ESAVE

Environmental Stewardship & Value Engineering

Quarterly Newsletter for the National Nuclear Security Administration
Office of Defense Programs

Sandia renewable energy projects aid rural Mexicans

A solar-powered water-pumping station at Jose Canul's ranch in rural Mexico is the first electricity to flow there. As the rancher put it, the innovation was "*una tecnologia muy moderna para una actividad muy antigua* (a very modern technology for such a very old activity)."

Sandia National Laboratories renewable energy expert Michael Ross helps build a photovoltaic water-pumping station at a ranch near Cancun, Mexico. "These programs seek to improve the economies of some of the poorest areas of rural Mexico by increasing the profitability of small ranches while also promoting the use of renewable energy technology, reducing pollution from fuel-powered generators, and broadening the renewable energy market outside the U.S.," Ross said. "It benefits everyone involved."

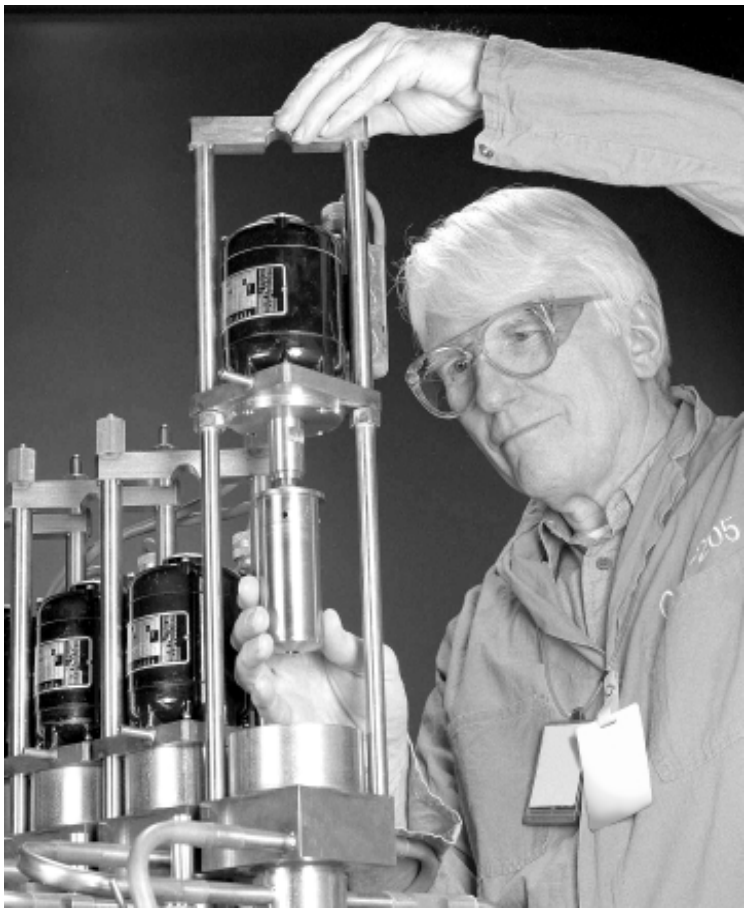
Canul's story reflects expanded efforts by the U.S. Department of Energy's Sandia National Laboratories/New Mexico to bring the benefits of solar and wind power to rural Mexico through new joint programs with the Mexican government, renewable energy suppliers in the U.S. and Mexico, universities, and other partners.

One such effort, the Renewable Energy for Agriculture program managed by the Mexican Ministry of Agriculture, is expected to bring as many as 1,200 new photovoltaic systems and 55 wind power systems to isolated areas of Mexico during the next five years. The systems will be used primarily for water pumping, but

See 'Sandia renewable energy' page 2

Argonne up to new tricks in solvent extraction technology for Savannah River tanks

Scientists at Argonne National Laboratory are adapting a 30-year-old technology to new uses in waste disposal at a U.S. Department of Energy (DOE) production facility. Argonne's



Researcher Ralph Leonard of Argonne National Laboratory's Chemical Technology Division examines a multistage centrifugal contactor unit employed in testing solvent extraction processes.

Chemical Technology Division has successfully tested a new twist on a well-known solvent extraction process that could help decontaminate millions of gallons of high-level waste now stored in underground tanks at the Savannah River Site (SRS) in South Carolina.

See 'Argonne up to new tricks' page 4

Pacific Northwest National Laboratory reuses water to reduce waste

By reducing a hazardous waste stream, the Pacific Northwest National Laboratory (PNNL) is avoiding almost $100,000 in expenses annually. Hazardous wastewater that previously was costly to dispose of is now being reused, thanks to a closed-loop system of pumps, settling tanks, and filters.

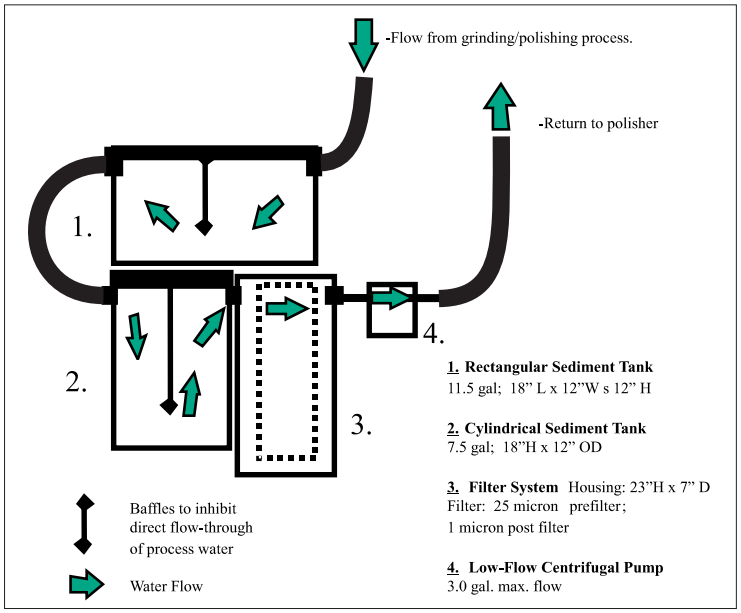
Benaiah Jorgensen of the Thermal Processing Group at Pacific Northwest National Laboratory helped develop this closed-loop system of pumps, settling tanks, and filters for water reuse.

The Thermal Processing Group at PNNL uses glass and ceramic samples to test methods for immobilizing hazardous wastes. To analyze the samples, the Group uses optical microscopy and scanning electron microscopy, which require the samples to be polished. When grinding and polishing the glass and ceramic samples, a steady flow of water is needed for cooling, lubricating, and carrying away the solids. The samples contain chrome, barium, lead and other heavy metals, which means the water becomes a hazardous waste and, thereby, a disposal problem.

Even when researchers used inductive coupled plasma spectroscopy to identify and separate the hazardous from the non-regulated wastewater, the concentration of suspended solid material in the non-regulated waste was too high to qualify for sewer discharge permits. The Group also tried using the smallest volume of water possible, but found that it compromised the polishing.

Benaiah Jorgensen, a student, and Mike Schweiger, a science and engineer associate, both from the Thermal Processing Group, solved the problem by designing and building a closed-loop system of pumps, settling tanks, and filters so the water can be reused for grinding and polishing.

Rather than disposing of the wastewater as it is generated, the Group is able to reuse the water for a period of several years until particulate matter buildup in the tanks requires the water to be disposed of. With this closed loop system, the waste, particulate matter, and system filters will need to be disposed of every two years as hazardous waste. However, instead of 1,000 gallons a year, the Group now has to dispose of only 20 gallons of hazardous waste water every two years. That is a waste reduction of 2,000 kilograms of hazardous wastewater and 6,000 kilograms of sanitary wastewater each year—a great success for a U.S. Department of Energy-sponsored Return-on-Investment (ROI) project that cost less than $5,000 to implement.



Reuse System for Grinding and Polishing Water

Contact Mike Schweiger, Pacific Northwest National Laboratory, 509-376-4235 or mike.schweiger@pnl.gov

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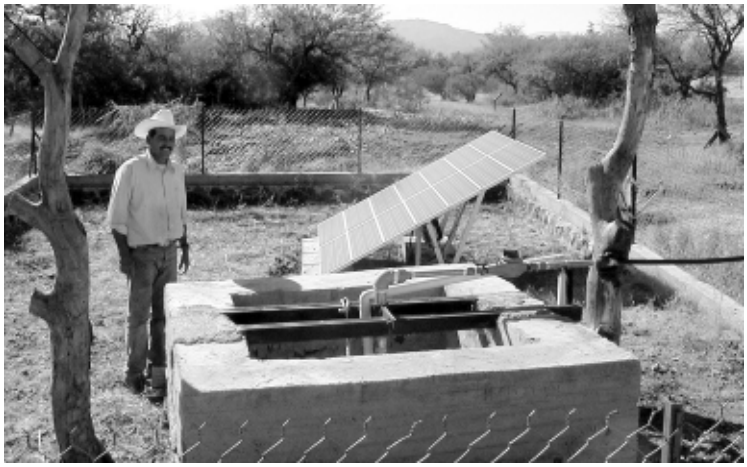
some may be adapted for other uses that improve economic, social, and health standards in agricultural areas of Mexico.

The Mexican Renewable Energy for Agriculture effort is part of a Sandia program that aims to bring renewable power to many underdeveloped areas of the Southwest, such as the Navajo nation in Arizona (see *ESAVE*, Third Quarter 2000).

Before the photovoltaic system was installed at Jose Canul's ranch, horses, oxen, and people carried water from the ranch well to the livestock and garden. Today, the bountiful southeast Mexican sun powers a submersible pump that draws enough water to sustain about 40 head of cattle.

The installation was facilitated by the Mexico Renewable Energy Program which was set up by Sandia in 1994. Overall, the program has resulted in the installation of more than 250 solar and wind-energy water-pumping systems, as well as 150 other renewable energy projects, in 14 Mexican states.

Sandia's renewable energy technology experts are helping install many of the alternative energy systems; training local officials and users to run them, all the while seeking new applications for renewable energy.



Jesus Barcelo Yánez, a member of Ejido San Pedro Tonibabi, a group-owned ranch in Sonora, stands next to the photovoltaic water-pumping system he is responsible for operating and maintaining.

Contact Howard Kercheval, Sandia National Laboratories, 505-844-7842 or hckerch@sandia.gov

Menlo Park honors SLAC for 'near-zero emissions' from Plating Shop

In January, the Stanford Linear Accelerator Center (SLAC) received a 2000 Environmental Quality Award from the City of Menlo Park, Calif. Environmental Beautification Commission, recognizing the energy research facility for "exceptional resource conservation" in reducing air emissions from the SLAC Plating Shop to near zero.

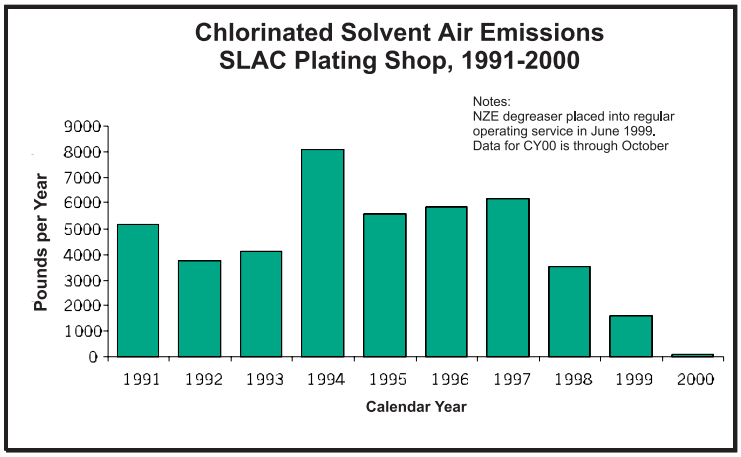
Frank Carney and Deirdre Digrande (left) of the City of Menlo Park present the City's 2000 Environmental Quality Award to Ali Farvid, Butch Byers, and Greg Loew of the Stanford Linear Accelerator Center.

In metal-finishing operations at the Plating Shop, manufactured metal parts are cleaned and otherwise processed before being placed into the ultra-high vacuum environments of electron-positron accelerator structures. Exacting levels of cleanliness are required to meet SLAC's research needs. One of the favorite sayings of Plating Shop personnel is, "Our dirtiest part is cleaner than anyone else's cleanest part!"

Historically, the largest piece of cleaning equipment at the Plating Shop used the chlorinated solvent 1,1,1-trichloroethane. While within local and federal limits, emissions to the atmosphere from the cleaner nevertheless totaled several thousand pounds per year. Solvent cleaning in the Plating Shop was the single largest source of air pollutants at SLAC.

In 1993, SLAC initiated a study to develop an alternative approach to parts cleaning. Major emphasis was placed on the criteria and analytical methods for determining cleanliness achieved by the alternative cleaning methods being tested. Involving 20 SLAC stakeholders, the study ultimately resulted in the 1996 procurement of a new, extremely sophisticated piece of cleaning equipment called a "near-zero emissions" (NZE) degreaser, which uses an alternative chlorinated solvent. SLAC's new alternative solvent parts cleaner was the first of its kind installed in the State of California.

With a $250,000 capital investment in the equipment and a roughly equivalent sum for the installation and three years of testing, modification, and prove-out, SLAC ultimately placed the new NZE degreaser into regular service in the Plating Shop in June 1999. The result was dramatic—a decrease in hazardous emissions to the atmosphere from a high of 8,000 pounds in 1995 to only about 100 pounds from January through October of last year.



Installation of a "near-zero emissions" degreaser in the SLAC Plating Shop sent hazardous air emissions plummeting after June 1999.

The NZE system helped SLAC avoid hundreds of thousands of dollars in costs for the development of new cleaning specifications for metal parts and a more sophisticated wastewater treatment system for the Plating Shop. The new system also averted potential water conservation issues that could impact metals-cleaning operations during times of drought.

Contact Rich Cellamare, SLAC, 650-926-3401 or cellamare@slac.stanford.edu

How green is my post office

The U.S. Postal Service (USPS) is making good environmental design the standard for the 500 to 600 buildings it constructs each year. February's *Building Operating Management* said that four years ago, the USPS assembled a green design wish list that included sustainably harvested wood, post-consumer recycled carpet, occupancy sensors, and indigenous plantings. The USPS then challenged its 11 construction and design regional offices to do a green showcase project. Six of the districts responded. The first project, a post office in Fort Worth, Texas, completed in 1998, includes daylighting, recycled materials, and a system for harvesting rainwater for landscaping. In Corrales, N.M., strawbale was used in the construction of a new post office—one of the greenest to date. In Alaska, the USPS installed one of the largest fuel cell systems to power its Anchorage distribution center.

Carbon dioxide 'solvent' equals cleaner chip manufacturing

A new technology that would eliminate most of the hazardous corrosives and wastewater associated with the fabrication of integrated circuits, or chips, for computers has been developed by scientists at the U.S. Department of Energy's (DOE) Los Alamos National Laboratory (LANL).

Los Alamos researchers have demonstrated a technology using carbon dioxide at high temperature and pressure to replace the more expensive and hazardous solvents and eliminate the need for the tremendous quantities of ultra-pure water used to rinse the solvents from the chips. Traditionally, high intensity light, acids and corrosives are used to create the tiny, integrated circuits in a computer chip.

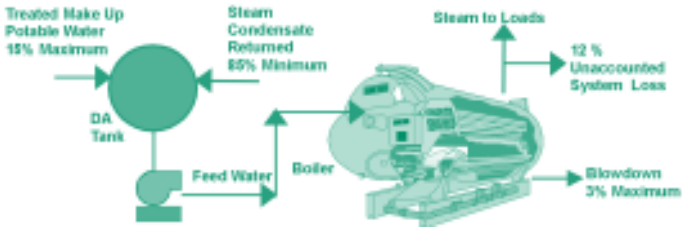
Contact Kay Roybal, LANL, 505-665-0582 or k_roybal@lanl.gov

Value Engineering at PPPL

Ssss-stop losses in your steam plant system and save $$$$

You can save on the costs of operating your steam boiler plant with increased steam condensate returned to the plant, an automatic surface blowdown control system, and daily system feedback logged by dedicated boiler operators, according to Tom McGeachen of Princeton Plasma Physics Laboratory (PPPL) in New Jersey.

At the current costs of natural gas ($5.50 per 1,000 cubic feet) and potable water (about $2.29 per 100 cubic feet or 748 gallons), methods now in place at PPPL save $18,000 per year on boiler operations. The cost of the necessary equipment (installed) was about $20,000, so the simple payback period is a little more than a year.



An efficient steam boiler system. Limiting total system losses to 15 percent through daily feedback can save thousands of dollars per year.

The key is the dedication of PPPL's steam plant operators. Through close monitoring, they have increased the return of steam condensate to their boiler from 68 percent to no less than 85 percent and have limited blowdown to 2-3 percent. If monitoring indicates that unaccounted losses in the system exceed 12 percent, everyone in the steam plant goes on alert until the problem is fixed.

Under this regimen, for every 10,000 pounds of steam they produce hourly, PPPL saves 5,212 gallons of chemically treated make-up water and 6,520 cubic feet of natural gas per day—a total of 1,902,464 gallons of make-up water and 2,379,000 cubic feet of natural gas in one year. The natural gas savings reduce carbon dioxide emissions by 785 pounds per day.

"Systems without feedback are, by definition, stupid. But systems with feedback of even the most rudimentary sort can grow smarter in a hurry."
– from Natural Capitalism, *Paul Hawken, Amory Lovins, and L Hunter Lovins*

Each day, the PPPL boiler operators obtain samples of the returned steam condensate and the chemically softened make-up water, which together are the boiler "feed water." They use a digital conductivity meter to measure the total dissolved solids (TDS) in the feed water and enter the data into an Excel™ worksheet, which contains all the necessary formulas to tell them how the system is performing.

Controllable loss in a boiler system is the amount of blowdown from the system necessary to maintain an acceptable TDS level for the boiler feed water. PPPL relies on maintaining a conductivity value of about 3,500 microsiemens in the feed water to ensure that the blowdown remains a steady 2-3 percent. A low blowdown rate also saves on sewer discharge costs.

"Your boiler/steam system operation needs daily feedback on how it is doing!" said McGeachen. "Unaccounted losses like those in steam piping or steam condensate piping will cost you a large amount of money with current natural gas costs. You want to know as soon as possible if the unaccounted losses in your boiler system are greater than 12 percent." The PPPL steam plant team has shown you how to do it.

Contact Tom McGeachen, 609-243-2948 or tmcgeach@pppl.gov and go to http://www.energy2000.ee.doe.gov/Presentations/Proj&ProgInt/SESSION4-KIGHTLINGER/sld001.htm

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This process, called CSSX (for caustic-side solvent extraction), minimizes solvent use for separating radioactive materials from liquid high-level waste. CSSX is one of several processes under consideration for use at SRS, where it will be used to separate the radioactive isotope cesium-137 from the extremely saline liquid present in the tanks. Once removed, the cesium would be incorporated into a glass waste form for disposal in an approved geologic repository.

The key technology in the CSSX process is a multistage centrifugal contactor, a materials separation device. Over the last three decades, Argonne researchers have applied various designs of this device to many different problems concerning disposal of liquid radioactive waste.

Working with scientists at Oak Ridge National Laboratory and the Savannah River Technology Center, Argonne scientist Ralph Leonard and his team modified an Argonne-designed centrifugal contactor to perform the cesium separation. They easily achieved the cesium decontamination factor of 40,000 required by the SRS application. In fact, a pilot-plant-scale contactor running the CSSX process produced a decontamination factor of almost 100,000.

The decontamination factor is the amount of undesirable material present before extraction divided by the amount present after extraction. A decontamination factor of 100,000 means that all but one part in 100,000 of the cesium contamination was removed.

When operated with an appropriate solvent, the contactor is able to quickly and efficiently recover transuranic elements and fission products like cesium from radioactive waste. The Argonne centrifugal contactor, unlike others, can be easily modified to handle different solvent compositions. It is also easy to scale up, can be remotely operated and maintained, has low construction and operating costs, and most importantly, requires relatively little solvent.

"The reduced need for solvent is particularly critical in the CSSX application since the major component of the solvent, a calixarene, is very expensive," contactor team leader Leonard said. "However, by combining it with the high efficiency and throughput of the Argonne contactor, the system has proved extremely-cost effective."

Argonne contactors have already demonstrated their effectiveness in several DOE facilities, including the Hanford Site, Pacific Northwest National Laboratory, Los Alamos National Laboratory, Oak Ridge National Laboratory, Y-12 National Security Complex, and Idaho National Engineering and Environmental Laboratory.

Contact Cynthia Wesolowski, Argonne Industry Liason, 800-627-2596 or partners@anl.gov

'Good sense' lets Y-12 re-brick furnaces without contamination

Two employees of the Facilities Maintenance Organization at the BWXT Y-12 National Security Complex have come up with a cost-saving project at the Oak Ridge facility that just plain makes good sense. For James Hubbard and George Renfroe, it was as simple as finding a new place to cut furnace brick.

Furnaces in a radiological (rad) area in Building 9998 require re-bricking several times a year, so up until recently brick-sawing operations at Y-12 were located there. Brick for furnaces in Building 9212 and in a beryllium area were also pre-cut in the rad area.

Workers use a large band saw to make curved brick pieces that fit the diameter of the furnaces. To re-brick a furnace can take as many as 380 bricks, an approximate total weight of 2,120 pounds. For each furnace, the cutting operation generates 35 percent (as much as 740 pounds) of waste. On an average, eight to 10 furnaces are re-bricked each year, only three or four of them in the rad area in Building 9998.

The simple solution of procuring a new band saw and HEPA-filter system for cutting brick and relocating the operation to a non-radiological area saves money and time in furnace rebricking at the Y-12 National Security Complex.

Historically, new, uncontaminated bricks were procured and brought into the brick-sawing location in the rad area. The bricks are special furnace brick with a high percentage composition of silica material. Dust from cutting the high-silica brick was contained using a special-purpose HEPA-filter vacuum system.

All materials that left the brick-sawing area, including the brick waste and dust, were handled as potentially rad materials and were surveyed by a rad technician prior to removal or disposal. It took a rad technician about one hour to survey a furnace's worth of brick, not counting waste.

Workers in the brick-sawing operation also had to meet rad worker permit requirements and don personal protective equipment (PPE) before entering the rad area. Because of required breaks, each worker in the rad area performed three full changes in and out of PPE per eight-hour shift, shortening the actual work day to three hours. It took two workers almost three weeks of eight-hour shifts each to cut a complete set of bricks for one furnace.

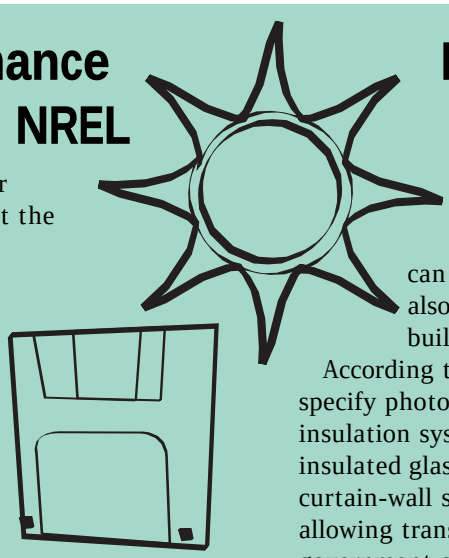
Each worker had to receive approval from the Building 9998 owner, Depleted Uranium Operations (DUO), before entering and working in the roped-off brick-sawing area. The boxes for storing potential rad waste from the operation were kept locked and authorized DUO personnel had to unlock them each time materials were deposited.

Hubbard's and Renfroe's "good sense" proposal involved procuring a second band saw and another HEPA-filter system and relocating the brick-sawing operation to a non-rad area. It is estimated that the relocated brick-cutting operation reduces the time required for two workers to cut a complete set of bricks for a furnace to about one week, an estimated 57 percent savings in time for each re-brick effort.

An estimated 740 pounds of low-level solid waste will be avoided annually by not bringing the bricks into a rad area to be sawed. There will be an estimated 67 percent reduction in labor and PPE costs annually, a cost avoidance of $38,000, based on re-bricking three furnaces per year. The total cost for relocating the brick-sawing operation was about $15,000, funded by the Y-12 Pollution Prevention Program.

Contact Eva Irwin, Y-12 Pollution Prevention Program Office, 865-241-2581 or exi@y12.doe.gov

Photovoltaic performance software released by NREL



A new version of the Energy-10 computer program has been released by researchers at the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory for review. The program evaluates building-integrated and stand-off photovoltaic system performance. Powerful output graphs allow the user to study the results at any level of detail. Energy-10 helps architects and building designers quickly identify the most effective energy-saving measures for small commercial and residential buildings.

Contact Sarah Barba, NREL, 303-275-3023, or sarah_barba@nrel.gov

Building-integrated photovoltaics are gaining ground

Building-integrated photovoltaics (BIPV), which can replace more traditional building elements while also producing electricity, are now available for most building envelope surfaces.

According to the January *Architectural Record*, architects can specify photovoltaic shingles, metal standing-seam or exterior insulation systems for the roof. Solar-collecting spandrels, insulated glass units, and sunshade elements are available for curtain-wall systems. Glazing that produces electricity while allowing transparency can be ordered for skylights. The Federal government offers two incentives to use BIPV products: a 10 percent investment tax credit and a five-year accelerated depreciation. Some states will pay some or all of the BIPV costs.

Fusion could be happening in the tiniest of spaces at Los Alamos

Fusion energy promises an unlimited source of energy, but so far researchers haven't been able to create fusion on a small, controllable basis. This state of affairs is about to change—in a small way.

Researchers at the U.S. Department of Energy's (DOE) Los Alamos National Laboratory (LANL) and the U.S. Air Force Research Laboratory in Albuquerque, N.M. are investigating Magnetized Target Fusion (MTF), which has the potential to produce smaller fusion energy sources at a cost far less than that of other current approaches.

"It is a qualitatively different approach to fusion with the potential for truly low-cost development. This means that fusion experiments and testing facilities might conceivably be built that cost in the tens of millions-dollar range, rather than in the billion-dollar range," noted Glen Wurden of LANL's MTF team.

Fuel for the MTF process is an electrically neutral, high-temperature ionized gas—plasma—that is injected into an aluminum cylinder about the size of a soft drink can. The cylinder and its contents are then quickly compressed by driving a powerful electrical current through the wall of the cylinder.

Above: Several components of Magnetized Target Fusion technology have already been tested at Shiva Star, the Air Force's pulsed-power facility. Right: A Los Alamos engineer looks down the quartz chamber of the Magnetic Target Fusion Field Reversed Configuration plasma injector.

As the fast-moving solid metal wall compresses the fuel, it burns in a few millionths of a second at pressures that are millions of times greater than that of the Earth's atmosphere. Scientists in the MTF program hope to produce tiny amounts of fusion energy—like that produced by the sun—within this mass of super-compressed, high-density plasma.

MTF background work has been underway in one form or another at Los Alamos for some time, including recent collaborative efforts with Russian fusion researchers. Several components of LANL's MTF technology have already been tested at Shiva Star, the US Air Force's pulsed-power facility in Albuquerque.

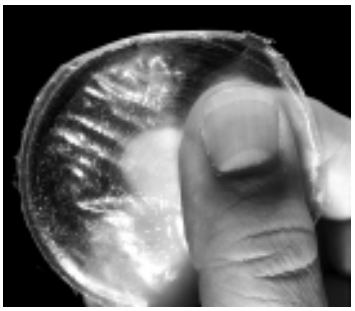
Contact LANL's Todd A. Hanson, 505-665-2085 or tahanson@lanl.gov, Glen Wurden, wurden@lanl.gov, or Richard E. Siemon, rsiemon@lanl.gov and go to http://fusionenergy.lanl.gov/mtf.htm

INEEL fosters a breakthrough in new lithium battery design

The technology behind the rechargeable lithium battery recently took a quantum leap forward, thanks to an innovative, flexible, plastic membrane developed at the U.S. Department of Energy's (DOE) Idaho National Engineering and Environmental Laboratory (INEEL).

The INEEL solid polymer electrolyte promises rechargeables that are safer, more versatile and 50 percent longer-lasting. The electrolyte is also more environmentally friendly to produce than others. Its waste products—mostly glass, phosphate and nitrogen compounds—can be converted to fertilizer.

Conventional electrolytes are made of toxic salt solutions within a liquid or gel base, such as the water-based electrolyte in a car battery. The INEEL solid electrolyte is a mix of a liquid polymer known as polyphosphazene and a ceramic powder that turn into a clear, non-toxic flexible membrane when properly blended. The INEEL team developed a ceramic to help the polymer hold its shape without interfering with its ability to transport lithium ions.



This picture shows the clear, non-toxic, flexible electrolytic membrane created at INEEL by mixing a liquid polymer and a ceramic powder.

Team leader Mason Harrup said the project first aims to create batteries for use in situations requiring long-lasting, low-power batteries in remote environments, such as outer space or in medical implants. The lithium battery solid polymer electrolyte topped a list of over 100 technologies nominated by the DOE laboratories nationwide for two special awards in the "Energy 100" program, winning first place in both the Energy@23 and Bright Light categories.

The solid polymer electrolyte team at Idaho National Engineering and Environmental Laboratory: (from left) Eric Peterson, Joe Delmastro, Mason K. Harrup, Thomas A. Luther (seated), Alan Wertsching, and Frederick F. Stewart.

Contact INEEL's Mason Harrup, 208-526-135 or harrmk@inel.gov or Mary Beckman, 208-526-0061 or beckmt@inel.gov

Color flexibility enhances solar cell development at NREL

Suzanne Ferrere, a chemist with the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL), has spent the past two years developing dyes that can be used to produce a low-cost, efficient solar electric device called a photochemical solar cell.

NREL researcher Suzanne Ferrere has spent the past two years developing dyes that can be used in a potentially low-cost and efficient solar electric device.

The photochemical solar cell contains a photoelectrode made of an extremely thin layer of titanium dioxide on a transparent glass substrate. Titanium dioxide often is found in such household products as paint, sunscreen and toothpaste. "Titanium dioxide alone only absorbs the ultraviolet light from the sun," Ferrere said.

"The dye allows the titanium dioxide to absorb both ultraviolet light and the visible light portion of sunlight." Dye molecules are absorbed on the surface so that when they are exposed to light, they inject electrons into the semiconductor material and are then collected as electric current.

The dye allows solar cells to be produced in a variety of colors cheaper than conventional cells. The photochemical solar cells currently have several novelty applications and are being used in watches and bathroom scales. "An advantage to working at a national lab is that I'm working on something that has a social good," Ferrere said.

Contact Suzanne Ferrere, 303-384-6686 or suzanne_ferrere@nrel.gov

ORNL lets the (cow) chips fall where they may be more useful

If farmers can get economical and technological help in putting it to better use, common manure could become a valuable energy source in the future. So says John Sheffield, a researcher at the U.S. Department of Energy's (DOE) Oak Ridge National Laboratory (ORNL).

In the past, small farms were practically closed ecological systems. Now, as then, farmers tend to spread manure produced by their stock on local fields. But those fields may already be saturated with phosphates, and the runoff pollutes stream, rivers and the water system in general. The problems are compounded by the presence of both pathogens and antibiotics in the manure. The odor and dust from the animal farm operations is also seen as a public nuisance and a health hazard.

These problems may be solved with modern technologies and systems, many of them developed by ORNL and other DOE laboratories, and used to turn a profit, Sheffield says. These include biotechnology, catalysts, advanced materials, separation systems, improved combustion, instrumentation and controls and computer models, all of which have been boosted by recent governmental bills.

Livestock in the U.S. produce 1.4 billion tons of wet manure a year, or more than 200 million tons in dry weight. Sheffield says the solids have value as fertilizer because of the phosphates and as an energy source. "Those 200 million tons of manure contain energy equal to the energy in about 100 million tons of coal—roughly 10 percent of U.S. annual coal use," Sheffield noted. ORNL, the Tennessee Valley Authority and the University of Tennessee's Joint Institute for Energy and Environmental Studies and College of Agriculture have been discussing various approaches for helping farmers convert their manure into a productive resource.

Contact John Sheffield, 865-574-5510 or sheffieldj@ornl.gov

Less office paper leaves for Livermore Laboratory landfill

Lawrence Livermore National Laboratory (LLNL) recently expanded its office paper-recycling program to include newspapers, magazines, external phone books and soft/hardbound reports. The expansion was made possible by selection of a new recycling vendor with capacity to recycle a wider range of material.

Kent Wilson, Livermore's Recycling Coordinator, said "The program expansion has been well received by lab employees because of the convenience of being able to recycle newspapers and magazines in the office rather than having to take items to a central collection point."

While it's too early to quantify the additional tonnage diverted from the waste stream by the expanded recycling program, newspapers and magazines alone represent approximately 10 percent of the laboratory's waste stream, with waste paper accounting for about half the waste shipped to the landfill.

Contact Kent Wilson, LLNL, 925-423-2115 or wilson20@llnl.gov

Brookhaven improves oil burner

Brookhaven National Laboratory researcher Tom Butcher checks the flame on a fan-atomized burner, a device being studied for use as a more efficient device for homes heated by oil.

Skyrocketing heating oil prices have researchers at the U.S. Department of Energy's (DOE) Brookhaven National Laboratory (BNL) working to help keep costs down. One technology they have developed is the fan-atomized burner, which ignites fuel at low input rates to match the smaller heating loads of well-insulated homes. It offers improved fuel and air mixing for better performance, and its features translate to about a 5-10 percent improvement in efficiency over conventional burners. The new burner also reduces nitrogen-oxide emissions by as much as 30 percent. Heatwise, Inc., of Ridge, New York, has begun to commercialize the burner.

Contact Diane Greenberg, BNL, 631-344-2347 or greenb@bnl.gov

Rollin', rollin', rollin': DP Detroit workshop revolves around 'Wheels of Change'

Roll on to the Motor City! The Defense Programs' (DP) Eighteenth Biannual Pollution Prevention Hands-On Training Technology Workshop will be held Tuesday May 1 through Thursday May 3 at the Doubletree Hotel – Novi (Detroit), Mich. The workshop theme, "Wheels of Change," reflects the preeminence of the area's automotive industry in recognizing and embracing environmental stewardship. Working groups—centered around topics such as Continual Environmental Improvement, Design for Environment, Employee Awareness, Environmental Management Systems, Life Cycle Management, and Sustainable Development—will visit successful businesses in the Detroit area who have found that these approaches have benefited them in ways hard to imagine just a few years ago.

Attendance at this workshop is limited to DOE and M&O contractor personnel who are actively involved in daily operations at DOE laboratories and production facilities. Registration and a reception will be held Mon. April 30 from 5:00 to 7:30 p.m.

Contact Julie Lyons, MER, Inc., 423-543-5422 or mers@usit.net or go to www.dp.doe.gov/dp45/p2/detroit/

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