



**Pacific Northwest  
National Laboratory**  
Operated by Battelle for the  
U.S. Department of Energy

# Sharing the Excitement of Science

Breakthrough  
Science and  
Technology for  
the Northwest

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## Making the most of manure



Researchers at Pacific Northwest National Laboratory and Washington State University are beginning a two-year study to determine the best process to generate higher-value products from animal manure. The study is funded by a \$800,000 grant through the Department of Energy's Office of Energy Efficiency and Renewable Energy. It is focused on developing new processes to use animal manure as feedstock to produce commodity chemicals including those commonly used to manufacture antifreeze and certain plastics.

"By successfully converting the wastes into chemicals, we can greatly reduce the need for open-field disposal of manure, which will reduce odor problems, methane emission to the atmosphere and run-off contaminants into streams and lakes," said Don Stevens, project manager at PNNL. In addition, the biobased products could directly replace some chemicals made from petroleum resources and could require significantly less energy to produce.

For more information, see <http://www.nsl.gov/news/2001/01-20.htm>.

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*New! Read 'Sharing the Excitement of Science' on-line at [www.pnl.gov/sharingscience](http://www.pnl.gov/sharingscience).*

## Strobe light system may keep fish from entering dam turbines

Fish disco? Not quite. An underwater strobe light system that scientists began testing in June could deter resident fish species from entering turbines at Grand Coulee Dam. The study, conducted by researchers from Pacific Northwest National Laboratory, the Confederated Tribes of the Colville Reservation, U.S. Geological Survey and Bureau of Reclamation, involves testing a system of three powerful strobe lights on loan from the Bureau of Reclamation.

The strobe lights will be suspended below a barge in front of the dam's third powerhouse, where about 85 percent of the estimated 402,000 fish that enter the power turbines each year make their entrance. Hydro-acoustic transducers attached to the lights will track fish movement so scientists can observe their reaction to the lights. Finally, hatchery-reared kokanee salmon and rainbow trout will be implanted with sonic tags that will be tracked by sensors near the forebay area to allow the scientists to better understand how fish react to the lights.



## Washington's index of innovation available

The Washington Technology Center released in July its 2001 Index of Innovation & Technology for Washington State. The Index (available at [www.watechcenter.org/techindex](http://www.watechcenter.org/techindex)) contains more than 30 indicators in six major areas, including innovation, competitiveness, growth, financial capacity, human potential and quality of life. Together, these indicators "outline the relationship between the prosperity and vitality of Washington State, its residents and innovation and technology drivers."

The Washington Technology Center is a technology-based economic development agency that facilitates and funds research collaborations. It stimulates growth in Washington's companies by helping develop commercially viable technology—with the ultimate goal of creating jobs and expanding the state's economy. In the last five years, companies involved in WTC-sponsored projects have attracted more than \$91 million in additional private funding. Mike Schwenk, director of communications and economic development at Pacific Northwest National Laboratory, serves on WTC's board of directors.

## PNNL named in four R&D 100 Awards

Four technologies developed by Pacific Northwest National Laboratory and its collaborators appeared on R&D Magazine's list of 100 most significant technology developments for 2001. The R&D 100 Awards honor the most promising new products, processes, materials or software developed throughout the world. This year's four winners include:

- Materials that convert harmful engine exhaust emissions—oxides of nitrogen—into components of clean air
- A suite of analysis procedures, software and hardware that can reduce lifecycle operations and maintenance costs by as much as 25 to 50 percent
- Long-range semi-passive radio frequency identification tags that can identify, locate and even determine the condition of any item to which they are attached
- A high-temperature viscosity measurement technology for process monitoring of hot molten materials such as those in glass manufacturing and metals refining.

For more information on these and past winners, see <http://www.pnl.gov/main/welcome/awards/rd100/>.

## High school students bring solutions to Laboratory



**Evan Comben (back) and Gabe Guillen work on the microprocessor for a measurement device they're developing.**

Since 1998, Southridge High School teacher Jim Hendricks and a few of his students have spent part of their summer at Pacific Northwest National Laboratory building a device that monitors the temperature on an important piece of equipment. Through the Laboratory's Scientist-Student-Teacher High School Research Project, teachers and a small group of students come to the Laboratory to work on a particular problem and then take the project back to the classroom for further exploration.

Hendricks' groups have been focused on monitoring the super-cooled magnets in specialized spectrometers that allow researchers to conduct studies at the molecular level. In addition to developing a prototype measuring device, the students also wrote software that automatically logs temperature readings every five minutes and can be monitored in the classroom. A web site they created allows researchers to look at historical trends. This year, the students are working on an eight-channel device that will take readings in more locations than the first two-channel model.

"This is an interesting project. I'd like to see it completed," said Gabe Guillen, a senior who is spending his second summer in the program. Guillen hopes to attend a technical school after he graduates and said that this experience may put him a little bit ahead of future colleagues. "There aren't a lot of opportunities to participate in programs like this," he said.

## Laboratory climate experts testify before U.S. Senate

Pacific Northwest National Laboratory scientist James Edmonds delivered a statement about energy technologies and stabilizing greenhouse gas concentrations to the Senate Committee on Government Affairs on July 18. Edmonds reported four conclusions based on his involvement with the Global Energy Technology Strategy Program to Address Climate Change: 1) The cumulative concentrations of greenhouse gases is what matters—not the emissions of an individual country or an individual year. 2) Technology is the key to controlling the cost of stabilizing the concentration of greenhouse gases. 3) There is no silver bullet solution, rather a portfolio of energy research and development is required. 4) Energy technology development is just one part of a larger, comprehensive strategy that includes resolution of scientific uncertainties, adaptation to climate change and a credible, global commitment to limiting greenhouse gases.

Another PNNL researcher, Bill Chandler, testified before the Senate Committee on Energy and Natural Resources in its Hearing on Science of Climate Change on June 28. Chandler's testimony summarized the conclusions of *Powerful Partnerships: The Federal Role in International Cooperation on Energy Innovation*, a 1999 report to the President's Committee of Advisors on Science and Technology. Read Chandler's testimony at <http://www.pnl.gov/aisu/pubs/sentest.pdf>.

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