University of Nebraska Lincoln | NEBRASKA CENTER FOR ENERGY SCIENCES RESEARCH

Cycle 5 – Energy Research Grants

Integrated Systems for CO2 Capture, Anaerobic Digestion, and Algae Production

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ABSTRACT:

Challenges currently confronting Nebraska and the nation include minimizing CO2 release, controlling agricultural nutrient runoff, and reducing petroleum dependence. In an effort to mitigate the environmental impact of CO2 released during coal-fired power generation, manage agriculture nutrient release and provide advanced biofuels, this effort will begin to develop a highly integrated algae growth system. This system will incorporate capture and utilization of CO2 sources from power plant flue gas and use anaerobic digesters to manage animal wastes to produce biogas and nutrients for algae growth. The algae can then be used for biofuel production and the residual biomass for animal feed. This project will apply a laboratory-scale system to assess the effects of flue gas and anaerobic digester effluent on algae growth. The algae produced from the process will be analyzed for lipid content and quality as well as assessed for co-product value.

The overall goal is develop a system to grow algae by integrating flue gas (CO2 source) and animal wastes (nutrients by anaerobic digestion) in the Midwest. This approach will both reduce the impact of these environmental challenges while supporting the production of biofuel as renewable energy and biomass for animal feed.