

One-Time Non-Base Investment Proposal: Step 2

(Please limit the proposal narrative and attachments to 10 pages)

Proposal Name: Campus Renewable Energy Utilization

1. Provide a description of the project being proposed. (5 points)

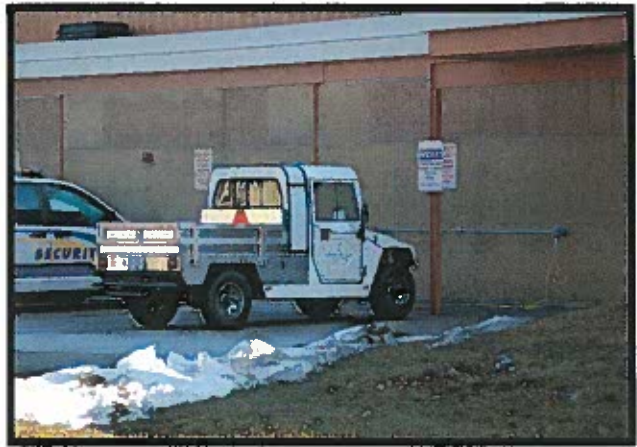
This focus of this project would be to identify sources of renewable energy available on campus and to incorporate them into day-to-day campus operation. Initially significant involvement from faculty and staff members will be required, however once established this is envisioned to have significant involvement from individual students and groups from across campus

ELECTRIC VEHICLE SIGNAGE

The University has 5 electric vehicles that are parked out of sight and charged by the grid. It is important that students on campus are made aware of some of the benefits and areas where alternative forms of energy can be utilized. An excellent way to do so is by using the vehicles as "moving brochures". The two pictures below are of electric vehicles on the University of Wisconsin, Madison Campus and Minnesota State, Mankato. We can do better.



e-ride Vehicle on UW-Madison Campus



e-ride Vehicle on MSU Campus

RELOCATING WIND TURBINES

There are four wind turbines located behind Gage that could be used to charge some of the vehicles. Two turbines will be moved to the CORE building near Wieking and used to charge the vehicles. The turbines were to initially be located near the CORE building; however the research grant that was used to purchase them for performance evaluation required them to be set up before the building was completed. The grant has been completed and energy being produced is not being utilized. Placing the turbines near the CORE building will allow ongoing research to be conducted on the performance of the units while at the same time using the electricity to power some of the campus electric vehicles.

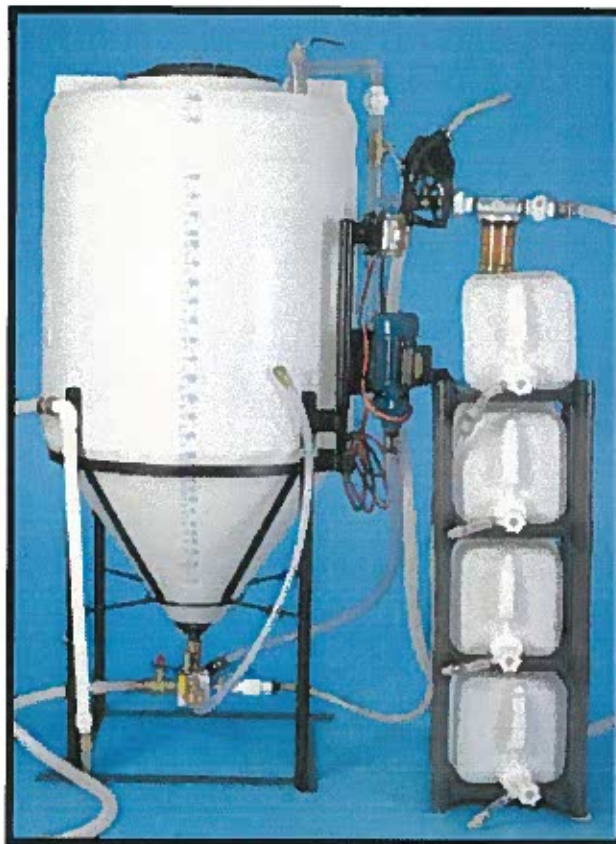


Artist Rendering of Wind Turbines near CORE Building

BIODIESEL PRODUCED FROM WASTE COOKING OIL

One gallon of waste cooking oil can be used to make 1 gallon of Biodiesel for slightly less than \$1 per gallon compared to the current petroleum Diesel cost of \$4 per gallon. Biodiesel can be blended with regular Diesel and run in engines with no modification required. The University has several Diesel powered vehicles and in addition to stationary engines with a consumption rate of approximately 110 gallons per month and a cost of \$400 - \$500 per month. It has been estimated that during the 15 week fall and spring semester's campus dining services produces approximately 150 gallons of waste vegetable oil per week.

Creating Biodiesel from waste vegetable oil is nothing new from a "research" perspective. However, it continues to be a very practical form of renewable energy and is relatively simple to do. Many of the "refineries" for this type of operation are relatively small and could easily be developed without new facilities. The picture below is of complete processing system that produces approximately 85 gallons of Biodiesel per batch.



Biodiesel Production Equipment

It should be noted that some schools have tried just filtering the solids from the waste vegetable oil and used them in Diesel vehicles. While this method can be used, it brings with it potential problems with fuel quality that can cause fuel system problems. By using the vegetable oil as a feedstock to create Biodiesel a far superior fuel is produced eliminating such problems.

FUTURE PROJECTS

There are many additional projects that can be carried out on a campus community in excess of 15,000 people and it will be the goal of the advisory board, graduate students and participating students to identify projects and develop work plans to attempt to address the needs.

An example could be solar cell charging stations for campus electric vehicles. Below you can see one of the newer electric vehicles on campus. This photo was taken where the vehicle is parked on the south side of the Student Union. While it may not make sense to require the vehicle to park near the CORE building to take advantage of wind generated electricity, a solar panel could easily be attached to the structure next to it and produce the energy needs of the vehicle.



MSU Electric Vehicle Parked Near CSU

Bus shelters can be very costly to install and operate. In many cases lighting is required for safety. This requires costly utility work. The bus shelter below requires no utility work. The unit has solar cells on the roof that charges batteries. Lighting is provided by using high efficiency LED lights. Wouldn't it be great to do a project at MSU designing and building a similar structure with students from engineering to art participating?



Solar Powered Bus Shelter

2. Describe how the project will drive positive transformational change. (5 points)

The project will drive positive change through educating students on energy alternatives by example. Initially the University can act in a sustainable way through using alternative forms of energy for transportation purposes. This model will also provide a positive way for students from any major to get involved in sustainable activities.

3. Explain how the project addresses student recruitment, retention, persistence, and/or completion or one or more of the 12 Challenges. (10 points)

In preparing this proposal we wanted to see if there was any data regarding campus sustainability and recruitment. We were surprised with the number of activities going on a university campuses across the nation. One site that was identified was the College Sustainability Report Card site: <http://www.greenreportcard.org/>. MSU, Mankato is not listed on the site.

MSU, Mankato has not been utilizing the resources that are available on campus. By moving in this sustainable direction we can be the University that people think of when they think of sustainability and renewable energy.

4. Describe the impact this project will have on students and/or others whom we serve. (10 points)

This project will affect students, staff and the community both directly and indirectly. Students will be impacted directly through participation in:

- developing a data acquisition system for monitoring the performance of the wind turbines and collecting performance data.
- collecting data on electricity use by vehicles on MSU campus.
- developing and operating a Biodiesel “refinery” and working on the logistics of obtaining the waste vegetable oil from the campus and potentially the greater Mankato area.
- the identification of renewable and sustainable practices that can be incorporated into the campus community. These practices may not always be related to transportation energy issues, but could include other forms of energy conservation and sustainability.
- analyzing the data from the programs in courses across the campus. The projects will be able to produce real data on the economics associated with residential wind energy, Biodiesel production, solar electric production and other related areas as they evolve.

Indirect impacts of the program include utilizing resources that are already on campus and identifying additional opportunities to operate the University in a more sustainable way. Improving the visibility of the programs not demonstrates a commitment to sustainability, but “shows” the Mankato community the possibilities that may be available to them. Part of the role of a university is to continually strive for improvement in itself and the community and share those ideas with all.

5. Identify the “SMART” outcomes for the project (specific, measurable, achievable, relevant, and time-bound). (5 points)

The following outcomes will be accomplished as part of this project:

- 1) Development of an Advisory Committee for the program and the hiring of 2 graduate assistants to manage the program. This will be completed by May 2012.
- 2) Two wind turbines will be relocated from the athletic fields behind Gage to locations near the CORE building. This will be accomplished during the summer of 2012.
- 3) A system to charge electric vehicles from energy produced by the turbines will be developed and integrated. This will be completed by May 2013.
- 4) A Biodiesel “refinery” will be identified, acquired and commissioned to produce Biodiesel from waste cooking oil. This will be operational by May 2013.
- 5) Develop appropriate signage from the electric vehicles that not only identify the fuel they use, but simple facts on their operation characteristics that help educate people that see them. This will be completed by December 2012.
- 6) Report discussing the outcomes of the initial projects including cost of operation and energy savings realized. The report will also identify additional opportunities for sustainable projects.

6. Discuss what this project will do for the university that warrants the investment. (5 points)

This project has the potential to reduce energy costs on campus, specifically in the area of Diesel Fuel costs along with electric consumption by the electric vehicles.. However, it should be noted that any reduction in energy costs would be very small and should not be considered the ultimate goal.

What the project will do is utilize the renewable energy opportunities present on campus and serve as a starting point for continued development in sustainable practices. This project will also make the activities on campus more visible, demonstrate a commitment to sustainable practices and provide opportunities for students across the campus to get involved in sustainable activities.

7. Describe how the activities generated by this project would be sustained after one-time funding has ended, or if applicable, explain why the project does not need to be sustained. (5 points)

Initially the project will be managed by 2 graduate students. It is felt that to properly develop the program from nothing that there will be significant efforts required in developing policies and procedures, promotion of the opportunities on campus, and documentation of the activities. They will also work with individual students and student groups that want to get involved in renewable energy development on campus.

After the program has been established it is envisioned that parts of it will need less direct involvement by graduate students. It seems reasonable that the day-to-day operations of the specific projects could be carried out by undergraduate students via financial aid or direct student help.

It is anticipated that direct savings to the University will be more than enough to cover supply and maintenance costs. With an established program with good visibility there will be opportunities to solicit outside grants and donations.

8. Budget (5 points):

Outline the funding requested using the categories listed below. Please identify any additional or matching funds that may be available to support the project. Please note, budget revisions beyond 10% total change from the initial proposal require approval. Budget revisions of more than 20%, constitutes a major change in the project scope and will not be approved.

	FY12	FY 12 Matching Funds	FY13	FY 13 Matching Funds	FY14	FY13 Matching Funds
Personnel						
Unclassified Salary (in-load, overload)						
Classified Salary	6000					
Fringe ^a (Classified and Unclassified)	3000					
Graduate Assistant Salary			18000		18000	
Graduate Assistant Tuition Reduction/Waiver ^b			11716		11716	
Non-Salary						
Student Help						
Purchased Services/Travel Expenses	24000					
Supplies and Materials	8000		9000		3000	
Building Improvement/Construction Costs			12000			
Equipment			8000			
Total Budget Requested	41000		58716		32716	

^a Note: All current employees must be paid fringe benefits. Fringe should be estimated based on salary and position classification: Unclassified 30%, Classified 37%, Adjunct 7.65%.

^b Estimated Tuition Reduction/Waiver for full-year enrollment: Masters \$5,858, Doctoral \$10,000.

Budget Justification- The total budget requested is \$132,432. A justification of each item can be reviewed below.

The "Classified Salary and Fringes" line item of \$9000 would cover the salary of Paul Steevens, Minnesota Center for Automotive Research Engineering Aid. Paul is fully supported through soft money and will be directly involved with the moving of the wind turbines and integrating them into the CORE building.

The "Purchased Services" will be used for the moving of 2 wind turbines from behind Gage to the CORE building will cost \$24,000. New concrete "pads" will need to be installed to support the poles for the turbines and an electrical company will be hired to take down the turbines, put them up in the new locations and complete wiring.

The "Supplies and Materials" budget of \$8000 for FY 12 will be used for electrical supplies required to relocate the wind turbines. There will be additional weather monitoring devices required because wind turbines will now be located at two locations. In addition one computer will be required to record data from the wind turbines.

The "Graduate Assistant Salary and Tuition Waiver" lines would be to hire 2 graduate assistants per year to work on the implementation, promotion and developing operating procedures for the project.

The FY13 "Supplies and Materials" budget of \$7500 will be for lettering and signage of vehicles, data acquisition components for the electric vehicles on campus and supplies required to make Biodiesel.

The FY 13 "Building Supplies and Construction" budget of \$12000 will be used for any required changes in sidewalks as a result of re-locating any electric vehicles closer to the wind turbines.

The FY13 "Equipment" budget of \$8000 is for the Biodiesel "refinery" system purchase along with necessary components to equip the lab to produce the fuel.

The FY14 "Supplies and Materials" budget of \$3000 will be ongoing project support.

9. Identify any special considerations or needs required for this project (e.g. physical space, contractual obligations, IT support, or collaborations with/implications for other units). (5 points)

No physical space is required at this time. However, depending on logistics of operating a Biodiesel "refinery" with vegetable oil as a feedstock a small space may be necessary for efficient operation. Justification for this will be developed in FY 13.

10. Provide a project timeline outlining key tasks, milestones and dates for completion. (5 points)

- 1) Development of an Advisory Committee and the hiring of graduate assistants - May 2012
- 2) Relocate wind turbines - June 2012
- 3) Electric vehicle charging station - May 2013
- 4) Biodiesel "refinery" commissioned - May 2013
- 5) Vehicle signage - December 2012
- 6) Final report – June 2013