2008 Federal Environmental Symposium West

Green Building Case Studies at Sandia National Laboratories

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Presentation Overview

- Summary of Sandia Green (LEED certified) Buildings
- Comparison of LEED Point Goals from Design to Final Certification
- Summary of Green Features and Related LEED Credits
- Discussion of LEED Credit Opportunities (Good and Bad)
- Questions & Answers

Sandia Green Buildings

Sandia, New Mexico, has 5 LEED Certified Buildings

- CINT
- JCEL
- MFAB
- MLAB
- WIF

Environmental Management System
EMS
ISMS

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How Do We Know It's a Green Building?

Leadership in Energy & Environmental Design

A leading-edge system for designing, constructing, operating and certifying the world's greenest buildings.

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LEED for New Construction

- Green Building Rating System
- 7 prerequisites, 69 credits in 6 categories
- Six Categories:
  - **Sites**
  - **Water Efficiency**
  - **Energy and Atmosphere**
  - **Materials and Resources**
  - **Indoor Environmental Quality**
  - **Innovation in Design**
- Four levels of certification
  - LEED Certified 26 - 32 points
  - Silver Level 33 - 38 points
  - Gold Level 39 - 51 points
  - Platinum Level 52+ points (69 possible)

Sandia Green (LEED) Buildings

Project Title	Project Type	Gross S.F.	LEED Version	Certification Level
Center for Integrated Nanotechnologies (CINT)	Office/ Lab	97,294	LEED-NC 2.1	Certified
Joint Computational Engineering Laboratory (JCEL)	Office/ Lab	66,143	LEED-NC 2.1	Silver
MESA MicroFab (MFAB)	Lab	97,050	LEED-NC 2.0	Certified
MESA MicroLab (MLAB)	Office/ Lab	128,185	LEED-NC 2.1	Silver
MESA WIF (WIF)	Office/ Lab	164,539	LEED-NC 2.1	Silver

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LEED Certified

Center for **I**ntegrated **N**ano-**T**echnology

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Project Description

CINT

Features low vibration for sensitive characterization, chemical/biological synthesis labs, clean room for device integration, interaction areas and conference rooms, visitor office space, and high-speed communications.

- 97,294 GSF
- 153 Occupants
- $57M TPC - $365/S.F. Construction Costs

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LEED - Silver

Joint **C**omputational **E**ngineering **L**ab

Project Description

JCEL .

A State-of-the-Art Research and Development Facility for high-performance computer and communications technology to expedite the interchange of information.

- 66,143 GSF, including a 3,962 GSF CUB
- 175 Occupants
- $30M TPC - $280/S.F. Construction Costs

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LEED Certified

The World's First "green" semi-conductor plant

Mesa **M**icro **Fab**rication

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Project Description

MFAB .

Provides cleanroom space for semiconductor research and prototype development, and workspace to support approximately 50 personnel.

- 97,050 GSF, including a CUB
- 50 Occupants
- $79M TPC - $755/S.F. Construction Costs

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LEED – Silver

Mesa **M**icro **Laboratory**

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Project Description

MLAB .

Includes chemical, electrical, and laser light laboratories, workspace to support approximately 226 personnel, and an Education and Design Center.

- 128,125 GSF
- 226 Occupants
- $65M TPC - $286/S.F. Construction Costs

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LEED –Silver

Weapons **I**ntegration **F**acility

Project Description

WIF .

Includes advanced scientific visualization laboratories, primarily electrical and laser light laboratories, and workspace to support approximately 376 personnel.

- 164,539 GSF
- 376 Occupants
- $89M TPC - $346/S.F. Construction Costs

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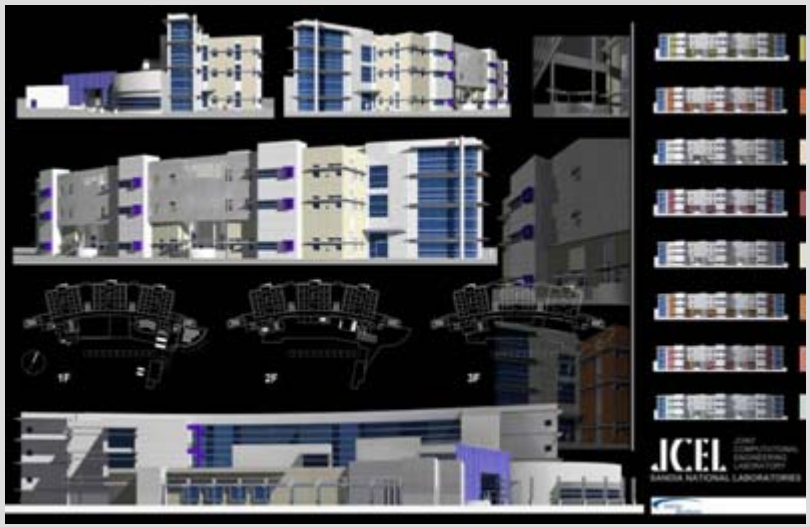
Process - Programming

SUSTAINABLE DESIGN CHARRETTE

- Project-specific design Charrettes with a focus on *integrated Sustainable Design (SD) strategies*
- Raises SD awareness and set the stage
- Preliminary and revised LEED scoring exercises



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Comparison of LEED Point Goals Design to Final Certification

Bldg	Design	Submitted	Awarded
CINT	35	33	28
JCEL	34	35	33
MFAB	36	34	28
MLAB	37	37	35
WIF	38	38	35

Sustainable Sites (SS) Category

Sustainable Sites (SS) Credit Points (14)	
CINT	6
JCEL	11
MFAB	6
MLAB	9
WIF	10

Sustainable Sites (SS) Credits

- Site Selection (1 pt)
- Urban Redevelopment (1 pt)
- Brownfield Redevelopment (1 pt)
- Alternative Transportation (4 pts)
- Site Development (2 pts)
- Stormwater Design (2 pts)
- Heat Islands (2 pts)
- Light Pollution Reduction (1 pt)

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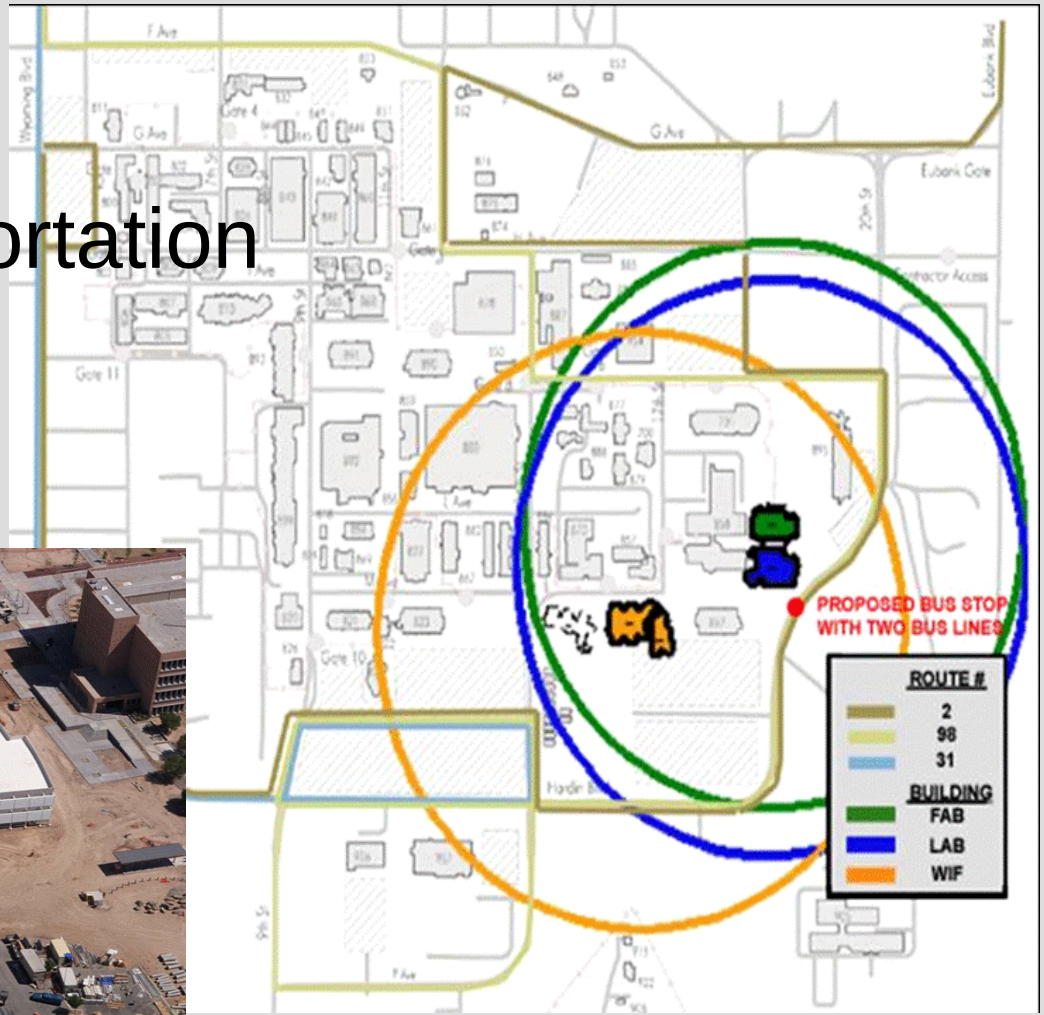
Common SS Credits

- Site Selection
- Alternative Transportation
- Heat Islands, Roof



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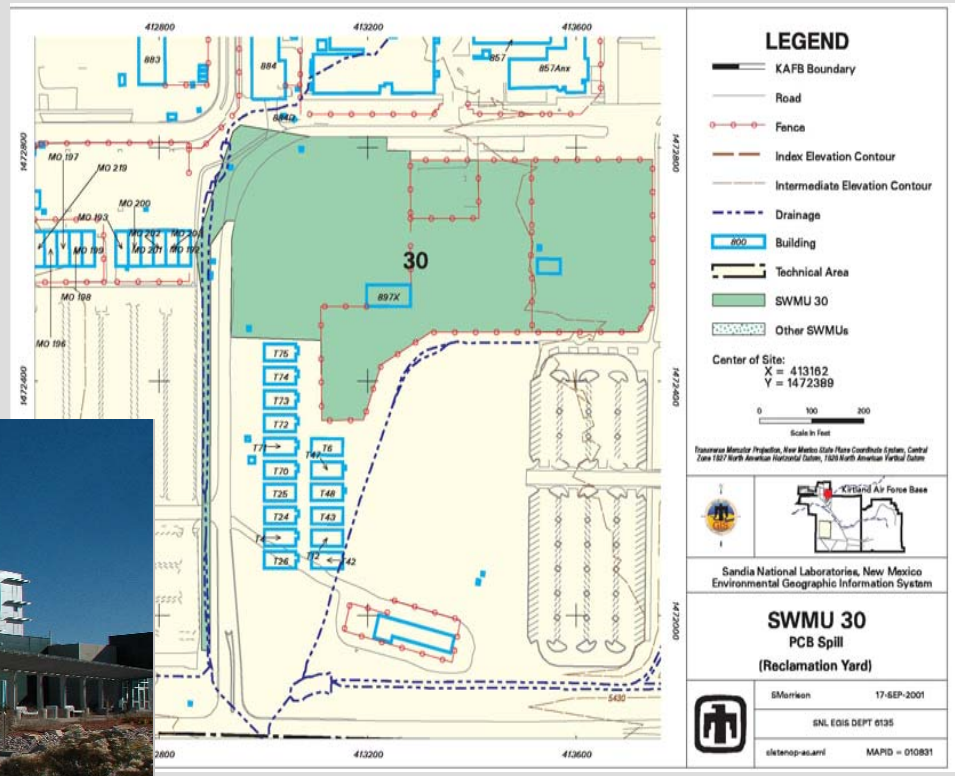
Some Unique SS Features

- Brownfield Redevelopment
- Stormwater Management



Water Efficiency (WE) Category

Water Efficiency (WE) Credits

- Water Efficiency Landscaping (2 pts)
- Innovative Wastewater Technologies (1 pt)
- Water Use Reduction (2 pt)

Water Efficiency (WE) Credit Points (5)	
CINT	3
JCEL	3
MFAB	3
MLAB	2
WIF	2

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Common WE Credits

- Water Efficient Landscaping
- Water Use Reduction

- Conventional toilets; 0.5 gpf urinals; 0.5 gpm restroom faucets

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Energy & Atmosphere (EA) Category

Energy & Atmosphere (EA) Credits

- Optimize Energy (10 pts)
- Renewable Energy (3 pts)
- Additional Commissioning (1 pt)
- Enhanced Refrigerant Management (1 pt)
- Metering & Verification (1 pt)
- Green Power (1 pt)

Energy & Atmosphere (EA) Credit Points (17)	
CINT	5
JCEL	8
MFAB	3
MLAB	7
WIF	7

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Common EA Credits

- Energy Efficiency
- Enhanced Refrigerant Management
- Additional Commissioning

Materials & Resources (MR) Category

Materials & Resources (MR) Credit Points (13)	
CINT	5
JCEL	2
MFAB	5
MLAB	7
WIF	7

Materials & Resources (MR) Credits

- Building Reuse (3 pts)
- Construction Waste Management (2 pts)
- Resource Reuse (2 pts)
- Recycled Content (2 pts)
- Regional Materials (2 pts)
- Rapidly Renewable (1 pt)
- Certified Wood (1 pt)

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Waste Management

Waste Management/Pollution Prevention

"Even if the contract didn't require waste management, I would still do it." Kable Oldham, Superintendent for Hansel Phelps

Each Project Recycled more than 75% of all Construction Waste.

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Indoor Environmental Quality (EQ) Category

Indoor Environmental Quality (EQ) Credits

- Carbon Dioxide Monitoring (1 pt)
- Increased Ventilation Effectiveness (1 pt)
- Construction IAQ Management Plan (2 pts)
- Low-Emitting Materials (4 pt)
- Indoor Chemical & Pollutant Source Control (1 pt)
- Controllability of Systems (2 pts)
- Thermal Comfort (2 pts)
- Daylight & Views (2 pts)

Indoor Environmental Quality (EQ) Credit Points (15)	
CINT	7
JCEL	8
MFAB	8
MLAB	8
WIF	8

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Common EQ Credits

- Construction IAQ Management
- Low Emitting Materials
- Lighting Controls

Innovation in Design (ID) Category

Innovation in Design (ID) Credit Points (5)	
CINT	2
JCEL	1
MFAB	3
MLAB	2
WIF	3

Innovation in Design (ID) Credits

- Innovation in Design (4 pts)
- LEED Accredited Professional (1 pt)

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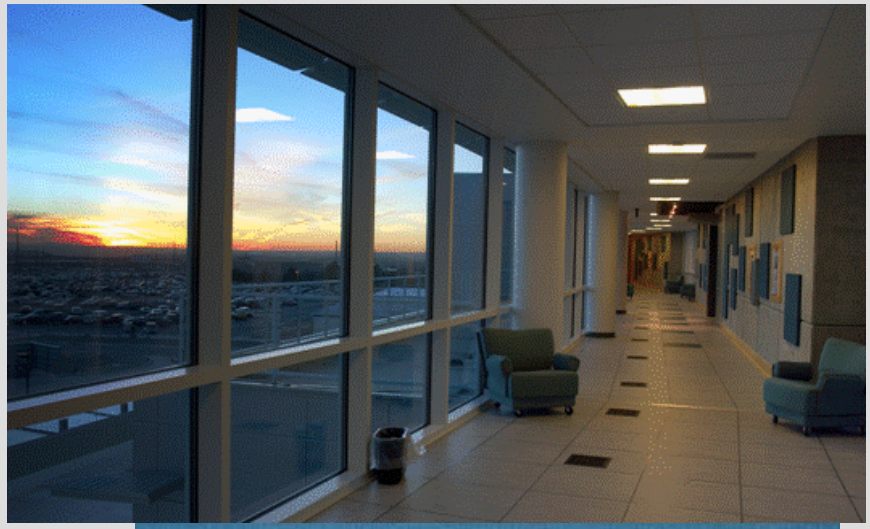
Opportunities for ID Credits?

- Exemplary Performance Credits
- Sandia Custodial Services Green Cleaning Program
- Awareness & Outreach

Lessons Learned

- Sunshade Integrate PV panels on JCEL
- Occupancy/Daylighting Controls in CINT
- Clear Skylight over TA Offices in MFAB
- Light Pollution Reduction???
- Daylighting & Views???



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Questions????