Energy Research Grants

Cycle 9 - REQUEST FOR PROPOSAL

Issue Date	April 1, 2014
Pre-Proposal Due	May 23, 2014 – 5:00 p.m., CDT
Full Proposal	By Invitation Only

A. DESCRIPTION. 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 to enhance UNL 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.

B. 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 UNL faculty and with other public- and private-sector organizations and businesses. More information about the Energy Center and previously funded energy research grants can be found at ncesr.unl.edu.

C. RESEARCH – CYCLE 9 FOCUS AREAS. NCESR seeks innovative research proposals that address science or technologies in the focus areas of: carbon management, energy efficiency, materials, advanced transportation, the electric grid, and biofuels and bioproducts. Proposed research may include, but need not be limited to, the topics identified within each focus areas below.

- **Carbon Management** — understanding and solving the methane problem in modern agriculture; increase carbon fixation; and the conversion of carbon dioxide to a commodity such as a fuel (or other useful material) using chemical and artificial photosynthesis approaches.
- **Energy Efficiency** — development of new materials or construction techniques to reduce energy consumption for the residential, commercial and industrial built environment; advanced recycling/reuse of water in buildings; advanced concepts in lighting, heating and cooling.
- **Materials** — alternate materials or device/system designs to reduce the use of critical materials (as identified by the U.S. Department of Energy); device or system designs and improvements using carbon nanomaterials; scalable carbon nanomaterials processing; energy storage materials to directly store electric charge or for improved energy density and rapidity of chemical to electrical energy conversion; improved photovoltaic (PV) solar materials; improved lifetime or maintainability of nuclear reactor components; improved heat exchanger system materials for thermal generating stations.
- **Advanced Transportation** — materials for device and sub-systems in passenger and off-road (heavy transportation, construction, agricultural) vehicles; sub-system designs for hybrid electric vehicles (HEV) and electric vehicles (EV); advanced communications protocols and hardware between vehicles and the electric power grid for stationary or dynamic charging of vehicle on-board electrical energy storage components; advanced prime energy storage platform/medium for vehicles.
- **Electric Grid** — systems modeling and analysis techniques, and the associated software for enhanced monitoring and reliability prediction and operability of the grid (typically a large service area or Regional Transmission Organization as a minimum footprint); dynamic operability models based on the new energy market implemented by the Southwest Power

Pool (SPP) in March 2014; wind forecasting techniques for improved resource planning; analysis of lack of a capacity market upon long-term grid reliability; smart grid enhancements focusing on technology improvements and communication tools; more efficient use of energy with remote real time monitoring for consumers.

- **Biofuels and Bioproducts** — Use of carbon dioxide (CO_2) as feedstock for biofuels production; further identification and enhancements to the use of value added byproducts from modern biofuels refineries; concepts for commercial-scale biodiesel production from algae; hydrogen production from biological systems; new studies to affirm the CO_2 reduction benefits of coal based ethanol production from modern biorefineries; investigate the potential benefits of CO_2 capture at ethanol production facilities as a more economical offset for carbon generated at fossil fueled power stations; metabolic or genetic engineering for innovative, high-value bioproducts/bioenergy; biochemical or biophysical conversion of biomass to bioproducts/bioenergy; enhanced technologies for separation, harvesting, or extraction of bioproducts/bioenergy components; collaborate with other leading universities to reinvestigate opportunities for biochar based carbon sequestration in Nebraska.

D. RESEARCH TEAM.

1. The research team includes the Principal Investigator (PI), up to two Co-Investigator(s) and other internal and/or external members as appropriate to successfully perform the proposed work.
2. The Principal Investigator (PI) must be current UNL faculty.
3. The Co-Investigator(s) must be current UNL faculty. One Co-Investigator is required, however, one additional Co-Investigator is allowed. The Co-Investigator(s) must be willing and able to take on the role of the PI in the unforeseen event the PI no longer can perform that function.
4. Only individuals currently holding a UNL tenured or tenure-track appointment as an assistant, associate or (full) professor may be designated as the Principal Investigator (PI) or Co-Principal Investigator (Co-PI). Individuals currently holding a non-tenure-track faculty appointment are not allowed to serve as the PI or a Co-PI; however, may be identified as members of the research team.
5. UNL faculty may serve as the PI for only one (1) pre-proposal; however, any individual may serve as a Co- Investigator on multiple pre-proposals.
6. UNL faculty not designated as the PI and Co-Investigator(s) are to be identified as participants on the research team.
7. Researchers from other universities and/or external partners from the private-sector may also be members of the research team.

E. COLLABORATION AND INNOVATION. Pre-proposals from interdisciplinary teams will be given priority, especially those resulting in disruptive innovations and clean energy technology that impact Nebraska, the nation and the world.

F. FUNDING. Funding to support energy sciences research is provided by the Nebraska Public Power District (www.nppd.com) to UNL and administered by the Nebraska Center for Energy Sciences Research (ncesr.unl.edu).

G. PROJECT PERIOD.

1. The intent is for the effective start date to be January 1, 2015.
2. The project period for Year 1 is intended to be January 1, 2015 – December 31, 2015.
3. The end date awards authorized Year 2 funding is intended to be December 31, 2016; which makes the project period January 1, 2015 – December 31, 2016. However, if selected, only the

Year 1 project period will be authorized. The end date will be extended if provisional Year 2 funds are authorized.

H. BUDGET. The maximum budget request for the pre-proposal is as follows:

1. For a one-year (12 months) research project, the maximum budget is $75,000.
2. For a two-year (24 month) research project, the maximum budget for Year 1 is $75,000. The maximum budget for Year 2 is $75,000; however, Year 2 funding is provisional and contingent on the PI's demonstration of adequate project and financial performance as documented in the required progress reports. The maximum project total budget is $150,000.
3. For budget purposes to estimate the total research budget requested for the pre-proposal, salary and benefits are not allowed for faculty holding tenured or tenure-track appointments; however, salary and benefits are allowed for non-tenure-track faculty appointments provided a clear description of the role and responsibilities directly associated with the project is detailed in the budget justification of the full proposal, if invited to submit a full proposal.

I. EXPECTATION TO SEEK EXTERNAL FUNDING.

It is important and must be understood that those invited to submit full proposals and selected to receive funding are expected to actively submit proposals to secure external funding to supplement the energy research seed grant.

J. *NUgrant* ROUTING IS NOT APPLICABLE.

This is an internal funding competition to UNL. Therefore, PIs do not enter this proposal in *NUgrant*, which is currently used only for proposals submitted for external funding.

K. SELECTION.

1. The final decision of which principal investigators will be invited to summit full proposals will be performed by the External Advisory Committee (EAC) to NCESR.
2. The decisions of the EAC are final.

L. PROCESS.

The process will involve two competitive stages: the pre-proposal and the full proposal, which is by invitation only.

M. PRE-PROPOSAL.

1. Pre-proposals are due by the date and time designated on page 1 of this RFP. Requests for extensions or exceptions will not be accepted.
2. The pre-proposal document must:
   a. Be submitted as a *Word 2003* or *Word 2010* file. Any other type of file, such as a PDF, will not be accepted.
   b. Not exceed five (5) pages when printed using standard 8.5" by 11" paper with a minimum of one (1) inch margins (top, bottom, left and right) and font not smaller than 11 point.
   c. The order and requirements are as follows:
      c1. Title/abstract – page 1.
      - The title/abstract page must not exceed one page.
      - The title/abstract page, must provide:
        - the project title (15 word maximum)

- the name, position title (Professor, Associate Professor or Assistant Professor), department name and contact information for the Principal Investigator (PI)
- the name, position title (Professor, Associate Professor or Assistant Professor), department name and contact information for a minimum of one Co- Principal Investigator or a maximum of two Co-Principal Investigators
- name, title, affiliation of other members of the research team
- a brief abstract (300 word maximum)

c2. Narrative – pages 2 and 3.

- The narrative must not exceed two pages.
- The narrative must include:
  - a short, non-proprietary description of the project that can be understood by a non-scientific audience
  - the research goal and scientific objective(s) of the project including methods to be employed
  - the energy science merit and potential impact of the project (i.e., innovation, benefits, outcomes)
  - sources where the principal investigator will apply for future funding
  - the proposed project length (one year/12 months or two years/ 24 months)
  - the total budget request

c3. Curriculum Vitae – pages 4 and 5.

- The Curriculum Vitae must not exceed two pages.
- The Curriculum Vitae must be for the Principal Investigator only and must include pending, current and past external funding from 2008-present.

3. To submit a pre-proposal, go to: **http://ncesr.unl.edu/event.php?eventID=1002**. Enter the information requested, attach the pre-proposal Word document and click on the "Submit" button.
4. A pre-proposal that does not follow all of the requirements will not be reviewed.

N. FULL PROPOSAL – By Invitation Only

Only the Principal Investigators who are invited to submit a full proposal in the second stage of the competitive process will be provided more specific information regarding the due date, requirements and instructions to electronically submit the full proposal.

O. NCESR CONTACT.

For questions or more information, contact the Nebraska Center for Energy Sciences Research:

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