

# The Cost of LEED: Silver for Free If...



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# Recent Studies that Address the Question of Cost

- California study of 33 LEED Buildings, October, 2003:
  - “The Costs and Financial Benefits of Green Buildings”  
A Report to California’s Sustainable Building Task Force
- FEMP study, October, 2003
  - “The Business Case for Sustainable Design in Federal Facilities”
- October 2003 USGBC GreenBuild Conference
  - “Defining LEED Costs for the USGSA”
  - “Managing the Cost of LEED”
- November 2003: Retroactive cost analysis for 3 Fermilab projects
- Ongoing Topic for List Serves and Journals



# FEMP Highlights

[www.eere.energy.gov/femp/techassist/sustainability.html#business](http://www.eere.energy.gov/femp/techassist/sustainability.html#business)

## Beyond first costs to Life Cycle Costs:

- Decreased energy and water costs
- Lower maintenance and repair costs
- Reduced absenteeism and increased productivity
- Increased building valuation
- Health, comfort and well-being of occupants
- Building safety and security, decreased insurance rates
- Lower air emissions
- Reduced solid waste generation
- Decrease natural resource use



# FEMP Prototype Building

Feature	First Cost	Annual Savings (\$/yr)
E2 Measures	+\$38,000	-\$4,300
Commissioning	+\$4,200	-\$1,300
Water efficiency	-\$590	-\$330
Landscaping and stormwater mgmt	+\$5,600	-\$3,600
Sustainable Materials	-\$51,000	-\$0
Subtotal	-\$3,790	\$9,530



# Challenges to Costing

- Many green buildings are one-time “showcase” projects
- There’s a learning curve cost for the first green building
  - Of a client
  - Of a design/architectural firm
- Relative newness of technologies and products can lead to over-sizing of systems or limited use of products, losing full cost benefits
- Estimators may add uncertainty factors for new technologies they are not familiar with

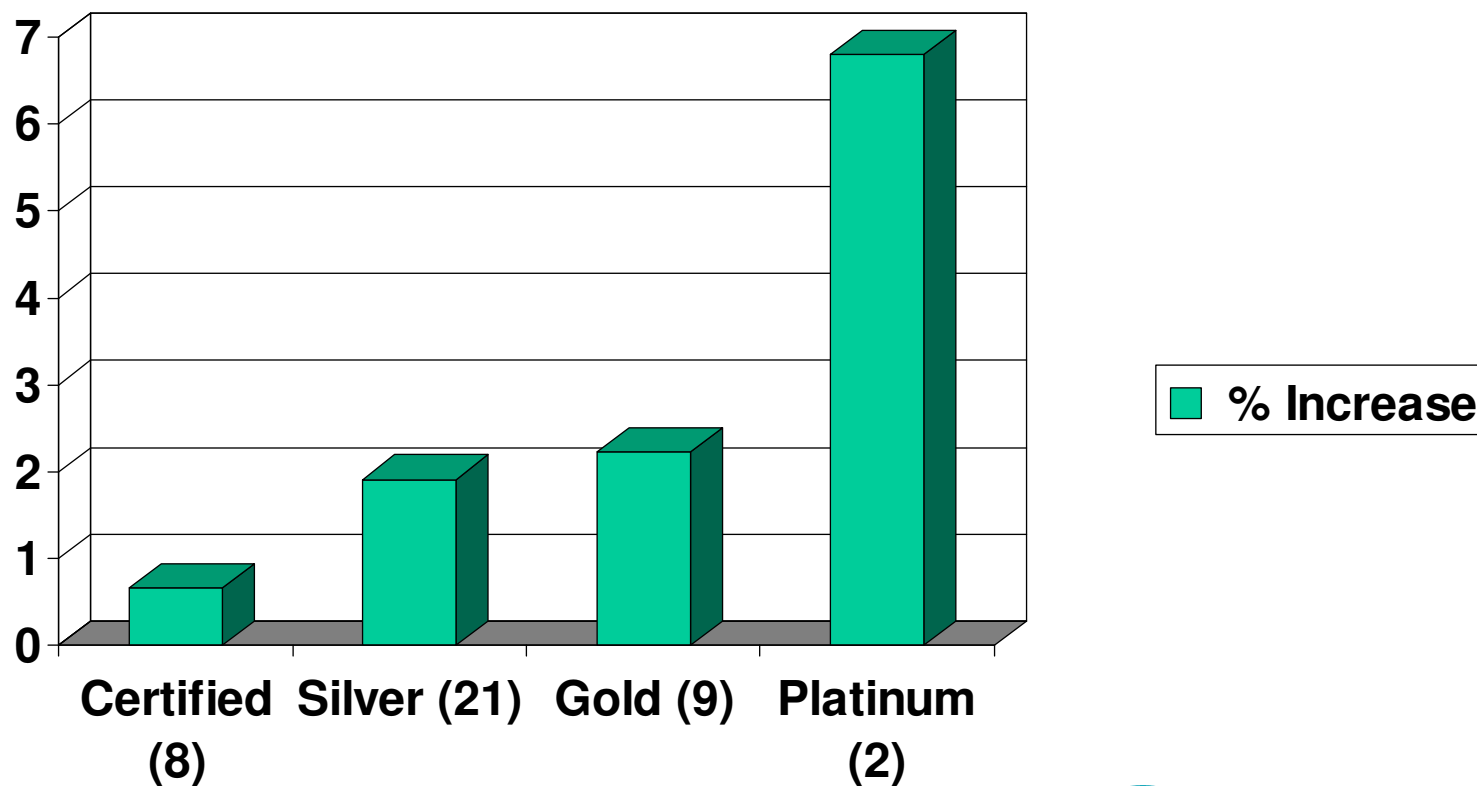


# Evidence of the Learning Curve

- Portland's 3 LEED Silver Buildings
  - 1995: 2% premium
  - 1997: 1% premium
  - 2000: 0% premium
- City of Seattle
  - Program onset (several years ago): 3-4% premium
  - Today: 1-2% premium



# Average Cost Premium vs. Level of Certification



# Case Study: ANL-CSF

## LEED Associated costs

- Consultants and commissioning \$75,000
- A/E effort additional options \$10,000
- Construction \$45,000
- LEED application effort \$38,000

Total \$168,000  
2.85% of TEC



# “Silver for Free” if...

- LEED Silver is required in the RFQ for the design team and embedded within construction documents, building construction, and commissioning;
- Design Team has sustainable design embedded within their culture
- Contractors, Property Managers, Real Estate Analysts, Budget Analyst, Crew Chiefs and Custodians are included on the Design Team.
- Selected strategies are “whole system” in nature and integrated design solutions are pursued that cannot be peeled off from the base project as “add alternates”.



# Costs are Reasonable When You Consider...

- Life cycle costs are below conventional buildings (2% first cost yields 20% life cycle savings)
- Energy:
  - On average, green buildings use 30% less energy
  - NPV of energy savings from green buildings is \$6.09/ft<sup>2</sup>.
- Water:
  - Typical green buildings cut water use by 50%
  - NPV is \$0.51/ft<sup>2</sup>



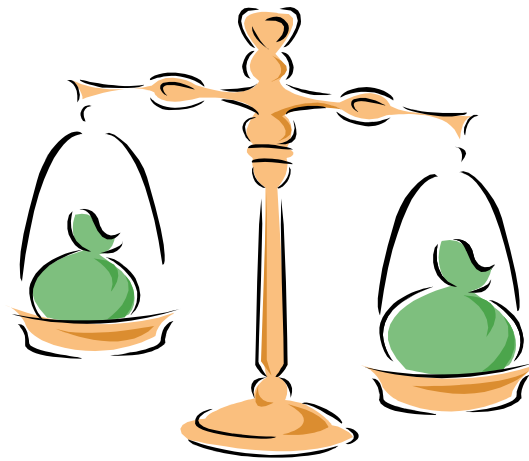
# Cost of Externalities

- Health, environmental, and property damage associated with pollution from burning fossil fuels
  - Regulations and emissions trading provides some tangible value to reductions in SOX, NOx, and PM10
  - The UN estimates the potential cost of global warming at over \$300 billion/year.
  - Total value for SOx, NOx, CO2, and PM10 reductions from green buildings is conservatively estimated at \$1/ft2.
- Productivity losses from poor IEQ
  - 1% to 1.5% productivity gain for LEED buildings
  - 20-year NPV is \$35-\$55/ft2



# Adding it All Up

Added Cost:  
\$3 - \$5 /ft<sup>2</sup>



Added Benefits:  
\$50 - \$65/ft<sup>2</sup>

# Common Cost Inflaters

- Lack of a clear green design goal
- Mid-stream attempts to incorporate green
- Decentralized management of the process
- Lack of experience with LEED
- Insufficient Time/Money



# Managing the Costs

## Don't even think of LEED unless...

- You have support from senior decision makers
- LEED can be started during conceptual design
- The project scope is significant, including systems and finishes
- The project can meet all of the prerequisites

## LEED Documentation Costs...

- As low as \$10,000 for an experienced team
- Most first-timers report costs of \$30,000 - \$60,000

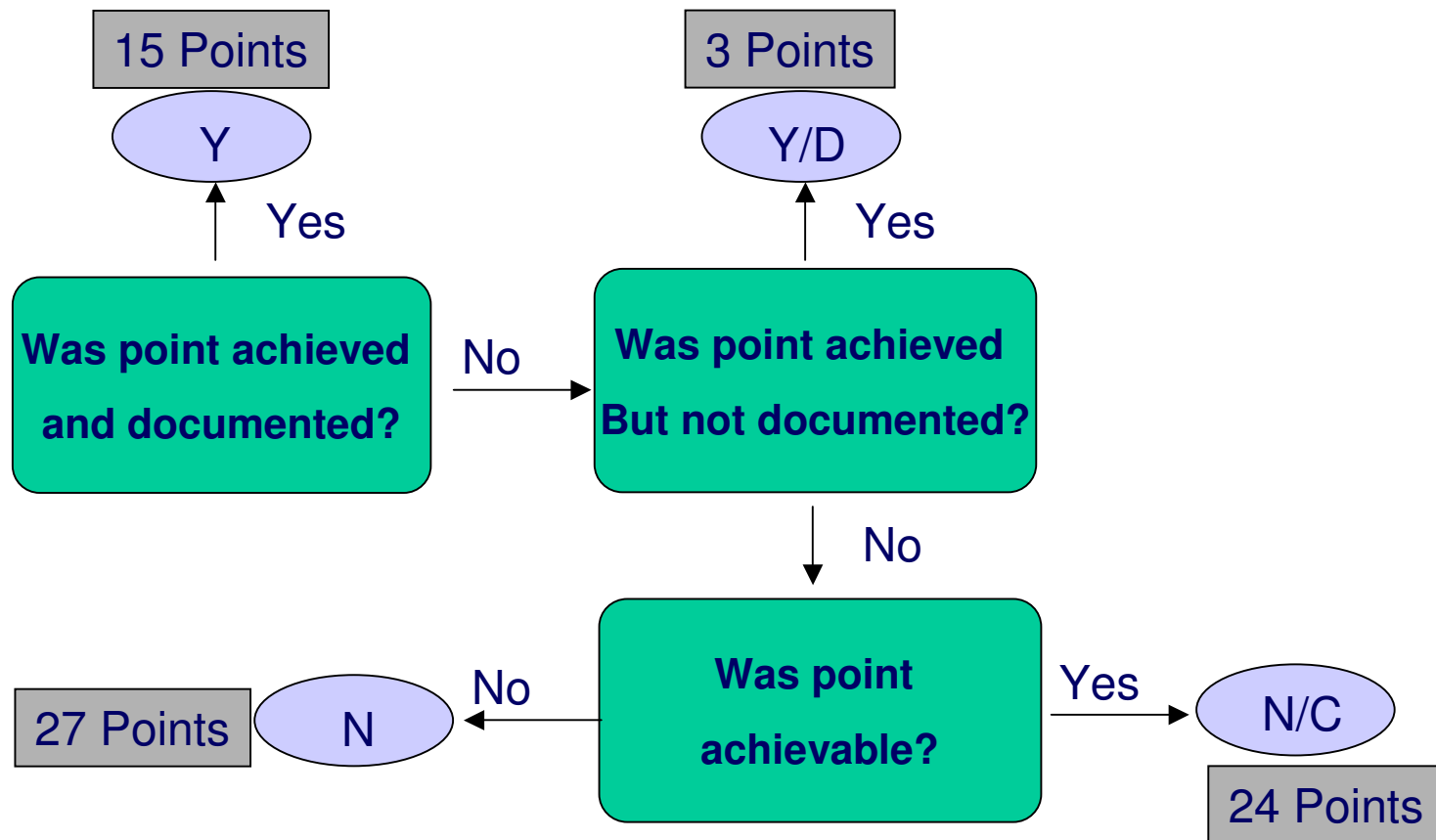




# APPLICATION OF LEED™ PRINCIPLES *to ANL & Fermilab Buildings*

## Cost Analysis for Lab-BEG

# Approach



# Costing Methods/Assumptions

- Feasibility-level cost estimates
  - Supplier quotes
  - Central Supply Facility Experience
- For each item costed, we considered:
  - Capital
  - Fermilab staff (@\$75/hour)
  - A/E hours (@\$75/hour)
  - Commissioning costs (@\$75/hour)
  - LEED documentation costs (@\$75/hour)
  - Lab Tax (@19%)



# Revised Score - Prerequisites

Starting Score: 15

Ending Score: 32

<b>Prerequisite</b>	<b>Recommendation</b>	<b>Cost</b>	<b>Revised Score</b>
EA 1	Add'l documentation for bldg cx	\$ 9,890	Yes
MR 1	Add glass to recycling service	\$0	Yes



# Revised Score – SS/WE/EA Credits

Starting Score: 15

Ending Score: 31

Credit	Recommendation	Cost	Revised Score
SS 4.2	Add bike rack, convert showers	\$ 2,266	1
SS 4.4	Striping and signage	\$ 460	1
SS 5.2	Add 350 ft2 to contractor's area	\$ 0	1
SS 7.2	Galvalume Energy Star roof	(\$15,000)	1
SS 8	Add shielding, change spacing	\$ 2,760	1
WE 3.1	See WE 3.2	\$ 0	1
WE 3.2	Waterless urinals, low flow faucets	\$ 1,600	1
EA 1.1	Inhouse DOE2 modeling	\$ 2,463	2



# Revised Score – MR/IEQ/ID Credits

Starting Score: 15

Ending Score: 31

Credit	Recommendation	Cost	Revised Score
MR 2.1	Develop/add Waste Mmgt plan, calcs	\$ 2,463	1
MR 4.1	Add 25% Recycled Content to project	\$ 1,265	1
MR 5.1	Add 20% locally manufactured	\$ 1,265	1
MR 5.1	See MR 5.1.	\$ 0	1
IEQ 7.2	Add rh sensor to control system	\$ 2,053	1
ID 1.2	Increase local mat'ls to 40%	\$ 1,265	1
ID 1.4	Show 29% downsize in scope	\$ 0	1

<b>TOTALS</b>	<b>\$12,750</b>	<b>31</b>
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# Does Sustainable Design Cost More?

