

HVACR Editorial: IAQ 2013 Topical Issue

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The papers in this issue were selected from presentations made at the ASHRAE IAQ 2013: Environmental Health in Low Energy Buildings held in Vancouver Canada in October 2013. The ASHRAE IAQ 2013 conference was held specifically to review the state of knowledge regarding the balance of environmental health and energy efficiency in buildings and to help define future education, policy and research directions. The strong international participation and attendance at the conference demonstrated the relevance of the conference theme.

The designers and operators of buildings and their HVAC systems are increasingly challenged to provide a healthy environment in an energy efficient manner. Increasing pressure to reduce energy consumption has come from those concerned about building energy use as a major factor in carbon dioxide emissions to the atmosphere and the steadily growing global greenhouse gas concentrations. (IPCC 2007; California Energy Commission, 2011). Building energy efficiency is regarded as the “low-hanging fruit” in human efforts to reduce human contributions to global atmospheric carbon dioxide and its role in global climate change. (IPCC 2007)

There is currently an abundance of initiatives in both the public and the private sector to aggressively reduce building energy use. Examples are available at the state and federal levels as well as in ASHRAE (ASHRAE 2011), USGBC (USGBC 2009), European Commission (European Commission 2012), the American Institute of Architects 2030 Commitment (AIA, 2013), and Architecture 2030 (Architecture 2030, 2013). Many of these initiatives are focused almost exclusively on reducing energy use, often without measures aimed at maintaining healthy IEQ, while others cover IEQ but not as thoroughly as energy performance. ASHRAE’s Advanced Energy Design Guides (AEDGs) also pay only minimal attention to IAQ. While ASHRAE in partnership with EPA and others developed the comprehensive Indoor Air Quality Guide, its distribution has been orders of magnitude smaller than that of the AEDGs, which may reflect the relative level of interest in and awareness about the means to achieving good IAQ relative to low energy use.

The complex relationship between indoor and outdoor environmental conditions, coupled with the impacts of climate change, requires an increased focus on creating buildings that are comfortable and healthy for occupants yet also energy efficient. While most of the recent attention has focused on energy efficiency, others within the building community have continued to focus on the need to avoid energy efficiency measures that adversely affect IEQ and occupant health and well-being (Fisk et al, 2002; Levin, 2007; IOM, 2011; Levin and Phillips, 2013; Teichman, et al. 2013). Although the goal of improved IAQ and thermal comfort can be achieved by increasing energy consumption, it can also be achieved without significant increase or even with decreased energy consumption (Levin and Teichman 1991; Persily and Emmerich 2012).

The ASHRAE IAQ 2013 conference and the papers published in this issue address a number of topics relating to environmental health in low energy buildings including: Moisture and Health, Sources and Chemistry, IEQ Factor Interactions, Residential Buildings, Commercial and Institutional Buildings, Air Cleaning and Filtration, Microorganisms and Infection, and Tools.

One purpose of the conference was the identification of knowledge gaps and as a result we recommend the following priority topics for further research:

1. Field studies of IAQ and health of low-energy buildings
2. Analysis of the "sweet spot" between energy use and IAQ or occupant health. This might be accomplished through meta-analysis, modeling, or an effort to find the ideal environment from a health perspective, then the lowest energy path to achieve it.

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