You Cannot Manage What You Cannot Monitor

ENERGY AND WATER USE

Recent executive orders and federal regulations require facility managers to reduce the amount of energy and water consumed by the buildings they manage. There are specific requirements for reduction as a percentage of use as of the base year. But how can a facility manager determine whether energy and water use has been reduced unless they first know how much energy and water is being consumed—and why?

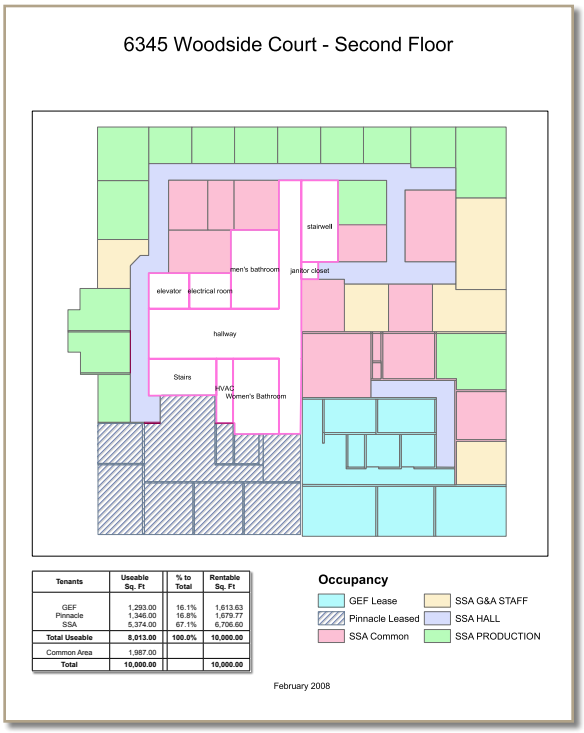
Historically, water and electrical consumption are monitored only at the building level. In a campus environment, sometimes there are not even building level monitoring devices.

OPERATIONAL ENVIRONMENTAL FACTORS

Facility managers are also often faced with having to respond to complaints from building occupants regarding what are perceived as unacceptable environmental conditions within a working environment. Less than optimal light levels, temperature, and noise levels are a few of the most common complaints. And while less commonly reported, the US Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) certification criteria encourages monitoring and control of other Indoor Environmental Quality (IEQ) factors which have been shown to increase worker productivity and reduce absence from work due to sickness. LEED credits are available for providing monitoring of carbon dioxide concentrations and ventilation airflows to insure compliance with ASHRAE 62.1. LEED commissioning and re-commissioning requires confirmation of the existence and operability of monitoring systems.

Temperature Monitoring and Evaluation

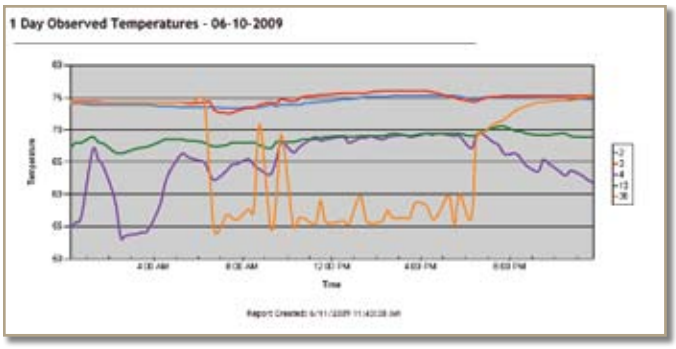
Many of today's HVAC systems include sophisticated monitoring and control devices. Supply air and return air temperatures are monitored and used to control whether a rooftop unit is in heating or cooling mode. Thermostats throughout the building control Variable Air Volume (VAV) boxes that supply air to zones within the building. If any zone is calling for cooling, then the system is supposed to insure that the VAV box for that zone is provided with cool air to provide for those needs. In many cases, other zones within the building may be calling for heat at the same time. However the rooftop unit can supply only one temperature at a time, which in this case would be cool air. The VAV boxes then take on the responsibility of heating the cooled air for their zones. The result is a fairly energy inefficient system in which the rooftop unit and the VAV boxes may be fighting one another. Theoretically the systems are "balanced" at the time of installation to minimize these inefficiencies. However, building administrators still have to respond to tenant complaints while the owner pays the utility bills.



Tenants	Useable Sq. Ft	% to Total	Rentable Sq. Ft
GEF	1,293.00	16.1%	1,613.63
Pinnacle	1,346.00	16.8%	1,679.77
SSA	5,374.00	67.1%	6,706.60
Total Useable	**8,013.00**	**100.0%**	**10,000.00**
Common Area	1,987.00		
Total	**10,000.00**		**10,000.00**

By monitoring temperatures independent of the HVAC system, a building administrator can determine whether the system is operating properly, whether individual complainants are justified, and can provide both real time and historical data to the HVAC maintenance staff to assist in identifying problems with the system. The following example shows how an online monitoring system might work:

1. Temperature sensors are located throughout the facility including in the supply air duct and in a location to monitor outside air temperature.
2. Data from these sensors can be reviewed at any time utilizing a graphical interface that shows the location of the sensor in the building, the location of the thermostats controlling the VAV boxes, and the appropriate temperatures.
3. Historical graphs can be generated that visually depict the temperature of multiple sensors vs. time. These graphs assist in understanding the relationships between outside air temperature, supply air temperature, and individual room temperatures.
4. This type of historical information can be stored indefinitely to monitor variations in system performance that are independent of the HVAC system itself.



Similar systems can be implemented for energy consumption, carbon dioxide levels, light levels, occupancy data, noise levels, etc. utilizing a common graphical interface—the floorplan of the building—and made available via a web-based interface to anyone with proper authorization.

Who We Are

Spatial Systems Associates Inc. (SSA) is a full service Geographic Information Systems (GIS) and Facilities Management (FM) implementation and support provider based in Columbia, Maryland along the I-95 corridor between Washington, D.C. and Baltimore, Maryland. The principals of SSA have been implementing these technologies since 1987; our staff has expertise in all of the required related disciplines. Clients have included federal, state, county, municipal, and private sector organizations throughout the mid-Atlantic region.

SSA is an authorized ESRI developer and reseller. ESRI is the world's leading GIS software provider, their products are the de facto industry standard. Building on the ESRI platform, we provide services and support to our clients in the following areas:

- LEED Analysis and Consulting
- LEED Certification Assistance
- Building Commissioning Services
- GIS and FM Consulting
- Website Development and Deployment
- Application Development
- Data Services
- Analysis and Cartographic Production
- Training

For More Information

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