High-Tech Garage to Showcase Strategies for Reducing Energy

Even from a distance, the new structure being built on the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) campus won't look like an ordinary parking garage when finished. It won't act like one either. NREL's parking structure project is proving that large garages can be designed and built sustainably—at no additional cost. While meeting staff needs with up to 1800 parking spaces, this new structure will feature energy efficiency and renewable energy technologies and blend in with the natural landscape.

The new parking garage is scheduled for final completion and operation in early 2012 and will provide centralized parking for employees who work at the South Table Mountain campus, many of whom now park offsite and take shuttles to and from NREL.

Fast Facts

Parking Spaces:

- Approximately 1800
- 90 preferred spaces for carpooling and vanpooling
- 90 preferred spaces for low-emitting vehicles
- 36 electric vehicle charging stations

Energy Use:

Less than 160 kBTUs per parking space per year

Energy Performance:

90% more efficient than ASHRAE 90.1 standards

Solar Power:

1.13 MW

Construction Waste Recycled:

75% planned

Cost:

$14,172 per parking space*

*Cost for typical parking space: $15,500 to $24,500

NREL's new parking structure will be the next sustainable building to open on its permanent campus. *Computer rendering courtesy of RNL*

To encourage more sustainable forms of commuting, preferred parking will be provided for carpool and vanpool vehicles, low-emission vehicles, and motorcycles and bicycles. In addition, pedestrian walkways connecting the parking structure to individual buildings will encourage a "walkable" campus culture.

Saving Energy and Water

NREL's new parking structure is a showcase for energy efficiency and renewable energy technologies and water conservation.

Energy Efficiency

- Reduced lighting loads to be achieved through:
  - Daylighting (enhanced by large light wells and an open central atrium)
  - Occupancy and daylighting sensors that automatically turn on lights when needed
  - Highly energy-efficient LED lighting
  - Controlled parking using digital signs to indicate available parking—and reduce driving and emissions
- Reduced solar-gain and heat build-up in circulation area achieved with translucent skylights
- Reduced energy usage achieved by limiting the garage to two elevators and encouraging employees to take the stairs
- Natural ventilation achieved through sides that open to the elements, eliminating the need for a mechanical system

Renewable Energy

- Electricity requirements will be offset by renewable energy power production of 1.13 MW from photovoltaic panels on the rooftop and floor level; excess power will help offset energy use in the nearby Research Support Facility.

Water Conservation

- Storm water drainage system from the rooftop and surrounding areas to the detention pond being constructed to the southeast
- A drainage swale on the parking structure's south side to encourage ground infiltration of storm water and snowfall
- Native and drought-resistant vegetation.

Daylighting and open stairwells are designed to reduce lighting loads, elevator use, and energy use. *Computer rendering courtesy of RNL*

Building Materials

In addition to functional and aesthetic value, building materials were selected for sustainability and durability.

- The façade, clad with recyclable perforated aluminum, provides weather protection while maximizing daylighting and ventilation.
- About 35% of building materials are expected to contain recycled content.
- More than 10% of building materials are regionally available.
- Low-emitting materials do not release significant pollutants indoors.
- Building glazing will be lined with a ceramic striped pattern to reduce bird strike fatalities.
- A steel roof canopy will provide support for a photovoltaic array.
- Concrete beams along the perimeter will provide crash protection, guard against headlight trespass onto neighboring properties, and keep out uninvited wildlife.

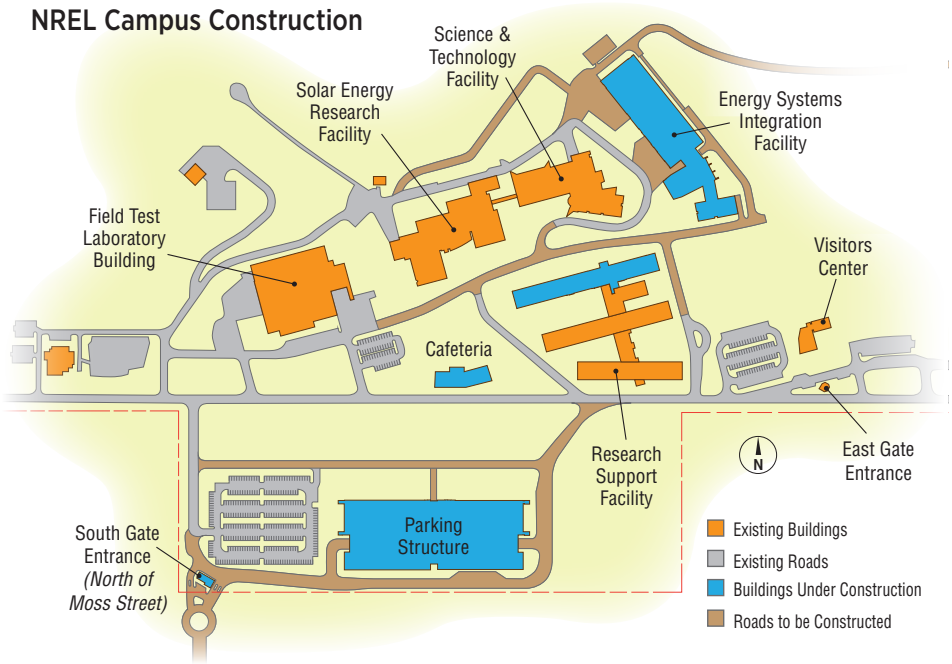
Minimizing Waste

About three-fourths of all building construction waste is being recycled and diverted from the waste stream.

Other Site Improvements

In addition to the parking garage, other site improvements include:

- New Site Entrance Building designed to achieve LEED® Platinum rating
- New south entrance road
- Expansion of the utility infrastructure
- Landscaping: Trees and shrubs to complement the native landscape and a rock garden at the central atrium space
- Recycling drop-off center for paper, plastic, glass, batteries, and electronics
- Protected shuttle stop for employees to access campus facilities and minimize vehicle traffic and emissions
- Parking for 30 bicycles, plus 20 lockers.



The new parking structure and south entrance are shown at the bottom of this illustration. See legend for more detail. *Illustration by Alfred Hicks, NREL*

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