

## NREL Keeps Rapid Construction Pace with Two New Facilities

The Department of Energy/National Renewable Energy Laboratory South Table Mountain campus is bustling with construction activities as work on the new office building and expansion of the Alternative Fuel Users Facility continues.

### RSF Walls Going Up

The 218,000 sq ft **Research Support Facilities (RSF)** is designed with a myriad of energy saving features such as precast exterior panels which help maintain the temperature of the building's interior spaces.

The exterior panels collect heat during the day and slowly transfer the heat to the building at night. The building's windows will help regulate inside temperatures by automatically opening to vent excess heat at night and allowing the cool night air to naturally bring down temperatures inside the office space. As the night progresses, the pre-cast panels on the outside of the RSF will lose their heat and cool down. The process begins anew the next day.

Environment is a concern when it comes to the materials used in constructing the RSF. The goal is to use locally produced materials to



*The exterior panels on the Research Support Facilities benefit the building on many levels. The exterior keeps the weather out and helps regulate interior temperatures. The middle section provides insulation and the opposite side serves as the interior wall.*

reduce transportation emissions. Precast panels were fabricated in Denver and all of the concrete and aggregate used to make the panels is from within Colorado.

On average, the panels measure 13 x 30 feet. Two hundred and eight have been installed on the RSF.

Several hundred construction workers joined engineers, architects and others from the design-build team of Haselden/RNL and their subcontractors at the RSF construction site Oct. 2 to celebrate the "Topping Out" event for the building—the placement of the

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### Community Concerns Heard During Open House

DOE's Golden Field Office (GO) hosted an Environmental Assessment Scoping Meeting on Aug. 6 to address public interest in the Laboratory's ongoing planning and construction activities. Areas of public interest raised at the meeting included the creation of a new access road to the South Table Mountain (STM) campus as well as the expansion of NREL's Waste Handling Facility.

DOE's recent Environmental Assessment (EA) Supplement

covers analysis and environmental impacts associated with the proposed new access road and waste handling facility as well as the planned Energy Systems Integration Facility (ESIF) and expansion of campus infrastructure and the Visitors Center.

DOE received eleven comments during the draft EA comment period and most focused on site access. After completing the environmental analysis and considering public

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**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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For construction updates, visit [www.nrel.gov/news/construction\\_update.html](http://www.nrel.gov/news/construction_update.html) or call 303-275-4087.

**Tethered Balloon to Aid in Parabolic-Trough System Designs**

NREL researchers have begun using an aerial platform as part of their work in the Concentrating Solar Program. Researchers use a camera suspended from a white, tethered helium balloon to observe the optical characteristics of parabolic trough concentrators, such as the one on top of South Table Mountain. Parabolic-trough systems concentrate the sun's energy through long mirrors that are tilted toward the sun, focusing sunlight on a vacuum pipe. The research balloon is flown at 500 feet where pictures are taken of the reflection of the vacuum pipe allowing researchers to determine what optical imperfections or misalignments there are in the trough system. The balloon may fly any time during the day but is deflated and stored when not in use. ■

**Mobile Truck Stop Electrification Locator Now Available**

NREL expanded its suite of Web-based, fuel-efficiency tools by launching the Mobile Truck Stop Electrification Locator. This comprehensive mobile application helps truck drivers find public truck stops with idle reduction facilities using a cell phone or other mobile device. Driving directions and an instant phone connection to stations can be accessed at [www.afdc.energy.gov/tse/m/](http://www.afdc.energy.gov/tse/m/). ■

**Higher Ethanol Fuel Mix Tested**

Ethanol is currently the most widely used and readily available renewable fuel. But, increasing ethanol from the current 10 percent blend to a proposed blend of E15 or even E20, brings up questions and issues relating to the environment and economy. This is where research from NREL and Oak Ridge National Laboratory will play a pivotal role in understanding how blends like E15 and E20 affect vehicles currently in the market. The research is examining whether using higher ethanol blends will have an adverse impact on tailpipe emissions, engine performance and exhaust temperatures. ■

**Finnish Prime Minister Visits Laboratory**



*The number of visitors to NREL from outside the United States is steadily increasing including a visit by the Prime Minister of Finland, Matti Vanhanen, on Sept. 23. During his few hours at the Laboratory, Vanhanen (pictured above right with NREL's Tom Foust) spent time discussing hydrogen fuel cell and plug-in hybrid vehicles and touring several facilities on site.*

**Debris Removed from Former Guard Training Site**

Construction crews working on site drainage for NREL's South Table Mountain (STM) campus on Sept. 9 discovered training rounds from when the site was a rifle range. The debris was found on the southernmost 25 acres within the STM site and removed safely by the Jefferson County Bomb Squad.

After the training rounds were found, NREL hired Environmental Chemical Corporation to conduct a range assessment of the 25 acres. During the week of Nov. 23 a surface sweep was conducted by trained personnel working with metal detectors to remove any remaining debris from the area.

The 25 acres were acquired from Jefferson County Open Space in 1999 and were formerly part of the Colorado National Guard at Camp George West.

For more information, contact Public Affairs Director Kerry Masson at 303-275-4083. ■

**NREL Research Garner Three Prestigious R&D 100 Awards**

An ultra-accelerated weathering system, a parabolic trough solar concentrating collector, and a microbattery — all developed in partnership with NREL — were honored as top 100 innovations for 2009 by R&D Magazine.

The **Ultra-Accelerated Weathering System (UAWS)** is a multifaceted ultraviolet solar concentrator used to speed up the exposure of coatings, paints and other materials to determine their durability and resistance to weathering. Industry applications include coatings used for solar panels while other uses for the UAWS include paints or finishes used on homes, cars or even bridges.

The UAWS provides test results 12 times faster than other accelerated weathering systems and can replicate years of sun damage in just a few

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## Wind Energy Research Center Growing; Two New Turbines Installed

NREL recently installed two new wind turbines at the National Wind Technology Center (NWTC) to study the performance and reliability of a new generation of larger land-based turbines. Data from each of the new turbines will help industry and policymakers determine how the United States could economically generate as much as 20 percent of its electricity from the wind in the next 20 years.

The Department of Energy's (DOE) 1.5 megawatt turbine manufactured by General Electric and a Siemens 2.3 megawatt turbine were erected on the NWTC's eastern perimeter.

The DOE turbine operates atop a 262-foot steel tower. The diameter of its rotor reaches 253 feet. DOE bought the turbine and awarded it to the NWTC for long-term studies.

The Siemens turbine uses a second tower of the same height, but its rotor diameter is 331 feet. The Siemens turbine employs an advanced new rotor design. Field testing in the NWTC's gusty and challenging conditions will provide valuable data to Siemens' engineers. NREL and Siemens have signed a cooperative research and development agreement that is



*The Siemens 2.3 MW turbine is among the largest land-based turbines deployed. Its rotor diameter is a whopping 331 feet – more than the length of a football field.*

expected to continue into 2014.

Both turbines have been commissioned. Governor Bill Ritter joined NREL's Director, Dan E. Arvizu, DOE Golden Field Office Deputy Manager Christine Phoebe and Siemens executives Oct. 19 to "turn on" the Siemens wind turbine, while DOE and NREL ceremonially celebrated commissioning of the DOE turbine Nov. 10. Power from both turbines will offset electricity used by NREL, and excess power will eventually be added to the Xcel grid. ■

## NREL Keeps Rapid Construction Pace (Continued)

RSF's top steel frame member.

### IBRF Taking Shape

Stage 1 construction of the **Integrated Biorefinery Research Facility (IBRF)** is progressing. Interior underground plumbing and electric is almost complete, while concrete walls are being formed.

The IBRF is a \$33.5 million two-stage expansion of the existing Alternative Fuel Users Facility that will let NREL accommodate a greater number and variety of industry requests to test biofuels conversion processes at the pilot

plant scale.

Stage 1 construction includes the addition of a 27,000 square foot high-bay area and process equipment. Construction is scheduled to be complete in June 2010.

Stage 2 construction includes 3,800 square feet of modified lab space, a new 11,900 square foot office building and additional high-bay process equipment. Funding for Stage 2 was included in the American Recovery and Reinvestment Act. Completion of this stage is expected by 2011. ■

## NREL Research Earns Three Prestigious R&D 100 Awards

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weeks. NREL shares this award with Atlas Material Testing Technology and the Institute of Laser Optical Technology.

The **SkyTrough™ Parabolic Trough Solar Concentrating Collector** uses a reflector material developed by NREL and its collaborative research partner, SkyFuel, to create a ground-breaking and low-cost system for utility-sized power generation. The SkyTrough™ uses Reflectech® Mirror Film, a glass-free, slide-in mirror that is lightweight and weather proof.

This innovation coupled with improvements to components like the hydraulic-based rotational system and the sun-tracking controller enables SkyTrough™ to reduce the installed cost by 35 percent and substantially improves the financial return to investors. This reduction to the price barriers brings the installation costs into competition with gas-fired power plants. NREL shares this award with SkyFuel, Inc.

The **PowerPlane UX Microbattery** is a safe, rechargeable, deep-cycle, thin-film lithium microbattery. It is ideal for use in remote wireless sensors, smart homes, smart cars and medical sensing devices. Unlike traditional batteries, the PowerPlane UX Microbattery has a long life cycle even if it is frequently and fully discharged.

It uses a solid glass electrolyte—lithium phosphorus oxynitride (LiPON)—to give the battery its longer cycle life. NREL developed the buried-anode architecture used in the microbattery. This innovation involves lithium being intercalated, or chemically trapped within, the cathode layer. The battery also is tolerant of high temperatures.

The R&D 100 Awards are known in the industry as the "Oscars of Invention" and showcase the best new technologies from around the world. Including this year's recognition, NREL has won a total of 45 R&D 100 Awards. ■

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## NREL Community News

### Community Concerns Heard (Continued)

comments, DOE has determined that the selected alternatives do not pose significant environmental impacts and therefore is issuing a Finding of No Significant Impact (FONSI). The supplement and the original EA (EA1440) are available online in the DOE Electronic Public Reading Room ([www.eere.energy.gov/golden/Reading\\_Room.aspx](http://www.eere.energy.gov/golden/Reading_Room.aspx)) and for review in hardcopy at the NREL Visitors Center, 15003 Denver West Parkway.

DOE has prepared this document in accordance with the National Environmental Policy Act. ■

### Visitors Center Power Lunch Lecture Series and Events

NREL's Visitors Center offers visitors of all ages the chance to learn about energy from the sun, wind, biomass and other sources of renewable energy in a fun, friendly environment.

The Visitors Center offers monthly public programs on a variety of topics, programs and field trips for teachers and students, special exhibitions and information in the DOE Public Reading Room.

NREL's Visitors Center is open 9 a.m. – 5 p.m. Monday through Friday. Throughout 2010, the Visitors Center will host a series of Open Houses from 9 a.m. to 4 p.m. on Saturdays (Feb. 6, May 15, July 24 and Oct. 2). Visitors 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](http://www.nrel.gov/visitors_center) for more information. ■

### Community Open House to be Held

DOE will host a community open house in early 2010 to provide an update on planning and construction activities. Visit [www.nrel.gov/news/events](http://www.nrel.gov/news/events) for more information

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