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Background: MSU Anaerobic Digestion Research and Education Center funding

Several major grants will work in tandem to help Michigan State University develop a more comprehensive research and education program incorporating anaerobic digestion research and energy audit training to promote sustainable animal agriculture, especially among small to medium-sized farms. MSU will contribute \$230,000 for the facility's operation and management.

Anaerobic Digestion Research and Education Center (ADREC)

Funded by a private southeastern Michigan foundation -- focused on advancing science to produce practical solutions to issues affecting energy and the environment.

\$1.5 million over three years to establish the ADREC, including programmatic support and the construction of a 3,280-square-foot building south of campus.

Proposal: To develop a center that will house existing and new programs encompassing the design, testing and outreach associated with small-scale farm application of anaerobic digestion technology. Researchers aim to develop and commercialize turn-key digester/microturbine modules for affordable, scalable waste-to-power systems for small and mid-sized farms.

Comprehensive Farm Energy Audit Program

Also funded by the foundation -- focused on advancing science to produce practical solutions to issues affecting energy and the environment.

\$250,751 over two years (approx. \$125,000/yr.) to develop a comprehensive on-farm energy audit program and provide training through the MSU Department of Biosystems and Agricultural Engineering (BAE) that will establish certified farm energy auditors.

Proposal: To develop a certification training program for farm energy auditors that will enable them to assist agricultural production operators to increase energy efficiency, reduce energy use and recommend alternate renewable energy sources. The program will continue development of auditing methodologies and tools for dairy operations initiated during an earlier project and expand training program to a wide variety of agricultural operations. It will also evaluate and recommend alternative energy projects.

Impact: The program will train 30 new farm energy auditors over two years. It will encourage Michigan farmers to participate in farm energy audits (working with MSU Extension) and raise awareness of the energy and cost saving benefits for participating in the program, as well as incentive payments available from the federal government to farmers for having a certified energy audit and implementing identified energy saving recommendations.

Michigan Public Service Commission (MPSC) Low-Income and Energy Efficiency Fund (LIEEF) Grant

(The MPSC LIEEF funds projects with the potential to make a significant impact on energy efficiency and the economy of Michigan.)

\$1,538,306 over two years for the development and promotion of small scale (< 500 head cattle farm) manure management, combined heat and power, and algae culture using anaerobic bio-digestion.

Proposal: To develop an integrated system for manure management that will reduce the environmental impacts associated with manure and generate energy and value-added products. The system will use an anaerobic digestion method of processing manure to decompose organic material and produce biogas. The resulting biogas will be burned by a combined heat and power (CHP) system to generate heat and electricity. Nutrients in the effluent (waste water) of anaerobic digestion and carbon dioxide from the CHP system will be used to grow algae for biofuels production. Heat generated by the process will be recaptured and recycled back into the anaerobic digester and also provide supplemental heating for farm buildings.

Impact: The integrated system will reduce the environmental impacts of greenhouse gas emissions, odors, pathogens and excess nutrients associated with manure. It will also generate energy and value-added co-products such as methane biogas, biodiesel, bioethanol, fish meal, animal feed, and digested fiber as a soil amendment. According to Wei Liao, lead investigator of the project (Department of Biosystems and Agricultural Engineering), the project could benefit 2,359 Michigan dairy operations (85 percent of which have fewer than 200 cows) and other animal farms across the state. Ultimately, the technology could be commercialized throughout the U.S. and around the world.