Lawrence Berkeley National Laboratory’s Facilities Division collaborates with other research and support divisions to evaluate and implement sustainable practices and building designs. Inside are highlights of recent activities that illustrate Berkeley Lab’s continuing commitment to sustainability.
1. User Support Building
The new ALS User Support Building uses 47 percent less energy than the national standard. Notable green features include use of sustainable materials, extensive daylighting design, window coatings that control temperature and glare, efficient lamps that save electricity at night, and versatile and flexible use of scientific apparatus assembly space. To take advantage of the mild climate, enclosed offices have operable windows and controls that automatically turn off the room’s heating or cooling whenever windows are open. An application for LEED Gold certification has been submitted to the U.S. Green Building Council.

2. A Cool Roof
Berkeley Lab is a leader in use of energy-saving technologies such as “cool roofs,” which reject rather than transfer heat to a building. Cool roofs lower air-conditioning bills and mitigate the “heat-island effect” of dark roofs in urban areas. Cool roof materials are available in a variety of “heat-island effect” of dark roofs in urban areas.

3. Molecular Foundry
In 2007 the Molecular Foundry became the first building in Berkeley to earn LEED Gold certification. Notable green building features include an energy-efficient chiller and boiler plant, extensive use of daylighting and control systems, and flexible-use lab spaces. The building design beats national energy efficiency standards by 15 percent.

4. General Purpose Lab – 1
Sun-shading, recycled steel, high-performance glazing, and solar hot water heating highlight the LEED Gold features in this new lab, due to open in 2013. Notable green features include use of sustainable materials; room occupancy sensors to manage lighting; heating, and cooling; a ventilation system that disperses only fresh air; energy efficient fan walls; and flexible-use labs, easily repurposed as research requirements evolve.

5. Electric Vehicles
More than 60 all-electric vehicles, most dedicated to Laboratory operations functions, from around the 5.6 miles of hillside roads at Berkeley Lab. That represents a quarter of the Lab’s entire fleet. These battery-powered vehicles are quiet, efficient, and run at the equivalent of 100 mpg of gasoline.

6. Building 74 Modernization
Berkeley Lab is renovating its 50-year-old Life Sciences Laboratory building to extend its useful life. An application for LEED Gold certification will be submitted. The project is scheduled for completion early in 2012. Notable green features include use of sustainable materials, a cool roof, solar hot-water heating, LED lighting, and a state-of-the-art computer-controlled lighting, heating, and air conditioning system.

7. Demolition Waste Reduction
Demolition of the Bevatron, an obsolete particle accelerator that once helped Berkeley Lab scientists win four Nobel Prizes, generated 2,000 truckloads of non-hazardous concrete and metal waste. More than 75 percent of this material has been recycled, and some of it will find its way back to the Lab in new roadbeds and foundations.

8. A Home-grown Energy Saver
Leaky heating and air-conditioning ducts allow as much 50 percent of the air blown through them to escape. Leaders in the development of new energy-saving technologies, Berkeley Lab scientists invented an aerosolized sealant to close off these leaks. In one Lab building the sealant reduced energy use for ventilation system fans by 60 percent.

9. Recycling Waste Heat
Waste heat from computers at the User Support Building is trapped by a bank of radiators on the back of 18 server racks and piped to the heating plant that serves the Advanced Light Source and its support facilities. This recycled energy will be used to save 110,000 therms of natural gas every year.

10. Induction Lighting at the Light Source
To illuminate the experiment floors of the Advanced Light Source, and save thousands of dollars in maintenance costs, the Facilities Division replaced old metal halide lamp fixtures with modern magnetic-induction fluorescent lights. Lighting quality has improved, and each new lamp draws less than half the power of the old ones. With a service life of 25 years, the new lamps will last five times longer.

11. Building 50B Data Center
Renovations at the Lab’s Data Center have improved the cooling system and trimmed energy use by 645,000 kWh/year. Redesigned ventilation and installation of more than 800 wireless sensors in computer racks and throughout the facility are optimizing data center efficiency and saving energy.

12. Fleet Reduction
Berkeley Lab has reduced the size of its fleet of government vehicles to trim fuel costs and reduce related resource requirements. In 2010, the Lab operated 166 highway-rated vehicles, down 36 percent from 2005. These actions exceed all current requirements. LBNL now meets the 2014 Department of Energy’s vehicle-reduction goal, and the Lab continues to seek opportunities to further reduce the fleet.

13. Boiler Replacement
Conventional boilers at Berkeley Lab are being replaced by a new generation of highly efficient boilers that capture heat otherwise lost up the flue. They require one-third the space and use considerably less energy, extracting almost every bit of heat from the burning fuel.

14. Advanced Electric Meters
Conventional electromechanical power meters have been swapped for advanced digital meters in 41 buildings. In 2012, the Lab will complete all installations required to comply with federal directives. These meters allow remote, real-time monitoring of electricity use and provide a wealth of data to help facilities managers use less power. Moreover, the Lab has begun to make energy use data available to building occupants via easy-to-view and interpret “dashboards.”
15. Recycling/Composting
Recycling comes naturally at Berkeley Lab, which has already reached its U.S. Department of Energy goal for 2015. The Lab is now diverting half of its non-hazardous, non-construction waste. Of that amount, 580 tons were recycled and 30 tons were composted during a 12-month period. Not resting on this achievement, the Lab continues to seek opportunities to expand its recycling and composting program.

16. Green Cafeteria Practices
Sustainability at Berkeley Lab’s cafeteria begins with the food: daily offerings of fresh, natural, and organic ingredients purchased from local farms. The Bay View Café also recycles cooking oil and grease, transferring it to a local refinery that converts it to biodiesel, the same fuel that powers the Lab’s shuttle bus fleet.

17. Green Building Assessments
Green Building Assessments are tools to help Berkeley Lab facilities managers prioritize spending of maintenance and repair dollars. Buildings are evaluated using green criteria, including sustainable practices and material options, and opportunities to save energy and water. The results of these surveys are combined with the results of the facilities and infrastructure condition assessment surveys, as well as research priorities, to obtain a well-rounded picture of options to maximize mission readiness.

18. Wastewater Recycling
The MicroSystems Laboratory in Building 70A uses an acid etching process to make unique and sophisticated semiconductor sensors used in state-of-the-science research, including in satellites and telescope instrumentation. Wastewater from that process is neutralized and then piped to the building’s cooling tower, replacing 500,000 gallons of potable water that would otherwise be used each year. This project was a joint effort of EH&S, Physics, and Facilities staff.

19. Green Commuting
Approximately half of Berkeley Lab’s 4,000 employees get to work every day using mass transit, shuttle buses, carpools, bicycles, or a brisk walk — instead of driving alone. Moreover, biodiesel and ethanol-powered shuttles and vans link the Lab to the adjacent UC Berkeley campus and connect to transit hubs and satellite facilities.