See More Green With Sustainable HVAC Technologies

By: Rich Halley
Vice President
TRANE

Preserving the planet is a major goal of ecofriendly innovation. However, building owners who embrace green construction or renovation for their heating, ventilation, and air conditioning (HVAC) systems stand to gain other advantages as well.

By investing in the advanced software and state-of-the-art hardware of new high-efficiency, sustainable HVAC systems, owners can provide optimal occupant comfort — while realizing substantial cost savings.

Energy-analysis software

New energy-analysis modeling software allows engineers to accurately simulate almost any space — from one building to an entire campus — then “try out” different HVAC systems to find the greatest energy and cash savings. This software is also a useful scoping tool, to suggest equipment appropriate for an initial design.

While green technologies are sometimes more expensive upfront, research shows they deliver significant cost savings long-term[1]. Software can project a building’s lifetime energy use, to help select the best system for minimum life cycle cost. It can also compare the impact of a variety of non-HVAC-related, energy-saving techniques including day lighting, reflective roofing, and other strategies mentioned in ASHRAE 90.1 and 62.1.

Energy-analysis software creates less paperwork. The detailed comparisons it generates can be submitted for the ASHRAE 90.1 compliance reports required by most local building codes. These results can also serve as documentation required under USGBC’s LEED (Leadership in Energy and Environmental Design) program and the U.S. Energy Policy Act of 2005.

"I cannot imagine performing energy modeling and mechanical system comparisons in today's engineering world without a solid computer modeling software,” says Rick Dustin of McKenney's, Inc., a design/build mechanical contracting firm in Atlanta, Georgia, U.S.A. “Our clients look to us to provide mechanical designs based on solid engineering and economical analysis. With the continual movement in today’s market, we need the ability to quickly evaluate alternative HVAC system types, options, configurations, controls, and so on. Without modeling software, engineers would struggle to meet the typical time demands of today’s projects and customer’s expectations.”

High-efficiency equipment

On the hardware side, new efficiency-enhancing options are available on all types of HVAC equipment. They’re also becoming increasingly affordable — especially when you factor in lifetime savings.

Chiller systems typically consume more electricity than any other commercial building system. Choosing high-efficiency chillers in a variable-flow chilled water system with optimized controls can provide a truly high-performing, sustainable HVAC system, as proven when managers at Providence Newberg Medical Center in Newberg, Oregon, U.S.A., installed high-efficiency

---

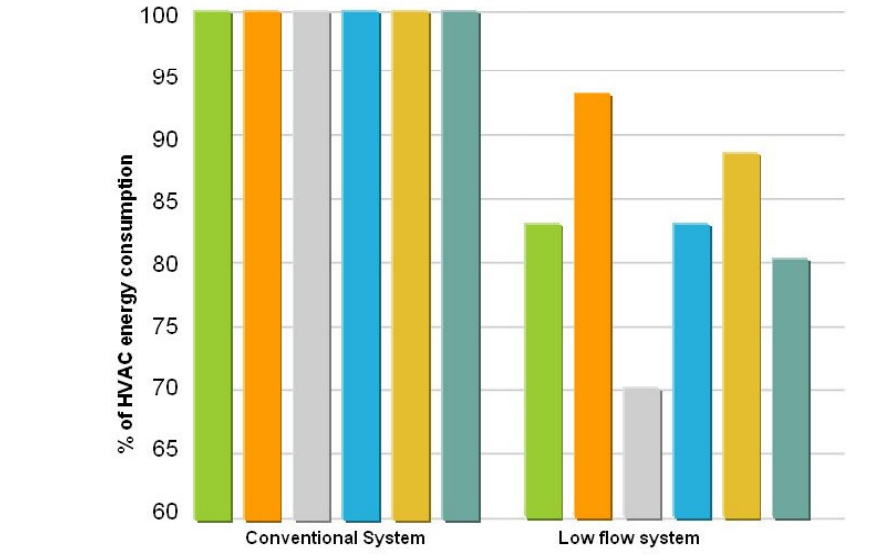
[1] *Building Design & Construction's White Paper on Sustainability: A Report on the Green Building Movement*. November 2003.

chillers while constructing the nation's first LEED Gold hospital. Their overall investment in high-performance energy systems should save an estimated $178,000 annually.

Optimized HVAC systems

Efficient water pumps and cooling towers can save even more. For instance, in a system designed for reduced flows of water and air, the lower the flow, the lower the pumping costs. Energy analyses show that net low-flow savings can approach 30 percent, depending on climate. Additionally, such design reduces material costs by allowing smaller pipes and pumps.

Figure 1. Comparing results of conventional versus high-efficiency systems



	Conventional System	Low flow system
Atlanta	100%	83%
Minneapolis	100%	93%
Los Angeles	100%	70%
Denver	100%	83%
Philadelphia	100%	89%
Portland	100%	80%

Also, the drier air created by low-airflow design allows higher space temperature set points. A low-flow system's set point of 77°F may provide the same comfort level as a conventional system's 75°F set point. Finally, low-flow systems may be effective choices for existing buildings, whose cooling capacity can be increased without changing ductwork and piping systems.

At BryanLGH Medical Center in Lincoln, Nebraska, U.S.A., as campus facilities were added to accommodate growth in usage, the plant's chilled water distribution system needed to increase capacity. But the system didn't allow for conventional expansion to meet cooling loads. A low-flow design, combined with larger chillers, solved the problem without replacing existing pumps and pipes. Even after adding 1,000 tons of cooling capacity, BryanLGH's system consumes the same energy as before, or even less.

Building owners can choose from a range of energy-saving, system-specific control algorithms to further enhance efficiency. High-quality control systems that monitor and adjust lighting, humidity, temperature, and ventilation are key to reaping full benefits from high-performance buildings.

Start saving green now

Follow these tips to get the most out of going green:

- **Get the big picture.** Consult an experienced HVAC design specialist who can use energy modeling software to analyze each building's current and potential utility costs.

- **Make a plan.** Work with your specialist to select a system that fits your building application and locale, based on lifecycle cost. Start realizing payback at the product level, then move on to systems, and finally to the whole building.

- **Perform careful execution and commissioning.** Thoroughly document project requirements, and diligently execute the plan through the entire project. Commissioning is essential to ensure everything runs according to design intent.

- **Sustain building performance for life.** Carefully review building operating parameters and energy consumption, at least quarterly. Adjustments and upgrades can ensure that optimum performance continues for a lifetime.

Sustainable green buildings are today's smart investment. Carefully analyzed, planned, and executed, they deliver great benefit to the environment — and your bottom line.

For more information, contact: Kristin Kubicki at TRANE New York – New Jersey at phone 973-434-2136 or email: KKubicki@trane.com.

###