Brief Summary of the Project

Smoky Mountain High School 'Goes Green'

In response to the need to provide opportunities for high school students in STEM, the Career & Technical Education Department at Smoky Mountain High School has worked to redesign some of its Technology and Carpentry course offerings. Through the "Smoky Mountain Goes Green" initiative, the school plans to develop and operate a working solar center.

Plans are to first re-install solar panels and refurbish a solar power charging station – both of which were given to the school by the NC Department of Natural & Environmental Resources. The charging station would be used to power the Technology Department's electric truck (also given to the school by DNER) as well as the fans in a wood kiln being built by the Carpentry Program. The electric truck will be used as a tool to increase awareness about alternative energy through demonstrations at elementary schools and car shows – as well as events such as Earth Day, parades, and festivals. Excess energy will be used to off-load power usage in the building where the Career & Technical Education programs are housed.

Narrative Description of the Project

Project rationale - should address the need for the project and show a logical connection between the proposed activities and intended outcomes.

Students from the United States continue to fall behind in math and the science compared to students in China, Singapore, Japan, South Korea, Russia, England, and the Netherlands. This decline in U.S. performance places the United States at a distinct disadvantage as it works fiercely to gain a foothold in a competitive global marketplace.

Many argue that a key factor for this discrepancy is that education in these subjects does not start at a young enough age in the United States – that it is crucial for our schools to begin teaching the subjects of science, technology, engineering and mathematics (STEM) as early as possible. Developmentally appropriate strategies can ignite sparks of interest in the areas of STEM, and can improve the odds for our youth when it is time for them to compete in the global job market – and in a world where STEM is revolutionizing the way we live. Teaching STEM education at an earlier age will ensure foundation knowledge and skills, as well as foster long-term interest and higher-level study in the four subject areas in later years.

To underscore this need, leaders from the world of education, business, and government met at the National Press Club in Washington, D.C. in September 2011 for a panel discussion on how to engage schools and students in STEM. The panelists discussed strategies for making STEM 'cool,' and many argued for more work to be done to build student interest.

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Potential for establishing viable school/university collaboration.

Mr. Mark Taylor will be the primary person responsible for the project. He is one of the Technology Program teachers at Smoky Mountain High School. He will be joined by Mr. Bryan Hartzog (the other Technology program teacher) and Mr. Charles Parham (the Carpentry Program teacher). Significant partners include WCU's Engineering/Technology and Construction Management Programs. Faculty and students from these programs will assist in the overall implementation of the project, serve as mentors for high school students, and provide ongoing energy efficiency audits on the solar center. In addition to this being a great 'live project' for both institutions, it will also serve as an opportunity to strengthen the high school students' awareness of postsecondary offerings at WCU. Other project partners include NC Solar Center, DNER, SCC, the Jackson County Green Energy Park and the EV Challenge Program.

Potential for enhancing student learning and promoting the development of 21st Century skills.

This project completely integrates with and supports several courses from the NC Standard Course of Study – including Technology, Engineering & Design, Principles of Technology, and Carpentry which are taught at Smoky Mountain High School. In addition to basic and advanced skill development in construction, mechanical, electrical and thermal systems and the technical aspects of rate, force, work, resistance, energy and power – students will also learn about project design, implementation and management (as this will be a student-driven project).

Impact – may include the extent to which the project will have an impact beyond the current academic year.

The re-installation of the solar panels, the construction of the solar wood kiln along with the refurbishment of the solar charging station and electric truck is a one-time project – but the operation of the solar station, solar wood kiln, and the electric truck will be ongoing.

We estimate that it will take approximately one (1) semester to re-install the solar panels, construct the solar wood kiln – and refurbish the solar power charging station and electric truck. Partners from the North Carolina Solar Center will assist in reinstalling the solar panels and refurbishing the charging station in January, February and March, weather permitting. High school carpentry students – along with WCU Construction Management students – will build the solar wood kiln. Also during this time, faculty/students from the high school and SCC will be refurbishing the electric truck – and planning for demonstrations and other awareness events. In April, testing and calibration of the charging station will take place – led by faculty/students from WCU's Engineering/Technology and Construction Management Programs. In May, the charging station will begin powering both the electric car and the wood kiln. Demonstrations and event participation will be ongoing.

Plan for evaluating the project's effectiveness.

There are many aspects we will be evaluating to gauge this project's success. A very tangible achievement will be having an operational solar center – and the power it generates to support the wood kiln and electric truck. Another measure of effectiveness will be the ongoing relationship with the WCU Engineering/Technology and Construction Management Programs – with WCU faculty/students providing ongoing energy efficiency audits of the solar system as well as interaction with high school students. In addition, the opportunities to raise awareness and educate young people about alternative energy will be very powerful. While it may be hard to measure, another project success will be increasing the engagement and excitement of the high school students involved in the project – ultimately increasing enrollment in high school science, technology, engineering and math related courses.

The extent to which grant funds are critical to the success of the project.

External funding is absolutely essential to the successful implementation of this project. While our Career & Technical Education Program has some resources to dedicate to this project, we are seeking outside support to fully fund the project. Without funding like that offered through the WCU SUTEP grant program, the project will likely be delayed or cancelled – which will negatively impact our high school students' ability to have an ongoing innovative hands-on learning experience.

Detailed Budget

BUDGET ITEM	AMOUNT
Reinstall Solar Panels	$0.00
Install a 220 Outlet	$0.00
Batteries for Charging Station	$1,200.00
Tires for Truck	$600.00
Batteries for Truck	$1,200.00
Vehicle Wrap	$2,000.00
Shed Cover/Carport	$650.00
Lumber for Kiln	$500.00
Tempered Glass	$365.00
Pallet Jack	$200.00
Fans	$460.00
Electrical Material	$100.00
Hardware	$100.00
Moisture Meter	$400.00
TOTAL:	$7,775.00

FUNDING SECURED	AMOUNT
Career/Technical Education Program	$4,775.00
Smoky Mountain High School	$650.00

OTHER REQUESTS OUTSTANDING	AMOUNT
Community Foundation of WNC	$1,600.00

October 27, 2008

Selection Committee
School University Teacher Education Partnership (SUTEP)
College of Education and Allied Professions
Western Carolina University

Committee Members:

The following is offered in support of Smoky Mountain High School as an applicant for the SUTEP grant for the 2011-2012 academic year. I have reviewed the proposal submitted by Laura Pennington and Mark Taylor regarding their proposal for implementing "Green Technology". The proposal provides an excellent means by which students can gain live and practical experiences in this area.

Two faculty members from the Kimmel School at WCU will gladly partner with Smoky Mountain and provide assessment related to energy audits and potential impact of the project including payback. Dr. George Ford, Assistant Professor of Construction Management and Dr. Aaron Ball, Professor of Engineering and Technology agree to offer support for this project.

The project should provide not only valuable experiences for students at Smoky Mountain High, but also establishes the infrastructure for ongoing and expanding opportunities for other related alternative energy activities.

If we can provide any additional information in support of the SUTEP grant consideration for Smoky Mountain High School, please let us know. The project certainly seems worthy of being funded for the current academic year and provides a good foundation for funding in the future.

Respectfully submitted,

Aaron K. Ball

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