KMC CONTROLS
In touch.

Controlling Your Green Building

Higher energy efficiency

Lower operating and maintenance costs

Better indoor air quality

Greater occupant comfort and productivity

Why Go Green?

Why Green is Good

Green, the iconic color of plants, is the symbol for sustainability in buildings. Green is good for the triple bottom line (people, planet, and profit). Green buildings are:

- Good for **occupants** (healthier and more comfortable working space)
- Good for our **environment** (reduced resource depletion and higher sustainability, which helps preserve the earth for future generations)
- Good for **business** (higher employee productivity, lower energy and life cycle costs, higher client attraction/retention, higher resale value, and enhanced public relations)

A significant goal for "greener" buildings is reducing energy and water usage while enhancing the quality of indoor air. This goal is attainable largely by optimizing the building's automation system.

Controls and Building Certifications

Although any building may be built or retrofitted with various enhanced green characteristics, **significant advantages exist in obtaining building certification by one of the "green" organizations**, such as ENERGY STAR® and the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) Green Building Rating System. A building's certification provides proof of its triple bottom line.

KMC Controls has been a member of the U.S. Green Building Council (USGBC) since the early days of the organization. The USGBC is a non-profit organization committed to a prosperous and sustainable future for our nation through cost-efficient and energy-saving green buildings. According to the USGBC, buildings in the United States are responsible for 39% of CO_2 emissions, 40% of energy consumption, 13% water consumption and 15% of the gross domestic product per year, making green buildings sources of significant economic and environmental opportunity.

Green buildings are found in many sectors, and KMC products have been minimizing energy use while optimizing occupant comfort in many government, school, hospital, hotel, office, and other commercial buildings for decades. To help you obtain green certification as well as ensure that your facility operates as it was initially designed, KMC provides a comprehensive approach to automating systems within commercial and institutional facilities. Our systems can manage heating, ventilating, and air conditioning as well as smoke control, lighting control, daylight harvesting, rainwater harvesting and landscape irrigation, power and utility (including alternate energy sources) monitoring/management, data collection with logging and trending, and a host of other applications.

Merry Lea Environmental Learning Center, Wolf Lake, Indiana (Platinum LEED Certified)

Whether your green building is small or large, KMC's products can play critical roles in attaining certification in the LEED, ENERGY STAR, or other ratings systems. For example, KMC controllers, sensors, and software can play key roles in satisfying the prerequisites and credits in the Energy and Atmosphere (constituting 25% of the total points) and Indoor Environmental Quality (22% of the total) categories for LEED New Construction and Major Renovation.

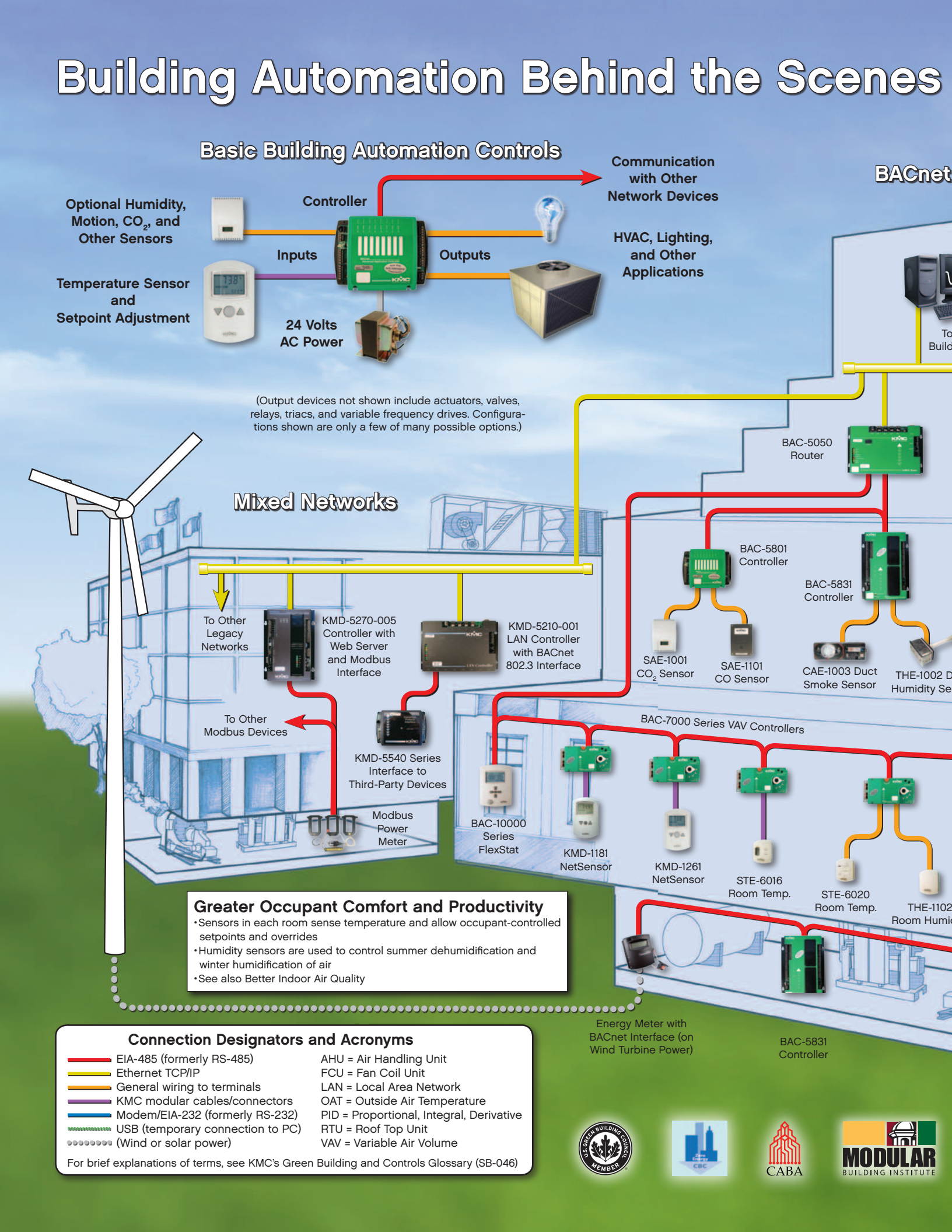
When attaining (the highest) LEED Platinum certification, the **Merry Lea Environmental Learning Center of Goshen College** had KMC direct digital controllers, sensors, and software working together to monitor and log building system performance factors such as heat pump fluid temperatures, current generated by photovoltaic arrays and a wind turbine (to get credit from the utility company), as well as other environmental conditions.

When attaining the ENERGY STAR label, the **Wachovia Bank Building in Tampa Florida** used software and over 300 BACnet controllers manufactured by KMC Controls. The HVAC controls retrofit, which replaced an obsolete system, provided an additional monthly energy savings of 10% over the previous system. In addition to energy savings, it also included CO_2 monitors to enhance the air quality and help meet qualifications to pursue LEED Gold certification.

On the following two pages are visual examples of KMC's controls used within different networks of a large building automation system.

Wachovia Bank Building, Tampa, Florida (ENERGY STAR Labeled and pursuing LEED Gold)

Building Automation Behind the Scenes



Greater Occupant Comfort and Productivity

- Sensors in each room sense temperature and allow occupant-controlled setpoints and overrides
- Humidity sensors are used to control summer dehumidification and winter humidification of air
- See also Better Indoor Air Quality

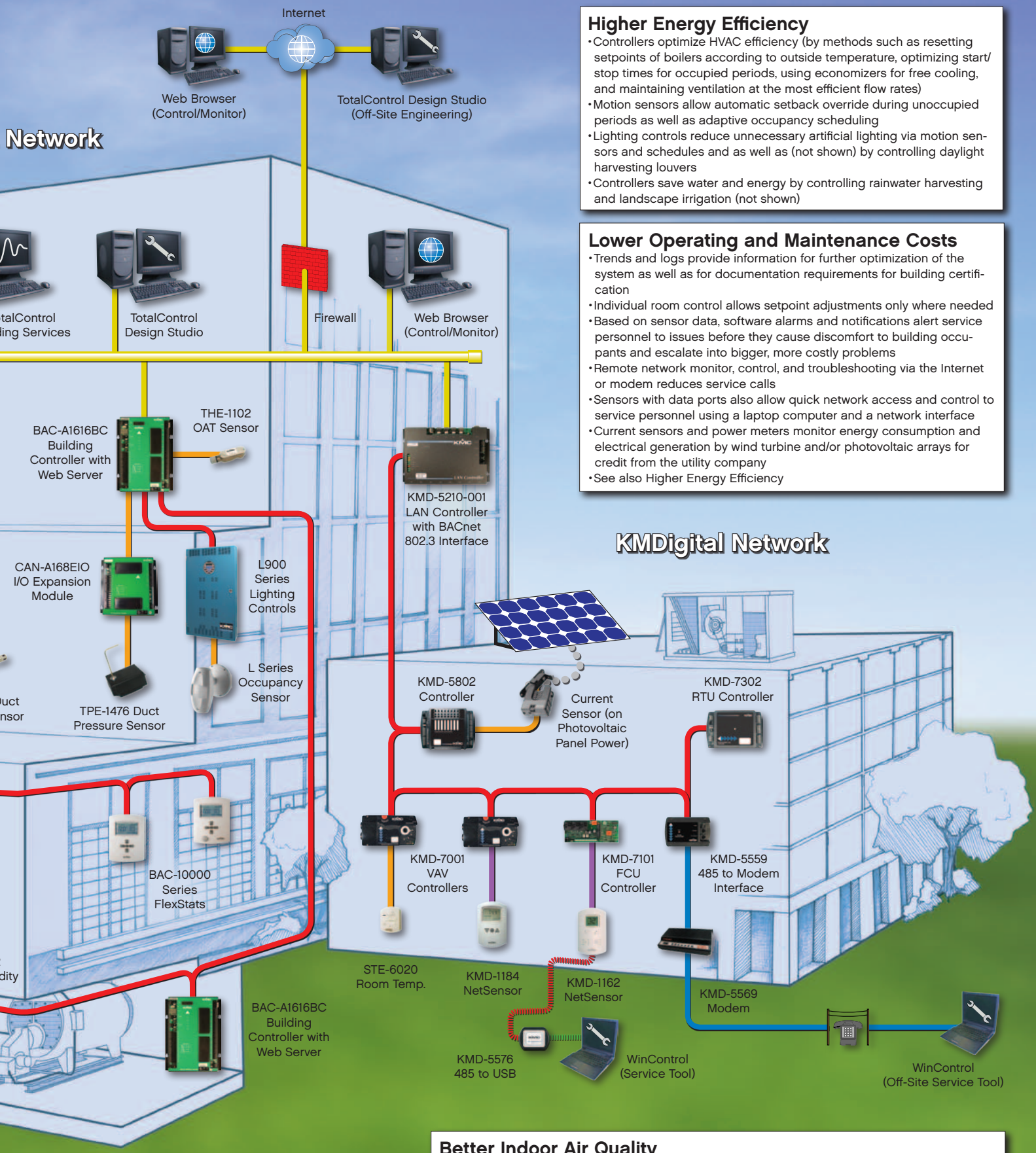
Connection Designators and Acronyms

- EIA-485 (formerly RS-485)
- Ethernet TCP/IP
- General wiring to terminals
- KMC modular cables/connectors
- Modem/EIA-232 (formerly RS-232)
- USB (temporary connection to PC)
- (Wind or solar power)

AHU = Air Handling Unit
FCU = Fan Coil Unit
LAN = Local Area Network
OAT = Outside Air Temperature
PID = Proportional, Integral, Derivative
RTU = Roof Top Unit
VAV = Variable Air Volume

For brief explanations of terms, see KMC's Green Building and Controls Glossary (SB-046)

U.S. Green Building Council Member
CBC
CABA
MODULAR BUILDING INSTITUTE



Higher Energy Efficiency

- Controllers optimize HVAC efficiency (by methods such as resetting setpoints of boilers according to outside temperature, optimizing start/stop times for occupied periods, using economizers for free cooling, and maintaining ventilation at the most efficient flow rates)
- Motion sensors allow automatic setback override during unoccupied periods as well as adaptive occupancy scheduling
- Lighting controls reduce unnecessary artificial lighting via motion sensors and schedules and as well as (not shown) by controlling daylight harvesting louvers
- Controllers save water and energy by controlling rainwater harvesting and landscape irrigation (not shown)

Lower Operating and Maintenance Costs

- Trends and logs provide information for further optimization of the system as well as for documentation requirements for building certification
- Individual room control allows setpoint adjustments only where needed
- Based on sensor data, software alarms and notifications alert service personnel to issues before they cause discomfort to building occupants and escalate into bigger, more costly problems
- Remote network monitor, control, and troubleshooting via the Internet or modem reduces service calls
- Sensors with data ports also allow quick network access and control to service personnel using a laptop computer and a network interface
- Current sensors and power meters monitor energy consumption and electrical generation by wind turbine and/or photovoltaic arrays for credit from the utility company
- See also Higher Energy Efficiency

Better Indoor Air Quality

- Temperature and humidity sensors monitor thermal comfort
- CO_2 and CO sensors monitor pollutants, ensuring the required minimum fresh air ventilation
- Controllers, based on sensor input, provide optimal zone ventilating, heating, and air conditioning
- Controllers provide smoke control during a fire, maintaining breathable air zones for evacuation (not shown)
- Controllers monitor and control natural ventilation dampers (not shown)

BACnet International

Still . . . Made in the U.S.A.

What KMC Can Do For You

Putting Control at Your Fingertips

Whether you want to just adjust the setpoint in your office or manage the entire building automation system, we have the products for you. For building automation applications, our digital hardware controls (as shown on the previous spread) include our proprietary KMDigital and our interoperable, open-systems BACnet controllers. (For support of older systems, we also offer analog electronic controllers and pneumatic controllers.) Software for the digital control systems includes WinControl® for our proprietary line of controllers and BACstage® for the BACnet controllers. Our TotalControl™ software integrates control and monitoring of these and other systems.

Connected to our controllers, switches and sensors detect temperature, humidity, pressure, air flow, CO_2, CO, smoke, occupancy, and electrical current for monitoring thermal comfort, air quality, lighting requirements, and energy usage. Actuators, valves, relays, and other output devices (not shown on the previous spread) perform necessary electronic, electrical, and mechanical actions (as directed by the controllers). These actions control the flow of air or hot/chilled water or control external electrical circuits such as for lighting, fans, pumps, compressors, boilers, and chillers. Other KMC tools include routers, repeaters/isolators, surge suppressors, computer interfaces, transformers, power supplies, enclosures.

For stand-alone applications and small buildings, a "Tier 2" network can sustain operations without a dedicated computer or LAN, but for networking capabilities, controllers can be interconnected via economical wiring. When needed, technicians can use convenient on-site network connections or use dial-up modem connections to check status or change programming. Larger commercial building installations typically use networks of Tier 2 controllers within each zone and also interconnected zones of "Tier 1" controllers. For campus-type or geographically dispersed applications, Internet solutions connect systems and workstations. Operators can monitor and control the system with either browser-based or directly connected workstations.

About BACnet

Building automation controls are increasingly using BACnet, the only communications protocol that was designed for open-system interoperability and specifically intended for building systems. Interoperability means that products from different manufacturers can communicate with each other and work together. The concept of interoperability blends well with the integrated project design of LEED and other green approaches.

An open system helps reduce future risk. If a vendor for an installed proprietary BAS goes out of business, future maintenance and upgrades might require the old BAS to be torn out and entirely replaced by something new. Interoperability, however, means that new can build on old, helping future-proof life-cycle costs.

For more information about how KMC BACnet products can help you, see the Native BACnet Building Automation Solutions Brochure (SB-008).

Buying KMC Products

Depending on your situation, you can purchase and arrange for installation and service through a variety of channels:

- Authorized Installing Contractors (Dealers)—These independent controls contractors have access to the complete line of KMC products. They can design, install, and service new construction or modernization projects as well as provide operational training.
- HVAC Wholesalers—They have access to the analog electronic and pneumatic portions of our product line, including controls, actuators, and valves. They offer the convenience of numerous locations and available inventory.
- Authorized System Distributors—They offer all the advantages of standard wholesalers but also offer our BACnet product line. They typically offer in-house design services, training, and expert advice.
- Original Equipment Manufacturers (OEM)—Even if a product has another name on it, it could still be one of ours. We have partnered with the biggest names in equipment manufacturing. They come to us because of our decades of reliable service and user-friendly processes.

See the KMC Controls web site for additional information about contacting a supplier.

About KMC Controls and Additional Resources

KMC Controls, an ISO-9001 registered company, is the only privately held manufacturer of a full line of HVAC and building automation controls. At KMC Controls, people and the planet matter, and in the long-term, what's good for people and the planet profits everyone. Join us in the sustainability revolution!

For more information about KMC Controls, see our Corporate Capabilities Brochure (SB-052).

For definitions of green building terms, see our award-winning and very popular pocket-sized Green Building and Controls Glossary (SB-046).

For the latest information about KMC Controls and sustainable buildings as well as downloadable PDFs of the mentioned documents, see the award-winning KMC Controls web site (www.kmccontrols.com).

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