

# Energy Efficiency Education at PETE Community and Technical Colleges

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## ABSTRACT

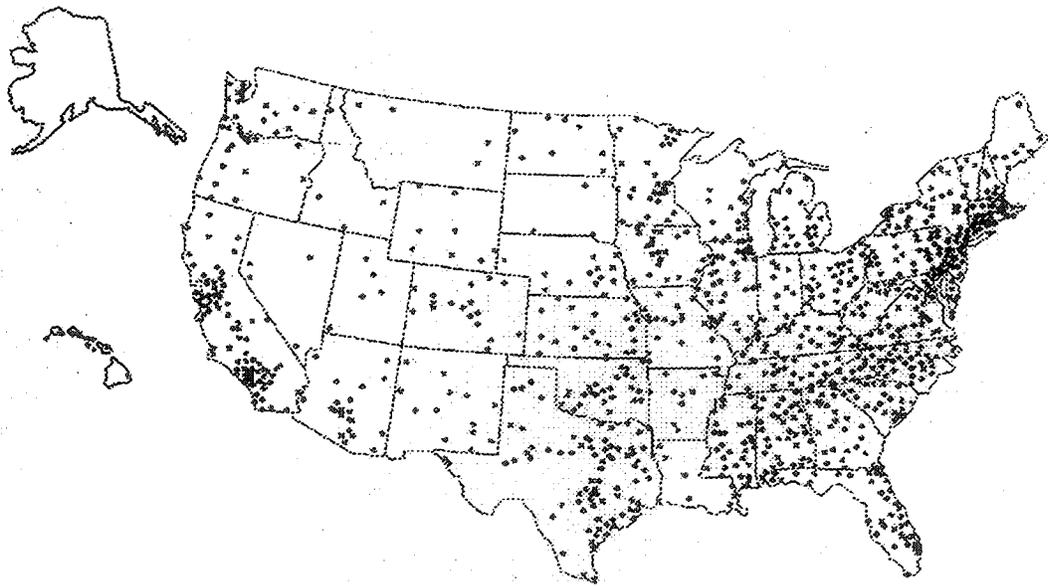
The Partnership for Environmental Technology Education (PETE) is a national non-profit organization focused on assisting community and technical colleges in developing and delivering two-year degree and short-term training programs in the area of Environmental Technology. PETE has defined a thirteen-task program funded through the US Environmental Protection Agency Atmospheric Pollution Prevention Division's Energy Star™ program. The mission of PETE, through this program, known as the Community Energy Efficiency Initiative, is to develop and implement an energy education initiative through PETE colleges to accelerate energy efficiency market transformation to a higher level.

In this paper, we describe PETE, the Community Energy Efficiency Initiative, and outline the goals, projects, and accomplishments to date. We also describe lessons learned over the past 18 months of the program as well as current barriers to accomplishing our three-year goals.

## Introduction

The Partnership for Environmental Technology Education (PETE) is a national, non-profit educational organization established ten years ago to link the technical resources of the U.S. Department of Energy, Environmental Protection Agency, National Science Foundation, other federal and state agencies, private industry and professional societies with participating community and technical colleges. The PETE network consists of six regional public/private partnerships serving all fifty states, Puerto Rico and the US territories. PETE's programmatic focus is to contribute to environmental workforce development through the establishment and presentation of curricula for training environmental technicians; to encourage more transfer students to pursue studies in environmental science, engineering and management at four year institutions; to promote technology transfer; to conduct special projects designed to enhance the participation of underrepresented minorities and women in environmental fields; and to assist foreign institutions in developing their own environmental education and training capabilities. The mechanisms through which PETE achieves its goals are primarily train-the-trainer programs, faculty internships, and Instructor Resource Conferences.

The PETE Infrastructure of over 650 participating colleges provides a broadly based nationwide network of training centers focused on providing education, training, and public information services that support economic development in their service areas. Figure 1 illustrates the extensive geographical reach of the nation's community, technical, and junior colleges.



**Figure 1. Community, Technical, and Junior college members of the American Association of Community Colleges (from AACCC)**

PETE has developed and implemented a variety of high quality faculty training and community outreach projects such as faculty professional development workshops, regional conferences and workshop-seminar series, environmental technology curriculum development, and community small-business training programs (Table 1).

### **Community Energy Efficiency Initiative**

PETE has designed, with the input of EPA and a Technical Advisory Group, an initiative that will result in the establishment of a network of energy efficiency colleges with faculty trained to conduct workshops for commercial/industrial businesses and associated providers in their service areas. A national assessment of existing energy efficiency programs was conducted in 1997 of the nation's community and technical colleges to help frame the PETE Community Energy Efficiency Initiative and identify existing instructional materials. The survey revealed that formalized training in the area of energy efficiency at community and technical colleges is minimal. However, many colleges and their advisory boards have identified energy efficiency training as one of the top areas into which they need to expand. Almost two-thirds of respondents to the survey indicated an interest in developing and offering workshops to the business community. More than half indicated an interest in developing and offering degree programs and classes in this field. Under a \$600K grant through US EPA's Atmospheric Pollution Prevention Division, Energy Star™ Program, we have created a thirteen-project program to accelerate energy efficiency market transformation to a higher level (Table 2).

**Table 1. Current PETE Training Programs**

<p><b>Programs for Faculty at Two-Year and Community Colleges</b></p> <ul style="list-style-type: none"><li>• <u>Regional Conferences and Workshops</u>: Provide regular networking and short-term training opportunities for college faculty. (Over 700 faculty participants in 1998)</li><li>• <u>DACUM (Developing A CurricuLUM) Train-the-Trainer Workshops</u>: Designed to train a cadre of PETE member college instructors in curriculum development focused on competency-based programs.</li><li>• <u>ATEEC (Advanced Technology Environmental Education Center) Summer Fellows Program</u>: Thirty science, math, technology education, and environmental technology instructors from high schools and community colleges nationwide are selected to guide ATEEC in issues and activities related to improving and evaluating environmental technology curricula. (32 faculty in 1998)</li><li>• <u>Faculty Associates in Science and Technology (FAST) Program</u>: Provides community college faculty internship opportunities in government and private sector environmentally related positions during summer and inter-term recess periods. (98 faculty placed 1997-98)</li><li>• <u>Pollution Prevention in Chemistry Instruction</u>: Training PETE college instructors in the utilization of Small-Scale and Microscale methods for chemistry instruction. (134 faculty trained in 1997-98)</li></ul>
<p><b>Programs for the Community</b></p> <ul style="list-style-type: none"><li>• <u>ISO 14000</u>: Environmental management systems courses targeting small- and medium-sized businesses.</li><li>• <u>Environmental Jobs Training Consortium</u>: Project to educate and train persons of underrepresented groups for employment in the environmental services industry.</li><li>• <u>Automotive Service Industry Environmental Training Program</u>: Training program to promote pollution prevention and enhance the environmental compliance of auto repair, body and paint shops, and dealerships.</li></ul>

**Table 2. PETE Community Energy Efficiency Initiative Goals and Projects**

<p>Goal 1. — To identify existing energy efficiency programs as well as education, training, certification and curriculum needs and define appropriate roles for community and technical colleges in meeting these needs.</p> <ul style="list-style-type: none"><li>• PROJECT 1: National Energy Management Education and Training Strategy</li><li>• PROJECT 2: National Energy Management Certification Program</li><li>• PROJECT 3: National Assessment of Energy Efficiency Programs</li></ul>
<p>Goal 2. — Establish a college training network in all six PETE regions to deliver energy efficiency services and develop accompanying curricula.</p> <ul style="list-style-type: none"><li>• PROJECT 4: Building Know-How Tech Sessions</li><li>• PROJECT 5: Community Energy Efficiency Training Centers</li><li>• PROJECT 6: Energy Efficiency Workshops</li><li>• PROJECT 7: In-Facility Energy Assessments</li><li>• PROJECT 8: Green Campus Initiative</li><li>• PROJECT 9: Energy Efficient Homes Project</li><li>• PROJECT 10: Public Outreach/Distance Learning</li></ul>
<p>Goal 3. — Leverage limited resources for maximum programmatic impact by establishing strategic partnerships to reach the commercial/industrial business sector and make beneficial use of existing PETE programs and resources.</p> <ul style="list-style-type: none"><li>• PROJECT 11: National Strategic Partnerships</li><li>• PROJECT 12: International Strategic Partnerships</li><li>• PROJECT 13: Strategic Plan Development and Update</li></ul>

### **Project Descriptions/Accomplishments**

A description of each of the thirteen projects PETE has designed under the CEEI is included below, along with a brief description of accomplishments by project.

#### **Project 1: National Energy Management Education and Training Strategy**

PETE will support the development of energy management programs at community and technical colleges through the establishment of an infrastructure for Energy Efficiency Workforce Development. The project will identify existing programs and determine the necessary steps to broaden and expand a national Energy Management Education Strategy at colleges throughout the country. As well as promoting the development of a two-year

Energy Management Technician degree program, the project will also encourage the inclusion of energy efficiency subjects in applicable existing curriculum.

**Accomplishments.** We have introduced Energy Star™ and energy efficiency to the PETE network through literature and survey distribution to over 1,000 community and technical colleges nationwide, and presented information at the six regional conferences to over 700 faculty attendees. PETE has also compiled, reported and distributed survey results detailing the need for Energy Efficiency education nationwide (Table 3).

**Table 3. 1997 Survey of U.S. Two-Year Colleges**

<b>Colleges . . .</b>	<b>Percent</b>
• With degree programs in energy efficiency or energy management	2%
• Offering energy efficiency classes	26%
• Incorporating energy efficiency in curricula	31%
• Offering energy efficiency workshops for businesses	6%
• Offering energy assessments	2%
<b>Colleges interested in . . .</b>	
• Degree programs in energy efficiency or energy management	56%
• Offering energy efficiency classes	60%
• Integrating energy efficiency modules in their curricula	63%
• Non-credit workshops for businesses	68%

PETE has had preliminary planning meetings with the Advanced Technology Environmental Education Center (ATEEC) to coordinate the development of a two-year Energy Management Technician degree curriculum. With continued funding, we expect the development of curriculum, as well as a college administrator's guidebook, to begin this year.

### **Project 2: National Energy Management Certification Program**

PETE will design and begin the development of a nationally validated certification program focused on Energy Management Technicians, including marketing the availability of certified technicians. We expect to address this need through forming a partnership with an existing organization already offering certifications in the energy field.

**Accomplishments.** This program has been delayed due to funding constraints, however a similar program is under development separately at Lane Community College in Eugene, OR.

### **Project 3: National Assessment of Energy Efficiency Programs**

The six PETE Regions will conduct an assessment of existing energy efficiency programs targeting to the business sectors in their respective regions. This snapshot assessment will identify existing programs, as well as materials used by utilities as a starting point to determine the focus of the PETE-EPA Community Energy Efficiency Initiative.

**Accomplishments.** In 1998, the six PETE regions disseminated an assessment tool to over 4000 utilities nationwide to determine existing energy efficiency resources and programs targeting businesses. Based on the results from this survey, we determined that most (65%) of the nation's utilities offer some type of Demand Side Management (DSM) program. Given the current pulse of change in the industry under restructuring or deregulation, it is uncertain how long most DSM programs will remain in place. Additionally, the number of DSM programs varies strongly by region, with numbers in the North East and North West much higher than in the South East or Central part of the country. PETE also determined that a large gap exists in public training about energy efficiency (nationally only 34% of respondents offer public training, most on the residential side), a need that the colleges can fill. The assessment also indicated that over 65% of respondents would be interested in hiring technicians with two-year degrees in energy efficiency or energy management. As deregulation affects more of the country, we will monitor the change in DSM programs to determine what additional role colleges may play in the energy efficiency marketplace.

### **Project 4: Building Know-How Tech Sessions**

The PETE network will host Building Know-How Tech Sessions delivered by US EPA to its Energy Star™ Building Partners.

**Accomplishments.** One Building Know-How Tech Session was hosted at South Seattle Community College in 1998.

### **Project 5: Community Energy Efficiency Training Centers**

Each of the six PETE regions will select one college to form the Community Energy Efficiency Pilot College Network. Two faculty from each pilot college will attend a training session delivered by EPA. This pilot college network will field test training materials during FY 1998 and will continue to deliver workshops as Community Energy Efficiency Training Centers in FY 1999. An additional 30 colleges nationally will be selected to expand the network.

**Accomplishments.** With help from EPA and its contractors, a one-week pilot Train-the-Trainer workshop was developed, finalized, coordinated, and delivered in Catonsville, MD in May, 1998 to enable pilot colleges (Table 4) to become Community Energy Efficiency Training Centers (CEETC). Workshop topics included Energy Star Programs, Energy Analysis 101, Deregulation, Energy Technology, Audit Software/Hardware, Hands-on Energy Audit, Audit Analysis and Marketing Energy Efficiency. Upon delivery, we

reviewed workshop evaluations and developed the plan and training schedule for expanding the CEETC network and delivering additional training to pilot colleges.

**Table 4. Community Energy Efficiency Training Centers, FY 1998**

<b>College</b>	<b>State</b>
Cameron University	OK
Casper College	WY
Community College of Baltimore County, Catonsville	MD
Cuyahoga Community College	OH
Lane Community College	OR
Owens Community College	OH
Paradise Valley Community College	AZ
University of Puerto Rico, Aguadilla	PR
and Volunteer State Community College	TN

Training was re-designed by EPA contractors and two community college instructors, Roger Ebbage, Coordinator of the Energy Management Program at Lane Community College and Richard Anderson, Director of the Maryland Energy Institute at Community College of Baltimore County, Catonsville. Training was delivered in February 1999 in Catonsville, MD and Phoenix, AZ to two instructors from each of the thirty colleges listed in Table 5. Training topics were as follows: Energy Use – Overview, History, and Approach, The Language of Energy, Building Systems Tour, Operating Standards, Energy and Profit Potential, Understanding your Utility Bill, Basic Systems, Energy Star™ Five Stages, Energy Survey Work Session, Energy Survey Follow-up, Working with Small Businesses, and Marketing/Coordinating a Program.

**Project 6: Energy Efficiency Workshops**

Trained colleges will deliver at least two Energy Efficiency Workshops for approximately 20 participants from area commercial/industrial businesses during FY 1998 through trained faculty at the Community Energy Efficiency Training Centers.

**Accomplishments.** The nine pilot colleges delivered workshops August 1998 – January 1999. The FY 1998 Training Centers delivered a total of 16 workshops, reaching over 310 attendees. Evaluations from the workshops were excellent. Comments included; “It is about time someone in this area would present ways to save energy. Thank you for this. I thoroughly enjoyed the seminar.”; “Very worthwhile to come to one of these presentations. I would highly recommend this to other small business owners”. “One of the best seminars affecting my businesses that I have ever attended. Many thanks for your work and presentation and I will use the info to modernize my businesses.” Both the FY 1998 and 1999 Training Centers are scheduled to deliver additional workshops this year. We also hope to receive funding to survey the business workshop attendees to determine whether they have implemented any energy efficiency measures.

**Table 5. Community Energy Efficiency Training Centers, FY 1999**

<b>College</b>	<b>State</b>
College of the Menominee Nation	WI
Iowa Central Community College	IA
Milwaukee Area Tech. College	WI
Missouri Southern State College	MO
Delaware Technical & Community College	DE
Harrisburg Area Community College	PA
Nassau Community College	NY
Niagara County Community College	NY
Suffolk County Community College	NY
Eastern Idaho Technical College	IK
Fort Berthold Community College	ND
Klamath Community College	OR
Lower Columbia College	WA
Prince William Sound Community College	AK
Arkansas State University Mountain Home	AR
Cossatot Technical College	AR
Delgado Community College	LA
Front Range Community College	CO
New Mexico State University at Carlsbad	NM
Nunez Community College	LA
Aiken Technical College	SC
Forsyth Technical Community College	NC
Itawamba Community College	MS
Miami-Dade Community College	FL
Northwest-Shoals Community College	AL
York Technical College	SC
Dixie College	UT
Honolulu Community College	HI
Imperial Valley College	CA
Shasta College	CA
South Central REBRAC (Allan Hancock)	CA

**Project 7: In-Facility Energy Assessments**

In-facility Energy Assessments will be conducted at businesses through trained faculty at Community Energy Efficiency Pilot Colleges to identify and determine ways in which the business can efficiently reduce energy consumption. These assessments will be provided as a service to the community at minimal cost. Eventually assessments may be used as an educational tool for students enrolled in a two-year Energy Management Technician degree program. The program was designed to resemble the Department of

Energy's (DOE) Industrial Assessment Center (IAC) program, though targeted to small businesses and with a wider geographic outreach.

**Accomplishments.** This project has been delayed due to funding constraints. We anticipate developing and delivering additional training for instructors in FY 2000.

### **Project 8: "Green Campus" Initiative**

PETE will establish a "Green Campus" Initiative to facilitate and accelerate the evolution of the nation's 1,325 Community and Technical Colleges to "green campuses", both in terms of operations and the infusion of environmental content throughout the curriculum. The Initiative will take a systems approach to a college as an institution, by addressing physical plant operations, facilities operating procedures, curriculum content, and other policies, with an emphasis on pollution prevention/waste minimization, environmental compliance, operating efficiency, and improved safety. The multi-dimensional program will be designed to provide information resources and technical assistance to a college transitioning to a "green campus", while promoting a mechanism for the college to sustain its initiative.

**Accomplishments.** This program has recently received funding and is currently in the planning process under the leadership of Northeast PETE.

### **Project 9: Energy Efficiency Homes Project**

An Energy Efficiency Homes Project will be established to facilitate the dissemination of energy efficiency technology for homes to the nation's community and technical colleges. Through a variety of mechanisms, the project will provide community colleges, the building industry and international partners opportunities to be updated on current critical energy efficiency technologies for Homes.

**Accomplishments.** Southern Maine Technical College has been identified as the pilot college under the Energy Efficient Homes Project and formed an Advisory Council. The council has recommended an energy efficiency building curriculum through a DACuM (Designing a Curriculum) process. The curriculum is being finalized and plans have begun to expand the program from the pilot college.

### **Project 10: Public Outreach/Distance Learning**

PETE will examine the feasibility of establishing a national program to develop training modules for delivery through satellite downlinking to PETE colleges. This delivery mechanism for Energy Efficiency training modules will dramatically expand outreach to the business community.

**Accomplishments.** PETE surveyed and developed a list of colleges interested and available for downlinked programs. Further work on this program has been delayed due to funding constraints.

### **Project 11: National Strategic Partnerships**

Strategic partnerships will be developed with several existing national networks to assist in long-term promotion of the Community Energy Efficiency Initiative to our commercial/industrial business target audience.

**Accomplishments.** PETE signed a Memorandum of Understanding (MOU) with the Association of Small Business Development Centers (SBDC) to collaborate on mutually beneficial projects, including the Community Energy Efficiency Initiative. Individual colleges have also formed partnerships with such organizations as Public Service Company of Oklahoma, Oklahoma Municipal Power Authority, WY SBDC, ReBuild Toledo, Greater Cleveland Restaurant Association, Portland Gas & Electric, PacifiCorp, Northwest Energy Efficiency Alliance, Northwest Energy Efficiency Council, Phoenix Chamber of Commerce, Arizona Public Service, Arizona Department of Commerce Energy Office, Tennessee Department of Environment and Conservation, Tennessee Environmental Council, and Nashville Electric Service.

### **Project 12: International Strategic Partnerships**

PETE will promote the Energy Star methodology of energy efficiency internationally through the development of partnerships and collaborations with government and NGOs in developing countries.

**Accomplishments.** PETE has been working with the Central European University in Hungary to develop an energy efficiency program proposal. Submittal of this proposal has been delayed until next year.

### **Project 13: Strategic Plan Development and Update**

A three-year Strategic Plan for the PETE's Community Energy Efficiency Initiative has been developed, completed, and printed.

### **Lessons Learned**

Through the first 18 months of the Community Energy Efficiency Initiative, PETE has learned many lessons in program management. Most of our program resources have been directed towards Projects 5 and 6 – establishing training centers and delivering workshops through the colleges. We had originally designed our week-long program to train our faculty to not only deliver awareness workshops to businesses, but also conduct audits or surveys. After our pilot training delivered in May of 1998, we determined that our faculty needed more training and experience in order to conduct on-site energy surveys. Thus, we have dropped that requirement from our program until more funding becomes available to properly train our faculty. We also updated and changed the technical information in the workshops based on evaluations received.

Second, we used EPA contractors to train our faculty. After the pilot training, we determined that we have instructors at colleges with the experience and knowledge to conduct the training. Not only do they have the expertise, but they also know “where their audience is coming from” – college instructors can speak to college instructors in the same language. We will now only use our instructors as trainers, supported by the EPA contractors.

We also determined that due to the technical complexity of energy efficiency, faculty with background in a related field, such as HVAC, engineering tech., physics, etc., would make better instructors. Thus for the second round of colleges, we required such a background.

Our pilot colleges have had mixed attempts at marketing workshops to a target audience. Some have found great success working with their local utility, while others have had problems due to the changing regulatory market. Based on the pilot runs last year, the colleges have learned more successful ways to market – newspaper ads, personal calls, utility partners – versus unsuccessful ways – direct marketing via the mail. As different schools get more experienced and try more techniques, such as working with local Small Business Development Centers, Chambers of Commerce, or professional associations, we expect that workshop attendance will rise and we will be able to duplicate their successes in other areas of the country. PETE must be more creative and aggressive in helping our colleges market the program.

## **Barriers**

The greatest barrier for successful completion of our goals is funding limitations. Our funding through EPA has been delayed for the life of the grant, thus we have been behind schedule on several projects and unable to start others. A key element of the program we have been unable to implement is development of a two-year curriculum. Survey results have indicated that markets are ready for trained technicians in Energy Management – professionals ready to act as energy managers, conduct audits, etc., yet we have been unable to move forward on our plans. We have also been unable to work on a certification program for recipients of the above-mentioned two-year degree and to design or provide further training for our pilot colleges in energy survey techniques.

PETE has traditionally worked with environmental or natural science faculty at our member colleges. As mentioned above, we have had a difficult time reaching instructors in other departments in PETE colleges. We are mounting an effort to work more effectively within the colleges’ organizational structure to identify the correct people to deliver energy efficiency contract training.

One other major barrier for success has been getting businesses to attend the workshops offered by the colleges. Though several Training Centers have had excellent success. We have received a good response from people who have attended the workshops, including many small business owners. As we gain more experience with different marketing measures, and as word gets out through the community, we expect participation to rise.

## **Conclusions**

After the first 18 months of the program, we feel the momentum is building. As of February 1999, we have 39 colleges trained for broader dissemination of energy efficiency information. The new colleges are better trained, and more prepared than the first nine, with lessons learned from their trials, especially in marketing. With continued funding, stronger partnerships, and continued interest in Energy Efficiency due to uncertainties about deregulation and increasing energy costs, the PETE Community Energy Efficiency Initiative should flourish. We strongly encourage the audience to seek out their local community college to get involved in this type of program.