

# Energizing EPA



The Kansas City Science and Technology Center (KCSTC) has struck gold—LEED™ Gold certification, that is. For more than seven years, a dedicated team of individuals and agencies has pursued a sustainable approach to the development and construction of EPA's new laboratory in Kansas City, Kansas (see *Energizing EPA*, June 2003). Their hard work paid off as KCSTC received the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED™) Gold certification, thanks to attributes such as daylighting, low-flow plumbing fixtures, and wood products from certified sustainable sources. For additional information, visit [www.epa.gov/greeningepa/facilities/kansascity-lab.htm](http://www.epa.gov/greeningepa/facilities/kansascity-lab.htm).



## Two Major Green Power Purchases Bring EPA to 40 Percent Green Power

EPA continues its commitment to buying green power, adding facilities in Washington, DC, and Research Triangle Park (RTP), North Carolina, to its growing list of buildings powered by renewable energy. As part of the Agency's efforts to reduce the environmental impact of its facilities, the new contracts represent EPA's largest green power purchases to date. With these additions, 10 EPA facilities will receive green power in 2003, and more than 40 percent of the Agency's nationwide electricity needs now come from renewable sources.

### Two Largest Purchases to Date

In September, EPA Headquarters in Washington, DC, began receiving 39 million kilowatt hours (kWh) of renewable energy from Pepco Energy Services (PES), the Agency's largest annual green power purchase to date. The electricity will be a blend of 25 percent wind power and 75 percent landfill gas, generated at mid-Atlantic facilities and purchased at an approximate 1 cent per kWh premium. EPA's Federal Triangle offices are the beneficiaries of the purchase, with 100 percent of their electricity needs now originating from renewable sources. EPA continues to work on procuring green power for its remaining Washington, DC, offices, with hopes of establishing renewable energy at all Headquarters facilities within six months.

EPA is purchasing nearly 36 million kWh worth of green power for its new consolidated RTP facility through three agreements that represent nearly 50 percent of RTP's Main Building and National Computer Center's electricity needs. Through two contracts awarded



EPA's Federal Triangle complex in Washington, DC, purchased 39 million kWh of green power.

September 30, EPA secured nearly 30 million kWh worth of "green tags" (see [www.epa.gov/greeningepa/content/energy/pdf/greentags.pdf](http://www.epa.gov/greeningepa/content/energy/pdf/greentags.pdf)) that will support the generation of renewable energy from a wind farm in Iowa and a landfill gas facility in Florida. In addition, EPA committed to purchase approximately 6 million kWh of green power generated from sources located in North Carolina in FY 2004, through an agreement with NC Green Power. NC Green Power is the first statewide green power program to be approved by a Public Utilities Commission. EPA is a founding partner.

With the green power purchases at Headquarters and RTP, EPA now supports the generation of approximately 113 million kWh of renewable energy annually across the country. This support has helped foster a demand for renewable energy and allowed the development of a more robust and competitive green power market. EPA continues to purchase green power whenever possible. For more information on how your facility can buy green power, visit [www.epa.gov/greeningepa/greenpower.htm](http://www.epa.gov/greeningepa/greenpower.htm).



## San Francisco Gets Into Hot Water With Solar Energy

EPA is reducing both energy and water use at its Region 9 Child Care and Fitness Center in San Francisco, California, thanks to the installation of a solar hot water heater. The new solar water heater, which offsets the natural gas consumed by the existing gas-fired water heating system, and other efficient features installed during the upgrade further reduce the facility's energy and water consumption. As a result, Region 9's utility bills are expected to be reduced by \$1,360 per year.

The project started with the installation of water-conserving plumbing fixtures and equipment. "Our goal since the inception of this project was to first reduce the existing hot water demand before installing the new water heater," says M.C. Toliver, facilities and security specialist at the Region 9 Office.

EPA installed 14 water-reducing showerheads and two high-efficiency washing machines, which combined save about \$395 per year in water costs. Once these fixtures were in place, an appropriately sized domestic solar hot water system was designed and installed to provide for the new peak hot water requirements. EPA estimates that the solar hot water system will decrease current gas costs by approximately \$965 per year. Actual water use in the building will be calculated with a solar hot water system control panel, which includes a feature that records daily trends of water use and temperature needs.

The new "closed-loop" solar generation system is the primary source of hot water for the Child Care and Fitness Center. This system will use the existing gas-fired hot water generation system only as a back-up during cloudy or nighttime periods. A typical system will reduce the need for conventional water heating by



The solar panels (above) will help reduce the building's natural gas costs by nearly \$1,000 per year.

approximately two-thirds, requiring only an occasional boost from the existing gas-fired hot water heater system to meet water temperature demands.

The system installation was completed in October 2003. "We are very excited about the new installation and the anticipated energy and water savings," Toliver says.

The project was a cooperative effort between EPA's Region 9 and Headquarters' Office of Administrative Services, Sustainable Facilities Practices Branch. For more information on the project, contact M.C. Toliver, EPA Region 9, at 415 972-3749 or <toliver.m-c@epa.gov>.

## Coast to Coast Conservation: Mechanical Upgrades Save Energy and Water

Mechanical upgrades underway at two EPA laboratories—the Environmental Research Laboratory (ERL) in Narragansett, Rhode Island, and the Central Regional Laboratory (CRL) in Richmond, California—will reduce EPA's energy use by approximately 5.24 billion British thermal units (Btus) per year and decrease water use as well.

The Narragansett laboratory will focus on improving its chilled water system. Currently, chilled water from the supply side is mixed with and warmed by spent chilled water from the return side. As a result, the chilled water is delivered at a temperature 12 degrees Fahrenheit too warm, which forces the laboratory's chillers and cooling towers to use additional energy to "re-cool" the mixed water.

To address this inefficiency and to improve energy and water efficiency even further, EPA will:

- Upgrade the entire chilled and condenser water system to allow for variable flow.
- Reintegrate an existing small, air-cooled chiller into the primary chilled water loop, which will allow the large water-cooled system to be shut down during the shoulder seasons—the times of the year (spring and fall) when there is less need for heating and cooling.
- Upgrade the building controls for the chilled water system.



An aerial view of the Environmental Research Laboratory in Narragansett, Rhode Island.

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## Water Softener Saves Region 7 Office Buckets and Bucks

EPA's Region 7 Office building in Kansas City, Kansas, recently cut its water use by 62 percent, which is equivalent to a year-end savings of 700,000 to 900,000 gallons of water, as the result of a new water softener that has made the cooling tower run more efficiently.

Before the water softener was installed, chemicals in the hard water coming into the building formed scale deposits within the cooling towers and chillers, reducing the heat transfer efficiency and requiring more electricity to cool the water. To reduce the buildup of scale deposits, regular flushing and draining of the water was required. "The harder the city water is, the more often we have to flush the tower water," said Bob Swope, Region 7 facility manager and chief engineer, adding that the building has some of the hardest water in Kansas City. While this action helped increase the heat transfer efficiency, water consumption increased.

To achieve both heat transfer efficiency and water use reductions, a commercial water softener was installed in the supply line going to the cooling tower to reduce the hardness of the water before it reached the tower, and therefore reduce the need for flushing.

When the water softener was first installed, it did not achieve the anticipated savings; EPA discovered that the water pressure being applied to the softener was too low for the softener to work properly. An adjustment was quickly made to allow for greater pressure to be supplied to the water softener and, consequently, savings began to accrue. Since the adjustment, the office has been saving 5,700 gallons of water per day.

EPA will continue to monitor and document water usage, so that comparisons can be made of annual water consumption.



A commercial water softener was installed in the supply line going to the cooling tower (left) to reduce the hardness of the water and therefore the need for flushing.

EPA's Region 7 Office (right) has cut its water use by 62 percent.



Region 7 incorporates additional water saving equipment, such as low-flow faucets, thanks to the building's "green rider"—an amendment to traditional lease language that emphasizes energy, water, and resource efficiency.

For more information on the Kansas City Regional Office water savings, contact Justin Spenillo at 202 564-0639 or <spenillo.justin@epa.gov>.



The Region 9 Laboratory in Richmond, California.

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The payback period for the ERL upgrades is projected to be less than 10 years, including electricity and water savings, once work is completed in summer 2004.

The centerpiece of the Richmond laboratory upgrades will be a 60 kilowatt (kW) cogeneration unit, fueled by natural gas, which will produce onsite electricity and hot water. The hot water will be recirculated into the lab's existing boiler system. In addition to conserving energy and reducing associated emissions, cogeneration, also known as combined heat and power (CHP), will improve power reliability and reduce congestion on the local electric grid. EPA will receive a \$60,000 rebate from Pacific Gas and Electric for installing the cogeneration unit.

Additional mechanical upgrades at the Richmond CRL will include a major building controls upgrade and the replacement of one large boiler with two smaller staging boilers. The payback period for the CRL upgrades is projected to be less than seven years, including gas, electric, and water savings. For more information on these upgrades, contact Dan Amon at 202 564-7509 or <amon.dan@epa.gov>.



# Labs21 Conference Reaches New Heights in the Rockies

With more than 500 participants, the Laboratories for the 21st Century (Labs21) 2003 Annual Conference, which took place in Denver, Colorado, October 21-23, 2003, was a resounding success. Laboratory designers, engineers, owners, and operators convened for three thought-provoking days, sharing ideas and innovations that will mark the next generation in laboratory design.

Keynote speaker William McDonough kicked off the conference, delivering an enlightening presentation on environmentally-minded architecture and planning. Focusing on a vision "to change the design of the world," McDonough set the tone for the rest of the week.

An array of conference sessions, ranging from lab-specific case studies to industry-wide codes and standards, allowed leading architects and engineers to better understand the changing face of laboratory design and the unique challenges facing today's lab-intensive industries. In addition, the first ever Labs21 Bio-Containment Symposium and Labs21 Poster Session provided in-depth views of cutting-edge technologies and groundbreaking sustainable laboratories.

Outside the conference room, participants were given the chance to explore leading examples of sustainable architecture. Tours of the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) provided a firsthand look at the nationally recognized Solar Energy Research Facility and the Thermal Test Facility, a showcase for integrated energy efficiency features, such as daylighting and evaporative cooling. The building is 60 percent more energy-efficient than a similarly sized standard building. During one evening, visitors at the University of Colorado's Boulder campus saw the unique Drescher Undergraduate Integrated Teaching Laboratory, where students enjoy a truly hands-on learning environment. Many areas of the building's internal systems (i.e., ductwork and wiring) are exposed, allowing the building itself to serve as an educational tool. The evening at the National Center for Atmospheric Research's Mesa Lab offered an opportunity to relax amidst the beauty of the surrounding foothills of the Rocky Mountains.

In addition to highlighting innovation in lab design, Labs21 once again took a number of steps to make this year's conference a sustainable one. In collaboration with the Xcel Energy Windsource, organizers purchased 53,000 kilowatt hours of

wind energy to meet the onsite energy needs of the entire conference. Organizers also continued their commitment to making the event as paperless as possible, posting agendas, abstracts, presentations, and biographies to the Labs21 Web site prior to the conference.

These successful efforts will be repeated at next year's conference, scheduled for October 5-7, 2004, in St. Louis, Missouri. For more information on the conference and the Labs21 program, please visit <[www.epa.gov/labs21century](http://www.epa.gov/labs21century)> or contact Phil Wirdzek, Labs21 program manager, at 202 564-2094.

Labs21 is a voluntary partnership program cosponsored by EPA and the U.S. Department of Energy. Its goal is to promote a more sustainable approach to the way laboratories are designed, engineered, and managed.



LABS FOR THE 21ST CENTURY

## Labs21 2003 Annual Conference



Labs21 Program Manager Phil Wirdzek (above, left) greets conference attendee and Labs21 supporter Karl Averd during the Grand Opening Reception.



Conference participants learn about new lab equipment during the Labs21 Technology Fair.

## Defining a new generation of laboratories



LABS FOR THE 21ST CENTURY