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Blazin' Trails to Energy Solutions!

Presented By:

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Federal Sustainability and LEED™ from an
Architect / Engineer's Perspective

Agenda

Federal Sustainability and LEED™

- Welcome
- Legislation and executive orders (EO)
- Guiding Principles / High Performance Sustainable Buildings (HPSB) Memorandum of Understanding (MOU)
- LEED™ new construction (NC) credits
- Existing building and future efforts
- Conclusion

Legislation and Executive Orders

Primary Drivers

- Energy Policy Act of 2005 (EPAAct 2005)
- Energy Independence and Security Act of 2007 (EISA 2007)
- Executive Order 13423 and 13514

Secondary Drivers

- Cost
- Energy security
- Environmental stewardship
- Sustainability

EPA Act 2005

- 30 percent improvement in building energy efficiency versus ASHRAE 90.1 2004
- Premium Motors, EnergyStar/FEMP Products
- Metering
- Recycled content in cement/concrete
- Sustainability in new and replacement buildings
- Water efficiency

EISA 2007

- Commissioning requirements
- Fossil fuel reduction (guidance still pending)
- Sustainability (10 CFR 433/435 rulemaking in progress)
- Stormwater pre-development hydrology
- Solar hot water heating

EO 13423 and EO 13514

Requires MOU for HPSB including numerous requirements in the following categories:

- Integrated design
- Energy performance
- Water efficiency
- Indoor environmental Quality
- Material selection



Challenges for A/E's

- “All Federal Requirements” portion of contract
- Federal rulemaking and recommendations
- Timing of project initiation and budgeting
- Guidance to UFC / template specs / design guides / etc, full flow-down and updates
 - UFC 3-530 Encourages Daylighting vs MOU required
- EISA fossil fuel reduction and stormwater requirements

Challenges – Agency-Specific Requirements

- Varying LEED thresholds and guidance by agency.
- Agency acceptance and guidance
- DOE Order 430.2b includes requirement for Guiding Principles and LEED Gold
- AF ETL 08-13 includes increased threshold for not adopting ground source heat pump

U.S. Green Building Council (USGBC), Green Building Certification Institute (GBCI), and LEED™

- Third party validation of sustainability metrics
- Widely accepted and implemented
- Agencies have adopted as a standard for NC

Federal Requirements and LEED™

- Federal requirements for sustainability exist
- Agency requirements for LEED™ exist
- Requirements closely mirror LEED™ credits in some cases, diverge in others

Approaches to address: bring together designers with specialists in renewables, commissioning, sustainability, LEED, and other areas

Summary of Overlap

- Broad overall sustainability requirements
- Specific metric-oriented requirements also exist
- Specific requirements with no metrics
- Similar metrics, differing calculations
- Similar requirements but still different enough
- Emerging requirements and guidance

Example Guidance

WBDG Combined Guidance Links:

- <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852>
- GSA LEED Applications Guide www.wbdg.org/ccb/GSAMAN/gsaleeda.pdf
- USAF Sustainable Design and Development Policy with point by point LEED scorecard indicating points supported by federal policy:
<http://www.afcee.af.mil/shared/media/document/AFD-080609-022.pdf>

USACE LEED™ Implementation Guide

https://eko.usace.army.mil/kd/go.cfm?destination=ShowItem&Item_ID=47308

DOE Guidance

http://www1.eere.energy.gov/femp/program/sustainable_buildings.html (FEMP Guidance)

https://www.directives.doe.gov/directives/current-directives/430.2-BOrder-b/at_download/file

(DOE Order 430.2b for DOE facilities)

Sustainable Sites



- **6.1 Quantity Control**
- **6.2 Quality Control**
 - EISA-required stormwater requirements should support pursuit of both points in most cases
 - EPA issued guidance relating to EISA 2007 as required by EO 13514 in December 2009:
http://www.epa.gov/greeningepa/documents/epa_swm_guidance.pdf

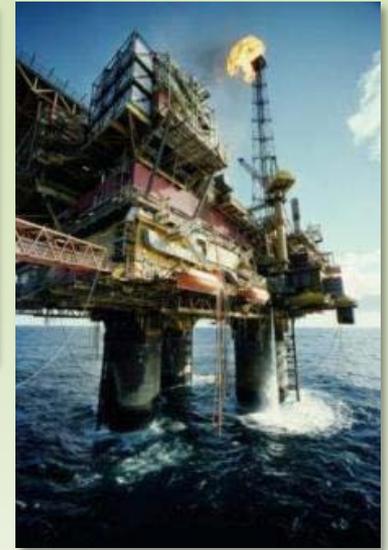
Water Efficiency (WE)

- *WE pre-requisite 1* water use reduction
- **WE 1 water efficiency landscaping**



- 20 percent reduction of potable water
- 50 percent potable water in landscaping reduction per MOU
- Lines up well with LEED 2.2 but may not be as consistent in LEED 3.0.

Energy and Atmosphere



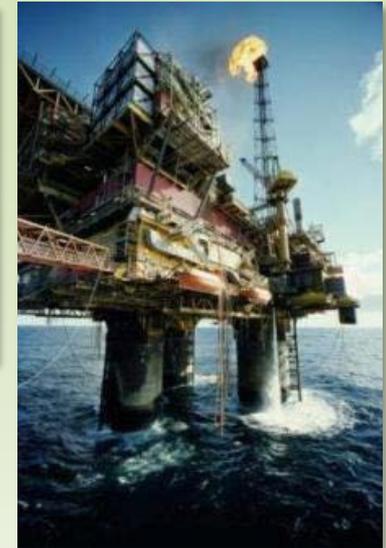
Energy and Atmosphere Prerequisites

- PR1 Fundamental Commissioning
- PR3 Fundamental Refrigerant Management

MOU requirements lines up well with each

- Consider added commitment through EA3 Enhanced Commissioning and EA5 Enhanced Refrigerant Management
 - May not be achievable due to project-specific conditions

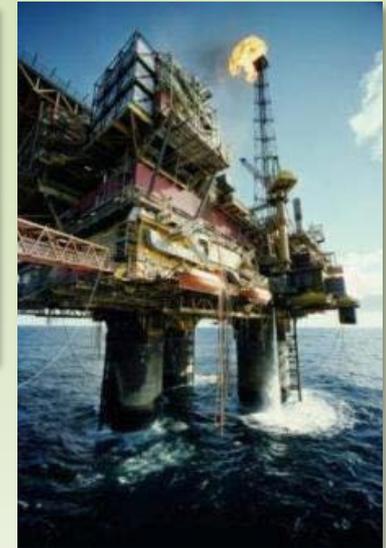
Energy and Atmosphere Cont'd



Energy and Atmosphere Credit: EA1 Energy Performance

- EPA Act 2005 and Guiding Principles call for 30 percent reduction versus ASHRAE 90.1 2004
 - LEED™ 2.2 uses ASHRAE 90.1 2004
 - LEED™ 3.0 uses ASHRAE 90.1 2007
- Handling of process loads

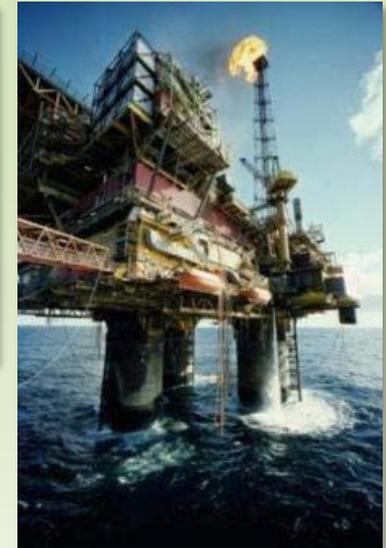
Energy and Atmosphere Cont'd



Energy and Atmosphere Credit: EA2 Renewable Energy

- EISA 2007 requires contribution from solar thermal (if life-cycle cost effective)
- Other technologies encouraged but not required if not life-cycle cost effective
- Certain approaches may meet federal renewable definition, but not LEED™

Energy and Atmosphere Cont'd

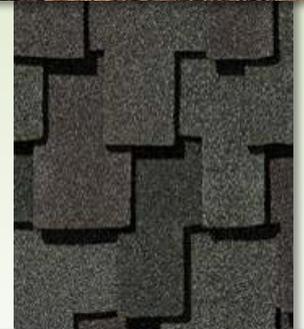
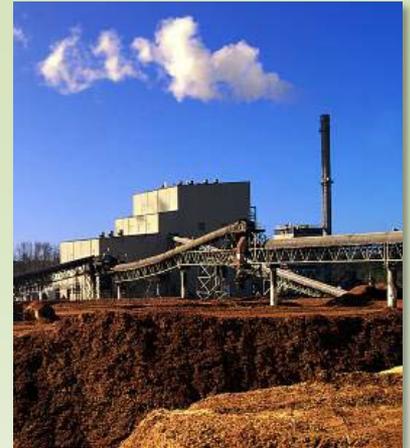


Energy and Atmosphere Credit: EA5 Measurement and Verification

- Sometimes avoided due to post-occupancy commitment, but supported by metering requirements
- Guiding Principles require post-occupancy activity including comparing performance with EnergyStar Target Finder projection (likely different than modeled energy consumption)

Materials and Resources

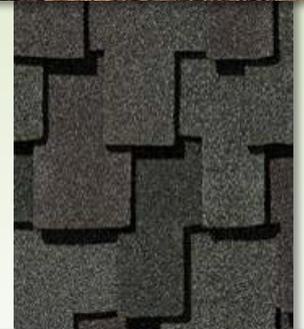
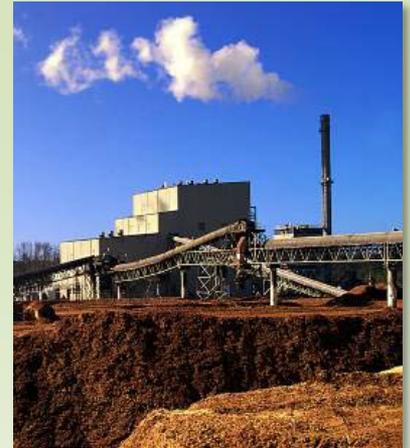
- **MR2 Construction Waste Management**
- **MR5 Recycled Content**
 - 50 percent waste diversion and 10 percent recycled content plus CPG per Guiding Principles
 - Lines up well with LEED™ if applied using LEED™ definitions
 - LEED™ only includes certain divisions in calculations; MOU says total project value



Materials and Resources

Cont'd

- **MR6 Rapidly Renewable Materials**
- **MR7 Certified Wood**
 - MOU calls for USDA biobased products, certified sustainable wood, and rapidly renewable products
 - Supports pursuit of MR7, but generally MR6 is not achievable due to minimum percentage requirements



Indoor Environmental Quality

- **EQ3.1 and EQ3.2 Construction IAQ Plan**
- **EQ4.1, 4.2, 4.3, and 4.4 Low Emitting Materials**
 - Guiding Principles requirements similar to each of these LEED™ credits
 - Specific low emitting materials requirements not defined in Guiding Principles



Indoor Environmental Quality Cont'd

- **EQ7.1 Thermal Comfort, Design**
- **EQ7.2 Thermal Comfort, Verification**
 - MOU requires ASHRAE 55 2004 and ASHRAE 62.1 2004
 - Agency may call for ASHRAE 62.1 2007; ASHRAE 62.1 2010 is in the mix
 - EQ7.2 at times has been avoided due to post-occupancy activity or testing
 - Similar activity required by ASHRAE standard



Indoor Environmental Quality Cont'd

- **EQ 8.1 Daylight and Views,
Daylight 75% of Spaces**
 - Guiding Principles requirements similar to LEED™ credits
 - Guiding Principles requires automatic dimming or similar



LEED Summary

- LEED 3.0 raises the bar in many cases. Drives need for new points that have historically been avoided due to cost, post-occupancy requirements, or other factors.
- 30 of 50 points to attain Silver under LEED™ 3.0 are required or similar to requirements in EPAAct 2005, EISA 2007, and Guiding Principles as required by EO 13423 and EO 13514
- Additional points are similar to requirements in these mandates, or supported by clauses in these or other requirements

Future Efforts

- Conflicting and overlapping energy calculations (EPAAct 2005 vs LEED vs EISA 2007 vs MOU, multiple versions of ASHRAE)
- Additional energy calculations once EISA 2007 fossil fuel reduction approach finalized
- GHG calculations and EO 13514
- How to apply the MOU to existing buildings?
 - Specifically ASHRAE 55, 62.1, and daylighting

Questions?

Energy Management, New Construction Sustainability, and Existing Building Sustainability

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