The untrained eye journeys through a campus with little understanding of the utility infrastructure that supports their activities. The complexity that surrounds even the simplest of those activities—turning on a light, working or studying in a climate controlled environment, sending and receiving e-mails upon demand—escapes most. Many walk over the miles of buried pipe and electrical lines and other utilities that serve their beck and call without any consideration of how many things have to be carefully orchestrated for these systems to work properly.

On the other hand, the facilities staff is unable to make a trip across the campus without worrying about the condition of that 20-year-old air handler with the patched coils, or the 35-year-old boiler that now requires the extra attention to keep it limping along, or the 40-year-old steam lines that are corroding.

The facility staff has the prominent middle position in the transfer, conversion, and delivery of energy and resources from primary utility providers to end-users or customers. The successful team commands an understanding of the needs of their customers and the capabilities and limitation of their systems as well as those of their suppliers. This understanding also requires a special vision of how dynamic influences such as energy availability, political policy, and regulation may have an impact on their ability to provide secure, reliable, and cost-effective utilities. Events over the last decade have compounded the challenges of delivering reliable utilities to the campus. Hazards have increased in number and complexity via intentional acts to disrupt service, whether from a computer virus or other acts of destruction. Further demands are placed on utility systems from indirect pressures such as aging infrastructure, difficulties in obtaining capital, uncertain regulations, unfunded mandates, and constrained supplies failing to meet rising demand. Natural hazards continue to wreak havoc even though advances have been made in mitigating the severity of the damage.

Needs and desires of the customer are becoming more complex. We are faced with providing both traditional as well as new utilities to support increasingly sophisticated facilities where loss of service can be extremely costly. Clear goals and objectives need to be established so that prioritization of utility needs can be established. For example, it may be prudent to segregate loads in a building where research labs, teaching labs, classrooms, and offices are combined within a single building. Too often entire buildings or even clusters of buildings are classified as “load critical,” yet insufficient and

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Campuses must determine how they are going to manage their energy resources. A good resource management plan will address issues such as fuel flexibility, sustainable design practice, energy conservation, and alternative energy use.

(EPA) published proposed National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Industrial/Commercial/Institutional Boilers and Process Heaters, 40 CFR 63 Subpart DDDD. NESHAPs are more commonly referred to as Maximum Achievable Control Technology (MACT) Standards, and this one has been dubbed “Boiler MACT.” At a minimum, the MACT standard will require a higher level of testing and monitoring of industrial, commercial, and institutional boilers and heaters. The implementation of Boiler MACT may require fuel switching or costly equipment retrofits resulting in a major financial impact on the institution. As written, this regulation also applies to backup fuel systems. This could cause a facility to become deficient of firm capacity due to its inability to operate older noncompliant equipment even during emergency conditions. The anticipated promulgation date for this rule is February 2004. Rule and implementation information for this pending regulation can be found at www.epa.gov/ttn/atw/boiler/boilerpg.html.

Campuses must determine how they are going to manage their energy resources. A good resource management plan will address issues such as fuel flexibility, sustainable design practice, energy conservation, and alternative energy use. Those that are more adept at managing their resources will be in a better position to serve the next generation of students.

While implementing a project, the entire life-cycle energy impact of the project and its components should be considered, as well as the economic and environmental impact and performance. Design and construction practices that significantly reduce or eliminate the negative impact on the environment should be encouraged. A focus on efficient systems and energy conservation will result in reduced loads and may relieve the stress on existing infrastructure. Managing the use of energy is encouraged in part due to the fact that the easiest and most secure utility load there is to serve is the one that does not exist.

Regardless of the countless “what-if” scenarios or contingencies set in place to circumvent a utility outage, there are bound to be interruptions. However, the impacts associated with an interruption can be substantially reduced with proper planning. The Federal Emergency Management Agency (FEMA) has released a document entitled Building a Disaster-Resistant University. This document walks the reader through a four-phase process:

Recent Disasters and Universities

In July 1999, a heat wave resulted in a sustained power outage in New York City. The electricity went out at Columbia University and was not completely restored for 2-3 days. In the intervening time, researchers at Columbia’s College of Physicians and Surgeons lost irreplaceable research materials—human tissue, enzymes, and cells—because there were not sufficient backup generators to keep freezers or incubators running. Damages to the $200-million research program were calculated at many millions of dollars.

Building a Disaster-Resistant University, FEMA August 2003 page 37
• Organize Resources
• Hazard Identification and Risk Assessment
• Develop the Mitigation Plan
• Adoption and Implementation.

This is a valuable resource that lays out a systematic approach to reducing vulnerabilities. It is available at www.fema.gov/fima/dru.shtm.

Delivering secure and reliable utilities is one of the major missions for facilities staff. It is a complex act of planning and implementation that is put to test everyday. Delivering on this mission requires balancing the needs of customers with meeting the goals and objectives of the institution. It requires continuous reassessment of the multitude of factors that have the potential to influence operations. It means developing an energy plan that addresses many of the same challenging aspects surrounding the development of our national energy policy. It means planning for hazards, whether created or natural, and enacting plans to protect life and property when these hazards occur. To the untrained eye, an “invisible” utility infrastructure is a routine expectation. To the facility professional it means so much more.

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Federal Energy Regulatory Commission (FERC)
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U.S. Green Building Council
U.S. Senate Committee on Energy and Natural Resources
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