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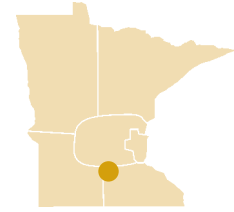
PROJECT/REQUEST

LOCATION

**Minnesota State  
University,  
Mankato**  
Mankato

Center for Applied  
Biofuel Research

\$2,500,000



**Project at a Glance**

- Develop a biofuels processing unit that can gain maximum methane and ethanol production from food and other biological wastes in geographically remote locations
- Demonstrate fuel distribution systems and fuel storage tanks for applications to quasi-stationary generators and for lightweight scouting vehicles
- Increase efficiency of internal combustion engines to operate on compressed natural gas fuel consisting of methane and other short carbon-chained fuels

**Project Description**

With the increasing cost of fossil fuel and budget constraints facing the military, the generation of energy from waste materials is a high priority. Biofuel can provide the military with a mobile power source for lightweight scouting vehicles and electrical generators.

The College of Science, Engineering and Technology at Minnesota State University, Mankato, working with regional collaborators, will use its long history in optimizing engine performance using alternative fuels to develop a prototype to convert biological wastes

common to military bases and outposts into biofuels to power mobile generators.

The bioprocessor prototype will convert human and food biological wastes generated daily within a military field installation into a biofuel, principally methane. This process eliminates or lessens the problem of managing biowastes currently burned using diesel fuel and turns the waste into usable fuel.

Production of fuel at the unit location eliminates much of the need to acquire fuel from external sources. Not only will oil be conserved, but also cargo shipments to replenish fuel will be reduced. The sanitary and environmental conditions of the camp can be improved as well.

In addition to the bioprocessor, a system for compressing the gas for storage will be developed. The project also will develop more efficient retrofitting of internal combustion engines to burn methane. The complete system will be mobile and setup of the units can be done quickly and simply.

This methane-fueled system can be replicated and used as a power system for multiple applications. The military application can provide a



*State-of-the-art laboratory facilities and equipment are used for testing mobile engines and various fuels in the power and vehicle research center at Minnesota State University, Mankato.*

demonstration model for civilian applications plus an educational model for efficient energy technology and a cleaner, affordable source of power. Long-term potential applications include treating methane with a catalytic converter to produce hydrogen for fuel cells.

**College of Science,  
Engineering and  
Technology**

Minnesota State University, Mankato is the lead institution of the new Center for Manufacturing and Engineering Excellence, one of four Centers of Excellence designated by the Board of Trustees of Minnesota State Colleges and Universities.

The university's College of Science, Engineering and Technology is home to 46 undergraduate, nine pre-professional and nine graduate programs. The college provides experiential learning through laboratory-based coursework. In partnership with business and industry, the college's goal is to prepare students to compete as leaders in the rapidly changing global marketplace and to provide a high-quality technical work force for the future. The college ranks among the top 55 undergraduate engineering colleges in the nation (*U.S. News & World Reports*).

In addition to the program departments, the college houses several centers for applied research including the Minnesota Center for Automotive Research and the Minnesota Center for Rapid Prototyping.

The Minnesota Center for Automotive Research focuses on student and faculty research dealing with government agencies and industries that are developing alternative fuels, such as ethanol. The center also works with manufacturers such as General Motors and others interested in fuel economy and emissions.

Manufacturing companies now have the opportunity to work with faculty and students on the prototyping of new products through the Minnesota Center for Rapid Prototyping.

### **Minnesota State University, Mankato Collaborators:**

- Minnesota Soybean Association
- Minnesota Corn Growers Association
- Minnesota Hog Producers Association
- Davisco Company
- Katolight and Kato Engineering
- Minnesota Center for Automotive Research
- Minnesota State University, Mankato, ROTC Unit
- Minnesota National Guard

### **Participating Institution:**

Minnesota State University,  
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[www.mnsu.edu](http://www.mnsu.edu)  
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