

# FUTURE FACILITY ENERGY TRENDS

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The amount of energy used by facilities is a significant issue...one that is growing in importance. The new American Society of Heating, Refrigerating and Air Conditioning (ASHRAE) Energy Standard 90.1 for energy efficiency is stricter than any that have come before. Even as more building and related energy codes adopt this standard - or take even more rigorous stances - the next version of 90.1 is being prepared and is expected to call for a 30% reduction in building energy usage! Beyond regulatory pressures, there is the fact that energy, in whatever form, is becoming increasingly more expensive while energy budgets for Heating, Venting and Air Conditioning (HVAC) are becoming smaller.

At the same time, the need for a healthy, comfortable and productive work environment is growing. Clearly, these requirements cannot be met effectively with the same technology that kept people comfortable in their offices in the past. In fact, many of the ways that buildings were conditioned in the past are no longer economical or, in some cases, even legal!

Yet, there are ways to combat these challenges. Tools are available to help design mechanical systems that comply with ASHRAE 90.1, California Title 24 or their variants. Energy simulation programs can help model energy performing systems that are compliant or better. "New" technologies - which, in many cases are not new, just new to the U.S. market - have been used extensively in Europe and Asia and have a history of providing comfort heating and cooling at a fraction of the energy usage of "traditional" HVAC systems. Two technologies we have been evaluating include:

- **Chilled Beams.** Suitable for commercial applications such as offices and even laboratories, chilled beams replace traditional air diffusers in a HVAC system, using water to transfer heat convectively in the space rather than moving large quantities of air. This results in a significant annual energy savings

(some examples are over 50%), at no penalty in initial cost. An added benefit is the floor-to-floor height in multi-story applications can be reduced by 12 to 18 inches per floor! These units, however, are not suited to high-density cooling loads.

- **Variable Refrigerant Flow Systems.** These HVAC systems have the capability to provide heating and cooling using indoor ductless units connected to a common outdoor condensing unit by refrigerant piping. Variable refrigerant flow systems can have any number of "zones" or rooms, simultaneously heating in one room and cooling in the next. In addition, they use a minimum of space and are very energy efficient because of variable speed refrigerant compressor usage. On the other hand, variable refrigerant flow systems are limited to about 60 tons of capacity and there is a limited choice of manufacturers at this time.

Both of these systems are very quiet and need only to supply enough ventilation air to meet code requirements; however, as described, there are limitations to each. For now, while these and other advancements offer opportunities for current and future projects, we are reviewing the project needs and potential application when considering these systems for our clients' projects.

#### Did You Know?

- In the United States, buildings account for over 60% of all electrical usage and for more than 30% of the total energy usage. (Source: U.S. Department of Energy)
- By 2010, 38 million new buildings will be created in the U.S. (Source: United States Green Building Council)

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