

Applicant's Statement

Project Description/Background

Introduction of District and School Background:

Having implemented a Resource Conservation Management Program in 1996, Federal Way Public Schools has a long-standing commitment to energy conservation. Comparing utility costs for FWPS with 7 peer districts in Western Washington for school year 2006-07 in the categories of total budget, Percent of total budget, cost per student and cost per square foot, FWPS had the top ranking in 30 of 32 categories.(Data from OSPI)

Thomas Jefferson High School (TJHS) is a diverse grades 9-12 campus located in the north end of the district that currently serves over 2000 students. It is the only "California-Style" open campus which is characterized by classroom clusters located in separate buildings with no inner hallways for students.

Current conservation programs at TJHS include:

-Thomas Jefferson High School and the FWPS is in the final design stages with McKinstry Company for two energy efficiency projects which include total new lighting and heating system upgrades, including all new DDC controls, for a cost of just over \$1,000,000.00. The project will be completed this summer.

- TJHS's student body recycling efforts and output have been double over the past two years.
- All vending machines have been retrofitted with "vending-misers."

Our project proposal identifies 3 main objectives to serve as a basis for implementation and assessment of the Solar Schools Project (SSP) at TJHS:

- 1) Awareness and Stewardship:
 - Building connections between students/community members lives, daily decisions and the Earth's resources.
 - Building awareness of our energy dependance, and future viability of different energy resources.
 - Instilling a sense of societal obligation to sustainability via renewable energies.
- 2) Solar Technology:
 - Understanding the principals behind the production of electricity via PV cells, system components of working solar arrays, and environmental factors that impact solar power production.
- 3) Regional Viability:
 - Observations of our students indicate that they often envision solar technology as primarily a "sun-belt" technology.
 - This objective includes exposure to existing solar technologies in the NW region and understanding how potential solar sites are assessed.
 - Developing an understanding of the renewable energy markets, regional and state government incentives for conservation and renewable energy

-Analyzing and publishing the real-time data generated by the SSP installation.

Educational Benefits: The implementation plan to address these objectives in our curriculum includes the following elements:

-TJHS has chosen to align its solar curriculum development with the standards defined by the National Energy Education Development Project (NEED).(Addendum)

-The project-champion views the SSP as a keystone curriculum piece to be implemented in our school's physical science, physics, and earth science curriculum with an emphasis on continuous integration.

-Chosen curricular activities are aligned with state EARL/GLE's

-We have established interdisciplinary partners school-wide. The assembled inter-disciplinary curriculum team is set to immediately deploy the specific solar curriculum projects listed below upon initial installation of the solar array. (September 2008)

-Long term projects such as a sustainability-themed small learning community are being discussed.

Specific Curriculum Implementation: The following projects are ready to be implemented upon installation of the system (planned for September 1, 2008)

Freshman Physical Science: This will be lead by the project champion who teaches Freshman Physical Science. Direct student exposure would be over 600 students based on 2007-08 enrollment. Identified SSP tie-ins that seamlessly integrate with the district adopted, state-aligned curriculum include the following:

Scientific Method/Experimental Design Unit: The first 3-4 weeks of our current curriculum involves the elements of sound experimental design and the scientific method.

-Energyhouse Experiments modeled after The Design Coalition's and NEED's Energy House activity (See Addendum Pg 4 for Sample Curriculum)

Energy Resources Unit: This already adopted unit would include:

-Carbon Footprinting exercises

-NEED's "developing an energy plan" curriculum piece

-Using data generated from the SSP.

Earth Science Unit: This already adopted unit would include

-Sun tracking activities

-Correlating the sun's path with data generated by the SSP.

Marketing/Physics/Earth Science: This is an interdisciplinary project between the Physics, Earth Science and Marketing Department. Direct student exposure includes approximately 100 students and secondary exposure to a potential 100% of the student body via the marketing campaign. Project highlights include:

-Physics students will use an energy logging device such as the "Watts-Up?" to monitor drink-

vending machines outfitted with “vending-misers” and determine the average monthly power consumption.

-The physics department will assemble student teams to determine the equivalent power allotment from the solar array to be earmarked for offsetting the power consumption one or two vending machines. (Preliminary test runs indicate about 274 kWh per month)

-Students will use this information to calculate the CO2 emissions, cost savings, and fossil fuel offset to supply the marketing department with data for an eco-marketing campaign.

-The marketing department has committed to having students develop an eco-marketing campaign that would promote the increased environmental soundness or “carbon reduced” nature of the products purchased from these particular vending machines versus the others in the school.

-This would simultaneously promote stewardship, consumer choice principles, and the Solar Schools project itself.

Earth Science Class: The earth science department has identified two immediate curricular deployment projects:

-PV Tracking: Earth science students will be assigned the responsibility of monitoring the optimum array orientation by tracking sun exposure to the south face of the campus and correlating SSP electricity production to the sun's position.

-Optimum placement coordinates would be determined by class research with the actual adjustments carried out by the Project Champion. Alternatively, if the system had a form of active tracking, then students could directly manipulate the orientation remotely and collect seasonal data. (**This curriculum piece is optional as it is dependent on the nature of the hardware.)

Physics: Lead by Project Champion who teaches Physics. The project champion has identified two immediate curricular implementations:

-Examining the physics of electricity production via photovoltaic cells.

-Developing and carrying-out a research project that involves incorporating PV cells into an existing technology and examining the viability of the product.

The direct exposure to the SSP (defined by students actively participating in curricular activities) is, in total approximately 800 students. (including Marketing and etc) Secondary exposure could reach 100% of the TJHS student body of over 2,000 students. Additional community exposure is outlined below.

Community Outreach Plan: TJHS has established four initial conduits for its community outreach plan:

-The Federal Way School district has a dedicated Community Relations Department (<http://www.fwps.org/dept/comm/>) located at *The Commons At Federal Way* (formerly known as SeaTac Mall.) The district has committed to locating a Kiosk there featuring the SSP with access to real-time data. Potential community exposure is linked to the foot traffic of the mall.

-The district has secured commitment from the Federal Way City Hall for the location of a second similarly featured kiosk there. The district has also committed to contribute \$1000 for kiosk funding.

-TJHS will feature weekly updated broadcasts of SSP information on its readerboard. (see

attached photos) The reader-board is exposed to on average 11,000 vehicles per day.

-A link on the TJHS webpage will highlight the projects mentioned above and include public access to real-time data from the SSP.

Project Location

Locations surveyed for the SSP were based on three criteria: public visibility, security, and maximum sun exposure. Installation location has the following characteristics (See addendum for location Photographs) :

-Thomas Jefferson is located on busy, 4-lane 288th St. South 288th is a significant corridor between the Kent-Auburn Valley and the Federal Way-Des Moines area in South King County, handling about 11,000 vehicles per day.

-The school is single story, open campus type design. Rooftops and street level are approximately the same elevation. It is planned to install the solar panel on the two-story gym roof, making it extremely visibly from the roadway.

-The roof location ensures a high level of security.

-Installation on the gym roof will provide an unobstructed, due south orientation for maximum sun exposure.

Key Players

Principal, Dr. Mark Marshall, 253-945-5600, mmarshall@fwps.org

Champion Teacher, Shawn Timulak, Physics endorsed 253-945-5719, stimulak@fwps.org

Bio: Shawn has a long-standing personal passion for renewable energy and energy conservation. He has a B.S. in Physics and Astronomy from the University of Pittsburgh and a Masters in Education from Western Washington University.

District Information Technology contact, Tim Crawford, 253-6-945-2111, tcrawford@fwps.org.

District Facilities Manager, Rod Leland, 253-945-5934, rleland@fwps.org.

Resource Conservation Manager, Ed Novak, 253-945-5937, enovak@fwps.org.

Deliverables

TJHS will deliver a written assessment of the curricular component as related to student understanding and an evaluation of successful SSP implementation. This document will be authored by the Project Champion and available for PSE review upon completion of the first full academic school year, no later than May 31, 2009 and will include:

-Student curricular understanding will be measured via pre and post assessments based on the diagnostics developed by the National Energy Education Development Project (see Addendum pg 3 for sample) and/or any PSE specific curricular goals.

-The evaluation of successful program implementation will be authored by the Project Champion based on meeting the above stated goals outlined: Awareness and Stewardship, Solar Technology, Regional Viability.

-The evaluation will include an outline of changes including revising or expanding aspects of the program for the following school year (2009-2010).

-The project champion will be available to PSE at anytime through out the year to report on the progress of the SSP.

-The project champion is committed to being a liaison for any FWPS party interested in utilizing the SSP.

End

Addendum Contents

- 1) Graph of TJHS paper recycling
- 2) NEED curriculum objectives
- 3) Possible project location photographs
- 4) Sample curriculum assessment
- 5) Sample Energy House curriculum