

# NMSU takes a lead in growing America's energy future

By M. Therese Shakra

For the Sun-News

**L**AS CRUCES — The green economy is quickly growing and New Mexico State University and the College of Engineering's Institute for Energy and the Environment continue to fuel New Mexico's instrumental role in the transformative "green age." The next industrial revolution



will center on production of renewable energy resources. This was one of the themes at the Southwestern Biofuels Association Policy Summit in Albuquerque in late May. The meeting included New Mexico's entire congressional delegation, about 140 scientists, academics, government officials and private sector executives.

The biofuels collaboration was highlighted by U.S. Department of Energy Secretary Steven Chu's announcement of almost \$800 million from the Recovery Act to accelerate biofuels research and commercialization. The SWBA was established as part of New Mexico's leadership role in developing clean, sustainable and environmentally superior transportation fuels for the nation and the world, according to Gov. Bill Richardson. New Mexico and the Southwest are prime areas for development of "third generation" biofuel feedstocks, such as oil-rich camelina, which grows on marginal land, requires little water and does not compete with the food supply.

Several NMSU staff and faculty participated in the non-profit organization's event including IEE Director Abbas Ghassemi. In the first panel segment moderated by Sarah Cottrell, energy and environmental policy adviser to Gov. Richardson, Ghassemi presented "Agricultural Challenges Facing Southwestern Crops & Algal (algal-based biofuels) Develop-



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**U.S. Sen. Jeff Bingaman, D-N.M.**, addresses participants at the first Southwestern Biofuels Association Policy Summit in late May in Albuquerque. Bingaman discussed legislative angles, policies, and renewable biofuel industry standards. New Mexico is taking a leadership role in the biofuels industry.

ment." The Institute's director emphasized the importance of sustainability, water and effective land use for environmental and economic feasibility. "It doesn't matter if an energy product is first to market if it's not sustainable," he said. "We need to look at each biofuel source as one of many tools toward truly overhauling the system."

An NMSU assistant professor in economics and international business, Meghan Starbuck presented a preliminary business lifecycle analysis within the algal biofuel industry. Starbuck and Luz-Elena Mimbel, an environmental engineer and project manager for IEE, will be developing an algal fuel techno-economic model assessing

the economic impact of a full-scale algal industry in New Mexico. The state's portion of the current fossil-fuel based petroleum market, \$173 billion annually, would be dwarfed by a full-scale biocrude industry, Starbuck said. She also emphasized that a huge barrier to advancing research is that no one wants to share outcomes for fear of giving away competitive advantages in the new green market.

"A Look at the Cutting Edge of Science," a session in algal research and development, included NMSU's Peter Lammers, a professor in the Center for Excellence in Hazardous Materials Management. Lammers and fellow panelists discussed the molecular and

cellular biology of various biofuel sources including micro-algae, single-cell, photosynthetic organisms known for their rapid growth and high energy content. The lipids or triglycerides, like those found in vegetable oil, can be used to advance biodiesel, green gasoline and green jet fuel.

Technological innovation is one of many factors making up the complex dynamic of the mandated green sector. Two factors add to the equation: The Energy-Water Nexus, where tradeoffs exist between production and output needs that require water (like transporting energy and source materials) and our decreasing amount and quality of water, becoming known as the

new oil. Also, peak oil is getting progressively closer. A standard definition of "peak oil" is the point when the maximum rate of global petroleum extraction is reached, after which the rate of production enters terminal decline. The International Energy Outlook, issued by the DOE and the Energy Information Administration, released in 2009 the most significant prediction thus far with a drastic drop in projected world oil output and a corresponding inverse reliance on non-traditional fuels such as biofuels.

The development of biofuels takes money. Green venture capital of almost \$148 million has poured into New Mexico since 2006 while the state is one of three that posted above 50 percent green-job growth between 1998 and 2007 (according to a recent study by PEW Charitable Trusts).

IEE, NMSU and New Mexico-based laboratories and businesses are well positioned in the race to power ground and air vehicles with biofuels. Collaboration is key to successful research and development and the economic impact of commercial biofuel operations is expected to be vast.

The Institute for Energy and the Environment includes WERC, a consortium for environmental education and technology development, Southwest Technology Development Institute, a renewable energy research and development group, and Carlsbad Environmental Monitoring and Research Center, a nuclear waste-management and monitoring center. For more information, contact Abbas Ghassemi, IEE Director at (800) 523-5996 or (575) 646-2038, or visit <http://iee.nmsu.edu>.

**"Eye on Research" is provided by New Mexico State University. This week's feature was written by M. Therese Shakra of the Institute for Energy and the Environment at New Mexico State University.**