Rec 10/3/14

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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 or mail to MTSU Box 57.

1. General Information	
Name of Person Submitting Request Dr. Saeed Foroudastan	
Department/Office CBAS	Phone # (Office) 615-494-8786
MTSU Box # MTSU Box 83	Phone # (Cell) 615-417-2761
E-mail saeed.foroudastan@mtsu.edu	Submittal Date October 3, 2014

2. Project Categories (Select One)			
Select the category that best describes the project.			
X	Energy Conservation/Efficiency	X	Sustainable Design
X	Alternative Fuels		Other
	Renewable Energy		

3. Project Information
a. Please provide a brief descriptive title for the project. **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. **Any funding request is a 'not-to-exceed' amount. Any proposed expenditure above the requested amount will require a resubmission.** c. List the source of project cost estimates. d. Provide a brief explanation in response to question regarding previous funding.
3a. Project Title Formula Hybrid Vehicle Project
3b. Project Cost Estimate The minimum cost to operate successfully is $8400
3c. Source of Estimate The cost to purchase and implement the projects components

3d. If previous funding from this source was awarded, explain how this request differs?

Previous funding allowed us to build a proof of concept vehicle and ensure the feasibility of our research, as well as give our students hands on experience and training for further research. This semester the project will serve as a research platform to push the limits of automotive efficiency through the use of highly efficient 3-phase AC electric motors and Lithium-Iron Phosphate Prismatic cell batteries.

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

The goal of this project is to prove the feasibility of electric propulsion in high performance automotive applications through the use of cutting edge materials and methods. As the design and implementation of this project will be carried out by MTSU students they will gain valuable knowledge in areas of conservation, energy efficiency, and sustainable design. Additionally, the huge strides our students will make in performance while simultaneously drastically reducing fuel consumption will better our position at the annual formula-hybrid competition, which will further the EVP mission of improving recruitment, retention, and graduation rates.

4b. Scope: Benefit Statement

This project will make great strides in advancing the cause of energy conservation and efficiency by showcasing that you can be an automotive enthusiast and environmentally responsible due to recent advancements in technology. Calculations suggest that our vehicle should be able to increase its already impressive fuel mileage by an additional 20%, while gaining another 15 horsepower. The technology we will be developing will not only serve as a potential enhancement to those consumers who are already part of the green movement, but will also mitigate the excuses of the crowd that has thus far refused to jump on the bandwagon.

4. Project Description (continued)

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

This project will be completed on campus in the Voorhies Engineering Building. Research and implementation portions will take place in room 170d (projects lab) and room 108 (machine shop), respectively.

4d. Participants and Roles

Dr. Saeed Foroudastan will act as faculty supervisor. He and Dr. Charles Perry will also act as faculty advisors to the hybrid vehicle project, mentoring the team as they take on the challenge of pushing the limits of efficiency in the automotive industry. Jeremy Posey, graduate assistant, will serve as the project manager for this project.

4e. Student participation and/or student benefit

On average 30 students now participate annually in designing and fabricating the hybrid car. The students will have to research, design, and manufacture the components from scratch to meet the rules of the annual competition, while reducing fuel consumption numbers by an incredible level. Students must use their ingenuity and creativity in order to solve the various layers of complexity. Some of these answers involve solutions that have our students working alongside those in the chemistry department in order to develop a more efficient combustible fuel. During this process the students will gain invaluable hands-on experience. The students will also learn critical skills such as teamwork, leadership, and effective communication.

4f. Future Operating and/or Maintenance Requirements

The hybrid car has been incorporated into the existing Experimental Vehicles Program at MTSU. The project is performed annually with the main construction coming in the first year of production, and modifications and improvements coming in the following years.

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

This project has fostered the largest increase in participation in the Experimental Vehicles Program in a single year since its founding in 2003. The EVP gives young students an opportunity to expand their classroom knowledge and gain hands on experience in the groundbreaking technologies surrounding the green energy movement. Students involved in the EVP have a nearly 100% retention and graduation rate, as well as a much higher chance of landing the most sought-after employment positions upon graduation.

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 direct fuel saving for our vehicle will be in the area of around 200 gallons per year when you combine testing and competition. However, the indirect savings if our technology and methods are implemented in the broader automotive market are nearly boundless. Using the latest data from the Highway administration and the Environmental Protection Agency we could expect that number to be as high as 223 gallons per vehicle / per year.

5b. Annual Energy COST Savings ($)

Again, the direct saving for us will be approximately $766 this year. A passenger car adopting this technology could expect to save around $797 per year. The amount of energy costs savings is only limited by the number of vehicles which eventually adopt the technology.

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

The switch to different motor and battery technology will eliminate the need for periodic re-winding of motors, as well as the need to replace batteries regularly. The new setup is not only far more efficient and powerful, but will also quadruple the usable life of our current system. The estimated cost saving per year seen by eliminating this process is approximately $650.

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

Our only other funding for this semester is a portion of the student activity fees awarded to the Society of Automotive Engineers.