



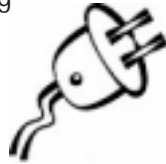
# Watts Happening

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## Rising Costs for Campus Energy

"In the battle for energy project funding, you must develop realistic utility infrastructure plans and budgets and seek creative funding solutions." So states an article, "Get Real on Campus Energy Costs," by Karla Hignite in the August 2002 issue of *NACUBO Business Officer*. According to the article, "rising utility costs and uncontrollable fluctuations in utility prices are having a big impact on college and university energy budgets across the country. But the issues affecting higher education energy management run much deeper than that." The article followed a two-part educational audio-conference about campus energy management issues by NACUBO, the National Association of College and University Business Officers. Among the panelists were Duane Stucky, former vice president for business and finance at Middle Tennessee State University (MTSU); Joseph Whitefield, director of the Center for Energy Efficiency at MTSU; and Jerry Preston, executive director of the office of



facilities development for the Tennessee Board of Regents.

Panelists agree that college officials need to be involved in assessing and communicating the impact of energy on campus maintenance and operations. Energy savings allow MTSU to pursue about \$10 million in improvements. "We are a rapidly expanding campus, so even though our utilities budget continues to increase, we estimate that our cogeneration plant is saving us about 17 percent on our energy costs compared to what we would pay without it." With its central plant overhaul complete, MTSU is now focused on deferred maintenance as its predominant energy related initiative. (See sidebar, "Energy Management Meets Deferred Maintenance.") MTSU is halfway through identifying \$5 million in projects that combine energy initiatives with academic needs.

Stucky commented that particularly important is retrofitting a building so occupants will observe the changes and feel better about their environment.

(See **Rising**, page 6)

## EVALUATING MOTIVES

As important as engaging in an energy initiative is determining its primary motivations so that it can be effectively carried out. Included below is a simple tool from Joseph Whitefield, director of the Center for Energy Efficiency at Middle Tennessee State University, for assessing the motivations behind a given project. Consider the statements and issues carefully, rating each motive statement in terms of importance to your organization by circling one number of the rating scale, where "0" indicates "not at all important" and "5" indicates "extremely important." While some overlap will likely occur among statements, the differences are important to note when structuring your energy initiative since they can help you remain true to your primary motivations.

Energy Management Motivation Evaluation Form		
MOTIVE STATEMENT	PRIMARY ISSUES BEHIND THE MOTIVE	RATING SCALE
Reduce energy consumption	Environmental, political	0 1 2 3 4 5
Reduce energy/energy-related costs	Financial	0 1 2 3 4 5
Reduce peak energy demand	Utility infrastructure capacity/reliability	0 1 2 3 4 5
Reduce deferred maintenance/augment capital maintenance	Facilities maintenance (operations and maintenance and capital maintenance issues)	0 1 2 3 4 5
Demonstrate technologies/processes	Innovation and research and development	0 1 2 3 4 5
Other (list other motivations)	Other (list other issues)	0 1 2 3 4 5

Source: MTSU 2002

## Electric Tram Visits MTSU

An electric tram was tested as a possible alternative to the Raider Xpress system this month—part of MTSU's ongoing effort to explore fuel alternatives and improve the flow of traffic on campus. "We think the tram offers the ability to move them (students) faster," said Joe Whitefield, director of the Center for Energy Efficiency. "We're trying to improve moving students around campus."

The demonstration consisted of the power portion of the tram running along the Old Main Circle as staff members observed its performance. A trailer that attaches to the back of the bus unit for passengers was not included. The tram's front car accommodates 16 people, and the attached trailer will transport 24 additional passengers.

MTSU's flat terrain makes it ideal for this electrically powered vehicle. With its battery powered design, the tram gives off no emissions, and its smaller, more open design allows passengers to load and unload more

quickly. "Its physical size will allow us to take advantage of other routes, not just the main roads," Whitefield said. "So, if we can develop some alternate routes and get the tram out of traffic, it will be faster to get from point to point without sitting in traffic like the buses do."

With a charged battery, the power car has a 75-mile range of operation which could be a disadvantage due to recharging needs. Using an electric tram would require diesel buses in the university's current transportation system to run to Greek Row and other areas requiring travel on off-campus roadways. The electric tram is also an "open air" vehicle, meaning that it could be uncomfortable during times of extreme cold and rain. "If it's raining, that's a disadvantage because of the 'open air' configuration," Whitefield said. "So, we would likely have to park it and use the bus."

While the Center for Energy Efficiency usually focuses on improvements in buildings and facilities, it has teamed with Parking Services on this project to improve both the traffic flow on campus and the efficiency and emissions of the transportation system.

"We have looked primarily at alternative fuel vehicles. We've looked, for instance, at electric buses and hybrid buses, compressed natural gas buses and propane buses," Whitefield said.

"Trams, while they are not of the same configuration as a bus, are more or less the same cost as the diesel buses ... that's what makes this the most promising of all the options," he said.



# ENERGY MANAGEMENT MEETS DEFERRED MAINTENANCE

BY JOSEPH WHITEFIELD

Deterioration of facilities brought on by inadequate funding over time for larger capital maintenance needs is frequently referred to as *deferred maintenance*. For any institution, the effects of deferred maintenance may be compounded by modernization and code issues, poor routine maintenance practices, poor operating conditions, and poor design or construction practices that seem to plague a facility forever. The fundamental problem resulting from deferred maintenance is an inability to provide functional, reliable, safe, clean, and environmentally controlled facilities for campus tenants and the public.

The importance of deferred maintenance is not its estimated value but the liability it represents. Major equipment breakdowns, system failures, and plant shutdowns—typically at the most inopportune times—become more common. Not only are building systems at risk for damage, but building contents and people may also be at increased risk. The day-to-day impact of deferred maintenance is felt physically by building occupants and financially in both the maintenance and operations and utilities budgets.

At Middle Tennessee State University, we estimate that our campus deferred maintenance needs are in excess of \$75 million. For our energy program to be effective in meeting the higher motives of energy and environmental stewardship, financial responsibility, and academic mission support, we must account for the deferred maintenance condition of our campus in every project and initiative. What follows is a partial list of considerations we use when developing a project. This information may be beneficial for other colleges and universities as well.

**Capital investment emphasis.** Energy-related project economics considering paybacks and cash flows typically involve the capital investment, operational and energy savings, and other soft factors such as avoided costs. While each component is important to the overall performance of the project, the capital investment in deteriorating facility systems is particularly important to a campus suffering from severe deferred maintenance. Projects that provide incentives to invest in the more costly, but more needed, replacement of

these facility systems can result in energy benefits as well as some deferred maintenance relief. Energy Service Company profits applied to capital investment rather than a percentage of savings is a simple example of one such incentive strategy.

**Life cycle costing considerations.** Don't lose sight of the soft economic benefits that aren't reflected in the capital investment (debt service), energy savings (revenue source) cash-flow models of typical off-budget energy projects. The avoided capital costs of equipment replacements and system upgrades as well as other maintenance and operations savings are real to a campus where budgets are insufficient to accomplish needed capital maintenance.

**Project bundling strategies.** Energy cost savings measures (ECSMs) involving older systems and technologies typically will not yield the more attractive economic paybacks. Selectively combining or bundling these ECSMs with other more attractive ECSMs produces an overall project scope and net economic payback that allows the deferred maintenance-oriented ECSM to be accomplished. While these projects often benefit from the economies of scale associated with larger projects, they may suffer as a consolidation of smaller projects in various locations. Sound bundling strategies that take into account the challenges as well as benefits are important.

**Energy efficient design of new buildings.** With all the emphasis on retrofitting, it's important to review the planning, design, and construction processes for any new buildings for energy, maintenance, and operations performance. Any campus should require designers to provide an energy report detailing expected system descriptions and performance expectations, utilities costs, special operating conditions, energy management routines, metering considerations, and commissioning plans. This can prevent new buildings from becoming instant candidates for energy-related retrofit projects.

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Reprinted from *NACUBO Business Officer*, August 2002

# About the M&V Workshop

Why is M&V important? • What makes a 'good' M&V plan? • How much energy is really being saved? • How are savings determined? • What are the four basic steps for M&V? • What are the established guidelines for M&V? (IPMVP, DOE, ASHRAE, etc.) • What is the value of an M&V plan? • How do you determine a baseline?

**Get answers to these questions and more:**

**Tuesday, March 11, 2003**  
8:00 a.m.-5:00 p.m. and  
**Wednesday, March 12, 2003**  
8:00 a.m.-12:00 noon

**Middle Tennessee State University**  
**Business and Aerospace Building**  
Room S118 MTSU Boulevard

**Registration: \$675**

Includes comprehensive seminar workbook,  
copy of IPMVP, and refreshments during breaks.  
Please register by **February 19, 2003.**

CEUs - Earn 1.2 Continuing Education Units. Participation certificate provided.

**Instructor - Steve Sain** is president of Sain Engineering Associates, Inc., Birmingham, Ala., a consulting firm specializing in energy conservation in existing facilities and selected by the DOE as one of the top 20 energy engineering firms in the country. Steve has delivered similar M&V training in the U.S. and overseas and has appeared as an expert witness in ESPC lawsuits.

**M&V Workshop, March 11 and 12, 2003.** Mail form and payment to **MTSU Center for Energy Efficiency, MTSU P.O. Box 57, Murfreesboro, TN 37132.**

Name(s) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contact person \_\_\_\_\_

Company/Organization \_\_\_\_\_

Phone \_\_\_\_\_

Address \_\_\_\_\_

Cost **\$675**                      Number of attendees \_\_\_\_\_                      **Total payment \$** \_\_\_\_\_

\_\_\_\_\_ Visa    \_\_\_\_\_ MasterCard    \_\_\_\_\_ Check    \_\_\_\_\_ PO # \_\_\_\_\_

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Card # \_\_\_\_\_ Exp. date \_\_\_\_\_

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## ‘To V or not to V.’ Is that the question?

Energy saving performance contracting is about saving energy—saving measurable, quantifiable, amounts of energy. After the RFP evaluation process is completed, resulting in an award to an ESCo, after the ESCMs are selected and installed, energy use is reduced, right? It's understood energy usage is going to be lower. But, depending on the complexity of the project, the ESCMs, determining the change in energy usage may be more difficult than one thinks. Verification requirements can range from savings from lighting, which may be relatively simple, to whole building energy management systems, which can prove to be very difficult to put into measurable amounts of savings.

The success of a performance contract depends on (monitored and) verified savings. This monitoring and verification substantiates that the project, with the carefully selected ESCMs, has saved energy and met the criteria set by the RFP.

So, how important is V? Very. How is verification of energy savings determined? Preparation. How reliable is the verification? That is determined by the preparation. And the preparation requires an established plan for measuring and/or monitoring energy usage. M&V, or measurement and verification, provides the capability to determine how much energy is saved upon completion of the project.

There are well-established protocols for measurement and verification of project performance. Interna-

tional Performance Measurement and Verification Protocol (IPMVP) is probably the most widely accepted protocol offering a range of approaches to M&V to fit specific circumstances of projects. The needs of both the customer and the performance contractor must be met and considered in the M&V planning and process.

According to Rebuild America, measurement and verification is the key to performance success of projects. The most important thing to do about M&V is to recognize the significance and make sure someone on the project team understands how to establish a baseline for energy costs, how to determine energy and maintenance savings after a project is completed, and how any adjustment to the baseline can be made if there are changes in building use. It is essential to establish customer and contractor responsibilities and lay the groundwork to avoid questions about savings after a project is completed.

Steve Sain is coming to MTSU March 11 and 12, 2003, to lead a workshop designed for energy managers, contracting personnel, and energy industry professionals developing and/or evaluating M&V plans. The hands-on workshop will enhance your understanding of M&V requirements and development and evaluation of M&V plans. Register now to attend at [www.mtsu.edu/~cee](http://www.mtsu.edu/~cee) or contact the Center for Energy Efficiency at 615-904-8096 for more information. Seating is limited.

Linda Hardymon MTSU Center for Energy Efficiency

## Fore! Scholarships from AEE

For the third year, the Middle Tennessee Chapter of the Association of Energy Engineers has hosted area golfers at a Scholarship Scramble and successfully raised funds for students in energy-related fields of study at local universities.

Held at Harpeth Hills on a beautiful day in October, the 1st place trophies went to the team of Randy

Mauldin, Chris Mardis, Ken Peck, and Allen Thompson. Second place team was Kirk Whittington, David Rehse, Troy Klein, and Al Hershenhahn.

Third place team was Rob Reasonover, Bobby George, Brandon Marcum, and Joe Lehmborg.

“Longest drive in the fairway” honors went to Kirk Whittington and “Closest to the hole” went to Danny Bertotti. Congratulations to everyone!

Hole sponsors make the difference in an event like this and AEE would like to thank all the sponsors: Siemens, Nashville Gas, IThomasson, ESG, RJ Young Company, Geo-Marine, Light Inc./Stones River Electric, Woodward Marketing, Aquadynamics, American Constructors, Thompson Power, LG&E, Wheatstone Energy Group,

TVA, Viron, Fast Electric, E. Sam Jones, National Water Services, and SSR.

The AEE planning committee appreciates all who worked hard on the event and wants to thank all who played, sponsored, donated door prizes, and donated individually to the scholarship fund making the Scramble another successful endeavor.

Those selected to receive scholarships this year are Andrew Escue and Jonathon Yeager from Tennessee Tech and Jared Odom and Tiffany James from MTSU.



First place team

(Rising, continued from page 1)

"Building occupants have certain expectations about how facilities should operate," Whitefield adds. "When you talk about reducing consumption, you have to do it in such a way that the occupants don't think you're inconveniencing them."

According to Jerry Preston, the biggest hurdle with receiving Tennessee state funding for the replacement of central plants may have to do with project size and amount of funding required. The Tennessee Board of Regents leans toward funding academic programs first. "With funding as short as it is nationwide, a pretty stiff competition exists for outlay and capital dollars," says Preston. "If we have a request for funding for a central plant, that can take a large portion away from other campus systems, so [we] have a hard time competing." The Tennessee Board of Regents is engaging in performance contracting with institutions as one more tool to help finance capital costs of energy projects and pay off debt service with energy savings.

Karla Hignite is a writer and editor based in Colorado Springs, Colorado.

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## Just FYI-

- √ **APPA is coming to Tennessee! APPA 2003 Educational Facilities Forum** - the National Association of College and University Business Officers (NACUBO) will be holding its annual meeting alongside the 2003 APPA Educational Facilities Forum. To enhance what APPA and NACUBO have to offer, joint programming tracks for facilities finance and planning, design, and construction have been developed for facilities and business officers. **Gaylord Opryland Hotel in Nashville, Tennessee, July 27-29, 2003.** Check [www.appa.org/](http://www.appa.org/) for more information.



- √ The **annual TNAPPA meeting** will be held at Middle Tennessee State University on May 14, 2003. The traditional TNAPPA program format has been modified to provide one day of training workshops for attendees. Planners want to encourage attendees and vendors to support the joint APPA and NACUBO meeting in July in Nashville and have Tennessee excel as a fantastic host for the event.



- √ Don't forget to register for the **M&V workshop** TODAY!
- √ Send your comments, questions, or concerns to *Watts Happening* c/o the Center for Energy Efficiency.

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### Contact information:

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