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NUMBER 2

Facilities Manager

The official publication of APFA: The Association of Higher Education Facilities Officers

Preparing Your Utilities Strategy



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Facilities Manager

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Volume 15 Number 2

March/April 1999

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From the Editor

Steve Glazner

As one of the core areas of responsibility for most facilities professionals, energy and utilities management continues to present complex challenges for the education environment. Utilities deregulation is picking up steam in most states, yet those outcomes are far from certain for the utilities industry and consumers alike.

This issue of *Facilities Manager* is designed to assist the facilities manager, business officer, and energy manager in considering current energy concerns and developing a utilities strategy to better manage the future. I first want to direct you to Lander Medlin's Executive Summary column, which reports on a new APPA initiative called Resource Re-allocation-Utilities Strategic Assessment (RR-USA). We think this is a powerful way in which to get your arms around a practical strategy that's right for your institution.

Tom Schubbe discusses further the need for a meaningful utilities strategy, and Mo Qayoumi presents the necessary information for establishing a metering, monitoring, and verification program. Larry Schoff reports on the U.S. Department of Energy/Rebuild America program and its effects at the K-12 level, and Lefty Schaeffer provides words of caution regarding deregulation.

Also in this issue you'll find Jim Christenson's history of a staff development tool used at the University of Michigan. In addition, President-Elect Maggie Kinnaman reports on her recent trip to the Australasian region as APPA ambassador, conference speaker, and wide-eyed tourist.

There is still time to register for APPA's 1999 Educational Conference and 86th Annual Meeting, scheduled for June 20-22, 1999 in Cincinnati, Ohio. The theme is Facilitating Learning in a Changing World.

In addition to such keynote speakers as Michael Gelb, George B. Wright, and Les Brown, there will be a number of education sessions focusing on energy and utilities management issues.

Sunday, June 20

- Department of Energy/Environmental Protection Agency Update
- Preparing for Y2K

Monday, June 21

- Is There a Pot of Gold at the End of the Rainbow? A Case Study on Rebuilding the Infrastructure at the University of Maryland

Tuesday, June 22

- How to Prepare a Comprehensive Utility Development Plan That Will Accommodate a Changing World
- An Integration of Operations and Academics: Clemson University's Central Energy Facility and Energy Systems Laboratory

For complete information on the Cincinnati conference, please visit our website at www.appa.org and click on the annual meeting icon. We look forward to seeing you there. 📌

APPA Plans Utilities Dereg Seminar

As a followup to APPA's popular publication, *Electric Restructuring and Utilities Deregulation*, APPA is scheduling a seminar on utilities deregulation for July or August in cooperation with the Electric Power Research Institute, the International Facility Management Association, and the National Association of College and University Business Officers.

The seminar is directed to facilities administrators, energy managers, and business officers at educational institutions. Experts in the field will discuss such topics as improving load

factors and load profile, metering and monitoring, energy efficiency and infrastructure, technology solutions, and much more.

For more information, visit APPA's website (www.appa.org) or call APPA's Education Department at 703-684-1446 ext. 230 or 231.

Illinois State Wins Top PGMS Award for Education

Illinois State University received the 1998 PGMS Grand Award in the education division for excellence in its grounds management program. Dwight-Englewood School and Multnomah Bible College and Biblical Seminary received the Honors Award for their achievements in

grounds management. All three awards were presented at the November 1998 annual meeting of the Professional Grounds Management Society.

For more information on the annual Professional Grounds Management Awards Contest, please contact John Gillan at PGMS at 410-584-9754 or ppgms@aol.com. In addition, the entry form for the 1999 contest will appear in both the March/April issue of *Grounds Management Forum* and the April issue of *Landscape Management*.

Turn the page for photos and a description of each of the winning facilities for 1998.



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Illinois State University



Illinois State University (Normal, Illinois) was founded in 1857 as the first public institution of higher learning in Illinois. The university has a proud heritage; the documents establishing the pioneer educational undertaking were drafted by Abraham Lincoln. Illinois State is, as its founders dreamed, a comprehensive university with degree programs at the bachelor's, master's, and doctoral levels.

The visionary founders of Illinois State and the Town of Normal saw the campus growing into a heavily wooded park in the center of town for the enjoyment and benefit of all. Part of that vision has been realized with the main campus occupying 350 tree-studded acres in the heart of the fastest growing urban area in Illinois.

With a staff of 19 and serving a student population of over 20,000, Grounds Services maintains this 350-acre park-



like campus which includes the eight-acre Central Quadrangle, six competitive athletic fields, and the residence of the university president. The Quad is home to over 400 trees from a diverse collection of nearly 80 species. Grounds Services is proud to be the recipient of four nationally recognized awards in the past seven years.

—Charles A. Scott
Director, Campus Services
Illinois State University

Dwight-Englewood School



Dwight-Englewood School (Englewood, New Jersey) is a 110-year-old private, independent K-12 school of 1,200 students. The campus is a 30+ acre site that includes athletic field, gardens, lawn areas, tennis courts, playgrounds, parking lots, walkways, and steps.

The Grounds Staff consists of three full-time employees, one summer employee, and the grounds manager. The staff is responsible for keeping the campus clean, safe, and well-maintained on a daily basis.

Responsibilities include turf maintenance, hedge and shrub trimming, tree pruning, litter and trash cleanup, irrigation, snow removal, planting, mulching, and fertilizations. Other responsibilities are pesticide applications, leaf removal, weekly mowing, athletic field renovation, and assisting the Maintenance Staff when necessary.



The amount of magnitude of work is accomplished by a small and caring staff, which proves that more can be done with less.

—George Van Haasteren, CGM
Grounds Manager
Dwight-Englewood School

Multnomah Bible College and Biblical Seminary

Multnomah Bible College and Biblical Seminary (Portland, Oregon) includes the grounds of an old nursery, which frame some of the buildings with state-ly trees. Rhododendron bushes are scattered throughout the campus in great numbers, providing a brilliant display of spring color. Since several of the older buildings were built for use by the state School for the Blind, some architectural anomalies remain, such as fire escape slides and grooved sidewalks. Even the more modern buildings create unique landscape features. The library building is set deep into the ground and is surrounded on two sides by a grassy bank. This bank creates many challenges, not the least of which is mowing on such a steep incline, but students enjoy "the Bowl" for concerts during warm weather.



There are two full-time grounds staff who supervise a crew of eight to ten part-time students during the school year. Maintenance activities are primarily carried out during the fall, winter, and spring seasons, such as leaf control, weeding, planting, and upkeep of existing beds. In the summer, the students work full time with the staff to create new landscaping designs, including updating beds, installing automatic

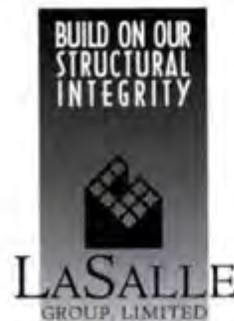
irrigation systems, and detailed pruning of various plants. The campus landscape is gradually moving to arrangements of low maintenance, perennial plants that frame colorful beds of seasonal annuals.

—Lloyd Helm

Director of Environmental Services
Multnomah Bible College



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Available at no charge to APPA members, the 1999 edition of *First Source for Products* is the most comprehensive, up-to-date roster of manufacturers in the construction industry and is complete with addresses and telephone numbers. Published by the CMD Group—a strategic alliance partner of APPA—the resource identifies more than 9,400 building product manufacturers and more than 20,000 products and trade names. Professionally written, concise product information features color photographs, illustrating products and their applications.

For Internet users, *First Source Online* complements the print version perfectly. Located at www.afsonl.com, *First Source Online* features the full information included in the print version as well as technical data and manufacturer specifications. Users can access and download the Construction Specification Institute's SPEC-DATA® technical data sheets and proprietary manufacturer specifications in MANU-SPEC® format from *First Source Online*. A handy cross-reference is provided at the bottom of each product entry to indicate what SPEC-DATA or MANU-SPEC information is available for that product. With more than a million hits per month, *First Source Online* has rapidly become known as the most comprehensive source for building product information on the Internet.

Together, these resources reduce the time required to select and specify products. To request your free copy or to learn more, log on to *First Source Online* or call 800-395-1988. You must mention that you are an APPA member to qualify.

Summer Grounds Conference Scheduled

Everything is shaping up for the 1999 Summer PGMS/MAPPA Grounds Maintenance Conference to be another excellent program for all grounds professionals. The 9th annual program, cosponsored by the Professional Grounds Management Society and the Midwest region of APPA—will take place July 13-15, 1999 on the Illinois State University campus in Normal, Illinois. Illinois State was the site of two of the previously successful conferences.

The dates for the program have been developed to achieve a balance of activities on each of the three days. A golf outing and reception will take place on the first day. Day two will involve both education sessions and a trade show, and day three will continue the education sessions and include tours of the university grounds.

Education will include at least one session in each of the following areas: turf/sport turf, arboriculture, horticulture, snow and ice removal, new equipment, and staff motivation. The program is not limited to those who live in the Midwest, and it is planned to be of equal value to grounds professionals who work with sites of all descriptions, including colleges, universities, K-12 schools and districts, office parks, recreation and park facilities, municipalities, residential areas, hotels and motels, and cemeteries.

In addition to its accessible location in central Illinois, the host site is a prime example of what grounds management is all about. See the article in this issue on Illinois State's winning the PGMS Grand Award for educational institutions.

Inquiries on the 1999 PGMS/MAPPA Grounds Maintenance Conference may be made directly to Chuck Scott at Illinois State University: phone 309-438-2032, fax 309-438-7955, or e-mail at ciscott@ilstu.edu. 

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*-Jim Steffy,
Vice President for Planning and Administration,
Muhlenberg College, Muhlenberg, PA*

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Executive Summary

Setting a Course for Resource Reallocation – Utilities Strategic Assessment (RR-USA)

by E. Lander Medlin

The impact of deregulation on today's utility market is dramatic, yet the present changes may represent only the tip of the iceberg. Changes are occurring in every segment of the utilities industry including electricity, natural gas, and telecommunications. As a result, utilities are rapidly restructuring to adapt to the emerging competitive environment. State by state the regulatory and market outcomes are unfolding.

Now is the time for educational institutions to undertake a *utilities strategic assessment*, to evaluate the opportunities and the barriers and embark on a strategic plan of action. Changes in the utilities market are creating unprecedented opportunities for educational institutions to address four costly and critical facilities issues:

1. Reduction of the deferred maintenance backlog;
2. Upgrading and replacement of the utilities infrastructure;
3. Promotion of sound plant economics and stewardship; and
4. Protection of the environment.

As I develop these themes, you might consider for a moment this context:

- Higher education and facilities impact the daily lives of 17 million students, faculty, and staff;
- Higher education boasts a \$500 billion plant asset portfolio consisting of more than 280,000 buildings with 4 billion square feet of floor space—the single largest dollar in-

vestment of most institutions, by far;

- Higher education spends over \$18 billion per year on facilities operations, maintenance, and construction;
- Higher education facilities' energy and purchased utilities budgets exceed \$7 billion, which comprises 25 to 40 percent of its annual facilities operating budget;
- A survey of colleges and universities revealed in excess of \$26 billion in deferred maintenance needs. Resource reinvestment is urgently needed for proper functioning and presentation; and
- If K-12 elementary and secondary school facilities are included in these figures, the totals jump to an annual expenditure for energy and purchased utilities of \$18 billion, and a deferred maintenance and capital renewal need of over \$100 billion.

Consider for a moment the irony that our institutions' capital campaign seldom includes funds for roof replacement, a new chiller, a boiler upgrade, or a major repair of your steam tunnel! Moreover, you will find few if any commemorative plaques or signs naming these kinds of major repairs, replacements, or upgrades after a prestigious donor or retired president or trustee—a missed opportunity, really!

Let's face it. These aspects of our business are not glamorous, yet they need to be strategically planned for and annually funded if we are to ensure the quality facilities that support the delivery of a first-rate educational experience for the students and uphold the total mission of the institution.

It seems to me that we could use a "utility strategic assessment" approach to the dynamic changes taking place in the utilities industry. We should direct our attention to the high utility budgets of \$18 billion in higher education and K-12 schools and examine the opportunities for resource reallocation imbedded in these budgets. For those who do their homework (including metering, monitoring, and verification of load), energy savings are possible within the context of each state's rules and regulations. It is important to start now to identify possible savings and to set priorities for using those savings. How would you like to:

1. Reduce your deferred maintenance backlog;
2. Replace and upgrade your utilities infrastructure;
3. Promote sound plant economics and stewardship; and
4. Protect the environment...

all with "found" dollar resources? Perhaps you can. APPA, with cooperation and support from both the United States Department of Energy's Rebuild America (DOE/RBA) program and the Electric Power Research Institute (EPRI), is expanding its educational program offerings, information, and publications to prepare facilities professionals to move dynamically, and as champions, into this emerging deregulated utilities marketplace.

How is APPA positioning itself to encourage your proactivity? First and foremost, APPA has established a formal strategic alliance partnership with the DOE/RBA program to provide educational opportunities and utilities case studies for dissemination and use both nationally and on an individual

Lander Medlin is APPA's executive vice president. She can be reached at lander@appa.org. Donald T. Little contributed many valuable suggestions to this column.

state-by-state basis. Rebuild America is a voluntary program that helps form institutional partnerships that then make improvements in their existing buildings using energy-efficient technologies.

The RBA programmatic approach lets you choose the best ways to save money by cutting the costs of energy supply as well as the overall consumption in your facility. RBA will support you with a network of technical and business experts, resource materials, and access to innovative solutions and proven technologies. For further details on this alliance, please visit our website, www.appa.org, as well as DOE's website, www.eren.doe.gov.

APPA and RBA are now developing a new series of state-based executive briefings called Resource Reallocation - Utilities Strategic Assessment (RR-USA) to help educational institutions understand, assess, establish, and implement a plan of action to address

the critical facilities needs outlined above through resource reinvestment. The RR-USA executive briefings will be delivered at the state level and will consist of components that are designed to:

- Review the stewardship context for what we do;
- Understand the macro case for institutional (utility) resource reinvestment;
- Take advantage of deregulation to determine new utility rates with their corresponding risk;
- Identify opportunities for reduced consumption through energy retrofits and upgrades;
- Understand why accurate measuring, monitoring, and verification is critical to your success;
- Show institutions how to turn utility budget cost avoidance into resources to fund deferred maintenance and utility infrastructure renewal;

- Create an effective utility strategic assessment that can lead to a utility strategic plan that is integrated with the facilities master plan; and
- Adopt a comprehensive program of utility and plant renewal through annual reinvestment in the plant asset portfolio potentially with utility dollars or other funds.

These executive briefings are designed specifically for the chief business officer and the chief facilities officer. They, of necessity, hit the key topics and move to possible actionable suggestions during the course of each full-day, state-based briefing. APPA is working collaboratively with the National Association of College and University Business Officers (NACUBO) in the delivery of these state executive briefings. Speakers for each of the state briefings will be drawn from APPA and NACUBO's membership and their business partners.

In addition, APPA has established a progressive working relationship with the Electric Power Research Institute to further augment the formulation and delivery of these important briefings. The prime partnership with RBA continues to be fundamental to our success in assisting you in this core competency area of energy and utilities.

EPRI is one of America's oldest and largest research consortia with over 700 member electric power utilities. Their mission is to deliver science and technology to make the generation, delivery, and use of electricity affordable, efficient, and environmentally sound. The advent of utility industry restructuring has caused many utilities to focus increased attention on their most important outcomes. Colleges and universities are usually considered a vital part of their customer base. To find new ways of assessing customer needs and to exchange information in constructive ways, EPRI and over 60 member utilities have formed the Education/Government Initiative to work with

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APPA and others on programs of mutual interest and benefit.

EPRI is also assisting APPA in the development and delivery of a second educational offering, a utilities deregulation seminar. We are planning delivery of this seminar for July or August. We are partnering with NACUBO and the International Facility Management Association (IFMA) to collectively cosponsor this seminar on a regional basis. More details will be available via brochure, fax, and on APPANet when available.

Furthermore, APPA, IFMA, RBA, and EPRI will develop and publish a series of monographs. The series will consist of:

1. A metering handbook for managers, authored by Mo Qayoumi of the University of Missouri/Rolla, which is already significantly underway;

2. A case studies and applications book; and
3. A set of generic technical specifications for use in preparing bids, RFPs, and other contractual procurement agreements or documents.

All in all, a great number of educational and informational products and services will be forthcoming from APPA and its strategic alliances and business partnerships. These products and services are, we trust, timely and extremely important for APPA members as we wrestle with both the opportunities and barriers posed by utility deregulation.

What's at stake? Millions of dollars that can potentially be "saved" (if not avoided) and reinvested from utilities budgets. This cost avoidance can then be leveraged and reinvested in the plant asset portfolio to address the

critical facilities needs of reducing your deferred maintenance backlog, replacing and upgrading your utilities infrastructure, promoting sound plant economics and stewardship, and protecting our environment. You can do this by upgrading and renewing your utility infrastructure with more efficient and less environmentally impacting equipment and practices.

Do you have a utilities strategic assessment underway? Are you ready to adopt a utilities strategic plan of action? Can you take advantage of the opportunities posed by deregulation? If not, we would like to offer our assistance; if so, we would like to share your story with your colleagues. Either way, please contact us. We would appreciate the opportunity to work with you in your stewardship of your energy and utilities resources. 🐷



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Technology Demands Change

by H. Val Peterson

In his book, *New Work Habits for a Radically Changing World*, author Price Pritchett highlights some facts about the rapidly changing world in which we live. For instance, did you know:

- During the early 1900s, 85 percent of workers were in agriculture; now, agriculture involves less than 3 percent of the workforce.
- In 1950, 73 percent of U.S. employees worked in production or manufacturing; now, less than 15 percent do.
- The Department of Labor estimates by the year 2000 at least 44 percent of all workers will be in data services: gathering, processing, retrieving, or analyzing information.
- There has been more information produced in the last 30 years than during the previous 5,000 years.

It is no wonder that many of us and our organizations suffer from an information overload. It is obvious from the statistics that the Industrial Age has given way to the Information Age. The rapid development and acceptance of computers and other electronic devices has been the principal factor in bringing about this transformation. It is interesting to recall that the first modern computer built in 1944 took up more space than an 18-wheeler tractor-trailer, weighed more than 17 mid-sized automobiles, and consumed 140,000

watts of electricity. This computer could execute up to 5,000 basic arithmetic operations per second. It was a great step forward for its time even though it was quite bulky and expensive. I suspect it was at this point in the development of computers that T.J. Watson, former chairman of IBM, made one of the worst predictions ever when he forecast, "I think there is a world market for about five computers."

By comparison to the size, weight and capacity of early computers, one of today's popular microprocessors is built around a tiny piece of silicon about the size of a dime, it weighs less than a packet of artificial sweetener, and uses less than 2 watts of electrical power. This computer can execute up to 54 million instructions per second. Its performance seems to improve even before we get our new computer out of the box and operating. Microcomputers are not only a necessity for business operations, but the home market is growing by leaps and bounds as well. Another prediction faux pas was made by Ken Olsen, former president of DEC, who said that "there is no reason for any individual to have a computer in their home."

To link the microcomputer's capability to an example that you and I might better understand, let's assume you're going to a birthday party and you purchase from the card shop one of those new-fangled cards that plays the "happy birthday" jingle when the card is opened. You might be surprised to know that this simple and relatively inexpensive greeting card contains more computer power than existed in the entire world before 1950.

In fact, the home video camera you'd use to document and record the birthday party contains more processing power than an old IBM 360, the wonder machine that gave birth to the mainframe computer age. Wow!

To carry this example even further, the birthday present you give is a popular interactive electronic gaming system. It runs on a processor that has a higher-performance than the original 1976 Cray supercomputer which, in its day, was accessible to only the most elite research scientists.

This advancement in technology has become so commonplace that today's average consumers wear more computing power on their wrists than existed in the entire world before 1961. And the cost for this new computing power has dropped drastically. Computer power is now 8,000 times less expensive than it was 30 years ago. If we had achieved similar progress in automotive technology, today you could buy a luxury automobile for about \$2 and it would travel at the speed of sound and would go about 600 miles on a thimble of gasoline.

So what does all this mean to us that work in the field of facilities management? One obvious conclusion is that we won't ever again be able to operate in the "old way," even if for some irrational reason or other we desperately wanted to do so. All our jobs will change in some way (many already have) and we will be required to perform tasks in a different manner (many already are). And it's not just facilities managers that will be affected by the change. The jobs of our staff will change as well

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and they will be required to do their work in significantly different ways.

Changes that take place in how we do our jobs have not come about because of any wrongdoing on our part. Yet, facilities management organizations and their employees will be very much at fault if they don't make necessary changes in order to adapt to the "new way." It will do little good to try to avoid change, to complain, or be bitter about what's happening. In fact, such behavior can only do us harm. We will merely waste precious energy if we resist, get angry, or give in to grief over all the changes that are taking place around us. We jeopardize our future if we cling to old assumptions, old practices, and old expectations about how our job should be done or how the facilities management organization should function. These needed changes may well be more difficult for many of our employees to accept than for those at the management level.

As Pritchett says, "Frankly, the world doesn't care about our opinions. Or our feelings. The world rewards only those of us who catch on to what's happening, who invest our energy in finding and seizing the opportunities brought about by change." For our own purposes we might well substitute for the word "world" in this quote such words as "institution's administration" or "governing board" or even "boss."

Our success on the job will be measured in how well we meet the challenge of technology and use it to our advantage since today's radical changes in technology demand that we too must change.

To paraphrase a modern saying that seems to apply: Change happens! 📌

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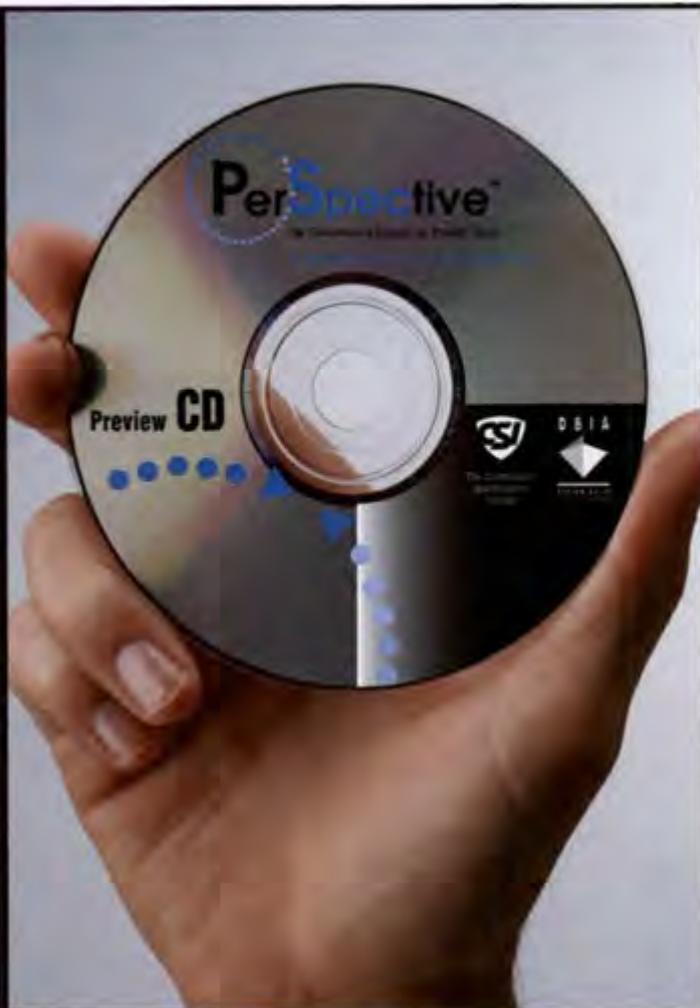
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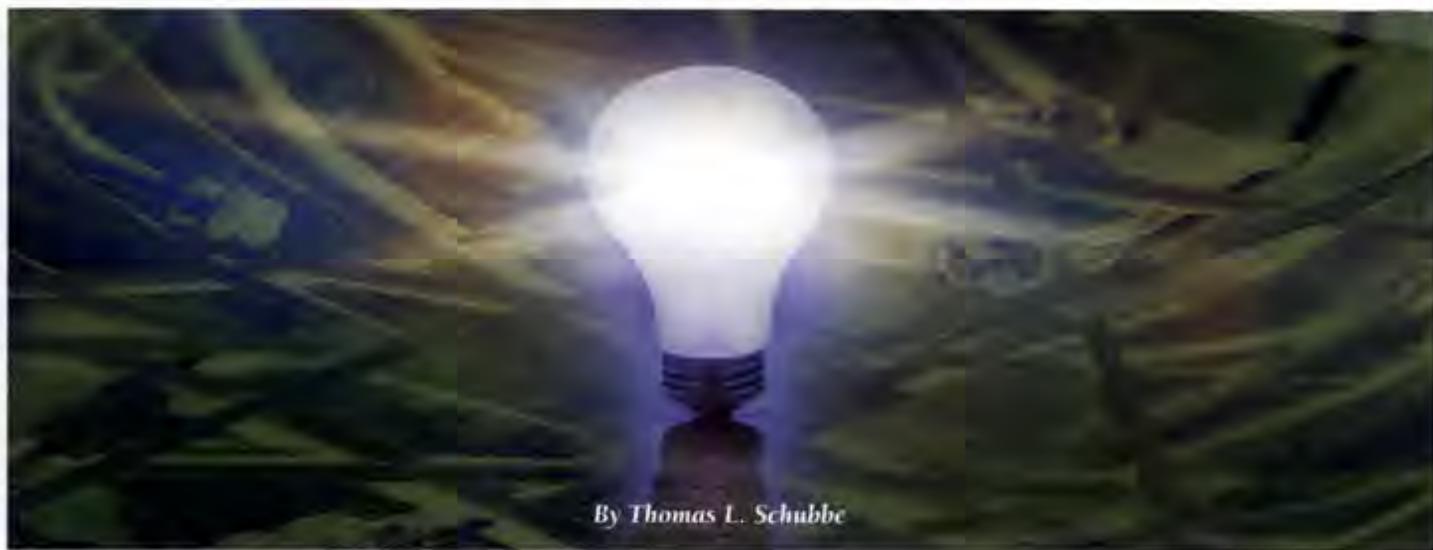
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Utility Management in the 21st Century: *Challenges and Opportunities*



By Thomas L. Schubbe

What will you do when your governor or university president says, "Send out an RFP to privatize our utility system. We are in the business of providing education, not being a utility company."

For over a decade, rebuilding infrastructure has been a major topic of public debate. Confronted by intense competition for increasingly limited funds, facilities officers are all too often called upon to operate and maintain aging facilities on limited budgets. The emphasis on utility infrastructure renewal comes at a time of radical changes in the structure and operation of the energy industry. The onset of non-regulated energy providers has created a new opportunity for colleges and universities in the form of vendors and prospects that can bring substantial capital and operating experience to the institution. This commodity has great appeal with state governments and university and college presidents.

The potential capital requirement of infrastructure renewal, capital budget constraints, and utility market changes are forcing administrators to look for creative financing mechanisms, innovative ownership and management structures, as well as competitive procurement strategies. The convergence of capital issues and the transition in the utility industry are creating business opportunities into the next decade.

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What does that mean for the facility manager today? There are estimates that by 2020, more than 50 percent of the public institutions will have outsourced a majority of the facilities operation. Facilities management will be considered a business unit.

The challenge for administration and facility management is to:

- quantify the expense of utility operations and cost of infrastructure renewal/development relative to the goals and objectives of the institution and changes in the utility industry; and
- recognize and manage the political dynamics of utility development and operation in addition to technical, financial issues.

The first element of this challenge provides a benchmark for evaluating and selecting a utility service option, while the second element addresses the smooth implementation and transition to the selected utility service option. Both elements are fundamental to the development of an effective utility master plan. While the conceptual framework that follows is nearly universal, we recognize that each institution has a unique set of priorities and circumstances relative to its utility infrastructure.

What is a Utility Master Plan?

A utility master plan establishes a strategy by which an institution can provide cost effective and reliable utility services for the planning horizon chosen by the institution. The first step in developing such a plan is preparing a Utility System

Assessment—a thorough evaluation of an institution's utility system which identifies both system requirements and the resources available to meet those requirements. The purpose of this section is to provide an overview of the factors that must be examined and the issues that must be addressed when assessing an institution's utility systems. The results of the Utility System Assessment also provide a strategic framework for evaluating the advantages and system requirements for alternative procurement of utility services.

Assessing Facility Condition

Assessing an institution's utility systems begins with evaluating the current condition of each system. To gain a thorough understanding of the institution's physical plant resources, the remaining useful life of major equipment and the condition of all auxiliary systems must be identified, along with the plant's firm and peak capacities. The following areas should be addressed:

- What is the total capacity of the system?
- What is the "firm" capacity of the system?
- Is the firm capacity sufficient to meet the expected loads on the system?
- What is the condition of the existing equipment?
- Has maintenance been deferred due to funding limitations?
- Have construction projects been delayed or re-appropriated?
- What is the average useful life of similar equipment? Has the equipment served beyond this average useful life?
- Has the system experienced outages due to equipment failure? What is the frequency of those outages?
- Have operating and maintenance costs been increasing? Is there an increasing need for appropriations for maintenance requirements and equipment replacement and improvement?
- What improvements must be made in order to assure continued, reliable service over the planning period?
- Is the existing delivery system capable of delivering the system output in the appropriate levels and conditions to assure reliable service? What improvements are needed?
- Does the system meet all regulatory criteria? If not, what type of improvements are necessary to meet the current and any known future regulatory requirements?

Documenting Facility Performance

At the same time that it is determining the condition of its utility systems, an institution must assess the performance of those systems, that is, their ability to meet the institution's load requirements. This phase consists of gathering information relating to the current operation of the facility, as well as information relating to the distribution systems, the metering systems and the management and operation systems. Basic information that should be assembled includes:

• Energy User Data:

- Develop building listings identifying building types, occupancy schedules, type of mechanical and electrical systems, age, and all recent or projected retrofit or modernization projects for the structure.
- Identify changes in building population on a five-, ten-, and twenty-year calendar.
- Identify types of energy required for each building including delivery pressure and conditions.
- Identify operating systems which are in place that can control energy consumption within the building and reduce instantaneous demand on the systems.
- Develop monthly and annual load profiles based on occupancy and weather conditions for the combination of buildings.
- Identify cost recovery mechanisms for the cost of energy supplied to the individual buildings.
- For decentralized heating, cooling or electrical supply systems, document all operating, repair, and maintenance costs associated with each decentralized system.

***Distribution System Data:**

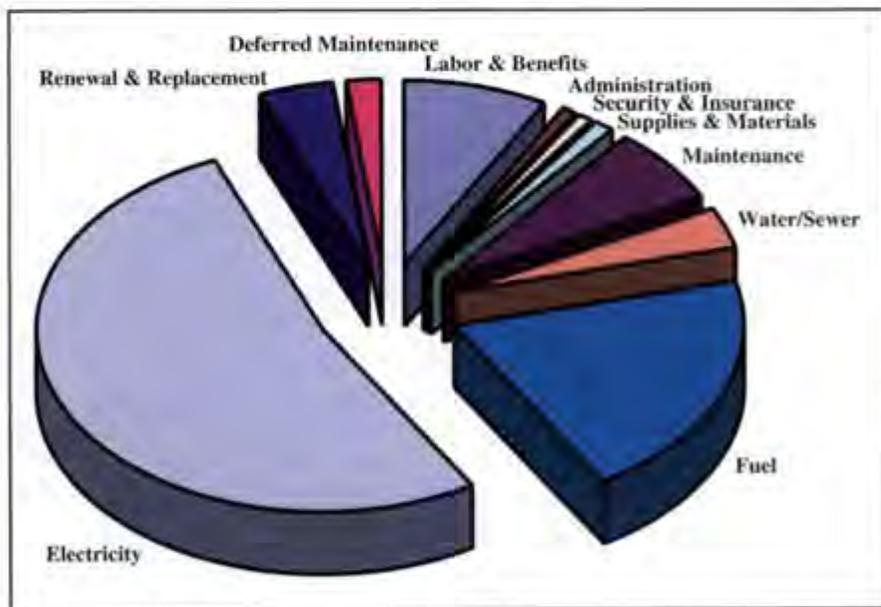
- Document system loading and utilization factors for each of the types of energy distribution systems.
- Identify and document all operating costs associated with each specific utility over the past five years. This should include costs that may be covered through other accounts such as blanket insurance policies, retirement programs, and maintenance labor pools.
- Identify and document operating constraints of the systems. This could include capacity limitations, reliability concerns, age and deterioration issues, and environmental concerns.
- Define methods for cost recovery associated with the distribution systems. This will usually include, as a minimum, expansion cost to cover new loads, repair and replacement expenses, and debt recovery opportunities.
- Document efficiency of the distribution systems and determine maximum and minimum operating points which will still satisfy the energy user's criteria.

***Utility Plant System Data:**

- Document operating criteria for the facilities. What are the expectations for delivery of utility supply from the plant?
- Assemble the operating constraints and review the requirements of all environmental permits for the facility. Establish contact with permitting agencies which regulate the operation.
- Assemble and evaluate all utility and fuel supply contracts which affect the facility, including ash disposal contracts.

- Document and evaluate all operating costs for the facility. This must be all inclusive and, in many cases, must include costs that may not have been included as part of the operating expense of the facility.
- Identify sources of funds for operating, expanding, or replacing the central plants. Document how any type of deferred maintenance program may be affecting the future reliability of the facility.
- Evaluate and document reliability of the facilities including a determination of the expected useful life of the major components within the plant.
- Determine operating limitations and capacity constraints of the components within the plant.
- Document and review operating guidelines for the plant. How is the facility staffed and what are the procedures to cover unscheduled and scheduled equipment outages. What are the procedures for regular, periodic maintenance of the systems and equipment?
- Determine operating and production efficiency of both the plant as a whole, and each piece of energy production equipment. Compare the results to other benchmarks for similar types of systems.

Cost Distribution of Utility Operations



Projecting Future Capacity and Consumption Requirements

A critical component of the Utility System Assessment is the determination of the ability of the institution's existing facilities to meet projected load requirements with sufficient reserve capacity to assure continued service during periods of forced or scheduled outages. Care must be taken in making these determinations. The costs associated with meeting inflated capacity requirements can severely limit the ability of

the institution to meet other financial commitments. Likewise, the financial impacts of either consuming significantly more or less units of energy on an annual basis may also impact financial and contractual obligations.

Firm plant capacity is defined as the plant capacity with the largest production unit out of commission. Firm plant capacity is not just a function of the reliability of the production units. All ancillary systems must also be reviewed to confirm that reliability exists throughout the plant. Firm plant capacity should be adequate to meet the normal expected peak demands during normally expected weather extremes. Firm plant capacity requirements should not be expected to meet capacity requirements during the extremes which may occur for less than 40 to 80 hours per year. Meeting such expectations may not be cost effective.

Total plant capacity requirements are those defined as the capacity requirements necessary to meet total projected demands during the most extreme conditions. Based on modular sizes of boilers, chillers, and similar equipment, this will normally be significantly greater than the required firm plant capacity. Again, plant auxiliaries must be adequate to assure that total plant capacity can be delivered if so required.

In instances where future load requirements are expected to be significantly greater than current load requirements, care must be exercised to assure that over-expenditure of plant capacity does not occur. At the same time, the plant basics must be suitable to expand future plant capacity in the most cost-effective manner.

Evaluating Operating Policies and Procedures

Many facility utility systems are operated with one item in mind: How can the operation be made to function within this year's budget? Policies and procedures must be examined to assure that the system can meet the reliability and demand constraints placed on it for the lowest life cycle cost possible.

Fuel selections, cogeneration and plant heat balance, equipment staging, hot standby procedures, and scheduled maintenance all affect the operation of a facility. Policies driven by annual budgets, environmental permits, equipment constraints, or staff abilities could unduly

restrain the facility and force the operation to be less efficient.

The Utility System Assessment must document an operating procedure system which clearly identifies "how work gets done." With this knowledge, suggestions can be made to improve the operation and reduce the cost of operation.

Organizational Environment

The Utility System Assessment requires an overview of the organizational environment in which the system is operated, since this environment provides the framework in which de-

cisions regarding the utility system are made. The first step is to determine how the system is managed. For example, many institutional utility systems are separate divisions of the institution and report directly to the institution's administration and, ultimately, to its governing board.

If the ultimate decision makers for the system are somewhat removed from the daily operations of the system or do not have knowledge of the problems faced in the industry, it is important to provide them with sufficient data to support the course of action chosen by the utility management. Occasionally, these decision makers are faced with concerns expressed by political or environmental groups that may not have complete information about a situation. It is important to be aware of these concerns and to provide the decision makers with the data necessary to address them.

The organizational structure may also affect a facility's ability to operate effectively and efficiently. A review of the existing structure will allow identification of limitations or possible opportunities for change which may enhance the effectiveness of the existing operation. A classic example is the "profit center" concept which may create competition among divisions, rather than cooperation for the good of the whole. For example, consider a university with utility systems on two separate campuses. By treating each system as a separate profit center, this university did not realize the economies of

scale or synergy of total utility operations. This university purchased economy electric power for delivery to one of its campuses. By simply changing delivery to the other campus (using the same electric supplier for transmission services), the university offset significantly higher power costs from the local electric supplier. While this action increased the costs of power for the first profit center, the university as a whole benefited from the transfer.

The Utility System Assessment

must also examine the issue of funding. As previously noted, if the primary function of an institution is education, defense, medical care, or some other function, the utility system may become the "loser" in the allocation of limited resources. The assessment should, therefore, include the development of an understanding of the traditional sources of financing that have been used by the institution and the current limitations of those funding resources. As noted earlier, the decision makers may not have sufficient information to make informed decisions regarding the utility system. This alone may prevent the utility from receiving required levels of funding.

Other concerns that should not be overlooked in the Utility System Assessment include human resources and environmental factors. The assessor should be aware of the human resource capabilities and costs, as compared to similar utility systems. Specific opportunities or concerns created by labor relations or unions should be identified. It is also important to understand the limitations on staff transfers or layoffs due to contractual or legal requirements, as well as the financial implications of any such actions.

Environmental issues are increasingly common in determining the parameters in which a utility system must operate. While many of these issues are determined by law, the particular institution may be faced with public demand for environmental standards in excess of legal requirements. While environmental improvements beyond legal requirements are certainly to be desired, such improvements must be carefully weighed against their incremental costs. The Utility System Assessment must clearly identify these issues. Utility managers should be aware that these issues will be faced by the decision makers and should be prepared to support suggested actions.

Internal Option and Alternative Ownership and Management Structures

The Utility Master Plan provides the foundation for the development of a long term strategic plan. By documenting system performance, identifying system requirements, evaluating the resources available to meet those requirements, and delineating the legal and financial parameters under which the institution's facility operates, the plan enables an institution's planning team to prepare a long-term plan for continued operation of a reliable utility system under the *existing ownership and management structure*—its "internal option."

This internal option plays an important role in the development and implementation of the strategic plan in two ways. First, it enables the institution to understand the costs of continuing utility system operation under the existing ownership and management structure, with improvements being made to enhance the system's reliability and its capacity for meeting the institution's long-term utility requirements. In addition, the internal option serves as a reference case against which



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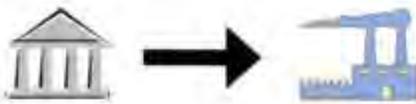
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Internal Option



- Institution owns and operates utility systems
- Not status quo
- Can compete with private sector alternatives

Public/Public Partnerships



Public or quasi-public entities share or trade services or form cooperative agencies.

- Advantages
 - Economies of scale
 - Access to additional funding sources
 - Intangible benefits
- Disadvantages
 - Start-up costs
 - Some loss of control

Public/Private Partnerships Management and Operation Model



Institution hires private entity to manage and operate facilities.

- Advantages
 - Preserve tax exemptions
 - Reduce business risk
 - Well adapted to facility construction
- Disadvantages
 - Institution has active role
 - Long-term relationship

Municipal Lease Financing



Institution transfer facilities to tax-exempt entity, which issues certificates of participation to investors and leases facilities back to institution.

- Advantages
 - May not be subject to legal debt limits
 - Funds available more quickly than with other forms of financing
 - Institution regains ownership of facilities
- Disadvantages
 - Interest rate may be higher than with other financing
 - Institution must still deal with facility operations

Build – Own – Transfer



Private entity finances, constructs and operates facility for a given term. At end of term, facilities are transferred to the institution.

- Advantages
 - Institution transfers construction risk to developer
 - Institution avoids necessity of financing full construction costs
 - Institution avoids “captive customer” dilemma
- Disadvantages
 - Requires clear understanding of the risks and business practicalities involved
 - Requires extensive cooperation between the parties

Pure Privatization



Institution sells or decommissions facilities. Private entity provides all utility services standards.

- Advantages
 - Institution out of utility business
 - Institution gains significant cash infusion
- Disadvantages
 - Additional costs
 - “Captive customer” dilemma

other ownership and management structures can be measured.

Confronted by increasing demand, aging infrastructure, and intense competition for limited funds, system managers in all sectors of the economy are taking non-traditional approaches to the construction and rehabilitation of heating and cooling systems. A number of these approaches feature innovative ownership and management structures.

The question of structuring the ownership and management of an institution's energy facilities is primarily determined by policy and financial considerations. It is critical that these issues be identified, fully analyzed, and weighed against each other *before* embarking upon a facilities development project. Each situation is different. An ownership and management structure which meets one institution's needs may not meet the needs of another.

A threshold policy issue is whether the institution wants to be in the utility business. There may be good reasons for the institution to turn control of its facilities over to another entity. After all, running a power plant is an expensive proposition and requires maintaining a skilled staff on duty twenty-four hours a day, 365 days per year. Moreover, purchasing fuel is becoming more complicated, the risks associated with system construction and operation are becoming greater, and compliance with environmental laws is becoming more difficult and expensive. Rather than contend with all of these and other factors, an institution may decide to forego energy production activities completely by turning over either the ownership and management of the facilities to another party, or by purchasing utility services from a local utility. As you consider ownership and management alternatives that would work for your institution it is important to consider the advantages and disadvantages of each option.

The alternatives for ownership and management can best be conceptualized as a spectrum, one end of which is total private ownership and management and the other end of which is total public or quasi-public ownership and management. Various forms of public/private and public/public partnerships lie at points along the spectrum:

Internal Option: Institution owns and operates utility systems

Public/Public Partnerships: Public or quasi-public entities share or trade services or form cooperation agencies

Public/Private Partnerships: Institution hires private entity to manage and operate facilities

Municipal Lease Financing: Institution transfers facilities to tax-exempt entity, which issues certificates of participation to investors and leases facilities back to the institution

Build-Own-Transfer: Private entity finances, constructs and operates facility for a given term. At the end of the term, facilities are transferred to the institution

Pure Privatization: Institution sells or decommissions facilities. Private entity provides all utility services and standards.

Financing Strategies and the Ownership/Management Alternatives

Funding considerations may arise in a number of ways. An institution may simply desire to have long-term certainty and stability for its utility expenses. One approach to accomplish this goal is to turn over ownership and management of energy facilities to the private sector in exchange for long-term pricing guarantees.

Accessibility to the capital markets for new facility construction and renovation may also determine ownership and management structure. A public or quasi-public institution may not have the capacity to issue new debt, or new debt may adversely affect the institution's financial ratings and increase the institution's future cost of capital. The acute needs

of such an institution may, however, make deferring critical renovations impossible. In such cases, various forms of privatization may offer ways for the institution to meet its utility requirements with the use of private capital.

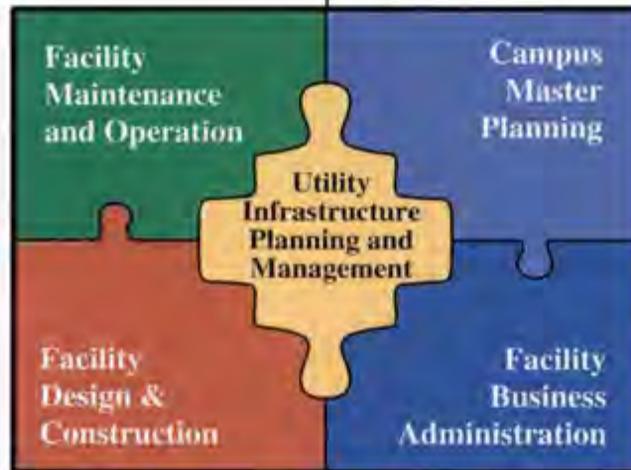
Finally, a facility's ownership and management structure may evolve from taking a broader view of all of the resources available for meeting an institution's energy requirements. In many situations, the potential exists for cooperative development of heating and

cooling systems through public and private partnerships. Such "partnerships" may take the form of joint ventures, separate nonprofit corporations created with public and private resources, or even a cooperative effort with local utilities. If an institution is to find a reliable and economical approach to meeting its future energy needs, it must be creative and open to examining all of the options.

Managing the Political Dynamics

The utility master planning process impacts and therefore must involve the different areas within the university. Each of those areas will have a specific interest and/or stake in the results of the plan, and depending on the project, are included in the planning process: administrators, facility managers, financial officers, planners, public relations, and human resources.

Specific political issues will vary with the scope of the utility plan, and the type of utilities involved, but may include: environmental, labor, business risk, and finance. Options for



utility development and operations such as cogeneration, fuel procurement programs, and alternative ownership and management structures will attract the scrutiny of constituencies internal and external to the institution. Examples of these constituencies are:

- Faculty & Student
- Groups Regulators
- Labor Unions
- Environmental Groups
- Utility Associations
- Governor & Legislators
- Neighborhood Associations
- Board of Regents

Each of these constituencies can potentially initiate proceedings to stop or delay a particular utility development strategy. Often these proceedings are a reactionary, based on incomplete information or in response to, from their perspective, the sudden announcement of a contract award. Once a proceeding is initiated, time and resources that could have been used to implement a utility strategy must now be dedicated to respond in the appropriate forum.

However, costly delays in implementation of a utility plan can be avoided by recognizing the political nature of utility development and involving effected constituencies throughout the planning process. Specific concerns and interests can then be incorporated into the planning process, and the constituencies understand the needs, and the goals and objectives of the institution thereby minimizing the probability of a challenge to a utility strategy.

Implementation

The implementation of a major infrastructure renewal project can be accomplished either internally or through an outsourcing process. Outsourcing of utility operations or development typically will involve a procurement process that must conform with applicable statutory requirements and accurately reflect the goals and objectives of the institution. The procurement process must also:

- Quantify the present and future utility needs and requirements of the institution,
- Identify the range of acceptable ownership/management structures,

- Define evaluation criteria, and
- Establish a timeline for evaluation, negotiation, and implementation.

With this information, prospective vendors and service suppliers can respond to a project solicitation. However, whether the internal utility option is implemented or utility services are outsourced, implementation and follow-up is as critical as the initial planning. By maintaining a consistency of team members and adhering to the goals and objectives set forth early in the planning process, the institution can expect to receive the cost-effective and reliable utility supply well into the future. 📌



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by Lorenz V. Schoff

Our K-12 schools are facing some hard facts of life and difficult choices as we move into the 21st century. After decades of tight budgets and deferred maintenance, the need to repair and upgrade deteriorating and inadequate K-12 school buildings is painfully obvious all across the United States. At the same time, enrollment numbers continue to increase. The school-age population, which has grown steadily since 1990, is expected to continue to grow for the next decade. Changing times require new and more complex instructional programs, adding building, repair, and renovation needs in our schools. Federal mandates require schools to address issues such as indoor air quality, lead, disability and accessibility, radon, and asbestos exposure.

A 1995 GAO report (U.S. General Accounting Office) estimates that about \$112 billion (1994-95 dollars) is needed to repair or upgrade school buildings to good overall condition and to comply with federal mandates. About one-third of the 10,000 schools surveyed for the report needed extensive repair or replacement of one or more buildings; 60 percent of schools, many in otherwise adequate condition, reported at least one major building feature, such as heating, ventilation, or plumbing, in disrepair. In over half the surveyed schools (58 percent) at least one aspect of environmental quality, such as ventilation, heating, or lighting, was unsatisfactory. Based on these facts, the rebuilding of our nation's schools is a wise economic and political reality.

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School boards and principals are well aware of leaky roofs and equipment breakdowns, but other priorities are often attended to first. Today these are normally corrected when failure occurs and has a direct impact on the instructional programs. Federal mandates must be met, and it seems right for educational programs and staff salaries to claim precedence over physical facilities. Moreover, in most K-12 schools, there is no professional, full-time facilities manager to study the school's needs, understand the state of the art in energy efficiency, and plan for improvements. To the principals and superintendents who manage the facilities along with all their educational, administrative, and public relations duties, maintenance may be just one more budget line item to compete with many others.

Despite obstacles and tight budgets, school officials and communities have begun to recognize new costs and potential benefits that give the schools balance sheet a whole new look. The condition of our school facilities has a direct and lasting effect on the quality of education for students. Buildings in disrepair, poor lighting, and other problems take a heavy toll on the learning environment, the ability of teachers to teach, and the ability of students to learn. The costs of unhealthy or uncomfortable conditions in school buildings may be seen in poor attitude, morale, and performance. One study showed that students assigned to schools in poor condition can be expected to fall 5.5 percentage points below those in schools in fair condition, and 11 percentage points below those in buildings in excellent condition.

The downward spiral of deferred maintenance is becoming financially intolerable, as buildings deteriorate more quickly and equipment requires more frequent and expensive repairs. The feasibility and fundamental benefits of investing—especially in energy efficiency—are being proven in facilities nationwide. In the struggle to control operating costs and use existing resources, facility managers and school administrators

are undertaking renovation projects to use existing facilities to gain in economy of operation and energy efficiency, while potentially cutting energy costs, controlling maintenance costs, and providing better learning environments.

Some of the money to pay for renovations, improvements, and new school buildings is coming not out of operating funds or traditional funding sources, but from the "energy equity" in the schools themselves. About \$2 billion in energy equity—or 25 percent of the energy consumed in K-12 school annually—is escaping out the school's front door, floating out the windows, or rising from the roof. Energy equity can be captured by improving or replacing the school's energy-consuming and

building envelope systems providing a healthier, more comfortable, high-quality learning environment.

Rebuilding Our Schools Through Rebuild America

The U.S. Department of Energy developed the Rebuild America program to assist communities in reducing energy consumption in existing facilities based on community needs. Rebuild America was created to help communities reduce energy use in existing commercial, institutional, and multifamily buildings. This program resulted from one of the goals of the President's 1992 Climate Change Action Plan, reduce energy consumption and air pollutants. Assisting communities to use existing resources (buildings) through renovation and/or

retrofitting resulting in reduced energy consumption and air pollution is the goal of the program. Rebuild America achieves this goal through the forming of community partnerships and the supporting of these partnerships.

Rebuild America lets partnerships choose the best ways to improve their communities and then supports them with a national network of technical and business experts, resource materials, and access to innovative solutions. The Rebuild America program is divided into six sectors to better serve the needs of the community: state government, local government, public and assisted housing, colleges and universities, commercial, and K-12 schools.

At the foundation of the program is the consensus held by Rebuild America partners and DOE that increasing the energy efficiency of buildings is a win-win opportunity for our communities and the nation. The community partnerships in Rebuild America may draw together representatives of local or state government, economic development organizations, private businesses, utilities, schools, and nonprofit organizations, along with technical experts, individual community leaders, and consultants. Each partnership is a unique combination of members that reflects the community's goals, needs, and priorities; the only requirement is that each partnership include at least one member be a champion "spark plug" for Rebuild America.

Rebuild America partners join the program because they can see that energy efficiency projects will benefit their communities. These projects can help achieve community goals whether they focus strictly

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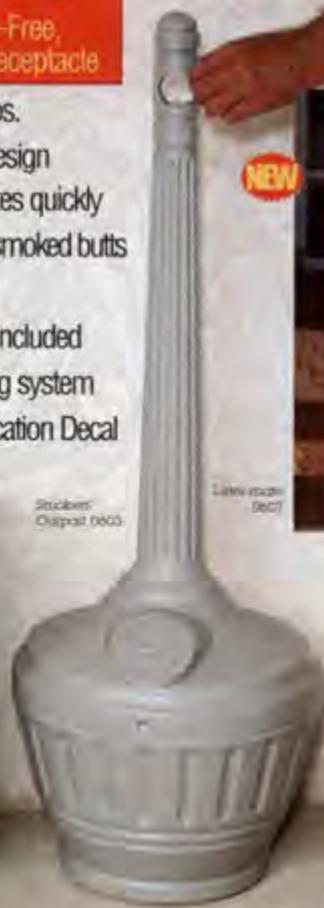
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on improving schools and lowering energy costs or they target economic growth and job creation, urban revitalization, lowering housing costs, or improving environmental quality. Rebuild America offers the resources, tailored to each community's needs, to ensure that their projects will succeed.

Why Schools Join Rebuild America

Is Rebuild America like all other government programs? That tells us what to do and how to do it and when? The answer is "NO."

Rebuild America is based on the needs of the community and the partnerships that it forms or develops—bottom up, not top down. K-12 schools are now beginning to figure more prominently in Rebuild America, as partnerships focus on the needs of schools in their communities and realize the benefits that the program can offer. Many of the current Rebuild partnerships are planning school projects, and several partnerships have already committed or completed renovations. Current Rebuild school projects span the nation from Alaska to Connecticut, from Hawaii to New Jersey, and to Idaho, Iowa, Missouri, the District of Columbia, Arkansas, Kansas, and elsewhere.

In 1999, Rebuild America is placing new emphasis on the K-12 schools sector and on ensuring that the program's resources and services are finely tuned to the needs of the schools. This emphasis will take many forms. One of the key

activities will be to provide information to all decision makers involved with school operations about Rebuild America and the benefits it has to the schools and for the decision makers. This will be accomplished through publication of articles and news about Rebuild in appropriate publications, and the development of easy-to-understand documents on the what, where, why, and how of Rebuild America.

In addition to the general information about the K-12 Rebuild program, assistance will be provided to both Department of Energy Rebuild regional support offices and Rebuild State Representatives on K-12 information as it is identified. In addition, guidance on financing strategies, sample procurement and contract documents, topic-specific workshops, and customized on-site assistance are offered to help partnerships realize the most positive outcomes possible from their action plans.

Schools will find that Rebuild America can assist in providing information and technical advice to overcome obstacles that have stood in the way of maintaining and improving school buildings. The program offers technical expertise from the four National

Laboratories and other sources, assistance identifying financing options, and the synergy of partnering with other community organizations with like goals. Participants also find themselves the beneficiaries of the domino effect when projects share the ways and means of their successes with others.

Rebuild America is one of the many existing Department of Energy Programs intended to improve the teaching and learning environment in our U.S. schools. The other programs are: Clean Cities, President's Million Solar Roofs Initiative, the State Energy Program, and Energy Star (a joint DOE/EPA program). The coordination of these programs with other state and local energy programs and the need to address policy issues will be accomplished under an umbrella known as Energy Smart Schools.

Program Elements

Getting started with Rebuild America is simple—in fact, the program is user friendly. DOE requires submission of only a simple one-page form to become a candidate for partnership. One city official said of Rebuild America, "This is the easiest government program I've ever been associated with." The form and more information about the program can be found on the Internet at <http://www.eren.doe.gov/buildings/rebuild>.

In joining the Rebuild America program, the community partner agrees to 1) lead in the development of a community partnership, 2) develop and provide to DOE a multiyear action plan within one year of the date of the signed agreement, and

3) promote its participation in the Rebuild America program.

DOE, being part of every Rebuild Partnership, agrees to 1) assign a program representative to assist the partner in the development and implementation of its community energy efficiency program, 2)

recognize the partner as an active participant in the Rebuild America program, 3) promote partner activities at state and local levels, 4) promote exchanges of information and provide guidance information, workbooks, and reference contacts, and 5) sponsor workshops on applicable energy efficiency and renewable energy topics. The program representative helps coordinate Rebuild's assistance to the partnership, and an array of products and services is available to guide partners in developing the partnership and action plan and throughout the building renovation phase.

Rebuild America's assistance is designed to give partnerships every possible advantage:

- leveraged capital investment and assistance in finding alternatives to financing;
- reduction of investment risks through group effort and government assistance;
- assistance from an objective third party in the development of requests for proposals, specifications, and other technical documents;
- information on the latest technologies from the national laboratories and program representatives; and
- participation in Rebuild America's local and national campaign to help local communities raise awareness of energy conservation measures.

After the community partnership has been formed and the Rebuild application approved, the next action to be accomplished is developing an action plan, which is the business plan for the community partnership. Every partnership's action plan will be different, but all plans should include information concerning five areas:

1. The partnership's priorities and goals,
2. The buildings targeted for improvement,
3. Resources and responsibilities,
4. A plan for determining energy and cost savings, and
5. A plan for promoting the partnership's program in the community.

The action plan states specific energy efficiency goals and describes the organizations that will act to meet those goals. It includes a description of proposed energy efficiency measures, a strategy to carry them out, and their expected costs and savings. It also describes the technical assistance

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desired from the Department of Energy.

Virtually all renovation or retrofit projects designed to capture a school's energy equity will begin with two actions: an energy audit of school facilities to determine the most effective ways to save energy and money, and the school

board or other funding authority establishing a policy that allows all cost savings (energy equity) from the energy efficiency project to be used to pay for the project itself and for other facility improvements.

Developing a prioritized list of improvements will help determine the best use of the captured energy equity; it is recommended that both large and small payback projects be accomplished at the same time. If this does not occur, then some projects with the largest benefit, but the smallest payback time, may not be accomplished. The more improvements accomplished to the energy and associated building systems now, will free up more energy equity for the future, to accomplish routine maintenance and repair.

After the action plan has been completed and approved and all policies required are in place, projects identified and designed and funding sources determined, the next action is the accomplishment of the projects. This can be accomplished by several means: In house forces, normal contracts, or by performance contracts. The choice is up to the school division and the type of project accomplished.

The final action but a continuous one is the monitoring and reporting of the results of the project. Is the energy consumption anticipated to be reduced actually occur? What improvements can be made to the project? All this information will be shared with other partnerships around the country for use in development of projects and their action plans.

Rebuild America Partnerships Involving Schools

The following partnership overviews are examples of successful programs involving schools.

REBUILD DC PUBLIC SCHOOLS

Washington, D.C.
Action Partnership

Partnership Overview: Rebuild DC Public Schools has committed to retrofitting schools and addressing energy and operations inefficiencies within the entire District of Columbia Public School (DCPS) system. The partnership also actively promotes energy, water, and operational efficiency in

all sectors of the system to achieve a 20 percent increase in efficiency of the DCPS \$32 million Energy and Operations budget by the year 2003. Through the Rebuild DC Public Schools partnership, DCPS hopes to set national standards for energy efficiency, attraction of additional capital and project partners, and environmental stabilization measures. The Rebuild America program will be supporting the Army Corps of Engineers, who has been hired by the District Superintendent, to implement capital and facility improvement projects.

Name of School/District: District of Columbia Public School System
School Commitment: 16 million square feet (146 buildings)

REBUILD HAWAII SCHOOLS

Honolulu, Hawaii
Action Partnership

Partnership Overview: The State Department of Education, Operations & Maintenance Section, submitted its Department of Education "Rebuild School Action Program" plan to conserve energy through energy savings performance contracting to improve buildings and facilities of over 250 schools in the Hawaii Department of Education educational system. Phase I of their Rebuild School Action Program will focus on initiating and implementing a performance contract for schools on the Island of Oahu. Three "pilot" schools have been selected, and the total projected energy savings for these schools is 3,923,160 kWh and the total projected energy cost savings is calculated at \$625,000. Phase II will build off of the experience and results from Phase I and concentrate on the nine outer island schools. The projected energy savings is 12 million kWh with a projected energy cost savings of \$1.9 million.

Name of school/district: Island of Oahu School District
(3 schools)
Lunalilo Elementary School
(Grades 1-6)
Koko Head Elementary School
(Grades 1-6)
Roosevelt High School
(Grades 9-12)
School Commitment: 272,826 square feet

REBUILD IDAHO

Boise, Idaho
Action Partnership

Partnership Overview: The goal of the Rebuild Idaho partnership is to promote and support cost-effective conservation and the utilization of renewable resources by providing information, technical assistance, and limited financial support to their energy consumers, producers, and policy makers.

Through Rebuild America, they will develop community partnerships based on a common need for increased building efficiencies and reduced resources, which in turn will enable them to become more actively involved in facilitating energy and resource savings throughout the states commercial sector. To facilitate these initiatives, they are incorporating a Resource Conservation Manager, or RCM, for each community. The RCM's purpose is to track the energy use and waste production and identify processes to reduce each. The savings gained from these operations adjustments can be distributed between ongoing building maintenance, new equipment, or additional staff. Rebuild Idaho's Action Plan targets ten school buildings for energy savings retrofits over the next five years. Each year, two schools will be selected for a full audit, including DOE2 simulation, building envelope analysis, lighting audit, equipment monitoring, and data-logging. After completion of the building audit, recommendations for each school will be designed to meet target energy savings goals and incorporating life cycle costing analysis. For their first year project, Rebuild Idaho is planning to install gas boilers with heat pumps in Taylorview Junior High and electric and gas boilers in Skyline High School.

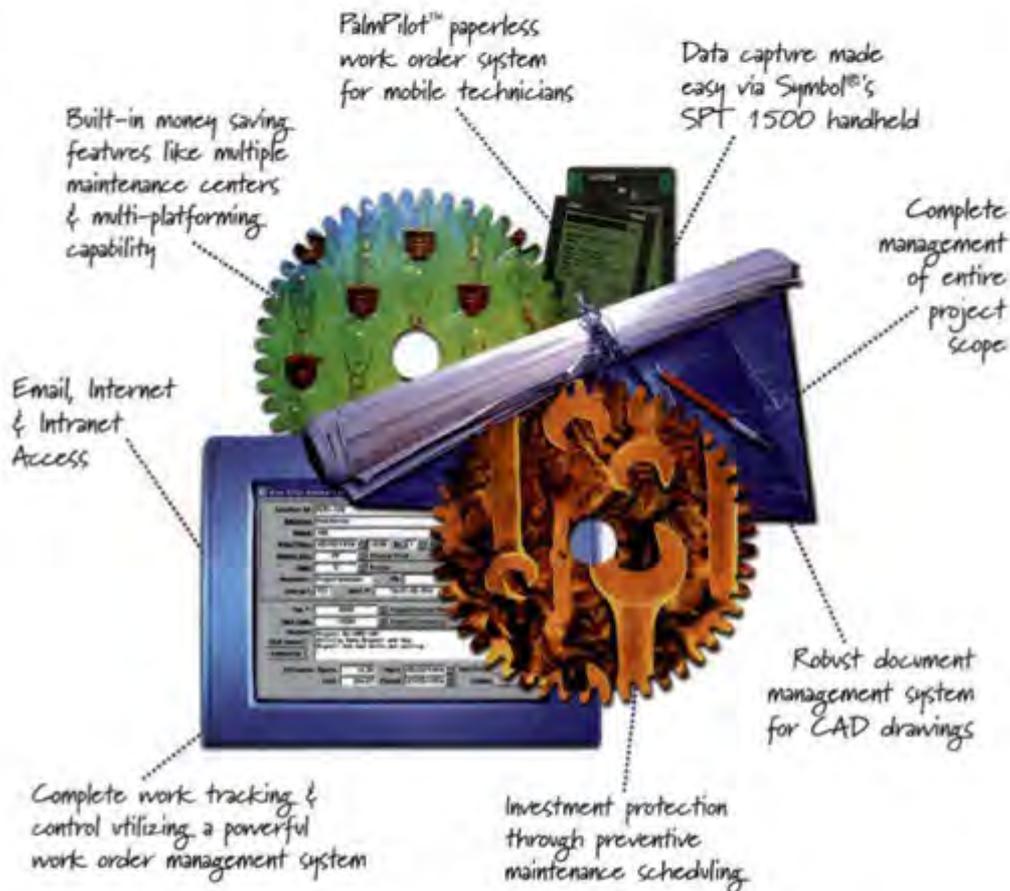
Name of Schools/district: Idaho Falls Schools District
(10 buildings)
Skyline High School
Idaho Falls High School
Eagle Rock Jr. High
Taylorview Jr. High
A.H. Bush Elementary
Dora Erickson Elementary
Edgemont Elementary
Emerson Elementary
Linden Park Elementary
Westside Elementary
School Commitment: 341,267 square feet (First Year Project)
825,343 total square feet

Conclusion

Rebuild America presents new opportunities for schools to repair and upgrade their facilities by using the energy equity that can be captured by improving energy efficiency. Energy efficiency can play an important role in providing high-quality learning environments, lowering operational costs, and maintaining the fiscal ability to respond to facility needs.

Rebuild America has grown to more than 200 community partnerships in 40 states, providing national expertise in energy efficiency and facility operations to address the needs of communities in upgrading their buildings. Improved quality and efficiency of facilities and operations will result in energy-smart schools that will provide comfortable and healthy environments into the 21st century for teachers to teach and children to learn. 📌

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UTILITIES METERING



AND MEASUREMENT

by Mohammad H. Qayoumi, Ph.D.

Organizations depend on measurement and analysis of performance. Measurements are driven from an institution's strategy and provide critical insights about core processes, outputs, and results. The type of data needed for performance measurement and improvement include customer service, operational efficiency, effectiveness, staff satisfaction, etc.

Measurement is a means and not an end. Measurement facilitates extracting larger meaning from data to support evaluation and decision-making at all levels of an organization. Data analysis can help determine both trends and root causes, making it an integral part of planning, reviewing, and

improving any campus operation. In short, a measurement system is an integral part of a decision support system.

Measurement in Higher Education

Public pressure for cost containment is increasing, and measurement has become an important issue as we are seeing more states beginning to migrate to outcome funding for higher education. The cost of attending college has become a major issue in the eyes of the public, lawmakers, and the press. Many policy makers are examining how the rising costs of college limit access to many sectors of the society. According to *USA Today*, "From 1977 to 1992 tuition rates at Harvard, the University of Chicago, Carleton, and Duke grew 4.6 percent faster than the annual rate of inflation." Although fee increases for public universities have not been as dramatic, the issue has still been the subject of scrutiny by the U.S. Congress, state legislatures, the press, and the public. According to a *Newsweek* survey of parents with children under the age of 4, when asked about their greatest fear in raising their sons and daughters, 52 percent of parents cited worry about the cost of education, 35 percent cited health care, and 22 percent cited the cost of day care.

The National Commission on the Cost of Higher Education, in its final report published in 1997, stated that colleges risk "an erosion of public trust" if their charges continue to esca-

Mo Qayoumi is vice chancellor for administrative services at the University of Missouri/Rolla, and the dean for the energy & utilities portion of APPA's Institute for Facilities Management. He can be reached at qayoumi@umr.edu. Qayoumi is the author of APPA's forthcoming book, The Manager's Metering Handbook, from which this article is taken. APPA gratefully acknowledges the generous contributions of the Electric Power Research Institute and the International Facility Management Association in the development of this publication.

late. Moreover, if colleges and universities do not behave responsibly and bring costs under control, others will do it for them. Finally, Dr. C. Peter Magrath, president of the National Association of State Universities and Land-Grant Colleges, in a letter to its members indicated that one of the most troubling challenges facing higher education today is "the college cost issue." He stated that "we must continue to work on controlling costs while aggressively working to address faculty and administrative productivity."

Responding to these pressures, some universities have begun to reduce tuition or to keep tuition flat for several years. Controlling energy costs can help balance the upward cost pressures in other areas where the task of cost control is even more challenging.

Universities and other research organizations are under a lot of pressure to increase their sponsored research activity. This is happening at a time when the government has significantly reduced appropriations in this area. For instance, the non-defense R&D (research and development) budget for 1995 was roughly \$34 billion. However, the appropriation was dropped to around \$28 billion for 1996 and has remained flat with no hope of any notable increase for the near future. The *Wall Street Journal* reports that during the past decade, major U.S. high-tech companies have also slashed their R&D expenditures. As universities are competing for fewer research dollars, they are being asked to forego part if not all of the research overhead costs namely the facilities energy and maintenance costs and administrative support. As illustrated by the new OMB (Office of Management and Budget) Rule 20, there has been a major move by the federal government funding agencies to move away from reimbursing all facilities costs and developing new rules and standard rates for facilities charge. This way, if a university has inefficient buildings, it will end up subsidizing a larger part of the research cost since it will not be able to receive full reimbursement for space costs.

A second potential cost pressures to universities comes from the technological breakthroughs in telecommunication. This has resulted in making distance education as a major topic of discussion for most universities. The creation of "virtual universities" in the cyberspace, the offering of college credits on the Internet, and the Western Governors' Initiative has fueled the discourse. Although distance education has been in use for a considerable number of years, its use was relatively limited. Operating and maintaining campus facilities cost roughly between 7 to 10 percent of the total university budget in addition to significant capital costs. The energy and utilities cost can be a significant amount of this. This implies that "virtual universities" would not be burdened with this cost, because they have a structural cost advantage when they are compared with traditional universities.

Electric Utility Deregulation Also Drives New Metering Needs

The advent of electric utility deregulation brings new challenges and opportunities for facilities managers of colleges,

universities, and other educational campus environments. Any owner of multiple buildings is a sizable market commercial customer to whom utilities are beginning to pay close attention. Also, acquiring electrical service in a deregulated environment will be different and will likely be more complex. In the current structure, electrical utilities are typically single vertical monopolies. In a deregulated environment, you will be interacting with two or three distinct entities: a generation company, a transmission company, and a distribution company.

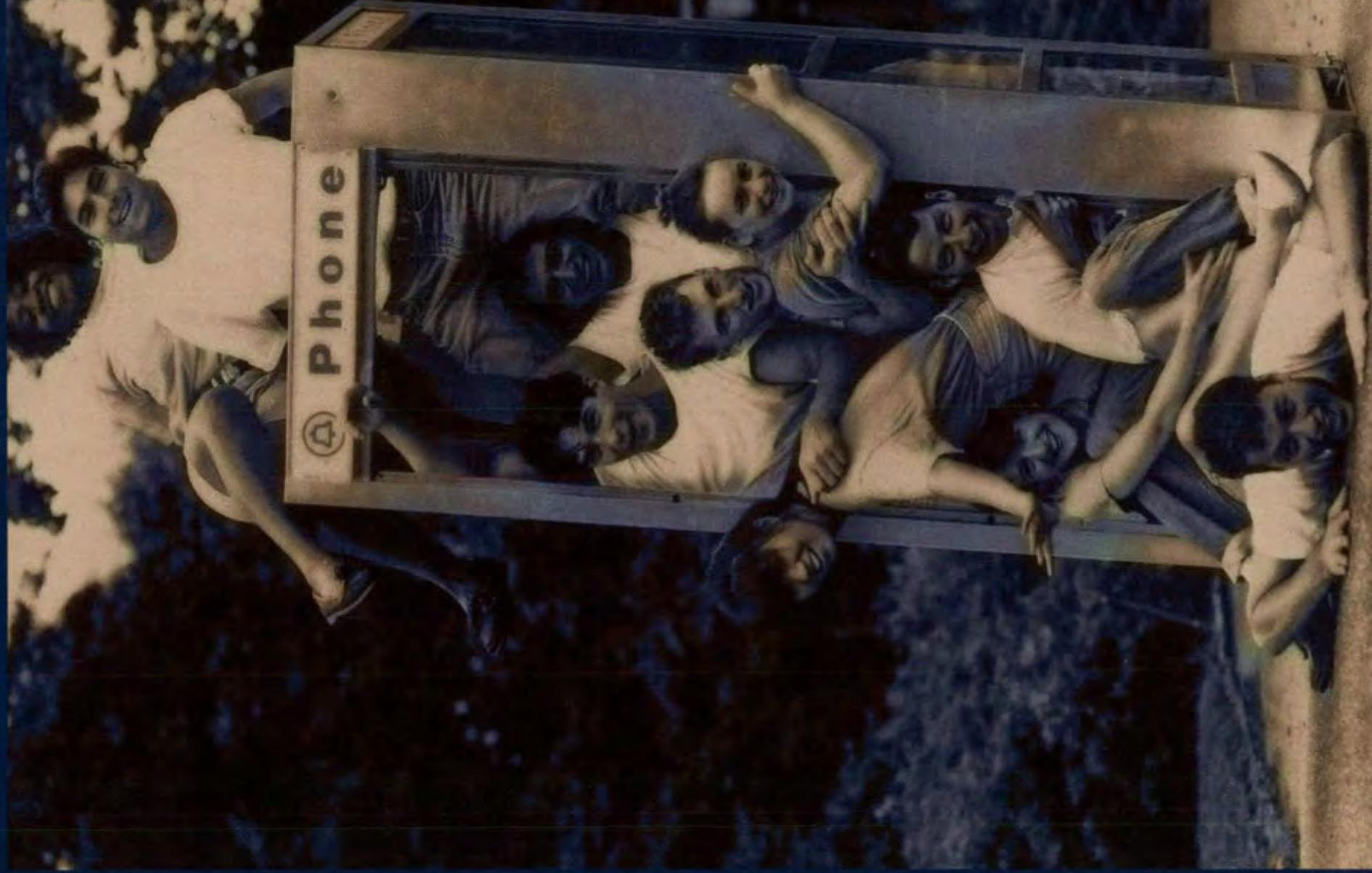
The 3,300 electric utilities in the United States are a \$250 billion industry that includes investor owned electric utilities (IOEU), public power agencies, cooperatives, and municipalities. Impending deregulation is going to fundamentally change the relationship of these utilities with their customers. It is important to understand that deregulation of electricity deals primarily with generation. This means that a facility or campus will still receive electricity through the distribution network of its local utility. Your relationship with your local utility is transformed in that you must choose to purchase power from them or use them as a conduit to receive electricity from another provider. Depending on individual state regulations, your utility may also be given the right to sell many new services, including metering.

Purchasing electricity in an open market environment requires an informed customer who is able to analyze market conditions and assess the needs of the institution so as to lower the overall cost of electricity. Deregulation can be viewed as a double-edged sword. Organizations who prepare adequately for deregulation will reap dividends. Those who are not prepared could end up paying much higher prices for electricity, creating more cost pressures on educational institutions.

One of the underlying reasons the price of electricity fluctuates over time is that it cannot be economically stored in any appreciable quantities. Generation and consumption of electricity have to match at every instant in time. However, the need for electricity changes daily and seasonally. For instance, the need for electricity is much higher at noon than at midnight at most campuses and is higher in the summer overall because of air conditioning loads. Capital cost is more than one third of the cost of electricity. When a generation unit is constructed, there is a strong financial motivation to have the unit operate continually (except for periodic maintenance shutdowns). On the other hand, if a unit operates only for a small portion of the day or the year, the cost of electricity from that unit will be much higher on a per-unit basis.

In order to reflect varying costs due to varying usages, utilities have instituted tariffs where the cost of electricity is higher during peak hours and peak seasons. Some utilities have tariffs where the cost of on-peak power is two to three times higher than off-peak power. In a deregulated environment, price differences between on-peak and off-peak may be

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even higher. For instance, in July 1998, due to the high summer temperatures, high power demand for air conditioning, and constrained capacity, electricity traded briskly at \$7.60 per kilowatt-hour to bulk power purchasers. By contrast, the typical 3.9 cents per kilowatt-hour at that time of year. Dramatic price fluctuations such as these are clearly more possible and could become a norm rather than the exception in a deregulated environment.

In order to prepare for a deregulated market, organizations with campuses or buildings need to spend more time and effort to learn how much electricity is used, at what time, and where. They must also learn whether it is possible to shift loads or change power demands without an appreciable negative impact on campus operations. Relevant and reliable consumption data is needed to determine load profiles. Consumption data is collected with metering. Unfortunately, most organizations do not have either adequate or well-maintained metering.

In many cases, there is only the main electric utility meter and no branch meters to know how much energy is used in different parts of the campus. Even if there are branch meters, these meters are often not properly sized. Moreover, lack of calibration and maintenance result in "meter drift," which means that the reading may not be reliable. Finally, even if a campus has properly sized and well-maintained meters, these units may all be electromechanical meters where data cannot be remotely read and processed for easily developing load profiles. In reality, the lack of a good metering system is the principal barrier that will prevent many organizations from taking advantage of utility cost reduction opportunities.

The importance of metering in a deregulated environment is illustrated well by recent events in Europe. In 1990, the United Kingdom began opening electric markets to retail competition. By the end of 1998, 23 million small commercial and residential consumers were able to choose their power supplier. Currently, the Electricity Pool of England and Wales prices electricity by the half-hour. This provides opportunities for power marketers to offer a variety of different on-peak and off-peak rates. Customers may "bundle" loads together to take advantage of special rates. However, customers must know their individual load profiles and the quantities of power needed each hour of the day. This information is communicated to energy suppliers daily for the following day.

Determining load profiles, identifying major energy users, and defining consumption patterns are the first steps in bringing energy costs under control. This is the prerequisite to uncover opportunities for savings. Submetering is the means to obtain data for trend analysis and determining consumption profiles of major load centers. The main reasons for having submetering are as follows:

1. To determine the cost of individual facilities objectively rather than by pro-rata allocation,

2. To account for energy costs by every department or college,
3. To monitor the efficiency of large equipment such as chillers, boilers, and compressors,
4. To provide valuable data for evaluating energy conservation projects,
5. To identify performance problems and guide preventive maintenance, and
6. To verify savings from energy conservation projects.

With reliable profiles for a campus' major loads, there are many opportunities for a campus of buildings to reduce the cost of electricity well in advance of deregulation. This may include modifying load shapes by changing the schedules of certain loads, equipment duty cycling, or installing thermal energy storage to reduce peak demand.

One of the more innovative techniques available in some regions of the United States is Real Time Pricing (RTP). Real Time Pricing tariffs have been offered by power providers in Australia, Canada, New Zealand, Norway, and United Kingdom for commercial and industrial customers for a number of years. More than 30 U.S. utilities—including Pacific Gas & Electric, Southern California Edison, Long Island Lighting, Duke Power, Georgia Power, and Baltimore Gas & Electric—have made RTP available to their customers. If campus or building energy use remains at status quo, neither the utility nor the customer realizes a benefit. However, if customers reduce energy consumption during high-energy use or peak periods, they may realize significant dollar savings.

State utility commissions are watching RTP offerings with great interest. Many commissioners believe this approach can have a positive affect on the successful implementation of retail wheeling. According to an article published in *EPRI Journal* (March/April 1997), the Marriott Marquis at the World Financial Center in New York City has been saving more than \$100,000 annually using RTP techniques without any negative impact on its operations.

Therefore, it is fair to say that metering and energy measurement will play a far more central role in operating facilities than they have done in the past. Before we begin to discuss various types of metering, their capabilities, and the technologies behind them, it is important to define the role of facility managers in the metering process and identify the purpose for installing meters at your specific campus.

Once the purpose of metering is agreed upon, a measurement plan can then be developed. The measurement plan should identify data to be collected, all locations for data monitoring, and frequency of data collection. Finally, a detailed data acquisition and analysis plan is needed.

Before proceeding to these more detailed plans, however, it might be of use to briefly discuss the role of the facility manager and some basic concepts that can be used for measuring energy. This will help you develop the conceptual framework needed to articulate the need for metering and how this can

be done in alignment with your organizational goals and objectives.

Management Aspects of Measurement

Lord Kelvin over a century ago had commented: "When you can measure what you are speaking about and express it in numbers, you know something about it; and when you cannot measure it, you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind. It may be the beginning of knowledge, but you are scarcely in your thought advanced to the stage of a science."

Measurement serves as a self-assessment tool to determine where an organization is, where it wants to go, and how far along they are in attaining their goals. It is a continuous improvement vehicle to reduce process variation, to identify problems and trends, to determine process efficiency and effectiveness, or to assess opportunities for process improvement. In other words, measurement is an integral part of a decision support system. Measurement provides insights that are not obvious and provides the infrastructure for fact-based decisions.

Although there is a general agreement that measurement is an important factor for continuous organizational improvement, it is equally critical to underline the motivation for it. Measurement can be viewed both as a language of progress and as a means to determine steady advancement toward goals and objectives. Moreover, it can serve as an effective communication tool within an organization. Finally, measurement influences performance and can be a strong behavioral tool. In the words of Eli Goldratt, "Tell me how I am going to be measured, and I will tell you how I am going to behave."

Therefore, as we begin to measure certain parameters, it is essential to know what subtle messages are communicated as well as possible unintended consequences of the measuring. Individuals might concentrate on measures to maximize perceived performance in one direction even at the cost of suboptimizing the overall system. The challenge is to develop a set of measures that will truly reflect the current conditions, safeguards against suboptimization, and yet serve as an incentive for continuous improvement.

Attributes of Good Metrics and Measurement Systems

A good set of measurements must reflect both customers' needs and organizational strategies or objectives. One commonly deployed framework for a good measurement system is the "balanced scorecard" developed by Robert S. Kaplan and David P. Norton. The balanced scorecard consists of the following four perspectives:

- **Financial Perspective:** *If we succeed, how will we look to our stakeholders?*
- **Customer Perspective:** *To achieve our vision, how must we look to our customers?*
- **Internal Perspective:** *To satisfy our customers, what management process must we excel at?*
- **Organizational Learning:** *To achieve our vision, how must our organization learn and improve?*

Each perspective should be understandable, interpreted uniformly across the organization, and provide an agreed-upon basis for decisions. Measurement should demonstrate

organizational effectiveness in addressing each perspective. For instance, determining what parameters need to be measured, i.e., energy consumption, cost, reliability, power quality, etc., should be driven by the organization's strategy and priorities in the way it meets customers' needs. Moreover, the organization's rewards and recognition structure must be aligned to these outcomes. Measurements need to provide information across time to show trends, not merely present snapshots. Finally, and most

importantly, measurement should develop collaboration in order to facilitate acceptance and buy-in across the organization.

Measurement Process

Measurement process is the act of comparing an unknown quantity against a predefined standard. This implies that every measurement is an approximation. Normally a measurement will contain both a magnitude and a unit (e.g., 3 kWh). A measurement can be direct or indirect. Simple measurements are done directly, like weighing an object to determine pounds or kilograms. More complicated parameters, such as energy, are measured indirectly. The accuracy of a measurement relates to how often a measure can consistently be reproduced. In other words, if the dispersion among repeated measures is small, measurement precision is high regardless of how close the readings are to the actual value.

There is no single best process for developing a measurement system. However, it is important to measure outputs and outcomes rather than processes. To illustrate this point, let's assume that you are interested in the reliability of an electrical system. First, you would agree that preventive maintenance will improve system reliability. In this example, collecting the number of hours of preventive maintenance is measuring the process, while collecting the number and length of failure for a particular time frame is measuring the outcome. In measuring reliability, the outcome measure is the

Measurement as an Energy Communication Tool

- Check utility rates
- Identify possible operations & maintenance problems

Measurement as an Energy Planning Tool

- Allocate energy costs accurately across buildings and systems
- Proper sizing of new equipment or meters

Measurement as a Behavioral Modification Tool

- Energy conservation
- Improved system efficiency
- Load shedding

relevant one, while the process measure can only prove useful if you are trying to find the correlation between the two.

A general framework for developing a measurement process should include the following major steps.

1. **Identify Tasks:** Identifying what is important to be measured. This can be determined by looking at the mission of the organization, identifying who customers are, and assessing what they value.
2. **Establish Goals and Metrics:** Determine the core activities and the critical tasks that are important to customers to ensure their satisfaction. This may include defining the metrics, standards, and goals that need to be met. Goals should be attainable, economical, and consistent to organizational objectives. Translate these into data needs. It is important to define data elements clearly and to communicate them to everyone who will be involved in data collection, verification, analysis, and interpretation.
3. **Identify Responsible Parties:** Identify the individuals or entities that will need to collect the data. Determine the role of the organization, the utility, and third party if any other entity is involved.
4. **Data Collection:** Collect the data and devise ways to reduce, transfer, and store it. Make sure that the data collected is free of statistical and personal bias and is collected based on defined procedures. Adequate steps to verify the validity of data is required. This may involve reading data elements more than once, checking the data against default values, or examining if the data falls within the expected range.
5. **Data Analysis:** Analyze the data and transform it into usable information.
6. **Comparison:** Compare the data with goals or previously established benchmarks to identify opportunities for improvement.
7. **Implement Changes:** Evaluate whether you need to modify existing goals or establish new goals.
8. **Define New Goals:** As the needs or priorities of an organization change, it is important that new goals are added and/or a number of existing goals are modified for future data collection.



Conclusion

Today most universities possess limited metering to adequately measure the overall performance of their facilities. Many facilities commonly have procurement metering for purchased utilities such as natural gas, water, and electricity. In addition, there may be primary meters for steam, hot water,

and chilled generation and possibly a number of meters to determine the consumption of the auxiliary facilities. These meters are usually read manually once a month for billing purposes, and many use the data for budget request and not part of any decision support system.

In the current situation and except for only a few institutions, many do not have adequate metering to successfully face the complexities of a deregulated environment or take advantages of the opportunities to significantly reduce energy costs. Moreover, if organizations do not invest in adequate metering to get prepared for deregulation, they may experience significant cost increases.

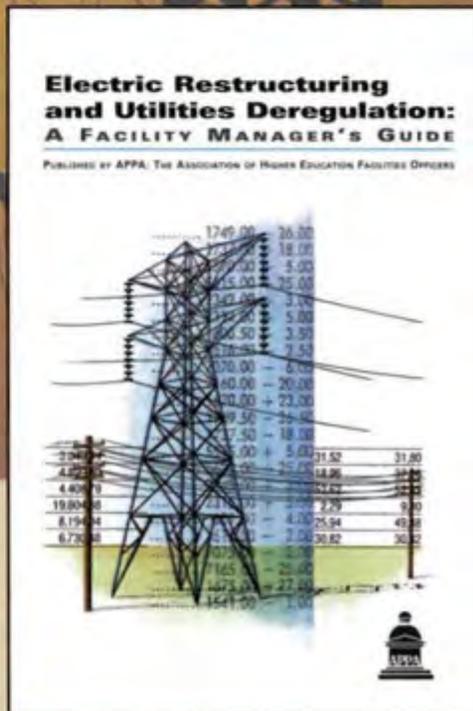
Although the prospects of funding such projects vary significantly from one institution to another, overall prospect to receive funding for these projects are bleak. A number of institutions have successfully combined campus-wide metering with utility or energy conservation projects. Others have worked with ESCOs to fund such projects and used energy savings as an incentive. A third approach may be working with the local utilities since some of them offer such services to their large customers to assure customer loyalty.

It is fair to say that deregulation is fundamentally changing the relationship between electric utilities and their customers. However, it should be kept in mind that only generation has been deregulated. No matter where you purchase the power from, it is still delivered through the distribution system of the local utility. This creates a different dynamic and opportunities for cooperation and partnership between the local utility and large customers in a more even playing field. One of the potential areas that the two could work may be in the metering area because of the expertise that utilities have in this area.

Even states and municipalities that will not be directly affected by deregulation in the next few years may not be immune from the impacts of deregulation from neighboring states. This means that in a relatively short period of time, every consumer of electricity will be affected. In order to maintain their customer base, many utilities are beginning to work with large customers on mutually beneficial projects such as providing technical assistance, seeking new tariffs that will be advantageous to both parties, or guaranteeing a certain level of power quality.

Despite the challenges for facilities and energy officers, there are a number of new opportunities for acquiring adequate metering. In the current, ever-changing environment, a "wait and see" attitude could easily result in "wait and lose." Therefore, the need for metering cannot be overemphasized. ▲

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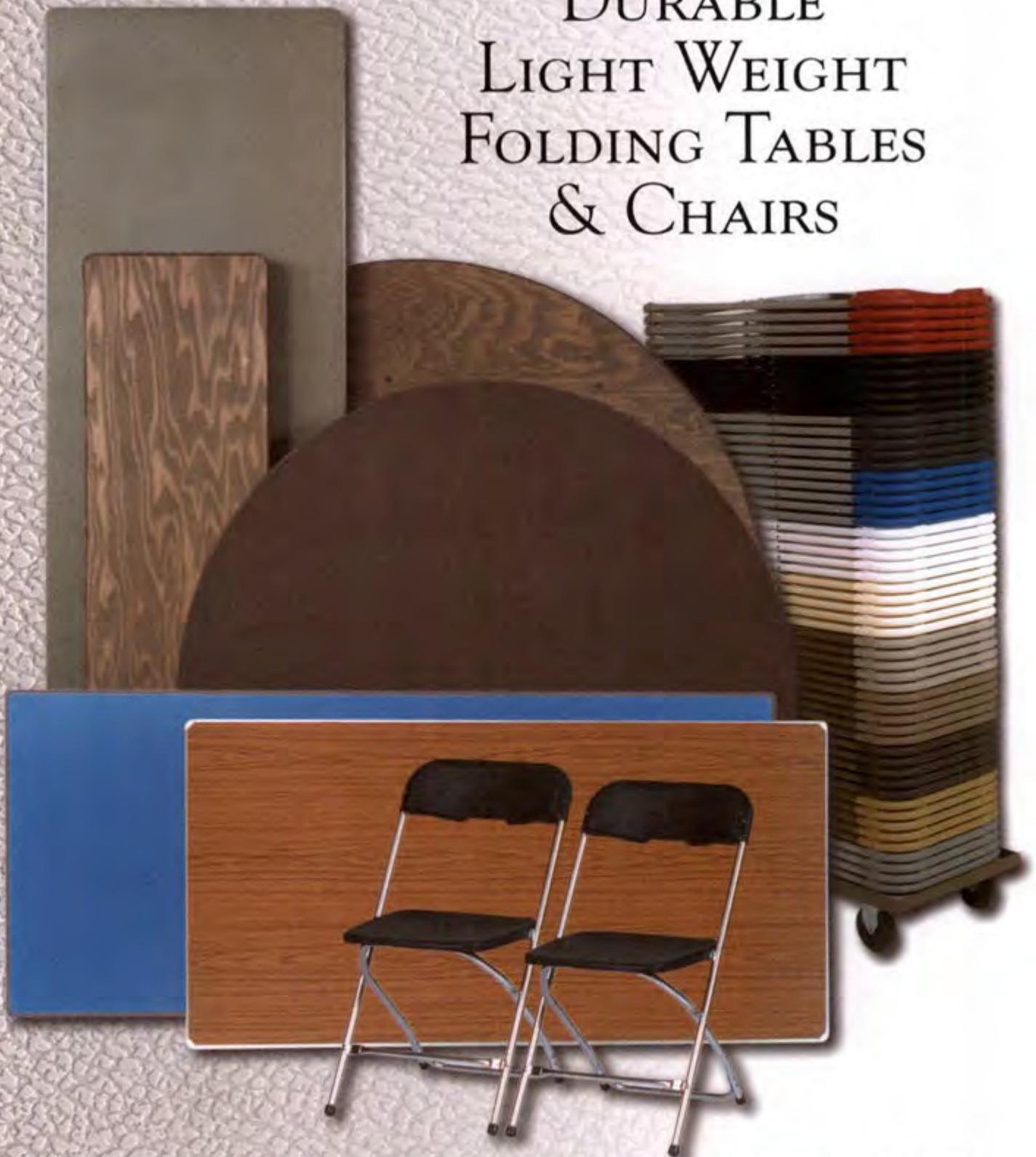
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by Stratton C. Schaeffer, P.E.

Electric

Don't Get The Cart Before The Horse

Deregulation:



Although electric deregulation is capturing the lion's share of ink these days, utility deregulation is hardly a new concept. Back in 1985 I attended an APPA natural gas deregulation conference in Washington, D.C. The featured lecturer was Dorsey D. Jacobs, then-director of physical plant at West Virginia University (WVU) and a past APPA President. Those of you who had the pleasure of associating with Dorsey during his WVU days remember what a creative, intelligent gentleman he was. Dorsey pioneered direct purchase natural gas contracts for WVU and shared his advice on potential savings with other APPA members and consultants like myself. He also warned us of the land mines associated with direct purchase negotiations. Dorsey is happily retired in Morgantown, but much of his advice given 15 years ago is still relevant and appears throughout this article.

Today it's electric deregulation that appears on our radar screen. Different degrees of activity exist in states throughout the country (see Figure 1). Electric deregulation has become our latest challenge in getting the best bang for our campus energy buck.

Initially, expectations for electric energy savings were touted as being at least 20 percent for all campuses. Many business managers, chancellors, and trustees are still laboring under this optimistic impression. On this point, I've got bad news and good news. Let's get the bad news out of the way first. A Con-

gressional bipartisan effort, encouraged by trade association lobbying efforts, prompted many state and federal regulatory agencies to seriously examine the issue and remove a portion of the barriers to electric deregulation. Likewise, the electric utility industry responded with a vigorous lobbying effort that, in varying degrees, resulted in generous settlements of stranded costs. Therefore, competitive negotiations with suppliers of electricity have had potential savings whittled down from initial optimistic scenarios.

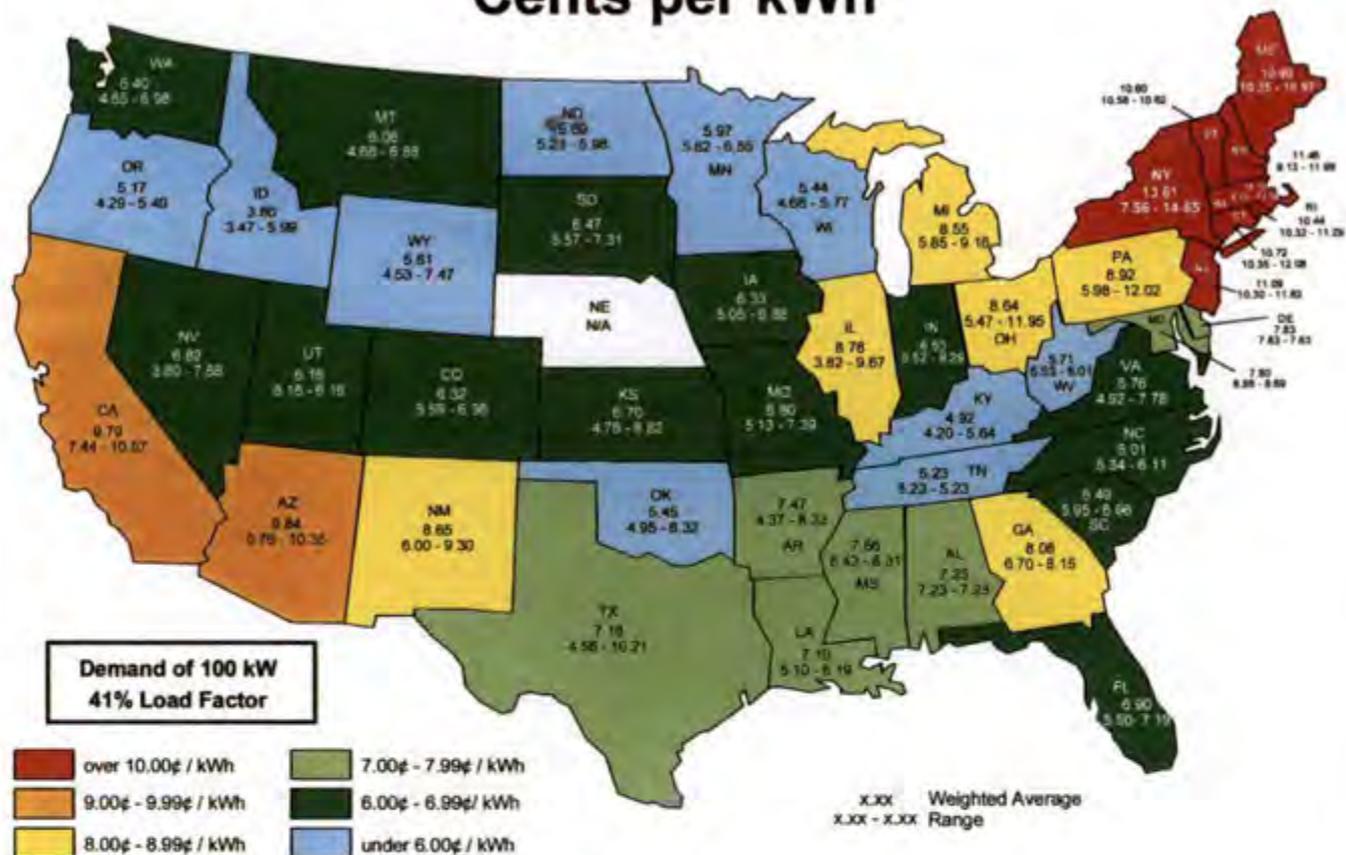
There were other obstacles to maximum savings. Politicians had for years avoided unpopular tax increases to fund a number of public programs by having a surcharge placed on electric bills. This could be seen by some as pork barrel politics as a method to fund pet projects with pass-through energy charges. These social programs, along with transmission, distribution, and other regulated charges, will continue to be tacked on to kilowatt hours you have successfully negotiated at lower than traditional cost.

Now let's get to the good news. There's still potential savings for everyone as a result of electric deregulation. A more realistic potential savings of 3 to 15 percent appears more likely for APPA members. However, to take a page out of Dorsey Jacobs' book, we're going to have to do our homework and customize our plan of action, including contract negotiations, for future campus electric energy supply.

Before we consider a future energy strategy, we must first answer in the affirmative the following question. Do we really know our campus electric load profile on an hourly, daily, and seasonal basis? If we operate a central boiler plant, we add a

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second dimension to this question—the thermal profile. These profiles are essential to negotiate the best electric contract or evaluate other non-traditional methods of electric supply. Without the profile, it is truly putting the cart before the horse. Remember, it takes up to a year to gather this information after monitoring equipment is installed, and the clock is ticking.

Energy monitoring need not be an expensive project. Nearly a decade ago Barry Hackenburg, director of maintenance at Lycoming College in Pennsylvania, recognized the value of electric profile monitoring. Barry wanted monitoring as a peak shaving tool before electric deregulation was an issue. With a shoestring budget, Barry and his maintenance staff installed simple current transformers on each campus building and electronically tied them together in a central energy management system. The results of the Lycoming College project were presented at the 1994 Eastern Region Conference of APPA. Barry feels he paid for the monitoring project in electric demand charge savings the first year the system went operational. Today, as a bonus, Lycoming College

is better positioned to negotiate a contract as electric deregulation becomes a reality in Pennsylvania.

Once we have campus energy monitoring operational, we can consider all three of the future energy strategies available:

- Purchase off campus electric energy.
- Modify power plant technology.
- Third party ownership of the power plant.

Purchase Off-Campus Electric Energy

The majority of APPA members will probably consider the technology and remaining life of their power plants adequate and opt for the best negotiated contract from their local electric utility or from a large selection of other utilities and independent power producers. Several factors should be considered before we automatically select this strategy.

First, have you properly analyzed your power plant in the past five years? Is the technology antiquated and what is the remaining useful life of the plant? If we're satisfied with the technology and condition of the plant, we proceed to the second stage of this self analysis. Do you have the in-house

expertise and time to investigate the best options available in the marketplace today? Not everyone is a Dorsey Jacobs. Maybe the best plan of action is to retain the services of a professional to deflect the multitude of direct and third party suppliers who will be bombarding you as deregulation picks up speed. If you're not satisfied with your existing power plant technology or energy resources, you may want to consider other energy purchase strategies.

Modify Power Plant Technology

During the past five years a number of APPA members have evaluated their campus power plants and decided, after a detailed comparative analysis, to modify the plant technology. The modifications also affected or changed their traditional methods of providing electric and thermal energy for campus needs.

Two technologies that have been successfully utilized in recent campus power plant renovations to reduce energy costs are, combined cycle turbines and fluidized bed combustors. The cogeneration integrated with both technologies is impacted by electric deregulation. Ongoing issues such as stranded cost and time-of-day rate structures (buying and selling) can significantly change calculated rate of return on investment (RRI). Fluidized bed combustors were installed at a number of campuses to take advantage of lower priced fuel and reduce emissions. Combined cycle turbines are growing in popularity because this technology requires lower capital requirements and utilizes relatively low cost natural gas made possible, in part, by deregulation of the natural gas industry. Neither technology is a panacea for environmental concerns or tight operating budgets. Depending on your energy profiles they may, in consort with electric deregulation, be the best opportunity for your long-range campus energy strategy.

There's a third energy strategy already being utilized by some of our industrial friends and neighbors. Farming out the power plant.

Third Party Ownership

This is the era of reorganization and downsizing in corporate America. Nothing, including the power plant, is considered sacrosanct. A question being asked with growing frequency in the board room is whether the power plant is an asset or liability. There is no universal answer.

At a recent electric deregulation conference in Washington, two Fortune 500 companies shared the speaker's podium. They had opposing views on power plant ownership. It became obvious during the debate that what these folks were really saying was the merits of ownership is site specific based

on variables that included existing plant conditions, state regulatory policies, and regional energy resources. Corporation A decided to concentrate on producing widgets. The uncertainty of future energy prices and environmental regulations, plus their skilled operator problems and antiquated power plant technology, led management to the decision to farm out their power plant to a third party. What they wanted was a long-term contract that included escalation factors for electrical and thermal requirements. In turn, the corporation gave a long-term lease for a designated power plant site inside the fence. This opened the door to better financing options by the third party expert who, with their negotiating expertise and design/operate skill, could max out potential RRI. A win-win situation for both parties.

Corporation B countered with the statement, "We can do that." This Fortune 500 company decided they already possessed the in-house expertise to complete their own project. During the past 30 years I've witnessed a number of industrial corporations and educational institutions who also said, "We can do that." Many case histories resulted in successful power plant projects. Unfortunately, I've also witnessed a number of less-than-happy campers who underestimated the complexity of the effort. An objective self-analysis is essential. Sorry gang, there's no such thing as one size fits all. Third party ownership will also require a site-specific analysis and, as was the case with the first two energy strategies, knowledge of your campus energy profiles is essential before considering this strategy.

Summary

Electric deregulation is proceeding on a state-by-state basis throughout the country with varying degrees of success. Stranded cost settlements in consort with regulated fixed costs, have whittled down potential savings; however, most if not all APPA members should realize electric energy savings in future contract negotiations. The degree of savings will be site specific and depend, in part, on the knowledge and strategy used by the negotiating team.

Other energy strategies available include renovating the power plant to incorporate state of the art cogeneration or contracting with a third party specialist to provide energy on site.

All three strategies require a preliminary verification of the campus electric profile. If a central power plant is involved, or being considered, the thermal profile is also needed. Without these profiles, establishing a long-term campus energy strategy is placing the cart before the horse. 📌



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By James E. Christenson, P.E.

In 1991, the University of Michigan followed the advice of its one-time poet-in-residence, Robert Frost, and started down the road “less traveled by.” At that time, at least, it was not a road overcrowded with institutions of higher education. Supported by the university’s executive officers, members of the university community began to study how they could apply the quality principles advanced by W. Edwards Deming and other quality gurus to this academic setting.

A quality-focused mission and vision were developed for the university and presented to the Regents. Members of the university met as a design team for almost a year to create a quality management approach tailored to the University of Michigan. In a short time, three activities (Quality Improvement Teams, Planning for Excellence, and Quality in Daily Activities)—undergirded by the fundamental principle of

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THE M-QUALITY JOURNEY

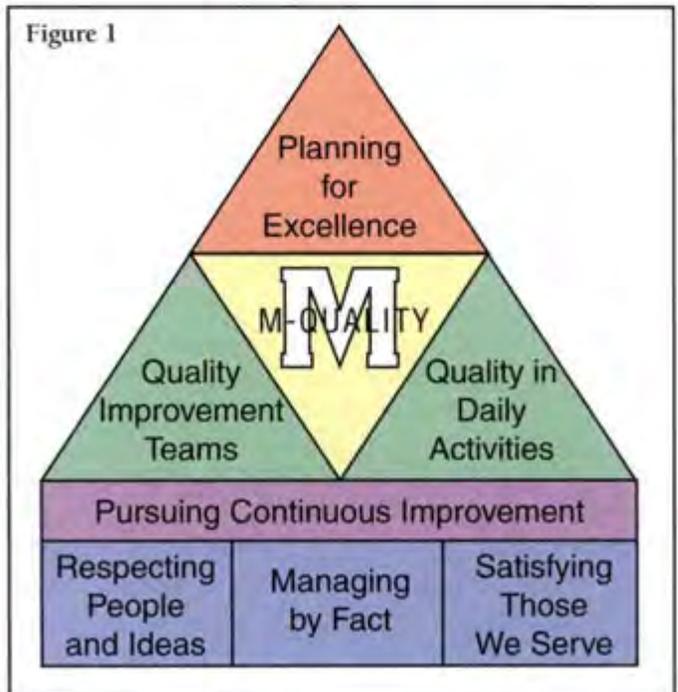
Pursuing Continuous Improvement—and three supporting principles (Respecting People and Ideas, Managing by Fact, Satisfying Those we Serve) were “Michiganized” into a logo (Figure 1). M-Quality was born.

Quality 101 and 102 seminars were widely attended. A Continuous Improvement Council, involving the executive vice presidents, vice presidents, deans, and a few of us on the fringes of the academy met periodically to learn and share ideas. Hundreds of people were trained as team leaders and many as facilitators of teams. There was excitement in the air—especially in the parts of the organization where widespread information sharing and consultative decision-making were new concepts. Many members of the university community suddenly felt freed to express their thoughts on how things could be improved.

A Parting of the Ways

Now, nearly eight years later, there is little talk of M-Quality. In part, that occurred because most of the academic world, after tasting it, rejected it. Especially, they rejected the notion of “customers”—even more, the student as customer. The later

Figure 1



turnover of eight of nine executive officers made it possible for them to erase the memory of M-Quality.

In some enclaves of the non-academic world, however, M-Quality is still honored and its principles are being used to varying degrees. In one of these enclaves, a group of people decided to continue to use M-Quality to deliberately change the work culture to one adapted to the 21st century. That group consisted of the more than 1,100 people in the Plant Operations Division—the operating departments of Maintenance Services, Utilities, Building Services, Grounds and Waste Management Services, Parking Services, Transportation Services, and the supporting administrative offices of Plant Administrative Services and Plant Human Resources.

Plant Operations started its own journey by converting the group of department and office heads, director, and division executive secretary (ten people) into the Plant Operations Lead Team. Besides serving as the "Board of Directors" for the Plant Operations enterprise with its \$150 million in annual revenues, the Lead Team developed mission, vision, and guiding principle statements; it approved or chartered unit, cross-unit, task, and departmental lead teams and considered interim and final reports of teams dealing with key issues.

Briefings and focus group sessions were held as the mission and vision were rolled out, attempting to get buy-in from the entire membership of the Division. Several members of the Division became certified to train university staff in the three-day course in Covey's Seven Habits of Highly Effective People. All managers and supervisors were required to enroll in these seminars. The Seven Habits seminars were then made available to all members of the Division, and nearly 800 have attended. For some, this training was life-changing. And for the rest, it at least provided a common language and some common approaches to issues.

The Trail Fades

In the early stages, we naively thought that if everyone was equipped with the mission (purpose of the organization), vision (direction), and guiding principles (how we get there), everyone would find their way to the promised land of perfect customer service by a well-tuned, responsive organization. Actually, we probably didn't think that. We didn't even hope that. We just got too busy doing other things to notice the opportunities to build on the initial progress. Meanwhile, people were wandering, trying to figure out how to apply what they had learned to their daily work.

Some parts of the organization made dramatic transformations, most notably the Building Services Department under the leadership of Nathan Norman. A dozen or more teams

were working on problems, decisions, or plans in any week. The teams planned events, evaluated products, and, eventually, some work teams became nearly independent. Ten self-directed work teams are performing great customer service today, and more are being trained.

The people in the Utilities Department felt they were already self-directed, but for quite a different reason—the extensive training for independent action in case of a variety of emergency scenarios. The Maintenance Services Department had the most difficulty with the concept, even though the Director of Maintenance Services had been an active member of the original M-Quality design team. It seems that the Trades portion of the Department, especially, was resistant to moving from a hierarchical to an empowered culture. That has recently begun to change under the leadership of Rich Robben. Other departments and offices were scattered along the spectrum of degree of change.

Additional Routes

Meanwhile, faced with a future planned change of facilities software, the Plant Operations Lead Team decided it was time for a basic look at our business processes. A consultant was retained to lead us through a classic Business Process Reengineering (BPR) adventure. It was a heavy commitment, but it went well.

As the director of plant operations, I preceded the 20-week process by providing assurances of new positions for those displaced by the streamlined processes that they would develop, with retraining as necessary. At this point, we decided that our version of M-Quality should encompass three basic components: the original M-Quality concepts, BPR, and Seven Habits.

An additional incentive for Plant Operations' commitment to high-quality customer service was the decision by the university in 1993 to develop a form of re-

responsibility centered management (RCM) system, which we have since called Value Centered Management. This would have put facilities money in the hands of more than 50 Responsibility Centers that would *initially* be required to buy services from existing facilities organizations.

An uncertain future beyond the initial year or so provided inspiration to do what we had said we should do anyway: exceed our customers' reasonable expectations. We decided the only way this could happen was to push the cultural change further to be sure that the majority of people on the front line felt comfortable making decisions that would serve the customers well, without having to refer every significant decision to their supervisor.



Boundaries

The intended outgrowth of this cultural change was an empowered, more self-directed workforce. But, again, we found that we were lacking some other important tools. Empowerment doesn't work without well-understood boundaries. People need to be informed of budgetary considerations, intended relations with customers, and some minimum policy guidelines. Without such boundaries, people are afraid to take the risks necessary to provide outstanding services on the spot, because they never know when they've crossed the line.

So we needed some more training, both education and skills. Supervisors were formally instructed in a two-day course in empowerment, including the application of boundaries. At their request, the entire non-supervisory workforce was given a four-hour course in empowerment, so they would know what to expect. These were the first courses that were taught under the new umbrella of the "Plant Academy."

Learning Along the Way

The term Plant Academy was coined in 1995 by Doug Fasing, our manager of grounds and waste management. He became the first "dean" of the Plant Academy. Working with the university's Human Resources Development (HRD) staff, a supervisory development curriculum was created that was to specifically train supervisors in their new roles in an empowered environment. Identifying needed courses, as it turned out, was easier than developing the syllabi. We needed professional help. Doug Fasing reminded us that he had a day job; being a dean was time-consuming. We raided HRD and hired Dr. Janet (JB) Bardouille as the full-time Dean of the Plant Academy. One of her first tasks was to build a bridge over a gap in the Plant Operations Lead Team's skills, that of strategic planning. We had decided that, to properly fulfill our task of identifying logical boundaries, we needed to go further in what we had started with mission, vision, and guiding principles. These should serve as the foundation for the strategies, goals, objectives, and tactics of each department.

A system to relate the various structures to the foundation was missing. JB spent much of a year providing intensive seminars, augmented by individual consulting, to guide the Lead Team and, then, each department and office through the process of creating an appropriate strategic plan that would really be applied and serve meaningfully at the department and shop level. At that level, the strategic plan then provided both the necessary boundaries and the goals needed to reach the department's vision.

As we considered the dilemma of the typical front-line worker, one more tool seemed important. We had said that we intend that these people should make decisions within boundaries without reference to their supervisor or anyone else. For some, decision-making comes as second nature. But not for most. So a course in situation appraisal, problem solving, decision-making, and potential problem/opportunity analysis was set up within the Plant Academy.

Our current view is that to stay competitive, we must be a "learning organization." The Plant Academy is our small-scale version of the corporate university, with some similarities to Motorola University and Dana University. We currently are negotiating with Washtenaw Community College on the subject of granting college credit for many of the courses taught in the Plant Academy.

The step that we also see as necessary at the Lead Team level is to engage in scenario planning (see Bill Daigneau's article, "The Future of Facilities Management," in the September/October 1997 issue of *Facilities Manager*). Higher education is on the brink of major upheaval due to many factors, but most importantly by the creative explosion of technology-based learning and by the constraints in resources.

It is impossible to determine where this will lead. But it is possible to create scenarios and to develop an action plan based on one or more of the most probable of those scenarios. In turn, analysis of the probable effects of these scenarios should cause each department to revisit their strategic plans and the goals that flow from these plans.

It is likely that, with more concentrated planning, the process of developing a customer-focused organization full of self-directed individuals could have been executed in less than seven years (in fact, of course, it will never be satisfactorily completed). New segments of this journey sometimes belatedly became apparent to many at once, as the deficiency cried out for attention or the obstacle stopped us cold. Like the attack on Pearl Harbor, this may have actually improved acceptance of the need to take the next step. The journey to quality service has been, much as Robert Quinn describes it in his book *Deep Change*, a case of building the bridge as we walked on it. That's not the neatest way to transform an organization. But change comes so fast today that it is often a practical way. One thing is worse—not recognizing that the world is changing. At the University of Michigan, we have, at least, recognized that.

Conclusion

We started with M-Quality. M-Quality in Plant Operations now is the tent within which we house the techniques and philosophies of quality service, the Seven Habits of Highly Effective People, business process reengineering, empowerment/self-direction, problem solving/decision analysis, scenario planning, and applied strategic planning.

When we look back at these years of development, though, we see that each of these techniques or philosophies are only better tools to use in applying one or more of the principles or activities of M-Quality. These tools of our expanded version of M-Quality help us to deal with today's world. But we all recognize that tools grow obsolete quickly. So, as our work world changes, our tools for dealing with it must be constantly updated. The challenge continues for all of us. 📌



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My Australian Adventure

by Margaret P. Kinnaman

When identified as APPA's President-Elect in April 1998, little did I know the incredible adventure that awaited me. My first official duty was to represent APPA at the Australasian Regional meeting, to be held in Darwin, Northern Territory of Australia. I initiated the coordination for the trip by establishing communication with the Australasian President, Brian Fenn.

Brian briefed me regarding the upcoming meeting, where it was to be held, my role, and then hooked me up with Pam Esdaile of the University of Sydney who would be my contact for the visit.

This was the first of a great deal of e-mail communications that kept me in close contact with our Australian mates down under. They certainly tested my ability to effectively utilize



University of Sydney

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evolving technology. Thanks to my very adept automation staff and Brian's encouragement, we were able to respond to online requests for pictures, biographies, presentation papers, overheads, and even book some hotel reservations.

My first challenge was to prepare a draft paper for presentation at one of the plenary sessions at the AAPP meeting. The plenary session is one in which the entire group assembles,

much like our keynote addresses. There are no other tracks or strands to choose from. In other words, your presentation is the only game in town.

Now I had to choose a topic. If the choice had been mine, I would have chosen something dealing with leadership, communication or teamwork. Brian Fenn had something else in mind. His suggestion was a topic that I had never really thought a great deal about—the impact of evolving technology on higher education and facilities management. It was not exactly a topic for which I felt qualified to address, but certainly one that piqued my interest. I now had my work cut out for me. It was the end of June, the APPA annual meeting

was the end of July, and my departure date for Australia was the third week in August.

During the APPA annual meeting in San Jose, I presented Brian with a 15-page draft for his review and waited eagerly for the results. Much to my surprise, he was delighted with everything except my feeble attempts at humor. I referred to Crocodile Dundee as the Australian role model and was informed by Brian that no respectable Australian would agree. It was back to the drawing board for me.

Finally the day of departure, August 22nd, arrived. From sea to shining sea is how I can sum up my 2½ week visit to Australia and tours of eight of its 38 universities. The adventure started with a 24-hour travel experience whose first leg took my husband John and I from our home in Columbia, Maryland to Los Angeles and then onto a 14-hour flight to Sydney, Australia. I knew it would be quite a trip when we sat down on the Quantas flight and the flight attendants told us that we would be served three meals and watch three movies.

I started to squirm in my seat realizing that this would be a very long trip made even longer by my seat location, a middle seat of three across. A computerized flight plan was before us the entire trip, and although I'm sure it was intended to keep us informed of our flight progress, it instead proved to be a point of distress for me. After the first movie I looked up and couldn't believe how little progress that darn plane had been made toward our final destination. I have made the trip to Europe many times in the past with little impact, but seven hours is much different than 19 hours. Our journey took us across the International Date Line, the equator, and a 15-hour time difference.

We finally made it to Sydney around 10:00 p.m. Sitting in our hotel room we had an unobstructed view of the Sydney Opera House. What a sight! We got to bed around midnight and were up bright and early, feeling quite chipper. This was our free day, so we set out on foot to explore a bit of the city. From the former prisons on the waterfront at the Rocks, to the Opera House, to the Observation Needle, Sydney has something for everyone. Its appeal is much enhanced by the presence of water, water everywhere, making ferry travel the transportation of choice for many folks. As with all big cities, traffic is somewhat of a nightmare, especially for tourists from the States. Australians drive on the left side of the road. Even stepping off a curb requires a clear head and some concentration.

We were having the time of our lives exploring the city until early afternoon, when the first indication hit that we had

just taken a very long trip. Suddenly all of my body parts became leaden and I really didn't know if I could make my way back to the hotel. We turned in early that night, 6:00 p.m., and woke up early, around 3:30 a.m. This went on for another day until our bodies were acclimated to the change in time.

Bright and early the next morning, Pam Esdaile and John Simmons of the University of Sydney picked us up from the hotel. They took us for a quick tour around Sydney to help us get the lay of the land. It was obvious that everything in this city is orientated to the beautiful harbor, and real estate with a glimpse of the water is much sought after. Our first stop was the Arts Department of the University of Sydney, located off campus in a recently renovated mental hospital. The site was really quite lovely with beautiful stone buildings, situated high on a hill overlooking the harbor. If this venue doesn't provide inspiration for art, I don't know what would. Next we swung back through the city and visited the University of Sydney proper. What an impressive campus. The University

of Sydney, is Australia's first university established in 1850. Today it is one of the largest in Australia, with traditions of innovation and excellence. Eleven locations throughout Sydney and New South Wales make up the University System that supports a student enrollment of 35,147. The university has recently allocated \$500 million to its Capital Management Plan for 1995-2004, a project to restore and preserve the university's historic buildings, grounds and facilities. This project recognizes the university's unique

heritage and the need to plan for the next millennium.

In the afternoon we toured the University of New South Wales with our hosts Roger Parks and Alan Eagan. Talk about a hardship tour, the campus is located just 5 km from Sydney's central business district and right around the corner from the infamous Bondi Beach. The campus is located on 38 hectares and is a world-class institution with over 31,000 students. New construction is going on all around the campus and it is obvious that there is a huge commitment toward ensuring the quality of physical facilities on this campus. Among the new facilities that we toured was the School of Business and Management, School of Architecture, and the new Student Center and courtyard. In addition, a major project was in progress to construct covered walkways throughout the central part of the campus as a way to provide connectivity between buildings, strengthen a sense of community and direct the flow of students.

The next day we were picked up from our hotel by Robert Kelly, director of buildings and grounds of Macquarie Univer-



Health Sciences Building, La Trobe University

sity. Macquarie is located in North Sydney about ten minutes from the site of the 2000 Olympics, Homebush Bay. The campus touts a great deal of beautiful open spaces and is the home to 20,000 students and 80 buildings. Grounds, custodial, and security are all currently outsourced, and Robert is working collaboratively with each trade to develop strategies that will enable them to provide the best service to the university. If it is determined that a service is best provided through outsourcing, a phased-in plan is developed and positions are eliminated through attrition. To date outsourcing has reduced an in-house staff from 150 to 80 and has resulted in savings to the university of close to 25 percent. Macquarie's performance standards for work requests are within 24 hours for health and safety requests, general maintenance within five days, and special requests within ten working days. Future initiatives for this facilities department include energy conservation and better space utilization.

As is the case for the other campuses, much construction was in progress at Macquarie. We visited the new School of Education, the Administration and Finance building, with a state-of-the-art interactive video teleconferencing center and the new Leadership Conference Center. Robert explained that a number of years ago the capital funding process changed for the 38 campuses. It went from a centrally controlled political process to an annual allocation based upon FTE students. Each university now receives a capital roll-in dollar amount that can be used for any construction priority on the campus. If a campus is trying to address deferred maintenance or facilities renewal they can realign funding appropriately. Each campus can develop their capital plan knowing the dollar amount that it will receive each year. They can use the funding in that year, bank the funding for future use, or even borrow from future funding. This approach to the capital budget seems to enable the campus community to better respond to the changing demands of the students and the environment. It also gives each campus more control over their ability to effectively plan and implement their capital plans.

Our next day included a tour of the Australian Technology Park, or ATP. This is an innovative and collaborative venture sponsored by the University of Sydney, University of New South Wales, University Technology Center, and TAFE (the two-year technical schools). Located close to Sydney's central business district, ATP is situated in the refurbished Eveleigh Railway workshops, a world-class heritage development. The mission of ATP is to serve as a hub to link their sponsor's

world class research facilities with industry and the wider community. Major initiatives include:

- Creating a culture of innovation through technology transfer
- Cultivating new businesses in high-technology industries
- Creating high value added manufacturing
- Creating opportunities for an Interchange of ideas and technologies
- Creating world-class research and development
- Developing the infrastructure for new technologies

The ATP is working to ensure that Australian industries are internationally competitive, helping them to adopt the latest technological advances and to compete successfully in world markets. It also hosts a series of incubators to help move good ideas into the commercial sector. ATP's stakeholder universities and TAFE have an opportunity to gain work experience and ultimately worthwhile employment at the Park. Through

links with the stakeholders, tenants at the park have access to 15,000 qualified staff, 120,000 students, plus the resources and infrastructure of these leading educational institutions. The three participating universities provide a ready supply of engineers and scientists and access to Australia's best research facilities. Twenty-five percent of Australia's university related research and development budget is managed by these universities. These universities have world-class strength in ten generic technology areas around which the ATP is building



University of New South Wales

clusters of companies.

The Australian Technology Park was an extremely exciting place to visit, and I was so fortunate to have my enthusiasm fueled by a chance meeting with the extremely charismatic Chief Executive Officer, Dr. Tom Forgan. It was obvious to me from our brief meeting that this is a man who believes passionately about the innovative concepts upon which ATP was founded. It was a privilege to be able to share thoughts with such a tremendous leader.

The next day it was off to Brisbane and "Banana Bender" territory. Brian Fenn met John and me at the airport and proceeded to turn over the keys to his vehicle. He then gave us some maps and told us to head off to our hotel, located on the Sunshine Coast of Australia, about an hour-and-a-half drive from Brisbane. Bravely, John asked for his sunglasses, jumped in on the right side of the car, and took off driving on the left side of the road. My role was navigator, which is not necessarily my strong suit; I'm usually too busy talking or looking at the scenery. When I think back on this situation, I'm still

Continued on page 51

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Continued from page 49

amazed about how cool and confident Brian was given the situation. I'm still not sure whether he thought he was doing us a favor or testing our risk-taking quotient. In any event, I believe he would say that we rose to the challenge.

We arrived at our hotel on the Sunshine Coast in one piece and proceeded to orient ourselves to the new surroundings. The next day we headed up the coast to Noosa Heads, a very scenic beach. We then made our way back to Brisbane and our downtown hotel. We were fortunate that it was a Saturday and didn't have to contend with weekly rush hour traffic in a city that we weren't familiar with. Although our adventure was exciting and memorable, once we made it to the hotel we gladly deposited Brian's vehicle, without any prangs (Australian for dents) in the hotel parking garage. Later that evening, when Brian picked us up for dinner, I know I detected a sigh of relief on his face when he spotted his intact automobile.

The next day we were picked up from our hotel by Alasdair McClintock and his wife for a tour of the St. Lucia campus of the University of Queensland. The campus is surrounded by rivers and is regarded by many as one of Australia's most attractive campuses. The riverfront location protects the campus and also provides a unique method of transportation for many of the students. Another example of sandstone architecture, the St. Lucia campus was established in 1910, supports the needs of 26,000 students studying in one of 66 departments and attracts Australia's highest level of industry support for research. As is the case with the other campuses that we toured, new construction is widespread.

We toured a recently completed state of the art library, the School of Engineering, major renovations of both the School of Medicine and the School of Law. In addition, much work is being done to create campus community and a sense of place for each of the schools. The construction of private courtyards and lush landscaping is creating a unique environment for the pursuit of education and the nurturing of community. This campus has tremendous potential given its beautiful location and so much open land along the riverfront.

The next day, Monday August 31st, we were off to Darwin, Northern Territory, home of the aboriginal culture of Australia. The capital of northern Australia, Darwin is closer to Jakarta than it is to Sydney, and closer to Singapore than it is to Melbourne. It's therefore no surprise that Darwin looks

outward to Asia as much as it looks inland to the rest of Australia. With a current population of just around 68,000, Darwin was destroyed during World War II by repeated Japanese air raids. It was once again flattened in 1974 when Cyclone Tracy blew in on Christmas Day. Darwin is the home of the aboriginal culture, the sacred aboriginal grounds of Arnhem Land, the home of the barramundi fish (a freshwater and saltwater perch), the home of the giant termite mounds built by non-wood eating termites, the home of the saltwater crocodiles, and the home of the fastest setting sun that we've ever seen.

Darwin was the site of the jointly sponsored ATEM (our NACUBO counterpart) and AAPP meeting with the theme "Walking the Tightrope: Competitive Collaboration?" About 300 attendees filled the beautiful Carlton hotel on the harbor in Darwin. The program was exceptional and activities were many. I attended all of the AAPP Board meetings, educational sessions, and after-hour

activities. Those who planned this meeting really knew what they were doing and provided something for everyone. The program was well rounded and included such topics as zone maintenance, space planning, customer service, energy conservation, outsourcing, and the infamous Y2K issues.

A very entertaining plenary session included a debate sponsored by Xerox Corporation in which academicians and administrators discussed "Why the Vice Chancellor

Should be an Academic." After each side made its case, the audience was asked to determine the most effective argument. Given the audience, naturally the administrative position was deemed most effective. A new element of this annual meeting was the involvement of business partners who provided support for a variety of events, exhibited their products, and in some instances made presentations.

Remember, I mentioned to you at the beginning of this article that one of my roles during the Darwin meeting, was to co-present a plenary session discussing the topic, "Technology: Friend or Foe in our Race to the Future." Some highlights from that presentation might be in order. If I had to summarize in one sentence the results of my research I'd have to say that technology is having and certainly will have future impact on higher education, but perhaps not in the way many of us envision. My research indicated that technology will be the tool that extends learning from the classroom and laboratories into the dormitory and home. It will be the tool that helps to make the concept of lifelong learning a reality. Technology will also be the tool that extends an education to the many



Management Conference Center, Macquarie University

folks who have historically not been able to partake in the traditional higher education experience.

What I found is that technology will not replace the need for campus buildings; however, the activities in those buildings may change. Many say that the lecture has gone the way of the dinosaurs and that campus buildings will be reconfigured to support smaller groups of students, faculty, and researchers as they explore the concepts of teamwork, collaboration, and interaction. These will all be essential characteristics of the successful enterprise of the future.

Evolving technology will allow us to access data and information, but it cannot provide folks with the face-to-face discussions and collaboration that will enable students to

transform this raw material into learning and knowledge for the future. In addition, most of us would say that higher education is about much more than the pursuit of knowledge. It is also very much about the socialization process and our campuses provide the key ingredients for socialization, people, and a place to congregate.

A special highlight of the conference was a site visit to Northern Territory University conducted by Bob Whalan, facilities director. Northern Territory University is a relatively new campus supporting approximately 10,000 students. The campus is located a mere stone throw from the ocean, with the tropical weather, air conditioning is essential. In fact, approximately 70 percent of the campus' electrical usage is

related to the provision of air conditioning. In response, an aggressive energy conservation program has been in place since 1992 resulting in an energy savings of close to 35 percent. A recently completed chilled water storage tank, researched through a site visit to Cornell University in Ithaca, New York, is anticipated to generate an additional 25 percent savings.

On September 5th we boarded the plane and headed for our last stop, Melbourne. Our host was Denis Stephenson, manager of buildings and grounds of the Bundoora campus of La Trobe University. Walking with Denis, it was hard to believe that what is now a lush, beautifully landscaped campus was just 30 years ago described as "degraded farmland." This campus was established in 1967 and today supports over 14,000 students studying in one of nine disciplines. As seemed to be the case in all of the universities that I visited, campus construction was in full swing. Most recently completed were two Health Sciences buildings, Lecture Theaters, and a great courtyard. The academic complex has been developed as a series of closely related buildings grouped around a central courtyard or Agora. Located within the Agora is the library, central lecture theaters, and commercial activities.

What really makes the Bundoora campus special is the parklike setting, which is an integral part of the campus design. Designers utilized the original characteristics of the campus site to work their magic and transform the site from flood-soaked land to a flood control system of lakes. This beautiful addition to the campus adds to

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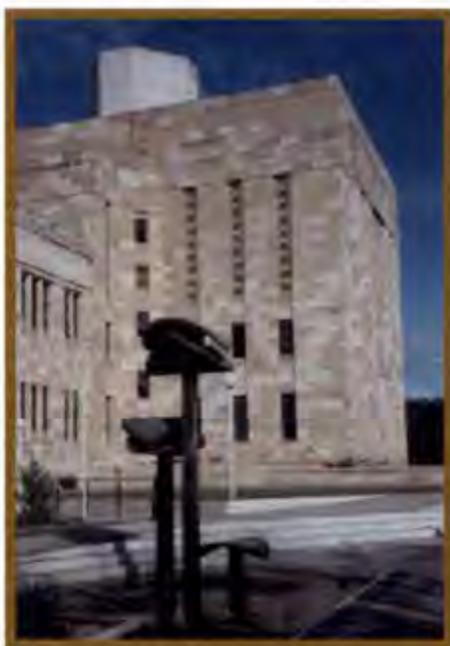
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and complements the stunning grounds and park-like setting.

For my final campus visit, I was fortunate to visit the University of Melbourne with Jim Colebatch, manager of property planning and development. The physical aspects of the University of Melbourne are the exact opposite of La Trobe University. The University of Melbourne was established in 1853 and today has a student body of close to 30,000. The campus is an urban campus located in downtown Melbourne. I was amazed about the creative campus construction and the ability to maximize the use of the scarce space and preserve the historical aspects of the buildings on campus.

Today as I look back on the 2½ weeks spent in the land down under, I have so many fond memories. First are the incredible hosts that made the trip so successful. My thanks to each of you for your sponsorship, your hospitality, your support, and your hearts. Next are the beautiful venues. Australia has so much unspoiled beauty to offer that I'm certain my husband and I will be going back for a visit someday. Finally, I'm proud to report that the AAPPA Region



University of Queensland Library, St. Lucia Campus

is alive, thriving, and extremely well. The highly motivated Board of Directors is extremely organized and have many resources that they make available to their members. Some of these include a management training week, an Internet discussion list for information sharing, a website (www.publications.qut.edu.au/extnl/aappa/aappahome.html), a newsletter, a benchmarking survey, scholarship opportunities, and various educational sessions to include an annual meeting. I would encourage each of you to check out their website, join the listserv, and strike up a conversation. We have much to learn from our Australian mates, and evolving technology enables us to compensate for the vast physical distances between us.

Finally, I would be extremely remiss if I did not also thank two very important

groups. First is the APPA membership who elected me as APPA's President-Elect, and second is my employer, the University of Maryland, Baltimore. Both have shown me support throughout my 15-year involvement with APPA. My thanks to all of you for your steadfast confidence and support. 🙏

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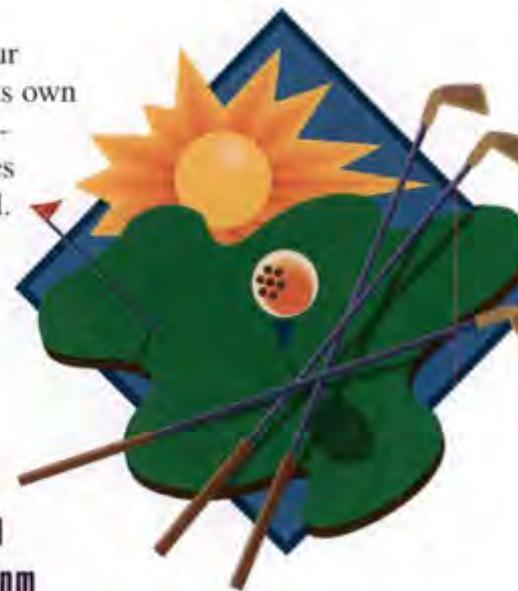
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The tournament will be played on the Center's 18-hole, par 61 Bruin course. Players will be teamed in foursomes and the tournament will be a shotgun start. Trophies and prizes will be given to the teams and players with outstanding scores.

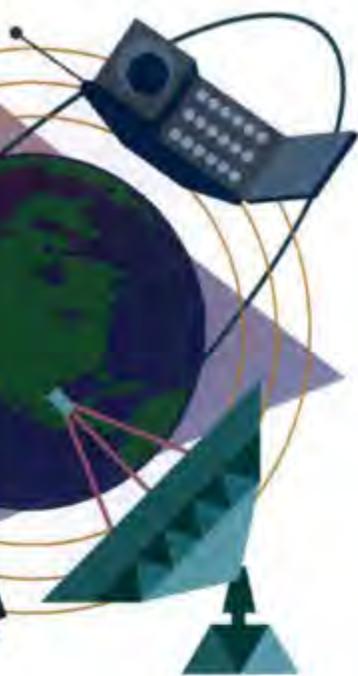


A Whole New Approach for 1999!

APPA members told us what they wanted in an annual meeting, and we listened. This year's meeting offer more social networking opportunities to help you form lasting professional relationships with your colleagues. The Education Committee has designed a program geared for mid and upper level facilities professionals that is guaranteed to stimulate thinking and conversation.

Summer Carnivale Celebration Saturday, June 19, 7:30-9:30pm

Join APPA and Johnson Controls, Inc., for a welcome party celebrating Carnivale. A slice of New Orleans merrymaking in Cincinnati! This is an event for the whole family, with fun, food, and fabulous festivities. Colorful beads, costumes, live music, and mischievous magicians will make this an evening to remember.



Keynote Speaker
Michael Gelb
Sunday morning

Author of *How to Think Like Leonardo DaVinci*
Creative thinking is an increasingly important skill in this age of rapid change, but how do you manage it when you're caught up in the daily grind of responsibilities? Michael J. Gelb is an internationally acclaimed pioneer in the fields of creative thinking, communication, and leadership development.

Moonlight Riverboat Dinner Cruise
Monday evening

Enjoy a leisurely cruise down the Ohio River featuring a buffet dinner and lovely views of the Cincinnati skyline. Have a great time while contributing to a great cause: \$5.00 of your ticket purchase will go to support the Make-A-Wish Foundation, a charitable organization that fulfills the dreams of terminally ill children.

Exhibit Hall Home Run Grand Opening
Sunday

Score a home run at the official grand opening of the exhibit hall on Sunday. Visit APPA's business partners to learn about the newest products and technologies in facilities management. Win prizes and enjoy grand slam refreshments with a baseball theme while you explore the expanded exhibit hall and Learning Resource Center.



Banquet Speaker
Tuesday evening
Les Brown

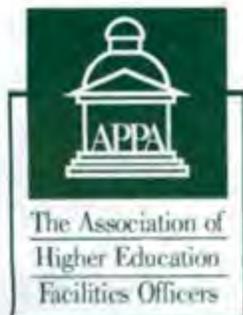
Les Brown, a renowned public speaker, author and television personality has risen national prominence by delivering a high-energy message, which tells people how to shake off mediocrity and live up to their greatness. It is a message Brown has learned from own life, and one he is helping others apply to their lives.

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Outsourcing: Is it Us Versus Them?

by Matthew C. Adams, P.E.

During a recent presentation for the South Carolina APPA (SCAPPA), I commented on what a great time it was to be in facilities management. I went on to say that our industry was no longer the hot-headed stepchild of business officers. The importance and magnitude of institutional facility stewardship is a recognized value in education today. In fact, the increased attention to facilities management has raised the bar. The stakes (and budgets) are high, and facility managers are expected to meet or exceed the same professional standards of all other administrative functions. Vice presidents are asking qualitative questions of facility managers. Issues of operational metrics or performance measurement, cost benefit measurement, and staff productivity are entering the daily vocabulary of facility managers. With this increased attention comes increased scrutiny. A natural result of this is the topic of outsourcing.

At some point, all business officers must consider the use of outsourcing at their institution. It would be irresponsible not to do so. Many business officers are hired from the private sector where outsourcing is more commonplace. Some are influenced directly by the boards of directors, and these business people may favor this approach. At a minimum, the use

of outsourcing must be explored by the business agent for the purposes of due diligence. Regardless of the particular situation, most institutional operations can anticipate either a cursory or exhaustive review in the context of outsourcing. Is this something to fear? It shouldn't be.

The fear associated with outsourcing has a great deal to do with the word itself. The word has come to represent a scenario whereby in-house employees are replaced by corporate employees; fewer in number and pay. This possibility, real or imagined, by facility managers is viewed as a department-wide "us versus them" confrontation. In fearing this confrontation, many avoid the topic and refuse to entertain the subject as if it is either inevitable or out of their control. Unfortunately, it is this reactive, head-in-the-sand mentality that actually precipitates the infrequent occurrences of an us versus them scenario.

In addition to offering encouragement to the attendees at the SCAPPA conference, I described the skills of the facility manager of the next ten years. The best in our industry will be those professionals that are both business people as well as facility experts. The days when a facility manager attended the vice president's business meetings begrudgingly are gone.

The facility manager is the public relations manager, business manager, and facility steward all wrapped into one. As a business manager, the plant officer is skilled in representing the plant department's performance, accountability, and return on the college's facility investment. Anticipating the eventuality of some sort of outsourcing review, the future facility manager welcomes this occurrence as

an opportunity to show off his or her business management skills. The facility manager of the future is skilled at performing "make versus buy" decisions.

In evaluating the strengths and weaknesses of the facilities management department, opportunities to perform the make versus buy analysis present themselves. Regardless of size, there are always specific conditions that may render a particular function within an FM department ineffectual. Upon recognition of this fact, the facility manager is presented with various options to react to this deficit:

1. Do nothing and accept the weakness.
2. Determine the management changes and investment of resources required to improve the function.
3. Evaluate the merit in purchasing this function from an external supplier.
4. Consider a combination of option two and three.

Just as the skills of the facility manager have grown and matured, so has the depth of the outsourcing industry. In fact, the word "outsourcing" is becoming an obsolete word for two reasons: it represents a catastrophic scenario cloaked with dogma, and it does not accurately represent a host of more sophisticated and precise service options that now exist. Recognition of this fact is critical to the modern facility manager. Outsourcing is replaced with smaller make/buy decisions on a continual basis.

Today's meaning of "outsourcing" is better represented as "sourcing" or some have called it "rightsourcing." The proactive facility manager recognizes that sourcing a facility management function(s) from an out-

Matt Adams is president of The Adams Consulting Group, a management/engineering consulting firm located in Atlanta, Georgia, specializing in the facility maintenance and management within higher education, school districts, and other institutions. He can be reached at mc.adams@facinet.com.

side supplier is simply one more arrow in his or her quiver of options.

The increased value and flexibility of the private facility maintenance service industry is based largely on experience and evolution. The worst-case scenarios of the past that tainted the outsourcing moniker were often just as traumatic for the companies themselves. All of the successful maintenance service contractors in the institution market recognize the need to seamlessly partner with their institutional clients. By definition, partnering does not include traumatizing employees or disrupting institutional flow, climate, mores, and even employee roles. The clear trend in the external sourcing industry is the execution of service contracts that are employee neutral. In other words, institutions purchase services from external suppliers because of a need for management expertise, services templates or infrastructure, or other reasons that serve only to improve the professional work of existing employees – not to displace them.

As the nature of institutional facility managers and the external sourcing industry both mature, the variety and flexibility of the possible contractual relationships will expand. Open-minded exploration of the possibilities represented by the external sourcing industry will be typical of the actions of those facility managers that welcome professional accountability and responsibility. A possible exchange between the business officer and the facilities manager might go like this.

During an internal review of the facility management operations, it is recognized that the department is making little or no progress in meeting the goal of transitioning from a 90 percent reactive maintenance organization to one characterized by a workload of 30 percent preventive maintenance, 30 percent planned capital maintenance, and 40 percent reactive (unplanned) maintenance. The problem seems to be the result of inadequate training of the line super-

visors and inadequate management systems at the trade foremen and plant director levels.

The facility manager develops two plans to correct this deficit. The first represents a five-year initiative with some changes in management, investment into the development of software and management systems, coupled with a significant increase in the budget for external training resources. The plan's difficulty lies in the need to develop and simultaneously implement several new initiatives.

The second option is to externally "source" or purchase this management infrastructure in the form of software systems, packaged training services, management systems, and facility management experts used to introduce and make functional the new systems. This plan is about the same cost as the first but is based on three years. The contractor is specified to develop, train, and improve

the institution's plant team while reaching the service transition goals. The plan is employee neutral in that it has nothing to do with hiring or firing – only developing the department. At the end of three years the institution may choose to transition the contractor out of the department, limited the involvement, or continue the initial arrangement with revised goals.

The business officer and facility manager agree to "buy" the departmental improvement with the idea of transitioning away from the contractor in year three. The business officer is satisfied that the facility management function is accountable and responsive. He or she will not "surprise" the department with any outsource proposal. The facility manager is content with control of his or her own departmental destiny and a solid professional relationship with the business office. Sourcing is a tool for the facility manager and not an "us versus them" situation. 🏢

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Book Review Editor: Dr. John M. Casey, PE.

If poor planning

were music, my last name would have to be Mozart. During the time that I should have made these three books available to APPA members for review, I was frittering away my life working on Engineering Department projects. In order to meet the submission deadline for this issue, I volunteered myself for two reviews, and through a good bit of blarney imposed upon a colleague to do the other one.

The books cover three topics that should be quite familiar to members of the academy, especially readers of this journal: construction project management, higher education history, and information technology in colleges and universities. The latter work was reviewed by Tom Bowen, an active member of the Society for College and University Planning (SCUP) and a planning practitioner at the University of Georgia.

I apologize for any Georgia "spin" put on these reviews, and promise to give other APPA members an opportunity to share their expertise with the readers of the Bookshelf in future issues. —JMC

...

John Casey is manager of the engineering department, physical plant division, at the University of Georgia, Athens, Georgia. If you are interested in reviewing a book for The Bookshelf, contact Casey at jcaseyp@uga.cc.uga.edu.



Project Scheduling and Management for Construction (second edition), by David R. Pierce Jr. Kingston, Massachusetts: R.S. Means Company, Inc., 1998. 250 pp, hardcover.

All higher education institutions, sooner or later, become involved in construction projects. In fact, some campuses seem to be in a constant state of building and renovating, with projects handled by both in-house personnel and private contractors. All of these construction projects share common problems which are easy to describe in general terms, but very difficult to define and solve successfully; for example, "finish on time and under budget" is easier said than done. Since most construction projects today are very complicated indeed, if they are to be completed successfully they must be carefully planned and managed. Poorly run construction projects often result in facilities which are poorly built, too expensive and, invariably, late in completion. Each APPA member institution needs to avoid these pitfalls, and take appropriate steps to ensure that its construction projects are carefully and professionally managed.

Enter R.S. Means Company, which has published another comprehensive reference book for the construction trade which explains and illustrates "today's successful project planning, scheduling, and management techniques." The author, David Pierce, has completely revised and updated his first edition, which features seven components of a successful building construction process:

- 1) latest computerized scheduling techniques;
- 2) preconstruction planning;
- 3) determining activity sequence;
- 4) tracking and controls;
- 5) managing resources effectively;
- 6) submittal data and procurement; and,
- 7) complete sample project demonstration.

Pierce spends the first three chapters of the book defining project management and describing the pre-construction planning process; by itself, the information presented here is reason enough to buy this book. Chapters four through nine cover the Critical Path Method (CPM), the process used for construction scheduling. The ninth chapter is especially interesting, describing resource management, ensuring that all materials and personnel are available at the right time and in the right place. The last chapter presents appropriate procedures for the management of submittal data and procurement actions. Finally, three appendices cover a sample project estimate, some sample logic diagrams and planning schedules, and suggestions on schedule sequencing.

This reference book is written from the perspective of a general contractor and, because of this, the reader is afforded an inside look at the often private and mysterious processes that

take place in a contractor's home office and construction trailer. It was revealing to read how the "buy out" process is described from a general contractor's perspective. The author claims that during the bid process for single contract projects, the scope of work for many subcontractors is not clear, requiring negotiations between the general contractor and the various subcontractors which result in "buy out" agreements. Note that the "buy out" occurs after the preparation of a formal competitive bid and the subsequent award of a contract to the general contractor.

Pierce reports the need for "buy out" procedures is the result of incomplete information and a lack of necessary time to prepare a completely coordinated bid. Unfortunately, "buy out" often changes the dynamics of the relationship between the general contractor and the subcontractor which existed during the bidding phase; this provides an opportunity for general contractors to shop the bids of subcontractors or suppliers, resulting in a loss of value for the owner and a gain of undeserved profit to the general contractor. It would have been refreshing if the author had addressed the serious bid shopping problem from a general contractor's perspective.

In summary, *Project Scheduling and Management for Construction* is an excellent reference for professionally managing construction projects. While it uses samples from a specific computer-based software package, the author points out that many other commercially available programs can be used to implement the book's recommendations. Every APPA institution with a construction program needs the ability to schedule, or at least monitor, these activities. This book is a recommended resource for managing successful construction scheduling. However, merely buying the book and appropriate software will not a successful program make;

institutions must be prepared to invest time and energy to master the scheduling process before reaping the benefits of this excellent reference.

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The Shaping of American Higher Education: Emergence and Growth of the Contemporary System, by Arthur M. Cohen. San Francisco, California: Jossey-Bass Publishers, 1998. 440 pp, hardcover.

Anyone familiar

with automotive engineering knows the name Harry Ricardo. Sir Harry was the premier internal combustion engine designer of this century, starting with tank engines for World War I. His book on high-speed engines describes most, if not all, basic design parameters still used today. When I worked in an automotive research laboratory as an engineering student, I discovered, like every other designer before me, that practically all the brilliant and fresh ideas had been tried and tested long ago by Ricardo and his peers. Due in large measure to the experience and work of these pioneers, the automotive profession was able to evolve successfully in the twentieth century. A similar statement can be made about those people who developed the academy and allowed higher education to flourish in the United States, and that story is captured in *The Shaping of American Higher Education*.

This book is a complete history of the academy in the United States from the founding of Harvard in 1636 to the present. Professor Cohen proposes, and most would agree, that it is impossible to improve or reform higher education without knowing about and understanding the past. The author, who teaches a History of Higher

Education course at UCLA and is the director of the ERIC Clearinghouse for Community Colleges, suggests that reading such history will convey a sense of "appreciation for the power of tradition," and reveal that "practically every aspect of contemporary higher education can be traced to the formation of universities in the latter part of the nineteenth century and to the colleges of the Colonial Era."

Shaping is developed along the UCLA course outline, and divides the time into five eras: Colonial, 1636-1789; Emergent Nation, 1790-1869; University Transformation, 1870-1944; Mass Higher Education, 1945-75; and Contemporary, 1976-98. During each era, eight topics are discussed, and while there is some overlapping in the focus of each topic, these eight areas of inquiry appear to cover most of the important information and trends: 1) societal context; 2) institutions; 3) students; 4) faculty; 5) curriculum and instruction; 6) governance and administration; 7) finance; and 8) research and outcomes. After devoting a chapter to each era, the author concludes with Trends and Issues for the Future featuring the same eight topics.

While I am an admitted higher education history junkie, I am not a trained historian, and I will not attempt to comment on the book's outline or research methods. However, four observations seem appropriate, based on my involvement with higher education both as a student and practitioner.

First, I felt that the author's emphases on certain topics in the last two eras, covering the period of 1945 to the present, were uneven. For example, I would have spent more time discussing the value of associations, or the duty of the members of the academy to be accountable to the public, rather than emphasizing deconstructionism in the curriculum. I suspect that this difference of opinion stems from the inherent problem of

writing contemporary history; the recollection of events that are within the living memory of both the author and many of the readers often produces a mixture of opinion and reality, and results in different interpretations of these events. A second comment involves the physical expansion of higher education in the past 20 years. The author indicates that such expansion has been curbed; while it is true that the number of institutions has leveled off in the 1990s, the total square footage of the academy's facilities continues to rise sharply.

A third item which caught my attention regarded deferred maintenance; Cohen suggested that during the end of the Mass Higher Education Era many institutions redirected maintenance money to other uses, but that the extent of this practice was unknown. Unfortunately, he never acknowledged the subsequent findings of *The Decaying American Campus*, APPA's seminal work published in 1989, regarding this matter. Finally, the author does little to acknowledge the important role of facilities in the development of the academy. In fact, facilities demonstrate and epitomize the traditions that he claims are so powerful in higher education, are necessary to support the teaching, research, and public service goals of each institution, and consume about 10 percent of all the money spent in the academy.

The Shaping of American Higher Education is a book which attempts to organize and systematize the chaos of the academy's past. Because of the width and breadth of this history, developing the book was an enormous task. As a product of a higher education program, I can appreciate the time and effort that went into this book; I applaud the author for producing a reference that is very informative and leads the reader through the five eras with relative ease. Both as a textbook for a college course and as a reference guide, *Shap-*

ing scores high marks. I recommend that APPA members consider purchasing this book to expand their knowledge of our profession.

Dr. John M. Casey, PE.

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Dancing With the Devil: Information Technology and the New Competition in Higher Education, by Richard N. Katz and Associates. San Francisco, California: Jossey-Bass Publishers, 1999, 144 pp, softcover.

Managing information technology advances in higher education today seems much like the dilemma the camper faced when he confronted a huge bear in the backwoods. Although frightened, the camper manages quickly to evaluate his options: 1) run as fast as possible for as long as possible in the opposite direction knowing that the bear will catch him eventually; 2) stand frozen in place and hope the bear will pass by without provocation; or, 3) fight the bear and hope to survive long enough for help to arrive or for the bear to lose interest and leave. Similarly, colleges and universities seem to be sorting out options to cope with the bear they face, information technology.

In *Dancing with the Devil*, Richard Katz, vice president of EDUCAUSE (a new association recently created from a merger of EDUCOM and CAUSE), has assembled an impressive cast of authors who offer sage advice on how to cope with information technology's effect on higher education. Katz describes common themes that flow through this compendium of monographs authored by former and present university presidents and practicing consultants, many of whom are former higher education officials.

First, higher education must decide to respond to change in a proactive or reactive manner as a result of the information technology bear. Second, private sector advances in information technology and specific educational training will jeopardize "colleges' and universities' unique economic standing as quasi monopolies." Despite this threat, the authors express "unwavering" confidence that higher education can retain and strengthen its mission by adapting its programs to fully utilize technology as well as its private sector competitors.

James J. Duderstadt, president emeritus of the University of Michigan, sets the tenor of the book in the opening chapter, asking the question "Can colleges and universities survive the Information Age?" He describes the forces driving change in higher education and how they affect specific academic program initiatives and higher education as a profession. Duderstadt suggests higher education consider "restructuring" itself, parsing and packaging programs and services to other sources, much like the health care industry has experienced recently. He stresses the importance of experimentation, and provides examples of experimental projects begun at the University of Michigan. Duderstadt concludes by urging higher education to aspire to a "culture of learning" rather than an "age of knowledge."

The opening chapter clearly sets the tone of the book, much like a keynote address sets the tone of a conference. Chapters two and three, *Competitive Strategies for Higher Education in the Information Age* by Richard Katz, and *Assessing the New Competitive Landscape* by Harvey Blustain, Philip Goldstein, and Gregory Lozier, offer prescriptions on how higher education should deal with threats of outside competition and marketplace changes. Both essays reinforce the strategy that higher

education should move boldly and aggressively to adapt to new technology and the new markets that exist.

Gregory Farrington, president of Lehigh University, assesses the opportunities and challenges to residential undergraduate education in chapter four. Farrington's practical, intuitive assessment is that technology should not replace, but enhance, the residential undergraduate experience.

Farrington makes what may be the most important assertion in the book stating that "the challenge for education in ten or twenty years will be the same as it is today; to educate real people, not computers, and to stimulate them to learn, not to entertain them." He reminds us that, regardless of technological advances, "learning will remain hard work, requiring not only information, but interaction, practice, and discipline."

Farrington's keen insight and engaging style of commentary emphasizes learning through the total undergraduate residential experience, while he draws clear distinctions between curriculum course models designed for the traditional college-age students and the growing population of non-traditional college students. He views the latter group as benefiting most from the new web-based, electronic course delivery systems.

William H. Graves closes the writings with *Developing and Using Technology as a Strategic Asset*, an essay that prescribes how colleges and universities can achieve maximum investment potential from information technology. Graves outlines principles and provides a life cycle model in four stages: experimentation, incubation, commercialization, and commoditization. Finally, he provides advice on how to organize campus agencies to reach full potential of their information technology resources and offers sug-

gestions on how to manage instructional technology.

Essays in a collection often stand alone better than they coalesce as a single concept or theme. That is the case with this book. The sixth and final chapter, *Tying Things Together*, attempts to merge the concepts and arguments of each essay into a collection of salient advice for the practitioner. Compared to previous chapters, the final chapter lacks substance. The six suggestions offered—engage the campus in a vision, develop the capacity for change, devise strategies, develop the faculty, manage information technology as a strategic campus asset, and focus on the assessment of student outcomes—convey trite expressions with little supporting commentary. Nevertheless, the essays in this book offer substantial benefits to anyone

connected to higher education or information technology.

Higher education cannot afford to dance with the devil or confront the bear without thoroughly examining the options, including the respective benefits and consequences related to each. This book will help colleges and universities identify the issues, examine the options, and select reasonable approaches to survive confronting the information technology bear.

Dr. J. Thomas Bowen
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New Products

Ed. Note: With this issue we introduce a New Products column for the readers of Facilities Manager. The purpose is to provide a sampling of new products, services, and technologies that will be of interest to the education facilities administrator. These listings are provided by the manufacturers and suppliers and are selected by the editors for variety and innovation. For more information, contact Gerry Van Treeck at 847-562-8614 or gerryvt@concentric.net. Send your new product listings to Gerry at Achieve Communications, 3221 Prestwick Lane, Northbrook, IL 60062.

Little Buildings, Inc. introduces its new OVALZ line of factory assembled buildings. Departing from the decade-old traditional boxy looking buildings, the smooth curves of this



desirable new design lend a fresh dimension to any installation. Utilizing custom formed galvanized steel panels, the strength and durability of the product is unparalleled. Whether used as a parking lot cashier booth, security post, valet booth, information kiosk, or other use, its sleek profile will be an eye-catcher now and into the new millennium. Little Buildings, Inc., 161 Shafer Drive, Romeo, MI 48065, 810-752-7100.

Lyon Metal Products has announced that 30 new selections of flammable and combustible liquid storage cabinets are now available. The new line includes free-standing, hangable, stackable bench mount and under-counter configurations to meet nearly any workspace requirement. The new Lyon cabinets are



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CSL Inc. Environmental Products introduces the latest in litter solutions, the Litter-Mate, a litter companion to their award winning Smokers' Outpost. This new trash receptacle resulted from consumer requests for a litter container to coordinate with the company's best seller the Smokers' Outpost, a maintenance-free outdoor smoking receptacle. Made of fire-safe, high-density polyethylene, the unit features an easy snap fit lid and a twist and knot bag holding slot. CSL Inc. Environmental Products, 10 Commerce Drive, Suite B, Destin, FL 32541, 800-622-6069.

Sears Industrial Sales announces the publication of its 1999-2000 Sears Industrial Tool Book, with over 380 pages, 8,000 SKUs, and more than 2,000 new products. Also available on CD-ROM, the new book offers more supplies as well as tools—more abrasives, drill bits, saw blades, wet/dry vacuum filters—to facilitate one-stop shopping. It also offers expanded lines of vehicle maintenance equipment and electric and electronic tools. *The 1999-2000 Sears*



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Marks USA introduces the Monaco design "Survivor" cylindrical lever



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Coming Events

APPA Events

For more information on APPA seminars and programs, contact the APPA Education Department at 703-684-1446 ext. 230 or ext. 231.

April 11-16—*Leadership Skills Academy: Organizational Skills*. Notre Dame, IN.

June 20-22—*1999 Educational Conference & 86th Annual Meeting: Facilitating Learning in a Changing World*. Cincinnati, OH.

September 12-17—*Institute for Facilities Management*. Montreal, Quebec, Canada.

July 16-18, 2000—*2000 Educational Conference & 87th Annual Meeting*. Fort Worth, TX.

APPA Regional Meetings

September 26-29—*AAPPA Regional Meeting*. Wellington New Zealand.

September 26-29—*MAPPA Regional*

Meeting. Notre Dame, IN.

October 3-5—*ERAPPA Regional Meeting*. Ocean City, MD.

October 3-5—*PCAPPA Regional Meeting*. Las Vegas, NV.

October 6-10—*RMA Regional Meeting*. Albuquerque, NM.

October 10-14—*CAPPA Regional Meeting*. San Antonio, TX.

October 23-26—*SRAPPA Regional Meeting*. Biloxi, MS.

Other Events

May 4-5—*FEDFacilities '99*. Washington, DC. Contact FEMP, 800-731-6106.

May 17-18—*Operations & Maintenance Management*. Chicago, IL. Contact Amy Tilton or Nicole Ray at FEMP, 509-372-4368.

May 19-21—*1999 International ARCHIBUS/FM Users' Conference*. San Diego, CA. Contact ARCHIBUS, 617-338-1011.

June 2-5—*Ontario APPA Annual Meeting*. Lakehead University. Ontario, Canada.

June 1-3—*The 1999 Electrical Code (#8191)*. Orlando, FL. Contact Katie Peterson, University of Wisconsin/Madison, 800-462-0876.

June 12-15—*90th Annual IDEA Conference & Trade Show*. Boston, MA. Contact IDEA, 202-429-5111.

June 17-88—*West Coast Energy Management Congress '99*. Anaheim, CA. Contact Association of Energy Engineers, 770-447-5083.

June 19-23—*ASHRAE Annual Meeting*. Seattle, WA. Contact American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 404-636-8400.

June 24-27—*CSI '99*. Los Angeles, CA. Contact the Construction Specifications Institute, 800-689-2900.

July 11-15—*ACUHO-I '99*. Vancouver, British Columbia. Contact the Association of College and University Housing Officers International, 614-292-0099.

July 17-18—*Life Cycle Costing*. Rockville, MD. Contact Amy Tilton or Nicole Ray at FEMP, 509-372-4520.

August 25-26—*Competitive Energy Congress '99*. Boston, MA. Contact the Association of Energy Engineers, 770-447-5083.

November—*PGMS 88th Annual Conference*. Baltimore, MD. Contact the Professional Grounds Management Society, 410-584-9754.

November 14-17—*NACAS: Annual Conference*. Harnessing the Past, Unleashing the Future. Dallas, TX. Contact Laura Ryman, National Association of College Auxiliary Services, 540-885-8826.

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