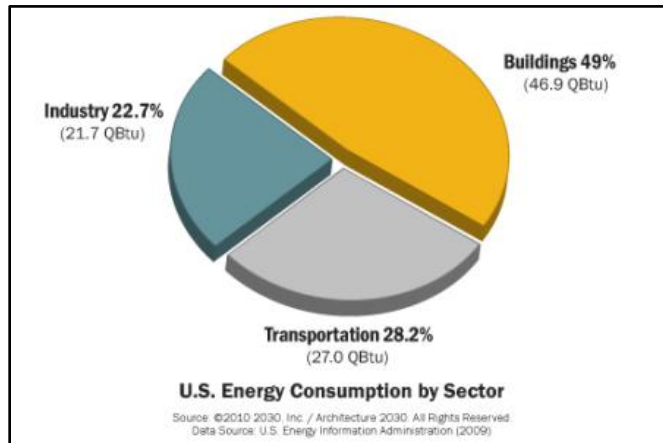


The “Moon Shot” for Building Energy Performance

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“The true sign of intelligence is not knowledge but imagination.” - Albert Einstein



There's nothing like an audacious challenge and one is certainly being set out for building energy performance. The test for building owners, facility managers, designers and contractors will be to drastically reduce energy consumption in their buildings. We're not talking about 15% or even a 30% reduction in energy consumption; something we may be able to

attain and be satisfied with in the here and now. The coming mandates and regulations, as well as the softer policies and initiatives, could require 60% or 70% energy consumption reduction and eventually net-zero buildings with the significant use of renewable energy. The teeth in this challenge will bite down hard, primarily in new construction codes which are already in the pipeline, not to mention the series of new government initiatives and imperatives that have been set forth by industry groups. What follows is a recap and assessment of some the upcoming mandates and initiatives and how they may affect the marketplace.

The International Code Council (ICC) – The ICC is the most serious of the efforts. They develop building codes for a variety of building types, addressing fire, plumbing, energy conservation, mechanical systems, zoning, etc. While the codes are “models”, they are widely adopted and used as mandates and regulations for governmental authorities. In the US most every city, county and state uses some ICC codes as the basis of their construction codes. In addition, ICC codes are used by the US federal government and are a



reference for other countries around the world. Therefore ICC activity translates into building codes and regulations adopted around the world.

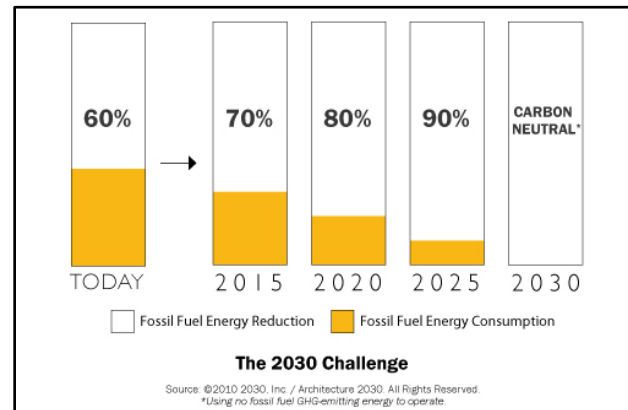
The International Energy Conservation Code (IECC) is an example of their reach. In 1998, the ICC produced the IECC which set requirements for the “effective use of energy” in residential and commercial buildings. Almost 40 US states have adopted the IECC as their mandatory state code. (Some states don’t have mandatory codes, some modified the IECC and some developed their own code.) While an important initiative, many of the adopted energy codes establish legal minimums for some, but not all energy-related features, and have been criticized for “gaps” in the general approach.

For the last two years ICC has been developing a new code, the International Green Construction Code (IGCC), focusing on new and existing commercial buildings to address green building design and performance much more comprehensively. The idea as stated by ICC is to move from voluntary green building programs and rating systems to a mandatory basis: “The IGCC is poised to produce environmental benefits on a massive scale: a scale impossible to attain with purely *voluntary* green building programs and rating systems”. This effort by ICC has been sponsored by the American Society for Testing and Materials (ASTM) and the American Institute of Architects, with coordination by the US Green Building Council, ASHRAE, IES and the Green Building Initiative (The Green Globe rating system). The First Edition of the IGCC is scheduled to be published in March 2012. The IGCC draft allow jurisdictions the latitude to identify specific requirements for energy, water, natural resources and material conservation, but at the same time reduce the choices for building designers, owners and contractors.

Central to the enforcement of the Green Construction Code is a metric referred to as Total Annual Net Energy Use (TANEU). TANEU is basically a ratio of the energy performance of the proposed design (minus energy savings from renewable energy on site and any waste energy recovered on site from the chiller plant or cogeneration) to the energy performance of a standard reference design. If you use the year 2009 for a baseline of 100, the code may require a TANEU of 77% or 65% or whatever the jurisdiction decides.

The IGCC essentially takes voluntary rating systems such as LEED and Green Globe together with industry best practices and crafts it into regulations aimed at building energy and sustainability performance. After the implementation of the IGCC via local construction codes it will be interesting to see if more buildings will become LEED certified since building owners and designers will be mandated to follow a process similar to the rating system, or whether there will be less demand for LEED certification since most buildings will have to follow similar mandates anyway.

Architecture 2030 Challenge – Architecture 2030 is a non-profit, non-partisan and independent organization with support from and coordination with AIA, ASHRAE, IES, USGBC, the US Department of Energy and many other groups and associations. The 2030 Challenge establishes a goal of "zero net energy" buildings



by the year 2030. The agreement specified energy performance targets beginning with an immediate reduction of 50 percent in energy use for all new buildings. This target increases rapidly with a 60 percent reduction in 2010, adding an additional 10 percent reduction every five years, until carbon neutral buildings are the norm by 2030. While nothing here is mandated, you have the major industry groups (AIA, ASHRAE, USGBC, IES the US government) involved and committed, with their membership of architects and engineers adhering and designing to the policies and initiatives of their organizations.



President's Climate Commitment – This is a more narrow initiative and an example of executive policy that will impact energy performance in a particular sector, in

this case higher education. It is a program American university and college presidents started in 2006 that “recognizes the need to reduce the global emission of greenhouse gases by 80% by mid-century at the latest.” Their commitment is fairly broad; new construction meeting a minimum of LEED Silver certification, purchasing appliances that are Energy Star certified, offsetting the greenhouse gas emission of travel, promoting public transportation, participating in

waste minimization, and finally probably the most difficult commitment, that is the goal of purchasing or producing 15% of the institution's electric consumption from renewable sources. While none of this is mandatory it does set policy for building energy performance higher education institutions.

Net-Zero Buildings

The end game here of the mandates, policies and initiatives and the severe reduction of building energy consumption is to demonstrate net-zero buildings (however defined) by 2025, followed by substantial deployment of such buildings by 2030, all done in concert with substantial use of renewable energy. Institutions such as the US Department of Energy and ASHRAE are supporting the effort with ASHRAE developing the tools necessary to design, build and operate net-zero energy buildings. Overall, the current number of net-zero buildings is minimal, many are associated with environmental or academic organizations not commercial buildings, and the square footage of the average net zero facility is relatively small.

The challenge of drastic reductions of building energy consumption and widespread deployment of net zero buildings is similar to the goal of landing a man on the Moon that was made 49 years ago; it has broad support, there is awareness that not all the technologies required are developed or even identified, there's a huge need and opportunity for innovative engineering, and there are eventual benefits to economies and to the world in general. In many ways however, the challenge for building energy performance is much more difficult than the moon shot; rather than one focused government agency leading the effort, reducing energy consumption in buildings will involve millions of individuals. The goals have been set and the bar is high, as we enter a transitional period where voluntary actions related to building energy performance will soon be mandatory.