Performance

HPSB Principle	LEED Credit for U.S. Department of Energy*	Assessment Requirement	notes/comments	Relates to other LEED credits	General Comments from Sites/Webinars
2. Optimize Energy Performance					
Energy Efficiency	EAc1.1-15; Energy Optimization: Document a 69 Energy Star rating (or non-rateable document 19% better than national average via Portfolio Manager, or document 30% from baseline).	Register with Energy Star's Portfolio Manger to Benchmark (applicable buildings) and print out the Statement of Energy Performance and/or document through meter data, bills, energy usage modeling software, or ESCO data	There are multiple ways allowed to use Portfolio Manager. However if not appropriate for the Building, document the 30% savings.	EAc1.1-15; Energy Optimization: Two points and a score of 69 is required. Up to 15 points are available.	1. Target for revised GP 2. Is there or can there be developed a benchmark of DOE labs. 3. Labs21 energy performance; Highlight additional performance measures
Measurement and Verification	No LEED Credit identified	Conduct benchmarking and Install building level metering to provide accurate energy use information to support energy management and identify opportunities for additional energy-saving improvements.	GP states, ... "install building level utility meters in new major construction and renovation projects to track and continuously optimize performance. Compare actual performance data from the first year of operation with the energy design target. After one year of occupancy, measure all new major installations using the Energy Star® Benchmarking Tool for building and space types covered by Energy Star®.	EA Credit 3.1 Performance Measurement, Building Automation Systems (BAS): For major installation of new systems; EA 3.2 & 3.3 Performance Measurement: System-Level Metering, 40% and/or 80%	metering requirements in place; 2. recommendations for 20 % by 2015 (H.R. 2007 states 30% savings for agency by 2015



HPSB Principle	LEED Credit for U.S. Department of Energy*	Assessment Requirement	notes/comments	Relates to other LEED credits	General Comments from Sites/Webinars
3. Protect and Conserve Water					
Indoor Water	WE Credit 2.2: Additional Indoor Plumbing Fixture Efficiency, 20 %	Show a 20% reduction of fixture potable water use from the calculated fixture water usage baseline (Energy Policy Act of 1992).		Prereq.1:Minimum Indoor Plumbing Fixture Efficiency and WEc2.1 Additional water Efficiency 10%. This credit would be achieved because of the higher GP requirement	1. Does process water savings count? 2. Site impacts/campus setting? 3. Would process water savings relate to LEED IO credit
Outdoor Water	WE Credit 3.1 Water Efficient Landscaping, Reduce by 50%	Show a 50% reduction in potable water use for irrigation over conventional means of irrigation. See LEED EB Reference Guide - WE Credit 3.1 for details on procedure and calculation.		WEc3.2 and WEc3.3 Water Eff Landscape - Reduce Potable Water by 75% and/or 100%. Additional water saving credits	1. Describe conventional baseline for landscape water
Reduce storm water runoff	SS Credit 6: Storm-water management	Employ design and construction strategies that reduce stormwater run off and polluted site water runoff. LEED calculators may be			1. active box? 2. Identify as campus setting, Target for revised GP



HPSB Principle	LEED Credit for U.S. Department of Energy*	Assessment Requirement	notes/comments	Relates to other LEED credits	General Comments from Sites/Webinars	
4. Enhance Indoor Environmental Quality						
Ventilation and Thermal Comfort	IEQ Prereq 1: Outside Air and Exhaust	Document compliance with ASHRAE Standard 55 & 62.1			Target to add non smoking: LEED distance from door; what is current DOE/federal policy??	
	IEQc2.3 Occupant Comfort Thermal Confort Monitoring					
Moisture Control	No new LEED credit. Met by Commissioning and Ventilation and Thermal Comfort criteria.	Establish an ongoing plan for preventing moisture accumulation and mold in the building through commissioning and implementation of ASRHAE standards 55 and 62.1. This criteria is met only after Commissioning, Ventilation and Thermal Comfort specifications are met.	The intent is to establish a plan to prevent moisture accumulation.	EQc 1.2: Best Management Practices:Outdoor Air Delivery Monitoring	Recommend delete LEED reference; compare to the commissioning and the ASHRAE standards	
	IEQ Prereq 1: Outside Air and Exhaust*					
	IEQc2.3 Occupant Comfort Thermal Confort Monitoring*					
	EA Credit 2.1: Existing Building Commissioning: Investigation & Analysis*					
Daylighting	IEQ Credit 2.2 Occupant Controlled Lighting	Document individual lighting control for 50 % of occupants (such as with task lights)				
	IEQ Credit 2.5: Daylight & Views: 50%, Daylight/45% Views 90 %	Perform visual inspections, take photographs, calculations, computer simulation and/or use light meters to record compliance.			target for revised GP	Mission impacts: If site can not meet due to mission;
	IEQ Credit 2.5: Daylight & Views: 75% Daylight/90% Views				target for revised GP	
Low-Emitting Materials	MR Prerequisite 1 Sustainable Purchasing*	Utilize the LEED Template calculator or keep records of material spec sheets that specify materials and products with low pollutant emissions, including adhesives, sealants, paints, carpet systems, and furnishings.	Multiple LEED EB credits deal with low emitting materials. Criteria relates to Recycled Content and Biobased Content		ADD IEQ Green Cleaning Policy	
	MR Credit 2.2: Sustainable Purchasing Durable Goods -- Furniture (40% of total purchases)*				Add Energy Star purchases-- recommendation to include 2.1	
	MR Credit 3: Facility Alterations & Additions(50% of total purchases)*					
	IEQ. Prerequisite 3. Green Cleaning Policy					
Protect Indoor Air Quality during Construction	IEQ Credit 1.5 IAQ Best Management Practices for Facility Alterations	Develop an implement an indoor air quality management plan for current or future facility aletion projects following the criteria outlined in LEED EB IEQ Credit 1.5	Applys when construction occurs		target for revised GP	





Reduce Env. Impact of Materials

HPSB Principle	LEED Credit for U.S. Department of Energy ¹	Assessment Requirement	notes/comments	Relates to other LEED credits	General Comments from Sites/Webinars
5. Reduce Environmental Impact of Materials					
Recycled Content Biobased Content	MR Prerequisite 1: Sustainable Purchasing Policy ¹	Reduce the impacts of the materials acquired for use in operations and maintenance of buildings. Sustainable Purchasing Policy, Durable Goods-Furniture and Facility Alterations and Additions are met under Low-Emitting materials.	Multiple LEED EB credits deal with low emitting materials. Site wide policy is acceptable. Additional requirements for LEED EB	40% requirement	
	MR Credit 1.1 Sustainable Purchasing, Ongoing Consumables, 40%				
	MR Credit 2.2: Sustainable Purchasing Durable Goods -- Furniture (40% of total purchases) ¹				
	MR Credit 3: Facility Alterations & Additions(50% of total purchases) ¹				
Construction Waste	MR Credit 9. Solid Waste Management – Facility Alterations & Additions 70%	Document that at least 50 % of waste from facility alterations is being diverted from landfills (receipts from recycling facilities,etc). Have a plan in place for future building alterations.	GP 50%		
Ozone Depleting Compounds	EA Prerequisite 3. Refrigerant Management - Ozone Protection	Document zero use of CFC-refrigerants unless a third party audit shows that a replacement or conversion is not economically feasible - in which case show that a phase out plan is place. Follow the provisions of the following: FAR 52.223-11 Ozone depleting Substances, FAR 52.223-12 refrigeration Equipment and Air		EAc 5. Refrigerant Mangement if no CFCc, HCFC or halons are used	



DOE Assessment Checklist

		LEED for Existing Buildings: O&M Project Checklist				
Worksheet Key						
HPSB Column: Guiding Principles						
Maybe Column: Potential Achievable Points						
N/A Column: Points Not Applicable or Achievable						
Project Name:						
Project Address:						
Points and LEED Prerequisites related to req. Guiding Principles - highlighted in Yellow						
YES		Maybe		N/A		
Certified: 34-42 points, Silver: 43-50 points, Gold: 51-67 points, Platinum: 68-92 points						
Percent of HPSB Guiding Principles Achieved					100.00%	
1	0	0	Sustainable Sites	12 Points	HPSB	
			SSc1 LEED Certified Design and Construction	1	Enter check mark into boxes below for each HPSB Guiding Principle achieved	
			SSc2 Building Exterior and Hardscape Management Plan	1		
			SSc3 Integrated Pest Management, Erosion Control and Landscape Management Plan	1		
			SSc4.1 Alternative Commuting Transportation - 10%	1		
			SSc4.2 Alternative Commuting Transportation - 25%	1		
			SSc4.3 Alternative Commuting Transportation - 50%	1		
			SSc4.4 Alternative Commuting Transportation - 75% or greater	1		
			SSc5. Reduced Site Disturbance - Protect or Restore Open Space	1		
1			SSc6 Storm Water Management	1		<input checked="" type="checkbox"/>
			SSc7.1 Heat Island Reduction - Non-Roof	1		
			SSc7.2 Heat Island Reduction Roof	1		
			SSc8 Light Pollution Reduction	1		

- DOE's HPSB checklist is a subset of LEED-EB Framework (users answer 22 of LEED-EB's 88 credits to get HPSB %)

- Goal: DOE must have 15% of building (by gross square feet) inventory meet 100% of GPs

Walk through handouts

Using EM Facility Selection Criteria Review of Sample Data from Hanford Site Assessment



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Sample Baseline Hanford Assessment Score

- **Going through 22 point HPSB GP checklist, staff can determine the number of guiding principles that each building could potentially meet**

Site	FIMS Property ID	GPs ¹	LEED-EB Level ^{2,3}
ORP	2704HV(office)	81%	39
	2750E	81%	32
Richland	6266 (lab)	71%	32
	2101M(warehouse)	62%	31
	2711(garage)	62%	27
	6290(maintenance shop)	86%	34
	6091(training)	81%	33
	2266E maintenance shop)	86%	34
	6092 (training)	86%	34

NEW LEED EB “certified” = 34 points

¹Each facility (in the 15% inventory) has to have GPs score of 100%.

²Preliminary LEED EB certified points must be a minimum of 34 points out of a possible 92. This is a very rough estimate on the LEED EB score for these facilities - the prerequisites for some of the LEED EB criteria must be verified by the facility person.

³Results of beta test of assessment tool results in March - May 2008, the average DOE GPs score is 85% - majority of the assessments performed on newer facilities.



Hanford Sample Building Prioritization Analysis

Site	FIMS Property ID	% HPSB GPs ¹	Initial LEED-EB (cert >33)	Est Cost to Achieve HPSB	Est Cost to Achieve LEED EB Cert Score	Bldg GSF	\$/GSF to Achieve HPSB
ORP	2704HV(office)	81%	39	23,000	23,000	121,040	\$0.19
	2750E	81%	33	18,550	18,550	96,787	\$0.19
Richland	6266 (lab)	71%	33	274,250	24,250	39,961	\$6.86
	2101M(warehouse)	62%	31	275,100	25,000	155,422	\$1.77
	2711(garage)	62%	27	33,250	36,250	39,645	\$0.84
	6290 (maint shop)	86%	34	268,550	18,550	33,036	\$8.13
	6091(training)	81%	33	16,250	17,000	35,099	\$0.46
	2266E (maintshop)	86%	34	268,550	18,550	33,036	\$8.13
	6092 (training)	86%	33	16,250	17,000	35,592	\$0.46

Goal is 15% by GSF – so look for cost-effective way to achieve HPSB



Next Steps and Discussion

- **Complete assessment for selected bldgs**
- **HPSBWG publishes detailed implementation guidance**
- **EM assessing secure web-based self assessment tool for EM buildings**
 - **Enables site building managers to**
 - Use series of yes & no questions to self assess initial LEED EB score and % HPSB conformance
 - Provide prioritized list (based on expected costs & benefits) of credits not achieved
 - Provide recommended technologies and reference guidance for achieving each credit
 - Enables tracking of cost estimates for achieving each credit
 - **Enable site portfolio manager to**
 - View status of multiple building assessments
 - Use LEED-EB internal score to identify best bldgs for achieving 15% requirement
 - Identify common credits needed across all buildings
- **Sites complete self assessment and identify candidate buildings**

Demonstration of LMI SBAT Tool



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