

Rec  
9/30/16

22

## MTSU Clean Energy Initiative Project Funding Request

There are five (5) sections of the request to complete before submitting. See <http://www.mtsu.edu/sga/cleanenergy.shtml> for funding guidelines. Save completed form and email to [cee@mtsu.edu](mailto:cee@mtsu.edu) or mail to MTSU Box 57.

1. General Information	
Name of Person Submitting Request: John Rozell	
Department/Office Engineering Technology, Lab 120, Voorhies Building	Phone # (Office) 615-904-8568
MTSU Box # 19	Phone # (Cell)
E-mail <a href="mailto:john.rozell@mtsu.edu">john.rozell@mtsu.edu</a>	Submittal Date

2. Project Categories (Select One)			
Select the category that best describes the project.			
<input type="checkbox"/>	Energy Conservation/Efficiency	<input type="checkbox"/>	Sustainable Design
X	Alternative Fuels	<input type="checkbox"/>	Other
<input type="checkbox"/>	Renewable Energy	<input type="checkbox"/>	

3. Project Information	
<p>a. Please provide a brief descriptive title for the project.</p> <p>b. The project cost estimate is the expected cost of the project to be considered by the committee for approval, which may differ from the total project cost in the case of matching funding opportunities. <b>Any funding request is a 'not-to-exceed' amount. Any proposed expenditure above the requested amount will require a resubmission.</b></p> <p>c. List the source of project cost estimates.</p> <p>d. Provide a brief explanation in response to question regarding previous funding.</p>	
3a. Project Title	Neighborhood Electric Vehicle (NEV) Technology Demonstrator
3b. Project Cost Estimate	\$9,000
3c. Source of Estimate	Review of Internet pricing of comparable models
3d. If previous funding from this source was awarded, explain how this request differs?	N/A

#### 4. Project Description

(Completed in as much detail as possible.)

- a. The scope of the work to be accomplished is a detailed description of project activities.
- b. The benefit statement describes the advantages of the project as relates to the selected project category.
- c. The location of the project includes the name of the building, department, and/or specific location of where the project will be conducted on campus.
- d. List any departments you anticipate to be involved. Were any departments consulted in preparation of this request? Who? A listing may be attached to this form when submitted.
- e. Provide specific information on anticipated student involvement or benefit.
- f. Provide information for anticipated future operating and/or maintenance requirements occurring as a result of the proposed project.
- g. Provide any additional comments or information that may be pertinent to approval of the project funding request.

##### 4a. Scope: Work to be accomplished

1. Purchase a used 2008-2015 GEM 2e (two passenger) electric vehicle. Purchasing a 2015 GEM or earlier provides a better cost effective means of obtaining an electric vehicle suitable for the project.
2. Once suitable vehicle has been purchased, Engineering Technology will repair and/or replace components to assure reliability. Possible replacement of the batteries with new is part of the requested funding.
3. Design and have installed vinyl graphics on each side of vehicle to promote MTSU, Sustainable Campus Program and to identify vehicle as a clean energy vehicle.

##### 4b. Scope: Benefit Statement

This vehicle will help provide visibility to the Campus Sustainability, program, promote use of clean energy resources, as well as providing a practical means of campus transportation for the Engineering Technology Department.

Additionally, there are several technology learning opportunities associated with and electric vehicle, such as upgrading the motor, conversion of the wet-cell battery package to lithium, as well as development of solar panel charging technology. This vehicle could also be utilized as an electric vehicle testbed for student projects.

#### 4. Project Description (continued)

##### 4c. Location of Project (Building, etc.)

Vehicle will be operated from and maintained by Engineering Technology in the Voorhies Building.

##### 4d. Participants and Roles

John Rozell, Director of Eng. Tech. R&D Labs: Will procure vehicle and provide maintenance and update support.

Faculty and Staff of Engineering Technology: Will utilize the vehicle for transportation on campus.

##### 4e. Student participation and/or student benefit

Engineering Technology Student Workers: Will utilize the vehicle to run errands on campus as directed. Use on campus will bring visibility to the student population on electric vehicle technology and how such vehicles can be used to provide efficient, affordable, eco-friendly transportation.

##### 4f. Future Operating and/or Maintenance Requirements

As with any electric vehicle, the maintenance of the battery pack is essential to good performance and extending the life of the battery. A 72 volt battery pack for a GEM vehicle typically last anywhere from 4 to 7 years with proper care.

Since the vehicle will be operated exclusively on campus, tire wear and replacement should not be a big recurring expense.

##### 4g. Additional Comments or Information Pertinent to the Proposed Project

Shown is the type and color scheme of the GEM car that is proposed, with concept graphics on the doors to identify the vehicle as a zero-emission, electric vehicle as well as promoting MTSU Campus Sustainability Projects.



Several MTSU departments (Printing Services, Resource and Operations Management, Facilities, Post Office) already utilizes GEM vehicles on campus. Discussion with users indicated that, being an electric-powered vehicle, the car met their needs and expectations.

Other than their size and unique design features, students on campus may be aware that the GEM car is an electric vehicle. Exterior door graphics provide a means to communicate the vehicle technology and that it was procured through the Campus Sustainability Fund.

## 5. Project Performance Information

Provide information if applicable.

- a. Provide information on estimated annual energy savings stated in units such as kW, kWh, Btu, gallons, etc.
- b. Provide information on estimated annual energy cost savings in monetary terms.
- c. Provide information on any annual operating or other cost savings in monetary terms. Be specific.
- d. Provide information about any matching or supplementary funding opportunities that are available. Identify all sources and explain.

### 5a. Estimated Annual Energy Savings (Estimated in kW, kWh, Btu, etc.)

The electrical energy used to fully charge a GEM vehicle for a 30 mile range is \$.33 (based on 5kWh and the current MTEM rate of \$.066 per kWh.)

A comparable golf cart will get approximately 30 miles per gallon, so for a 30 mile range the cost would be on average \$2.30

GEM vehicle fuel cost: **\$.011 per mile** (no exhaust, quiet, low carbon footprint)

Golf Cart: **\$.076 per mile** (fossil fuel)

### 5b. Annual Energy COST Savings (\$)

Based on the estimated usage of our current solar cart (7 miles/week x 45 weeks/year):

Gas Golf cart: 315 miles X \$.076 fuels costs= **\$23.94**

GEM car: = 315 miles x \$.011 per mile = **\$3.47**

Summary: The GEM car provides transportation at about 1/6<sup>th</sup> the cost of a traditional gasoline fueled golf cart. The GEM car is less expensive to operate, as also reduces greenhouse gas emissions.

5c. Annual Operating or Other Cost Savings. Specify. (\$)

A GEM car requires approximately 5 kWh of electricity to fully charge. Currently, local industrial user rates in Murfreesboro is 6.66 cents/kWh. Thus, it would cost \$.33 to fully charge (assuming a full charge is needed). Currently the range of a fully charged vehicle is 30 miles. It is estimated that about the equivalent of 10 full charges a year would be required which is approximately **\$3.33**

A gasoline fueled golf cart achieves about 30 mpg. If it is operated the same 315 annual miles as shown above, the fuel cost would be (at 2.30 average per gallon currently in Murfreesboro) would be **\$24.15** in fuel.

5d. Matching or Supplementary Funding (Identify and Explain)

N/A