

Research Support Facility Sustainable Site and Building

LAB 3 TJ Bandrowski Wesley O'Brien Matt Garr

Building Description

Submitting Architect:
RNL

Project Completion Date:
June, 2010

Project Type:
Laboratory

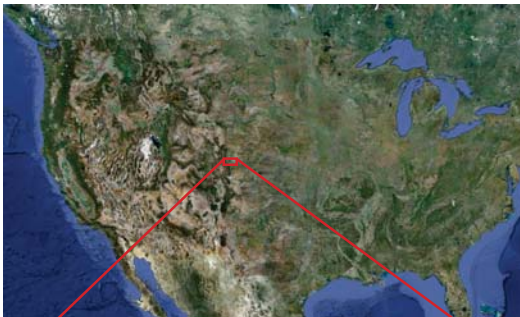
Building Gross Floor Area:
222,000 square feet

Total project cost at time of completion, land excluded:
\$64,000,000.00



Owned and occupied by the Department of Energy's National Renewable Energy Laboratory, the NREL is a government building designed to promote net zero sustainable strategies

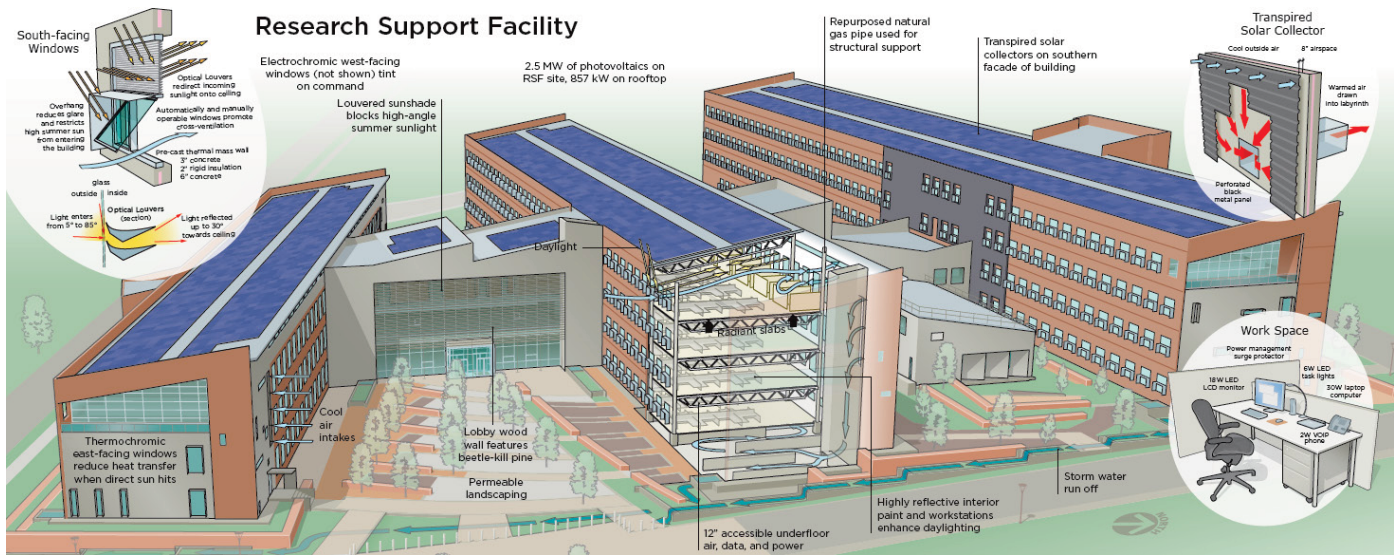
Site Location: Golden Colorado



Site Map



Sustainable Strategies



- Optimal Solar Orientation
- Manual and Automated Operable Windows
- Roof top PV array
- Transpired Solar Collector
- Plan layout that promotes day-lighting
- Passive Cooling and Heating Labyrinth
- Radiant floor heating and cooling
- Automatic tinting west windows
- Bioswale with native planting

Regenerative Analysis

Regeneration-Based Checklist for Design and Construction

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	Project:							
	degeneration	sustainability	regeneration					
	-100 always	-75 usually	-50 sometimes	0 balance	25 a bit	50 sometimes	75 usually	100 always
the site								
the building								

negative score
2200 possible
-75

positive score
2200 possible
975

final score: **900**

- Air Cleansing =0
 - No significant air cleaning on site.
- Water Cleansing =50
 - Promotes natural hydrology with permeable pavers, rain gardens and calculated roof collection given water usage, but given Colorado law, reuse is not allowed.
- Rainwater =75
 - No cisterns to hold water but water is directed for irrigation with care given to permeable surfaces to allow the water to naturally be held in the earth
- Food Production =-25
 - While no food is grown for human consumption, native species provide natural food to local ecology such as frequent deer visits on site to graze.
- Soil =25
 - Permeable surfaces as well as the promotion of natural rain flow maintain natural soil conditions.
- Waste =-25
 - 52% of on site waste is recycled, 29% composted with 19% solid waste sent to landfill.
- Wildlife Habitat =75
 - Supports natural ecology with the use of native species that is accessible to local wild-life.
- Energy =75
 - Large array of photovoltaic panels produce 35kBTu/ft2/year while the building's needs are 32kBTu/ft2/year with remaining being consumed by campus buildings.
- Transportation =-25
 - Alternative fuel fleet, carpooling and telecommuting reduce need on petroleum based fuels.
- Weather =0
 - Microclimate impact is minimal with very little paving and the use of natural vegetation around the site.

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Project:		sustainability								
		degeneration		sustainability			regeneration			
		-100 always	-75 usually	-50 sometimes	-25 a bit	0 balances	25 a bit	50 sometimes	75 usually	100 always
the site	pollutes air									
	pollutes water									
	wastes rainwater									
	consumes food									
	destroys rich soil									
	dumps wastes unused									
	destroys wildlife habitat									
	imports energy									
	requires fuel-powered transportation									
	intensifies local weather									
the building	excludes daylight									
	uses mechanical heating									
	uses mechanical cooling									
	needs cleaning and repair									
	produces human discomfort									
	uses fuel-powered circulation									
	pollutes indoor air									
	is built of virgin materials									
	cannot be recycled									
	serves as an icon for the apocalypse									
is a bad neighbor										
is ugly										

negative score 2200 possible	positive score 2200 possible
-75	975
final score: 900	

• Daylight =100

- 92% of occupied use is provided by natural daylighting achieved by solar orientation and light penetration maximums

• Heating =75

- Passive heating is achieved by a transpire solar collector from the building's envelope and the reuse of server room exhausted heat.

• Cooling =75

- Utilizes cross ventilation, shading devices, evaporative cooling tower and automatic tinting windows to reduce cooling load

• Maintenance =25

- Use of durable of materials as well as passive systems that require less maintenance.

• Human Comfort =50

- 60' deep office wings allow for natural daylighting with direct line of sight to the outside, air is constantly refreshed via natural ventilation, operable windows for personal comfort levels and an outdoor courtyard for social gatherings.

• Circulation =50

- Elevators are given no preference in layout with adjacent stairs within close proximity.

• Indoor Air =0

- Natural ventilation keeps indoor air quality fresh and interior materials were selected to have minimal air quality impact.

• Materials =25

- Building was constructed with recycled/reclaimed materials with consideration given to future recyclability.

• Recyclability =50

- Good majority of project is made of materials that can be recycled or reclaimed

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• Icon =75

- Was intended to serve as an icon for the sustainable practices of the (NREL) National Renewable Energy Laboratory.

• Neighbor =75

- Doesn't impact surrounding buildings on the campus in a negative manner.

• Aesthetics =75

- Maintains that sustainability can be done in a manner to produce results that are beautiful.

