The Green Architect

By Blair Seibert, AIA, LEED AP

Originally published March 2007 in the San Fernando Valley AIA Elevations Newsletter

2010 Imperative/ 2030 Challenge

Before the release of "An Inconvenient Truth," it seemed most people were unaware of global warming, or failed to understand its seriousness. Since then, a lot has changed. These days, there is a growing demand for products and approaches that rely less on fossil fuels and people have shown they're even willing to pay more for them.

Just a little more than a year ago (January 2006) Ed Mazria's New Mexico-based non-profit organization, Architecture 2030, issued the "2030 Challenge" over the Internet. The American Institute of Architects was quick to react to the Challenge with its adoption for all 78,000 of its members. In June of 2006 at the U.S. Conference of Mayors, more than 300 mayors representing more than 50 million citizens signed on to adopt the "2030 Challenge" for their cities. http://www.usmayors.org/climateprotection/

What exactly is the 2030 Challenge and why should you be interested?

America's population accounts for 5 percent of the world's population but uses 25 percent of the earth's greenhouse-gas-emitting fuels. The building sector is responsible for almost 50 percent of all greenhouse gas emissions in the U.S. Of this total, 40 percent is produced by building operations and 8 percent is produced by the manufacturing of products and construction of buildings.

Unlike cars and planes whose engines may change every decade or so, the buildings we design will demand a fixed amount of energy for the next 50-100 years. Working in the largest single sector of energy demand suggests that as building designers, we affect demand. We have an obligation to our clients and to future generations to create buildings that satisfy our clients' demands for aesthetics and function, while not requiring more of the energy that is finite and whose depletion is detrimental to the earth.

The 2030 Challenge demands that new buildings and renovations become carbon neutral by the year 2030. (Being carbon neutral means the building's operations won't release any carbon dioxide into the atmosphere. Either the building can avoid using fossil-fuel-generated energy and/or the building owner can offset the emissions through purchasing carbon dioxide "offsets".)

In order to reach the goal, an intermediate goal of reducing fossil fuel demands by 50 percent by 2010 was incorporated. These targets were developed by working backwards, according to Mr. Mazria. They were established by looking at the requirements for the year 2050, when scientists have predicted catastrophic climate change if we continue along the same course of designing, building and living.

The commitment is real and the need to understand how architects can meet these challenges is extremely important.

In order to meet the 2010 Challenge, faculty and design/engineering students were invited to participate in the "2010 Imperative, A Global Emergency Teach-In" on February 20, 2007. It was sponsored by the AIA, The Home Depot Foundation, US Green Building Council and others. Speakers included Dr. James Hansen with NASA, Edward Mazria

with Architecture 2030, Chris Luebkeman with ARUP and Susan Szenasy of Metropolis Magazine. According to its organizers, more than 15,000 people registered for the Webcast event. Many registrants were going to "broadcast" the program to staff and classrooms so the actual influence was far greater.

Reducing demand to 50 percent may sound like a huge hurdle, but we shouldn't be concerned, Mr. Mazria assures us. In the energy crunch of the late 70s the U.S. Department of Energy commissioned a number of architects to design very low-energy buildings. These architects quickly proved that **energy consumption could be reduced by 50-80 percent through a change in design alone.** The wealth of information developed by these early environmentally-friendly architects (Malcolm Wells, David Wright and others http://www.malcolmwells.com/index.html) was lost to the next generation because oil prices plummeted and the incentives and government initiatives disappeared.

Looking at some of the buildings completed within the last decade by forward thinking architects we can find a number of examples of projects that meet the 2010 goal. The Alberici Corporate Headquarters in Overland, Missouri (February 2004) and the Global Ecology Center in Stanford, California (December 2004) are examples expected to exceed base case energy use by 60 percent.

Reaching these benchmarks means thinking about energy efficiency from the very first steps. Using the Global Ecology Center as an example, the initial stages of programming included discussions about "different" ways of arranging the labs and offices. Rather than providing the typical lab with adjacent office, the professionals in the building agreed to have offices separated from the labs. This allowed for a "mixed mode" building. The energy intensive labs inhabit one floor and the open, naturally ventilated office spaces are on the other.

While I'm confident in our ability to meet the challenges for 2010, the carbon-neutral goal deserves more research. I will share what I learn with you in future articles.

Recently The United Kingdom's Guardian Unlimited published an article about the plans for the world's first carbon neutral resort in Nungwi, Zanzibar. (http://travel.guardian.co.uk/article/2007/jan/14/green.escape) The owner, Per Aquum, known for many luxurious resorts, was totally uninterested in doing an eco project at first, according to the London based designer Hywel Evans. Now Per Aquum loves the idea. While still in the conceptual phase, it is due to open next year.

Because of the following characteristics, the developers claim it will not adversely affect the environment in any negative way:

1. An infinity pool in front of each of the 35 self-sufficient villas will use water that has been naturally filtered by reeds in an adjoining pool
2. The villas will be shaped to draw the sea breeze into the bedroom for natural air-conditioning
3. Water will be heated by running under the solar panels
4. Waste water will be reed filtered and recycled
5. Buildings will be made from local earth, renewable timber and reclaimed stone
6. Staff will be given bicycles
7. Electric cars will transport guests to and from the airport
8. The restaurant will be solar powered and use locally grown food
9. Food waste will fuel a biomass generator to produce energy
10. When guests use the gym machines, the energy produced will feed back into the electrical system
11. The resort will offer training and education to local people so that they can obtain more lucrative, white-collar jobs.

Still, becoming carbon neutral is about more than changing a single building. An interesting commentary on the AIA COTEnotes Web site gave me some ideas. The author, Thomas Fisher, Associate AIA and dean and professor at the School of DesignCHK at the University of Minnesota in Minneapolis, suggested we change our consciousness about ourselves in relationship to nature in order to truly reduce

carbon emissions. Not until we stop designing "single-use buildings in single-use zones in cities accessed by single-user vehicles, using materials and products shipped from everywhere" can we begin to dramatically reduce the damage we are causing to the planet and its resources.

Akio Okumura, a currently popular Japanese architect, has received numerous honors and awards for his work as an entrepreneur. His company has built more than 20,000 solar-heated and cooled buildings including hospitals, schools and shopping malls. http://www.omsolar.net/en/about/history.html When asked about the inspiration for his unusual natural system designs, he gave credit to the American architects of the 1970s who wrote books about their findings.

It's clear that we have the ability to make a big improvement in the future of global warming if we chose to.

****

To learn more about Ed Mazria the architect that developed the 2030 challenge see: http://inhabitat.com/2007/01/29/interview-ed-mazria-from-architecture-2030/

Case studies of project around the world that greatly reduce their energy demand can be found here: http://www.architecture2030.org/case_studies/index.html

To help put our potential energy savings in perspective, here are some basic carbon facts.

-- For every gallon of gas expended, 19 lbs. of carbon dioxide is disseminated into the air.

-- Depending upon the type of energy (coal-fired, gas-fired, hydro or nuclear) and the distance from the source of the energy to the final destination (i.e. lamp in fixture) up to 100% or 1:100 of the amount needed on-site must be generated. This is due to the fact that energy is lost in transmission through the electrical lines. Coal burning emits the most carbon dioxide into the atmosphere. Therefore, on-site energy creation, no matter what type, reduces the amount of greenhouse gas emissions.

--To determine your project's carbon footprint (the amount of CO2 per square foot it emits) go to the EPA's online Power Profiler: www.epa.gov/cleanrgy/powerprofiler.htm

Blair Seibert, AIA, LEEP AP is a member of the San Fernando Valley and Los Angeles AIA. It you have any questions or comments about this article or requests for future articles, don't hesitate to contact her at 310-422-2417 or blair@verdearchitects.com.