



Project Summary

National Renewable Energy Laboratory Research Support Facility

The U.S. Department of Energy set a new standard with the design and construction of the Research Support Facility (RSF) on the National Renewable Energy Laboratory (NREL) campus in Golden, Colorado. The project goals included energy use below 25kBtu/sf, Net Zero Energy and at least a Silver LEED rating. The design team is anticipating these goals to be met and a LEED Platinum rating.

Daylighting Innovations provided daylighting design, simulation and analysis services for the project, electric lighting zoning and control consultation, and final LEED documentation.

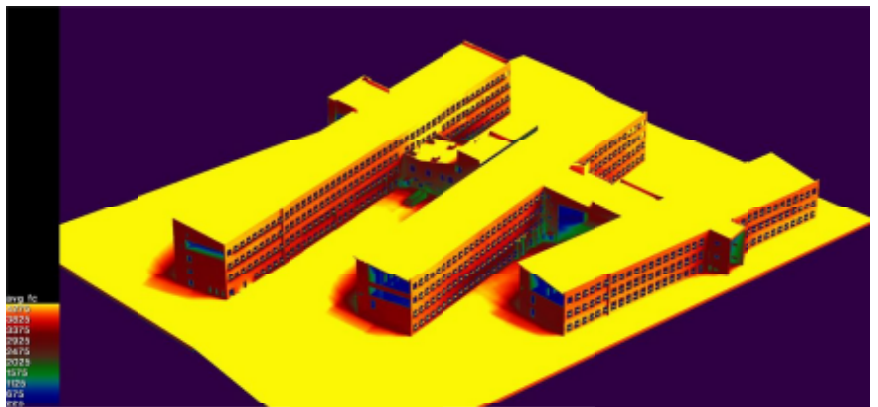
The building floor plate depth was studied early on to strike a balance between daylight saturation and construction efficiency. The interior furniture and office layouts were designed to allow for access to daylight and views for all occupants. Using the LightLouver Daylight System, a high level of daylight saturation is achieved for the open office plan that comprises over 75% of the buildings area. Solatubes and controllable fabric shades provide daylight with darkening for the buildings various conference rooms. A sloping roof on the top floor provides an optimal surface for the PV arrays that cover the entire project and allows for high north clerestory providing ample daylight for the upper floors. An interior photosensor system ensures the lights are turned off or dimmed in response to the abundant daylight.



Rendering of top floor executive suite



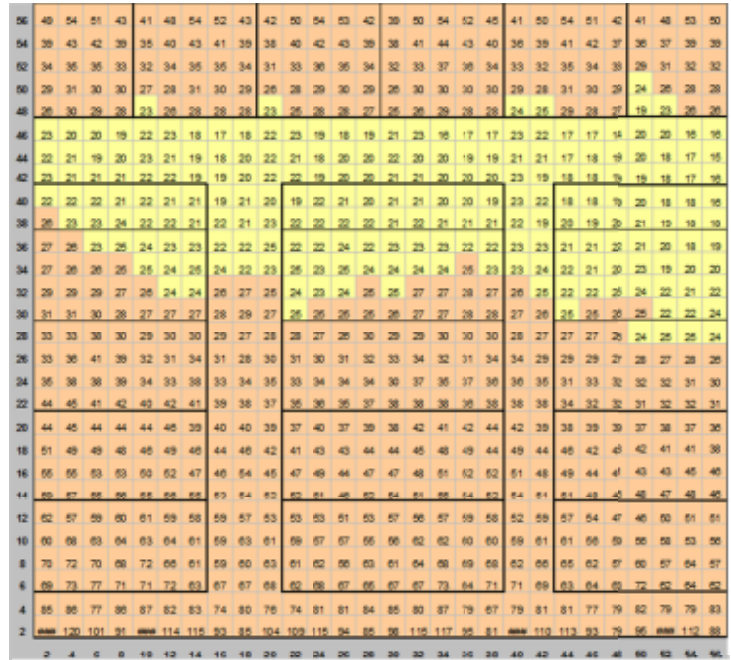
Rendering of open offices



Study of annual daylight availability

Daylighting Features:

- 93% overall building Daylight Saturation (30fc base)
- 55% overall building Daylight Autonomy (30fc base)
- LightLouver Daylighting System in south daylight windows
- Shaded south view windows with a perimeter walkway (eliminating the need for window shades)
- Dimmable Solatube skylights in conference rooms
- High north clerestories on top floor
- Closed-loop photosensor control of electric lighting



Daylight distribution calculations

Daylighting Challenges:

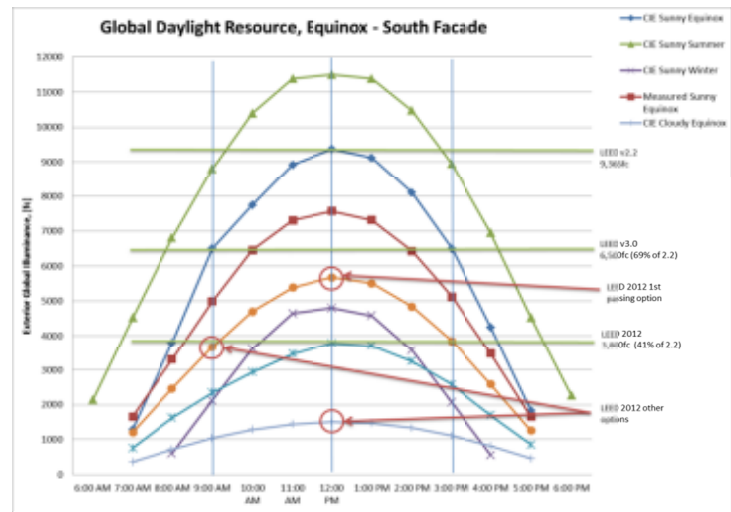
- Creation of detailed photometric files for the optically complex LightLouver system
- Development of an annual simulation method of the LightLouver system
- Integration of daylight simulation results with a DOE-2 whole building energy simulation
- LEED daylighting metric study resulting in Daylight Credit recommendations to the USGBC.



Rendering of Library

Project Design Team:

- Owner:** U.S. Department of Energy
- Architect:** RNL
- Electrical / Lighting Design:** RNL
- Mechanical Design:** Stantec
- Sustainability / Energy Consultant:** Architectural Energy Corporation
- Daylighting Consultant:** Daylighting Innovations



LEED metric daylight resource study