



Common Notions About Sustainable Design “Myth” the Point

In the April 19 issue of *Design Architecture Magazine*, architect Terry L. Belknap lets readers know that holistic design is not a bad word. His article, entitled “Nothing to Fear: Debunking Myths and Fears of Sustainable Design,” cites and refutes several misconceptions including the following:

Myth: Building “green” is more expensive.

“Some materials are more costly while others are less than their conventional counterparts, but by closely tracking prices, costs can be controlled and goals can be achieved, both financially and ecologically.”

Myth: First cost is the most important.

“This kind of logic is superficial because buildings are complex ecosystems where every decision affects many other building features. The fundamental goal is to optimize a building’s performance in terms of flexibility, comfort, functionality, energy efficiency, resource efficiency, and economic return. Today, rising energy costs have made economic success a greater challenge, but sustainability can enable us to meet and even exceed our goals. Sustainability is a holistic design approach that is good for the environment, good for the community, good for employees, and good for the bottom line.”

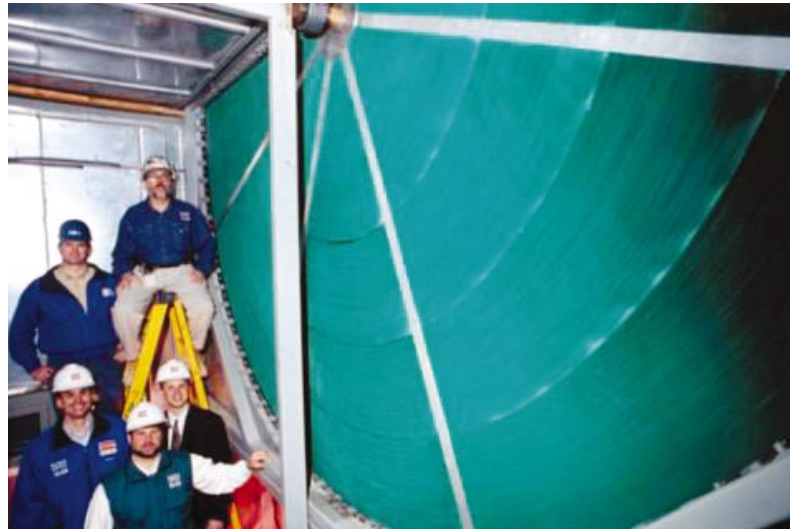
Myth: Sustainability is only a design trend.

“Sustainability in the new millennium unites ancient practice with today’s technologies. In ancient times, builders used climate-responsive design to heat and cool their structures. Following the Industrial Revolution, designers ignored site placement and climate because they had supplemental technology. Today, we must merge these disparate approaches and seek a balance of ecological nurturing and technological applications—sustainability.”

You can read the complete article at:
www.designarchitecture.com/view_article.cfm?aid=343&return=articles.cfm&Catid=343

Visit the EDR website at:
www.energydesignresources.com

ENERGY RECOVERY VENTILATORS: A BREATH OF FRESH AIR FOR MECHANICAL ENGINEERS, OWNERS AND OCCUPANTS



Credit: National Institutes of Health

A desiccant energy recovery wheel rotates between the supply and exhaust air stream of the air handling units to provide a 50-percent reduction in peak demand load for cooling and heating. In warmer months, outgoing cool air lowers the temperature of the wheel, which in turn spins through the warmer incoming outdoor air and lowers its temperature. In cooler months, the opposite occurs.

Calling all mechanical system design engineers: If you want to ensure that your project meets the latest indoor air quality standards, uses energy efficiently, and lowers peak energy demand, consider installing energy recovery ventilators that reclaim waste energy from the exhaust air stream.

Building owners and occupants are increasingly concerned about poor indoor air quality that can lead to health problems and lower occupant productivity. Indoor air quality is negatively affected by smoking, the use of volatile organic compounds, high occupancy and activity rates, airtight building envelopes, and inadequate or improperly controlled mechanical systems. Two effective ways to achieve proper air quality are to control contaminants at their source and to properly filter, heat, and cool the air. Another important element of air quality control is ventilation—the introduction of fresh outdoor air.

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A Thought to Ponder

"We shape our buildings, and afterwards our buildings shape us."-Winston Churchill

Winston Churchill used this statement twice, first in 1924 at the English Architectural Association, then in 1943 upon the occasion of requesting that the bombed-out Parliament be rebuilt exactly as before. The first time he said, "There is no doubt whatever about the influence of architecture and structure upon human character and action. We make our buildings, and afterwards they make us. They regulate the course of our lives."

NEW AIR QUALITY STANDARDS CAN INCREASE HVAC ENERGY COSTS

Traditionally, design engineers introduced ventilation air into buildings by way of the heating and cooling systems, meaning that the delivery of fresh air was tied to or limited by the controls, cycles, and sizing of mechanical equipment. Their designs included simple special-purpose or general-purpose fans that expelled conditioned air to the outdoors.

The standards set by the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) have changed fresh air requirements to improve indoor air quality. ASHRAE Standard 62-1989, "Ventilation for Acceptable Air Quality," calls for continuous ventilation based on specific occupant usage and activities. As a result, traditional mechanical design practices often miss the mark, and those practices that meet the ASHRAE standard for acceptable air quality raise HVAC energy costs dramatically.

COST-SAVING ENERGY RECOVERY TECHNOLOGIES

The solution to this "Catch-22" is energy recovery ventilation systems that can reduce the energy required to condition air by as much as 60 to 80 percent. Moreover, their added capital outlay can easily be justified in buildings with high, continuous occupancy or activity rates such as schools, institutions, and applications with more than an eight-hour workday. Further applications include buildings with specific air quality pollutants such as moisture in swimming pools or odors in kitchens and locker rooms. Return on investment depends on the hours of operation and the severity of the climate zone, but keep in mind that these systems can allow you to downsize heating and cooling equipment and reduce peak load energy demand.

Energy recovery ventilators are manufactured in a variety of sizes and configurations to suit specific applications. They include stand-alone units for individual rooms (such as school classrooms) that introduce the proper amount of fresh air as well as heat and cool the room. Also available are large, custom-designed central ventilation systems with energy recovery modules. Some units can be matched and installed with typical rooftop heating/cooling units.

Following are the most common technologies used for energy recovery:

Flat Plate Heat Exchangers: In fixed plate, cross-flow heat exchangers, exhaust and fresh air streams are kept physically

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separate by composite plates. As each airstream passes through completely separate passages, both sensible and latent energy are exchanged.

Refrigerant-Filled Heat Pipes: A traditional heat pipe is a hollow cylinder filled with a vaporizable liquid. Heat from hot, humid outside air is absorbed in the evaporating section of the heat pipe. After passing through a standard cooling coil, the “overcooled” air passes through the condenser section of the heat pipe, where the air is then reheated to a comfortable temperature.

Thermal Wheels: A desiccant energy recovery wheel rotates between the supply and exhaust air stream of the air handling units to provide a 50-percent reduction of peak demand of load for cooling and heating. In warmer months, outgoing cooler air lowers the temperature of the wheel, which in turn spins through the warmer incoming outdoor air and lowers its temperature. In cooler months, the opposite occurs.

In the long term, energy recovery ventilation systems may require some additional maintenance, because dirty heat exchangers have limited efficiencies. Building owners can expect the recovery modules to last as long as any typical mechanical equipment; however, plate exchangers are the most reliable of the three common technologies mentioned above.

For more information on this topic, see the sources used for this article:

“Ventilation Heat Recovery” in *Energy Manager Newsletter* from the Michigan State Government Energy Office at www.cis.state.mi.us/opla/erd/enmanjan00.htm.

“Energy Recovery Ventilators” by Gordon Cooke, Advanced Buildings Technologies & Practices, at www.advancedbuildings.org

You can read the ASHRAE Standard referenced above at: ASHRAE Standard 62 - Ventilation for Acceptable Air Quality, American Society of Heating, Ventilation and Air Conditioning Engineers, www.ashrae.org.

Further information is available in the following article: “Recovering Energy, Discovering Savings,” by Aaron Gotham, *Engineered Systems Magazine*, Nov.1999, pp. 94. 