

Laboratory Expansion Continues to Take Shape

NREL's South Table Mountain campus will be bustling with building activity for the foreseeable future as construction on the Laboratory's next sustainable facility begins in earnest.

The **Research Support Facilities (RSF)**, which broke ground in February, will house more than 700 NREL and Department of Energy-Golden Field Office staff. This 218,000 square-foot office building will be a showcase for energy efficiency and renewable energy technologies.

The final subcontract was awarded to the Haselden Construction and RNL team. Foundation work has begun and construction is scheduled to be complete in June 2010.

The preliminary design for the **Integrated Biorefinery Research Facility (IBRF)**, an expansion of the Alternative Fuels User Facility at the west end of the NREL campus, has been completed.

The IBRF will enhance NREL's biomass-to-ethanol research capabilities to develop new cellulosic ethanol technologies. Construction is scheduled to be complete in early 2010.



This image shows how the 218,000 sq. ft. Research Support Facilities will be sited relative to the Visitors Center and NREL's existing research facilities.

Request for Proposals for the **Energy Systems Integration Facility (ESIF)** is being finalized and a contract award is planned for late summer.

The ESIF will be a 150,000-square-foot building housing a variety of research that aims to overcome technical barriers to adding new renewable energy

generation systems to the electrical grid. It is expected to have laboratory and office space for about 200-250 NREL researchers and support staff.

NREL's **Mesa Top PV Project**, managed by DOE's Golden Field Office, was completed in December 2008. The project is expected to produce an estimated 750kW of clean, renewable

Continued on Page 3

Trail Access to Portions of South Table Mountain Available to Hikers and Bikers

Jefferson County Open Space recently opened trail access from Pleasant View to South Table Mountain, thanks to a new fence that was constructed on NREL property. Through a partnership with the Pleasant View Metropolitan District and DOE, which holds the management and operating contract for NREL, the public can now park at the Pleasant View community ball fields off of Old Golden Road and hike across NREL property to the South Table

Mountain Open Space.

The fence was completed April 17 and the trail opened the next day. The trail follows the NREL roadway and requires hikers and bikers to cross the road east of the NREL campus at the designated crosswalk. Portions of the mesa top continue to be privately held, so users are reminded to respect private property.

For additional information on Jefferson County Open Space, visit <http://openspace.jeffco.us>.

NREL Contact: If you have any questions about NREL's activities, contact Public Affairs Director Kerry Masson at 303-275-4083.

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Mobile Locator Available for Alternative Fueling Stations

Driving an alternative fuel vehicle used to require a little homework to find the nearest fueling station—but not anymore. Drivers on the go now can access DOE's Alternative Fueling Station Locator using a cell phone, BlackBerry, or other personal digital assistant. The station locator allows drivers to find the five closest biodiesel, electricity, E85 (ethanol), hydrogen, natural gas and propane fueling sites. Maps, detailed driving directions and an instant phone connection to the station can be accessed at www.afdc.energy.gov/stations/m/. ■

New Solar Technology Concentrates on Cost, Efficiency

It looks like a giant funhouse mirror. But the big new dish atop NREL's South Table Mountain site could be a renewable energy breakthrough that helps make concentrated solar power more affordable and appealing to utilities and their customers. For the next several months, NREL engineers will be testing the performance of SkyTrough, an innovative parabolic trough coated with a gleaming reflective skin instead of mirrored glass. The SkyTrough was developed by SkyFuel, an Albuquerque-based manufacturer with a research facility in Arvada, CO. The NREL test will span portions of at least three seasons to explore the unit's performance under a variety of weather conditions and sun angles. ■

NREL Assigns Renewables Experts to Hawaii, Alaska

NREL has dispatched clean energy experts to Hawaii and Alaska to work as advisors to local policymakers and utilities. Hawaii and Alaska both have considerable renewable energy resources, including solar, wind, geothermal, biomass and wave energy. And because of their remote locations, they have the nation's highest energy costs and rely almost exclusively on fossil fuels. In Hawaii, two NREL senior engineers

Continued on Page 3

Lab Tests Energy-Saving Office of the Future

Making sure the new Research Support Facilities (RSF) will achieve platinum level certification from the U.S. Green Buildings Council Leadership in Energy and Environmental Design (LEED®) takes not only planning — but practice.

NREL planners have set their sights on achieving a LEED platinum rating for the RSF, which means the building will meet the needs of the workforce — both current and future, maximize the efficiency of employee workspaces and make the best use of the space while using the lowest attainable amount of energy per square foot.

Reaching these goals will not be easy in a building as large as the RSF. The most dramatic change from a traditional office to NREL's office of the future can be seen in employee work areas. Frontline staff and supervisors will work in open air cubicles. Workstation panels are only 42 inches high and bookshelves between workstations top out at 54 inches.

The low cubicle walls are vital energy savers allowing for circulation of both air and light. Background office chatter is mitigated through white noise, which is incorporated into the building to help mute conversations. Employees who need privacy can use "huddle rooms," small conference rooms set aside for teams to have conversations in a quiet space.

Staff from NREL's Information Services office volunteered to prototype the new office design and moved into the Golden Hill Office Centre in Lakewood in November. The Golden Hill Office Centre was built in 1983 and recently received "LEED for Existing Buildings" status from the U.S. Green Buildings Council. ■

Bigger and Better: NREL Aims to Improve Giant Wind Turbines



Trucks capable of transporting wind turbine blades are some of the largest and heaviest vehicles driving on the nation's roadways.

If the U.S. is going to generate 20 percent of its electricity from the wind in the next 20 years, wind turbines will need to evolve in every way - larger, taller, less expensive, more reliable and more efficient.

At NREL's National Wind Technology Center, engineers are preparing to install the two largest turbines ever tested at the Laboratory. Key elements of a 1.5 MW General Electric turbine have begun arriving; instrumentation and equipment testing should begin by late summer. Installation of a 2.3 MW turbine from Siemens Power Generation is scheduled for late summer, too.

Both turbines will be erected on the NWTC's eastern perimeter, where they will run for years while serving as prominent sentinels overlooking metropolitan Denver.

The GE turbine will operate atop a 262-foot steel tower. The diameter of its rotor will reach 250 feet. Its total weight, including the tower, will approach 220 tons. The Siemens 2.3 MW turbine will be noticeably larger than the GE. It will use a similar tower, but its rotor diameter is a whopping 331 feet – more than the length of a football field.

Siemens is providing the turbine, engineering support and maintenance from its new R&D office in nearby Boulder. NREL is providing the site, installation services and expertise in field aerodynamics testing, structure and reliability testing and meteorological analysis. ■

Lab Preserves Nature, History

NREL's South Table Mountain campus teems with wildlife. Its dry landscape is home to more than 200 plant species. The site includes cultural gems that speak to the region's past. But NREL's growth for the future won't mean changing the nature of the place or ignoring its history. NREL staff is keeping a watchful eye to ensure that construction has minimal impact on the environment.

NREL's main campus sits on land owned by DOE. Because the site is largely undeveloped, NREL seized the opportunity to safeguard numerous species of plants and animals.

In 1999, DOE ensured the preservation of its piece of South Table Mountain along with its inhabitants by placing 177 acres under a conservation easement. This means that the land will not be developed and that habitat and visual panoramas on the mesa top will be kept as natural open space.

South Table Mountain provides a temporary home to a variety of migratory birds throughout the year. Wildlife surveys since 1987 have identified more than 50 species including raptors such as American Kestrels and nesting pairs of red-tailed hawks.

Preserving open space along South Table Mountain for migratory birds is important because many of the birds stopping by are just taking a breather during a trip than can cover thousands of miles each year.

The plants on the STM site provide habitat for winged visitors and homes for numerous smaller mammals such as deer mice and prairie voles. The plant life is consistent with what you would expect to see in grassland areas.

But don't think it's "only" grass — there are nearly 200 species of plants ranging from cactus to wild roses to a wide variety of wildflowers (and of course, grasses).



Native yucca — such as this one covered in morning frost — is just one of nearly 200 plant species that can be found on open space near the NREL campus.

More information about NREL's Environmental Management System can be found in a regularly published report — Environmental Performance Report — available at http://www.nrel.gov/features/20090320_nature.html. ■

Laboratory Expansion Continues to Take Shape (Continued)

electric power from solar energy that will be used to provide up to 7 percent of the electricity NREL uses.

Construction of the **Renewable Fuel Heating Plant (RFHP)** was completed in September 2008 and the boiler was lit in December. The RFHP uses wood chips from urban wood wastes and forest thinning projects along Colorado's Front Range and is expected to reduce NREL's natural gas use by 80 percent and cut carbon dioxide emissions from fossil fuels by more than 4 million pounds a year.

For construction updates and information, visit NREL's Construction Update Web page at www.nrel.gov/news/construction_update.html or call the Construction Hotline at 303-275-4087. ■

NREL Assigns Renewables Experts to Hawaii, Alaska (Continued)

have started working directly with state officials, utilities and the private sector to help implement an initiative to help the state generate 70 percent of its energy from clean sources by 2030. In Alaska, researchers will focus on bringing renewable power to a state that has among the nation's highest energy prices — as much as \$1 per kilowatt hour in remote villages. ■

Controlling Heat Key to Hybrid Performance

NREL engineers are exploring several ways to improve hybrid vehicle performance to such a convincing level that millions of commuters will make the switch. That means increasing the vehicles' fuel economy to 100 mpg or more, improving reliability and reducing costs — all while operating with drastically reduced tailpipe emissions. In their labs, there isn't a whole car in sight. Instead, researchers are testing key power components at bench stations, including motor controllers and inverters that condition the electrical signal between the power generation unit (a fuel cell or battery) and the electric motor to provide power to various components. No single improvement will make the difference. But combined, the results can help automakers overcome technical barriers that can delay the commercialization of advanced vehicles. ■

Shedding light on how much sunshine hits the ground

A team of NREL and industry engineers has launched a new ground-based instrument network to measure the sunlight hitting the southwestern United States. The first solar station has been installed in Arizona, with several more planned in nearby states. The stations are part of NREL's Solar Resource and Meteorological Assessment Project (SOLRMAP). The improved data will be incorporated into computer models to help determine the most efficient locations for utility-scale solar energy conversion projects such as concentrated solar power plants. ■

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NREL Community News

NREL Seeks Energy Innovators

Unlike many workplaces today, NREL is growing. Driving this growth is the critical need to find clean energy solutions for the nation and the world.

While NREL has been pursuing this mission for its entire 32-year history, the need for clean energy technologies is more urgent than ever. NREL is at the forefront of developing energy solutions and delivering innovative technologies to the marketplace. To meet these challenges, NREL is staffing up and looking for scientists, engineers, analysts and other energy innovators.

NREL has created an inclusive work environment that benefits from diversity throughout the Lab, and encourages employees to develop and contribute to their full potential. For a current list of job opportunities, visit www.nrel.gov/employment/job_postings.html. ■

Visitors Center Power Lunch Lecture Series and Events

NREL's Visitors Center offers noon time presentations on a variety of renewable energy and energy efficiency topics. The presentations are open to the public and attendees are welcome to bring their lunches to enjoy during the lecture. Space is limited so please call 303-384-6565 to make a reservation.

Tackling Climate Change in the U.S

Presented by Dr. Chuck Kutscher with NREL's Center for Electricity, Resources, and Building Systems Integration
May 19, Noon to 1 p.m.

The Visitors Center is open from 9 a.m. – 5 p.m. Monday through Friday. On Saturday, May 16, the Visitors Center is hosting an Open House from 9 a.m. – 4 p.m. Enjoy a day of discovery and exploration. Visitors of all ages are welcome to explore the interactive exhibit hall, enjoy a *Science on a Sphere* presentation and take virtual tours of NREL facilities.

Visit www.nrel.gov/visitors_center for more information. ■

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