



# **An Introduction to Sustainable Facilities & Infrastructure**

*Training Outcomes and Recommendations*

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# Overview

- ◆ SFI training and its role in sustaining RAFB
- ◆ Training exercises and outcomes
- ◆ Barriers to implementing sustainability
- ◆ Recommended actions, goals, and objectives for RAFB (organization and projects)
- ◆ Discussion on next steps...

# SFI Training and its Role in Sustaining RAFB

- ◆ Training:
  - 35 RAFB participants
  - Two days of training and facilitated exercises
- ◆ Training Objective:
  - To provide an introduction to the concept of sustainability as it pertains to the built environment, along with an overview of basic tools and methods for sustainability implementation, assessment and evaluation, and economic analysis

# SFI Training and its Role in Sustaining RAFB

- ◆ RAFB Motivation for Sustainability:
  - Policy mandates
  - Mission, including health of the US and increased personnel productivity
  - Leadership
  - National strategic opportunity

# SFI Training Topics



- ◆ The Context for Sustainable Capital Projects
- ◆ Sustainable Facility Strategies
- ◆ Integrated Strategy Design
- ◆ Barriers to Project Sustainability
- ◆ Decision Making and Selection Strategies
- ◆ The LEED Green Building Rating System
- ◆ Economics of SFI
- ◆ Implementation: Avenues for Change

# Facets of Sustainable Facilities



- ◆ Site
- ◆ Energy
- ◆ Water
- ◆ Materials and Systems
- ◆ Indoor Environmental Quality
- ◆ Project Planning, Management, and Specs

# Facilitated Exercises

- ◆ The meaning of built environment sustainability
- ◆ Reactions to, benefits of, and risks of implementing sustainability
- ◆ Assessment of strategies for improving the training facility
- ◆ Ease of LEED point implementation in RAFB projects

# Facilitated Exercises

- ◆ Barriers to, benefits of, and next steps for implementing top-ranking LEED points
- ◆ RAFB recommended action items, benefits, required resources, and target dates
- ◆ Personal commitment input sheets, including benefits, required resources, and target dates

# The Meaning of BES

- ◆ Material durability (5)
- ◆ Energy effectiveness/efficiency for long term cost savings (5)
- ◆ Minimal, mitigatable environmental impact (4)
- ◆ Future generations in mind - modular design (4)
- ◆ Low resource use (4)
- ◆ Environmentally friendly (3)
- ◆ Recycled materials within reason (3)
- ◆ Long term economic maintainability/benefits (2)

# Implementing Sustainability: Reactions, Benefits, and Risks

- ◆ Optimism: “overall good idea with a desirable goal”, “right thing to do”
- ◆ Pessimism: “payoff is too low now”, “risk is much higher than benefits”, “will be like other government programs - all talk with no actual results”
- ◆ Realism: “extra time and effort - we already have a very heavy workload”, “there is no legitimate sense of urgency”, “must have top-level support to happen”, “will slow down the design process”

# Implementing Sustainability: *Reactions, Benefits, and Risks*

- ◆ Economic: “can create cost savings in some areas”, “reduced manpower/maintenance”, “lower cost in the future”, “energy savings”
- ◆ Social/Mission: “good publicity”, “more responsible use of resources”, “improve quality of life”, “better end products”
- ◆ Environmental: “better environment”, “decrease waste”, “less pollution”, “better use of energy resources”

# Implementing Sustainability: *Reactions, Benefits, and Risks*

- ◆ Uncertainty: “not guaranteed to succeed”, “unknowns”, “not enough”, “negative results/unintended consequences”, “no definite measurements/metrics”
- ◆ Organization: “commanders have a short term mentality and will not support if greater first cost”, “too time consuming”, “lack of full team participation”, “backlash to program when mistakes occur”
- ◆ Resources: “higher costs now”, “cost and time [may] lead to failure of projects”, “lack of materials availability”

# Improving the Classroom Building



- ◆ Carpet replacement with leased, recycled content carpet
- ◆ Changing roof to a lighter shade to reduce heat gain
- ◆ Insulation of the building envelope
- ◆ Lowering the dropped ceiling of conditioned areas of the building
- ◆ Installation of more efficient HVAC equipment
- ◆ Incorporating daylighting into warehouse spaces

# LEED: Ease of Implementation

A dark blue world map is visible in the background of the slide, showing the continents in a slightly lighter shade of blue.

## ◆ Sustainable Sites:

- Site selection (8)
- Reduce site disturbance (6)
- Reduce heat island effect - high reflectance roof (5)

## ◆ Water Efficiency:

- Water use reduction (17)
- High efficiency irrigation (12)
- Use of captured rainwater for irrigation (11)

# LEED: Ease of Implementation

A dark blue world map is visible in the background of the slide, showing the continents in a slightly lighter shade of blue.

- ◆ Energy and Atmosphere:
  - Optimize energy performance (13)
  - Measurement and verification of energy performance (11)
  - Eliminate HCFCs and halons (9)
  - Best practice commissioning (8)

# LEED: Ease of Implementation

## ◆ Materials and Resources:

- Building reuse (11)
- Use of local/regional materials (11)
- Resource reuse/salvaged materials (9)

## ◆ Indoor Environmental Quality:

- Temperature/humidity monitoring systems (9)
- Increase ventilation effectiveness (8)
- Low-emitting materials - paints (8)

# Implementing LEED:

## Barriers, Benefits, and Next Steps

- ◆ Affordability/cost effectiveness/lack of funding/increased cost (10)
- ◆ Poor performance/concerns with unproven technology/existence and availability of acceptable alternatives (7)
- ◆ Management approval/approval authority (4)
- ◆ Manpower/technical expertise/knowledge (3)

# Implementing LEED:

## *Barriers, Benefits, and Next Steps*

- ◆ Reduced costs/enhanced savings (9)
- ◆ Reduced resource consumption/enhanced conservation (7)
- ◆ Lower energy use/greater energy efficiency (6)
- ◆ Reduced waste (5)
- ◆ Enhanced compliance/reduced liability (3)
- ◆ Better comfort/air quality (2)
- ◆ Reduced environmental impact (2)
- ◆ Green (2)
- ◆ Reduced project time/faster delivery (2)

# Implementing LEED:

## *Barriers, Benefits, and Next Steps*

- ◆ Investigate costs and benefits/study process and technologies/research availability of materials and resources (7)
- ◆ Educate ourselves and customers/awareness training (4)
- ◆ Validate options to management/obtain management commitment (3)
- ◆ Program extra funds (2)
- ◆ Establish measurement/metering (2)

# Organizational Action Items

- ◆ Devise training/continuing education effort and educate all personnel
- ◆ Incorporate LEED scores for all major projects
- ◆ Report wins and provide cross-feed forums on successes
- ◆ Dedicate resources, human and otherwise, to implement and sustain sustainability
- ◆ Provide management support and commitment

# Organizational Action Items

- ◆ Adopt sustainable project procedures, technologies, tools, and methods and include them in all project language
- ◆ Establish a team to initiate and champion the sustainability implementation process
- ◆ Identify areas where sustainability is achievable now
- ◆ Program and design a prototype green project

# Personal Action Items

- ◆ Remain open-minded and suppress pessimism; be a proactive team player
- ◆ Support the efforts of organizational change agents
- ◆ Read sustainability articles/material; do research on the web
- ◆ Develop training briefings on sustainability
- ◆ Obtain information about successful projects

# Barriers to Implementing Sustainability for RAFB

- ◆ Perceived economic impacts
- ◆ Individual and/or organizational resistance to change
- ◆ Lack of necessary knowledge
- ◆ Lack of management buy-in
- ◆ Risk of failure
- ◆ Lack of appropriate measures of project success
- ◆ Lack of resources to implement sustainability concepts
- ◆ Unclear payoff/lack of incentives or rewards

# RAFB Goals and Objectives

- ◆ Establish a common vision and mission for sustainability for RAFB capital projects:
  - Draft a vision/mission statement, circulate for review, and revise as necessary
  - Revisit vision/mission annually and revise to reflect new knowledge or project experience

# RAFB Goals and Objectives

- ◆ Establish knowledge base:
  - Sustainable facility reference materials
  - LEED training for selected RAFB personnel
  - In-depth training on specific topics
  - Periodic refresher training for all personnel
  - Continued support for sustainability working group, with the authority to audit processes/projects and make recommendations for change

# RAFB Goals and Objectives

- ◆ Establish awareness of and alignment with sustainability vision/mission among *all* team members:
  - Web site/other materials to describe/explain sustainability vision and mission
  - Lunch n' learn sessions for project team and other RAFB personnel
  - Use of sustainability criteria for A/E/C and consultant selection

# RAFB Goals and Objectives

- ◆ Increase the sustainability of future projects:
  - Require minimum LEED rating
  - One project/year as showcase sustainable facility with interpretive displays/other publicity
  - Shift resources/responsibilities to allow for material and technology research
  - Sustainable design review criteria + responsibility for checking compliance + contractual penalties and rewards



Discussion of Next Steps...