

Energy Smart Schools – Applied Research, Field Testing, and Technology Integration Technical Progress Report - Annual

October 1, 2001 – October 1, 2002

Submitted by Frank Bishop

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NASEO

1414 Prince Street, Suite 200

Alexandria, VA 22314

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ABSTRACT

This multi-state collaborative project brings together federal, state, and private sector resources in order to move the design and use of high-performance energy technologies in schools to the forefront.

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Executive Summary

NASEO and its contractors continue to make progress on completion of the statement of work. The high watermark for this period is the installation and operation of the micro-turbine in the Canton School District. The school is pleased to begin the monitoring phase of the project and looks forward to a ribbon cutting this Spring.

The other projects continue to move forward and NYSERDA has now begun work in earnest. We expect the NASEO/NYSERDA workshop sometime this Spring as well.

By the time the next Annual Technical Progress Report is submitted, we plan to have finished all of the work. The next year should be filled with dissemination of information to interested parties on the success of the project in an effort to get others to duplicate the high performance, and energy smart schools initiatives.

We expect all of the deliverables to be completed with the possible exception of the high-performance schools retrofits in California. We expect that 2 of the 3 campuses undergoing retrofits will be complete and the third will be nearly complete. All other activities are on schedule for 10/1/03 completion at this time.

Experimental

Available in individual task summaries below.

Results and Discussion

California Super Efficient Schools

Accomplishments since the last report:

- Oakland School District submitted both the third and fourth quarter reports that contain an update on the progress of the school construction. The district submitted proof that they received funding allocation for this project. They also requested an extension through October 1, 2003. The district expects to have construction complete and school in session by September 1, 2003. Construction has started on this project, a commissioning agent is on board and is familiar with the Collaborative for High Performance Schools and will help to insure the original design intent for this school.
- Tahoe Truckee School District has submitted the third and fourth quarter reports. The district has also requested an extension through October 1, 2003. Site construction has been completed for this school. All of the drilling and piping are complete for the ground source heat pump system. A commissioning agent has also been hired for the school. A construction contractor has been hired and will begin constructing the buildings as soon as the weather allows.

On-going technical support:

- Both schools have hired commissioning agents to insure the original design intent of the school.
The Commission provided technical assistance to the Tahoe Truckee school district to assist them in putting together a Request For Proposal (R.F.P.) for a commissioning agent. The district had originally gone out to bid on their own for this service, the bids they received varied by over \$50,000. They requested help in writing a new, more specific R.F.P. Through the Bright Schools program, the Commission hired Eley Associates to assist the district in sending out a new R.F.P. Eley Associates also helped the district review proposals, and conduct interviews. The district has hired Keithly Welsh Associates, Inc. from Seattle to write a commissioning plan and to act as a commissioning agent for this project.
Oakland Unified School district also request assistance in hiring a commissioning agent. The Commission partnered with Pacific Gas and Electric to assist the district in hiring an agent. Sherill engineering has been hired by the school district to write a commissioning plan and act as the commissioning agent on this project.
- Tahoe Truckee School district worked with the Commission, Integrated Waste Management and Lionakis Beaumont Design Group, the Architectural firm for the district, to insure that the recycled content materials and construction waste management plan that was worked on during the summer was incorporated into their construction specifications.

Projected activities

- The Commission plans to continue to provide support to grant recipients to insure that construction stays on track and that construction compromises do not negatively impact the CHPS design principles. Site visits will be conducted and ongoing meetings with both commissioning agents will take place to insure original design intent.

Amount Commission is invoicing NASEO in this report:

The Commission is invoicing NASEO for **\$10,200**.

Administrative costs

\$200

Amount Commission has paid to Tahoe Truckee School District

\$10,000

Total **\$10,200**

Ohio Micro-turbine Demonstration Project

Project Status Report

All tests have been completed and both microturbines have been commissioned. The units are scheduled to go on-line full time on 1/13/03. The only part of the system that will not be functioning at this time will be the cooling portion. Two unit ventilators have been delivered (onsite) and should be installed within a week or so. A third unit has been back ordered and should be shipped in February.

The school project manager is in the process of identifying potential cost overruns and developing an action plan to reduce the dollar exposure. Current estimates are that the project is about 5% over budget.

Once the units go on-line full time, the school, the State of Ohio and First Energy (Project Manager) plan a ribbon cutting ceremony. When we get a date, I'll let you know in the event you'd like to attend. In addition, the district plans to utilize the system as part of their educational process for the students.

Technical Progress Report

FLORIDA PORTABLE CLASSROOM CHARACTERIZATION & RESEARCH

Period Covered: October 1, 2001 – October 1, 2002

Date Prepared: January 2, 2003

NASEO Program Manager: Mr. Frank Bishop

Cooperative Agreement # DE-FC26-00NT41010 between NASEO and U.S. DOE

FSEC Account No. 26-58-889

For questions concerning this report please contact:

Stephanie Thomas, Project Lead

Florida Solar Energy Center (FSEC)

phone: (321) 638-1469

e-mail: sthomas@fsec.ucf.edu

Note: This project will be referred to as *FSEC PERC*. *PERC* is the acronym for Performance Enhanced Relocatable Classrooms. For further clarification, each sited classroom will inherit it's location into the

acronym, i.e. *NY PERC*, signifying New York *PERC*.

Task 3a. Establish a baseline. The purpose of this task is to rapidly construct a portable classroom baseline database to which the results from this project can be applied. At a minimum, it will assess the amount of portable classroom use by state and the types and quantities of classrooms being produced by major manufacturers. This task will be accomplished through a mail-out and web-based survey instruments and through telephone interviews with state energy offices, state agencies responsible for schools procurement, and portable classroom suppliers.

Progress:

An estimate of costs from a modular manufacturer supplying classrooms to California schools was received in November. It had been requested in March. A prospective school for the California PERC has been located and discussion between the modular manufacturer and the school are taking place.

North Carolina Solar Energy Center is interested in partnering with FSEC involving the North Carolina PERC. FSEC is writing the specification and NCSC will request approval from the school district. North Carolina Solar Energy Center has committed to sharing costs associated with the North Carolina PERC and also in locating a school district to place and monitor the North Carolina PERC.

Discussions are still ongoing with the Orange County Public School Environmental Services department to resolve a lighting layout that meets Orange Counties' approval and satisfies FSEC research scope. EnergySmart Schools' representative Larry Schoff has been assisting in the coordination efforts between FSEC and Orange County.

Task 3b. Improved design and systems engineering. This task will focus on employing a systems approach to improving the energy efficiency, indoor environment and classroom performance of prototype portable classroom units specifically designed to achieve up to 50% energy savings and enhanced classroom performance in various climates. The team will work closely with the suppliers identified in Task 3a with the goal of improving new classrooms at the lowest possible incremental cost.

Progress:

The NY PERC has been instrumented and the classroom data is being analyzed. The HVAC improvements are proving to create almost 50% savings when operating as specified. Savings associated with lighting are not expected until February when the lighting controls are scheduled for commissioning in the experimental modular.

Task 3c. Improved procurement opportunities. The team will also work with state education agencies and industry partners to identify bulk purchase opportunities and work to develop negotiated model bulk purchasing agreements. A portable classroom purchasing guide based largely on the prototype design, energy use and economic and financial analysis conducted in Task 3b of the project will also be developed and published.

Progress:

Continuous research of materials are ongoing in hopes to find sustainable and environmentally responsible products that improve the indoor air quality, reduce maintenance, consume less energy and are economically competitive. Information and data on real costs associated with the modified portable are currently being investigated. However, this serves to often be difficult due to proprietary

information between the manufactures that buy from distributors and the price at which the manufacturers sell to the school districts' liaison and then the inflation at which the liaison subjects to the school district.

NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY **School Building Energy Efficiency Applied Research NYSERDA Quarterly Report**

Task 7: Technology Integration

Issue:

Need for organized program to train architects and engineers on energy efficient technologies, and design practices.

Objective of Project:

- \$ Select training contractors
- \$ Offer training sessions using nationally developed materials
- \$ Develop complete outreach program as national model

Status:

The New York State Energy Research and Development Authority (NYSERDA) has selected a project team led by the Sustainable Building Industry Council (SBIC) as the winning contractor to develop an internet training curriculum for Energy Efficient School Design and Operation. The Technology Evaluation Panel met on November 13, 2002 and made recommendations to NYSERDA management for selection of the contractor. Award was approved by NYSERDA management and the contractor was notified on December 23, 2002. Discussions have commenced for development of the scope of work along with a project schedule that will bring several courses online by September 2003.

The SBIC project team includes four leaders in high performance school training development: NJIT Center for Architecture and Building Science Research headed by Deane Evans, who authored the High Performance School Buildings Resource and Strategy Guide; Eley Associates who created the CHPS Best Practices Manual series, and helped develop the U.S. DOE's *National Best Practices Manual*; Innovative Design, an architecture firm who authored DOE's *Energy Design Guidelines for High Performance Schools* and conducted training workshops on high-performance schools across the country; and Building Media, a technology company currently developing the California Online Schools Training Program and working with SBIC on its Internet-base train-the-trainer program.

The team proposed to develop a 25-module curriculum organized into six main categories: Site design; Daylighting and Windows; Lighting and Electrical Systems; Mechanical and Ventilation Systems; Commissioning; and Operation and Maintenance. The training curriculum will be designed to complement the U.S. Department of Energy Design Guidelines for High Performance Schools.

Contact:

Kimberlie A. Schryer, kas@nyserda.org
New York State Energy Research Development Authority
17 Columbia Circle

Albany, NY 12203-6399

New York Energy Research and Development Authority School Building Energy Efficiency Applied Research

Task 8: Applied Engineering and Design Assistance

Issue:

School Districts need site specific Engineering and Design Support to help review plans and make recommendations on how to improve energy efficiency designs.

Objective of Project: Create pilot technical support program to help school districts building new schools. The goal is to develop the program and transfer to NASEO for deployment.

Status:

The New York State Energy Research and Development Authority (NYSERDA) has selected SBIC as the winning contractor to develop and deliver a National Training Program for Technical Assistance Contractors. SBIC will work in cooperation with Innovative Design and NYSERDA to develop training that addresses both the technical and tactical aspects of providing technical assistance. Technical content will be drawn from the course materials SBIC is currently delivering at workshops across the country, and enhanced primarily from Volume IV of the CHPS Best Practices Manual, which concentrates on operations and maintenance of school facilities. Technical assistance contractors that attend the training will be encouraged to take the Internet-based training before attending the workshop. Tactical content will include discussions and case studies of successful programs of intervention and assistance at the jurisdictional and state level.

Contact:

Kimberlie A. Schryer, kas@nyserda.org
New York State Energy Research Development Authority
17 Columbia Circle
Albany, NY 12203-6399

FLORIDA LARGE SCALE STUDY AND DIAGNOSTIC TESTING OF SCHOOLS AND CLASSROOMS

Period Covered: October 1, 2001 - October 1, 2002
Date Prepared: January 10, 2003

NASEO Program Manager: Mr. Frank Bishop

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For questions concerning this report please contact:
Robin Vieira, Co-Principal Investigator
Florida Solar Energy Center (FSEC)

phone: (321) 638-1403
e-mail: robin@fsec.ucf.edu

Task 6a. Large scale survey. This task will determine the levels of occupant satisfaction or dissatisfaction with the IAQ, thermal, lighting and acoustical conditions in schools and classrooms through a survey questionnaire. The questionnaire will be available as a mail-out and as web-based form that can be filled out and submitted to a web server. State energy offices and education departments across the country will be solicited to participate in the survey and telephone interviews will be conducted to fill in gaps and obtain additional detail.

Progress:

Task is largely completed.

Task 6b. Operating conditions. Characterization of actual operating conditions of schools and classrooms through field audits and diagnostic tests and measurements, including envelope and zone-to-zone leakage measurement, pressure mapping, temperatures, relative humidities and IAQ parameter measurements and equipment performance characterization. Meetings and phone interviews with administrators, operation and maintenance personnel and teachers are also planned.

Progress:

The FSEC team audited one Texas school and two Florida schools. Reports were written on the 1st Florida school and on the McAllen Texas school. The FSEC audit team has prepared a draft report for the Flagler County Florida school.

In the midwest, the selected school officials have been slow in responding and no audit has been done. In the northeast, the audits of four schools are expected to be done later this winter.

All three audits in the northwest have been completed.

Task 6c. Analysis. Statistically analyze the data to find underlying trends. Attempt to identify the source of satisfaction or dissatisfaction. Compile results and publish to a web site.

Progress:

No activity this quarter, but work here will be ongoing during the next several months.

Task 6d. Retrofits. Conduct retrofits in problem schools and classrooms to alleviate problems. Measure and document changes in operating conditions. Collect before and after energy use, classroom conditions and other parameters. Perform analysis on resulting information and report.

Progress:

We are looking into retrofit opportunities at each school that is audited. As reports are completed we will select schools to retrofit based on funds available and school cooperation.

Task 6e. Follow up. Resurvey schools that have been modified to determine levels of improvement in perceived classroom conditions, document improvements and remaining problem areas and provide tech transfer in the form of professional papers, reports and web site content.

Progress:

No activity this month.

Conclusion

Projects within each task area have begun to show results. Recently, NETL representatives and NASEO met with all Task Project Managers to discuss the progress of each project. Each project began slowly due to several unforeseen obstacles, which have now been overcome. Some projects may require an extension to complete project to full extent.

Most tasks are now running smoothly and have or will soon acquire results.

References

There are no references to this report.

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