

**Why are we swimming upstream? Promote comfort and energy efficiency will follow.
By Kevin Delahunt**

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In 2004, I started www.healthyheating.com with a whopping start-up budget of \$5,000 to experiment with the Internet as an educational tool. The purpose: to serve as an interpreter between the health and building sciences with a focus on thermal comfort, indoor air quality and the energy required to condition people and spaces.

The key strategy: enable discerning consumers and building owners to make better decisions regarding their choice in architecture, interior design and HVAC systems without having to become academics. With an annual operating budget of another "bank breaking" \$1,000/year we have maintained a steady course in disseminating the work of scientists from all over the world. So, what are the two key principles we have concluded to date?

1. Design for people and good buildings will follow.
2. For resilience and sustainability, improvements in first-law energy efficiency should not be done in isolation without increasing second-law energy efficiency.

I only have space in this piece to address item number one.

Let's begin by stating the obvious. Since 2004 it is likely hundreds of millions of dollars have been spent in North America promoting energy efficiency rather than focusing on the five senses that humans use to judge the built environment. So, hold that thought and consider this...the highly acclaimed Rocky Mountain Institute recently stated: "Seventy percent of whole home performance customers cited comfort as a reason for their upgrade." Stay with me on this. Comfort is a broad topic but as it pertains to the thermal part, as an example, only three percent of the industry can define it, only one and a half own the thermal comfort standards and less than one percent can list the ten key metrics. How do I know? I've asked. In fact, I've been asking audiences since 2004. If you want witnesses just ask the thousands of people who have sat in my classes.

Consumers are telling the industry they want comfort and we keep responding with energy efficiency as if the two were synonymous. I'm not a PhD, just a low life technologist trying to scratch out a living, but even I can figure out that if millions of people are looking for comfort from an industry purported to be in the comfort business, better than three percent ought to be able to define it, own the standards and be able to describe the metrics.

So, what are the consequences of investing heavily in the promotion of energy efficiency rather than comfort? Let me explain. When asked how to design a comfortable home, energy focused professionals will say design with simple geometries, orient the home and select aspect ratios for energy conservation, tighten up the enclosure, increase the levels of insulation, reduce the window to wall ratios and improve fenestration performance. Whilst all of this is true, and this will come as a shock to most, none (that would be zero) are prerequisites found within thermal comfort standards such as globally recognized and universally referenced ASHRAE Standard 55 or ISO 7730. Likewise, when asked what instruments

energy professionals use to assess a home for comfort, the default answer is blower doors and thermographic cameras and yet neither of these devices are used in thermal comfort assessments. Energy efficiency and comfort are not the same, different standards, different instruments.

So, I'm going to share with you three key points that students from my integrated design course would like industry to know:

3. Where an energy efficiency approach says adding insulation reduces energy consumption, the indoor climate approach says adding insulation results in higher mean radiant temperatures in winter and lower MRT's in summer. No occupant interviewed ever said they wanted to live in a meat locker or oven and if preventing that with insulation conserves energy all the better. The broader populace gets comfort. They generally don't get u values, conduction, kilowatts and therms and thermal bridging even though the results are the same from an energy perspective.
4. With regard to leakage, the energy efficiency approach says lower your operating costs by tightening up the building to prevent heated or cooled air from leaving and hot and cold air from entering. Whilst this is true, the comfort approach says houses that leak enable undesirable drafts, sounds, odors and untreated air into the home contributing to poor thermal quality, bad acoustics and low air quality. Again, the broader populace gets the benefits of a quiet, thermal comfortably home with air of good quality, they don't generally understand pascals, stack effect and infiltration. The results are the same from an energy perspective but only comfort speaks to consumers in everyday language.
5. When it comes to windows, energy efficiency says conserve cooling and heating energy by reducing window to wall ratios and upgrading from double pane to triple pane glass with low emissivity films and argon fills. Whilst true, the comfort approach says improving window performance prevents windows from behaving like radiators in summer and freezers in winter, mitigates glare and solar radiation which breaks down interior finishes contributing to poor air quality and destruction of property. Once again, homeowners get glare, preservation of finishes and thermal discomfort; they don't get emissivity, solar heat gain coefficients or visible transmittance.

Well, if you made it this far you likely "get it" or are arguing that this is semantics. But it isn't. Only the comfort approach starts with the occupant's senses in mind and this is the DNA for designing and constructing buildings in the first place. So, here's the thing...when you focus on comfort the light comes on in a eureka moment and people get twitter crazy. In fact, you can see the power of focusing on comfort in the messaging from Delos and the Well Being Standard® and you can see it in statistics from RMI and from the Center for the Built Environment. Global Institutes such as Harvard University, the Danish Technical University and Seoul National University and many others are advocating the benefits of comfort on wellness, learning, productivity and health. These items resonate with the general public.

This logic of putting human needs at the center of the design process is the ethos of world famous IDEO and can be applied to benefit most every aspect of energy efficiency in building design. It has been my experience over the past three decades that there are less people who start from a position of energy efficiency and more who start from a position of avoiding indoor environmental discomforts. So why are we swimming upstream when we could go with the flow? Promote comfort and energy efficiency will follow.

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