University of Nebraska Lincoln | NEBRASKA CENTER FOR ENERGY SCIENCES RESEARCH

2009/10 Energy Research Grants – Cycle 4

NCESR. The Nebraska Center for Energy Sciences Research (NCESR), a collaboration between the Nebraska Public Power District (NPPD) and the University of Nebraska-Lincoln (UNL), was established in April 2006 to conduct research on renewable energy sources, energy efficiency and energy conservation; and to expand economic opportunities and improve quality of life for Nebraska and the nation.

Goal. The overall goal of the NCESR is to foster research and education in energy sciences by providing funding to support innovative research and collaboration among University of Nebraska-Lincoln faculty and other public- and private-sector organizations and businesses working in energy sciences.

RFP. The NCESR released the Request for Proposals (RFP) for its fourth competitive round of Energy Research Grants on June 20, 2008. The focus areas included:

1. *Biofuels and bioenergy;*
2. *Carbon cycle research that helps energy-related industries respond to, and benefit from, federal climate change initiatives;*
3. *Improved efficiency of power generation and distribution systems;*
4. *Wind, solar and geothermal energy; and*
5. *Innovations that increase energy efficiency of the built environment.*

Selections. Thirty-one faculty teams submitted proposals and requested more than $2 million. The External Advisory Committee (EAC) met on October 12, 2009 and awarded approximately $530,000 for the following 11 new energy research projects:

1. BIOFUELS AND BIOENERGY

- *Reference Methods for Detailed Quantitative Analysis of Bio-oils Using Comprehensive Two-dimensional Gas Chromatography (GCxGC)* – Stephen Reichenbach, Computer Science & Engineering

2. CARBON CYCLE RESEARCH THAT HELPS ENERGY-RELATED INDUSTRIES RESPOND TO, AND BENEFIT FROM, FEDERAL CLIMATE CHANGE INITIATIVES

- *Nanostructure Design of More Efficient Catalysts for Hydrogenation of Carbon Dioxide* – Xiao Cheng Zeng, Chemistry

3. IMPROVED EFFICIENCY OF POWER GENERATION AND DISTRIBUTION SYSTEMS

- *Optimum Maintenance Strategies for Improving Reliability, Efficiency and Safety of Wind Plants* – Sohrab Asgarpoor, Electrical Engineering
- *REIs: Renewable Energy Infrastructures on Urban Sites for the Generation and Transmission of Renewable MW to End Users in High Population Areas – Chris Ford, Architecture*
- *Energy Storage by Supercapacitors Based on Carbon Nano*-onions – Yongfeng Lu, Electrical Engineering

4. WIND, SOLAR AND GEOTHERMAL ENERGY

- *Nanostructured Low Work Function N-Electrodes for Polymer Photovoltaics* – Chin Li Cheung, Chemistry
- *Online Non-Intrusive Wind Turbine Fault Diagnosis* – Wei Qiao, Electrical Engineering
- *Investigating Windmills Safety and Reliability* – Michael Riley, Industrial and Management Systems Engineering
- *Development of an Inexpensive Manufacturing Method for High Efficiency Solar Cells* – Rodney Soukup, Electrical Engineering

5. INNOVATIONS THAT INCRASE ENERGY EFFICIENCY IN THE BUILT ENVIRONMENT

- *Optimal Energy Efficient Design for Residential Construction and Renovation* – James Goedert, Construction Systems
- *A Combined High-Efficiency System for Buildings* – Haorong Li, Architectural Engineering

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