

GLOBAL WARMING AND THE ARCHITECT - February '08

By Dean A. Biancavilla, AIA, LEED AP, Holmes King Kallquist & Associates, Architects, Syracuse, NY dab@hkkarchitects.com



We enter the New Year with a lot of work ahead of us all. What work is that you ask ? The work of beginning the implementation of the Syracuse SDAT recommendations which were released in their final form in December. Also linking the design & construction work being planned for the first seven schools of the Syracuse Central School District to the sustainable community planning component which would begin with community charrettes in the neighborhoods surrounding those seven schools. Also we need to take stock of our individual commitments to taking what actions we can to help reverse the effects of global climate change. Those stories and more we will report on in the coming months.

Our series theme – “Architects can make a difference in the battle against Global Warming by the reduction of our buildings’ energy use and consumption.”

How do we reduce our building’s thirst for energy ?

In the past we have talked about new buildings and ways that our designs can utilize energy and limited resources better. However we have not touched on existing buildings yet in this series. How does one take advantage of the energy invested in our existing building inventory ? If we think about the very materials they are made of we see that these represent huge investments of coal or oil or natural gas to produce those materials whether they are steel-framed or load bearing masonry structures or just wood framed. Also consider the transportation costs in terms of energy just to get that product or material to the site after fabrication.

Therefore one form of energy savings can be the wise and practical re-use of our existing building stock because these represent spent resources, even some that are irreplaceable...so why throw them away through demolition if they can be adaptively re-used and extend their shelf life so to speak ? European buildings are continually re-used with some over a thousand years old and successfully occupied!!

In case you haven't seen it yet, the latest issue of Preservation Magazine is all about green preservation. I like this quote from the article, "A Cautionary Tale" by Wayne Curtis.

"People often tend to think that historic buildings are inherently energy inefficient," writes Walter Sedovic, a preservation architect in Irvington, N.Y. "The opposite, though, is more likely to be true: that many historic buildings are inherently very energy efficient." As he put it when I contacted him: "Before sustainability had a name, traditional builders incorporated sustainable elements into buildings. Working in sync with the environment was the norm, including siting, local materials, natural ventilation, shading, reflective roofing, cisterns, indigenous plantings--the list becomes long, and in many ways mirrors 'new' standards espoused today."

A great article appeared recently by Michael Stanton which touched on aspects of historic preservation and how this can be viewed in light of recent advocacy of conservation of our natural resources. Namely the natural resources we have already spent in our older buildings. By adaptively reusing our older building stock rather than demolish them and filling up our landfills with demolition debris we are able to conserve those natural resources that our grandfathers and great-grandfathers utilized in the construction of those buildings, including the energy that was used to make those building materials. Brick, glass, steel, marble, tile, iron, to name a few; not to mention

the tens of thousands of hours of labor used in the making of these and installing these in buildings. Skilled labor hours which in most instances cannot not be replicated in today's unskilled labor market, ie. translate this to "craftsmanship reproduce his short article here since it relates to our theme:

Efforts to preserve our nation's historic architecture have traditionally been based on cultural, aesthetic and more recently economic concerns. But in this age of climate change and natural resource depletion, that may soon change. Important new partnerships are being forged between historic preservationists and the green building movement.

The earliest preservation efforts were to protect sites important to the nation's history – shrines to our forefathers and sites where events important in our nation's history took place. Following World War II, highway construction and "urban renewal" leveled great swaths through the nation's cities and neighborhoods. The national preservation movement arose in the 1960s in response to these events, culminating with the 1966 National Historic Preservation Act.

More recently, economic motivations have come to the fore. Across the country, restored historic districts, like Armory Square and Franklin Square in Syracuse, are serving as engines of downtown revitalization. Franklin Square developer Douglas Sutherland explained to the Thursday Morning Roundtable last year that a developer restoring an existing building can save 20 percent or more, compared to new construction. Sutherland says existing buildings are the "low-hanging fruit" of redevelopment. His advice: "Stop destroying your assets."

The city's new comprehensive plan calls for the restoration of our traditional, pedestrian-friendly neighborhoods. The plan recognizes that the restoration of downtown and neighborhood business districts requires the traditional density and mixed uses that allow these places to work.

Urban planner Andres Duany, who oversaw development of the county's new Settlement Plan, is internationally known for his traditional New Urbanist developments. When people ask him how they can move to one of these new communities, Duany and his wife suggest they consider one of the older towns that inspired their work.

Then there is the "cool" factor. Economic development guru Richard Florida says the long-term financial prosperity of any region depends on its ability to attract and retain creative people. What draws them? Florida says historic architecture is an important factor. It provides "the authenticity, the credibility, the sense of community, the sense of history that bind people in a fast-moving, 24/7, ever-changing world."

So why is the green building movement emerging as a major partner in historic preservation? The answer becomes apparent when you take into account that constructing a new building typically requires 15 to 30 times the new building's annual energy use. Thus, the most intrinsically "green" buildings are those that already exist.

Another important factor is solid waste: 40 percent of all the material going into the nation's landfills is construction debris. Twenty-five percent comes from demolition alone, but the percentage must be much higher in Syracuse where we average 300 demolition permits per year, five times as many as building permits.

Then there is the embodied energy in new construction materials. For example, new high-tech windows are more energy efficient than older windows. But when you take into account the energy required to extract raw materials, manufacture replacement windows and ship them to where they are needed, it is often more energy efficient to repair existing windows.

Historic preservation encourages the use of local labor, typically pays higher wages and provides a stable supply of work, compared with the ups and downs of new construction.

Award-winning local architect David Ashley has been called the "godfather of green design" in Central New York. His firm, Ashley McGraw, is designing the new Syracuse Center of Excellence in Environmental and Energy Systems downtown. Ashley says, "The idea of being 'green' implies . . . relying on public transportation and reducing sprawl, and tearing down buildings is exactly the opposite."

One of the first official gatherings of historic preservation and green building professionals took place in Philadelphia last October. Called "A National Summit on the Greening of Historic Properties," the main order of business was to start developing ways to reconcile green building criteria with standards for the rehabilitation of historic properties.

Differences did arise. For instance, historically accurate roof colors tend to be dark, while light-colored roofs are better for reflecting heat. The issue was resolved by acknowledging that the most important historic properties must remain true to their original character, while others might yield to energy efficiency measures like reflective roofs, photovoltaic panels and even green grass roofs.

A white paper produced at the close of the conference concluded "that the intersection of these two initiatives has the potential to generate a nearly endless array of positive results for all parties involved."

More science on the Global Warming

You may be interested in data collected from Antarctic ice cores and other sources have recorded changes over the last 600,000 years in carbon dioxide and temperature in the Antarctic was posted on the EPA website - [http://www.epa.gov/climatechange/science/pastcc_fig1.html]

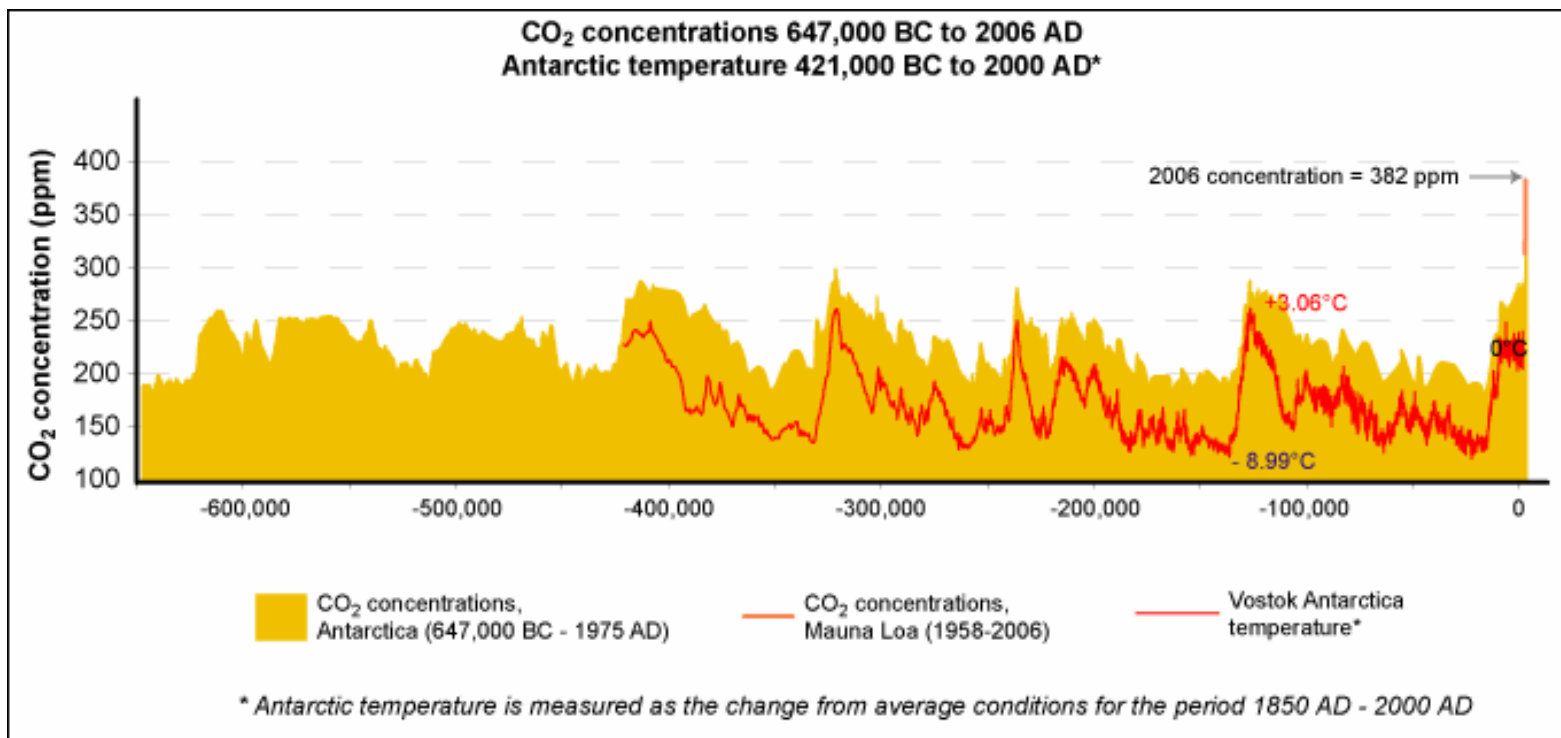


Figure 1: Fluctuations in temperature (red line) and in the atmospheric concentration of carbon dioxide (yellow) over the past 649,000 years. The vertical red bar at the end is the increase in atmospheric carbon dioxide levels over the past two centuries and before 2007.

In keeping with the idea that when we provide this newsletter series with the scientific information on global warming we also provide the sources of the data and charts so that the reader can cross-check and verify the information for themselves. So the governments EPA website is quoted above

and from that same site we list below the multiple sources of the research that went into the EPA chart.

References for the above chart -

CO2 Data

647,426 BC to 411,548 BC: Siegenthaler, U., T. F. Stocker, E. Monnin, D. Lüthi, J. Schwander, B. Stauffer, D. Raynaud, J.M. Barnola, H. Fischer, V. Masson-Delmotte, and J. Jouzel. 2005. Stable Carbon Cycle-Climate Relationship During the Late Pleistocene. *Science* 310: 1313-1317.

415,157 BC to 339 BC: Barnola, J.-M., D. Raynaud, C. Lorius, and N.I. Barkov. 2003. Historical CO2 record from the Vostok ice core. In *Trends: A Compendium of Data on Global Change*. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A.

9002 BC to 1515 AD: Flückiger, J., E. Monnin, B. Stauffer, J. Schwander, T.F. Stocker, J. Chappellaz, D. Raynaud, and J.-M. Barnola, 2002, High resolution Holocene N2O ice core record and its relationship with CH4 and CO2, *Glob. Biogeochem. Cycles*, Volume 16, Number 1, March 2002, 10.1029/2001GB001417.

1010 AD to 1978 AD: D.M. Etheridge, L.P. Steele, R.L. Langenfelds, R.J. Francey, J.-M. Barnola and V.I. Morgan. 1998. Historical CO2 records from the Law Dome DE08, DE08-2, and DSS ice cores. In *Trends: A Compendium of Data on Global Change*. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A.

1958-2006 AD: National Oceanic and Atmospheric Administration, Earth System Research Laboratory, Global Monitoring Division. 2007. [Monthly Mean CO2 concentrations from Mauna Loa, Hawaii](#). (Accessed May 29, 2007).

Temperature Data

420,765 BC to 2000 AD: Petit J.R., J. Jouzel, D. Raynaud, N.I. Barkov, J.M. Barnola, I. Basile, M. Bender, J. Chappellaz, J. Davis, G. Delaygue, M. Delmotte, V.M. Kotlyakov, M. Legrand, V. Lipenkov, C. Lorius, L. Pépin, C. Ritz, E. Saltzman, and M. Stievenard. 1999. Climate and atmospheric history of the past 420,000 years from the Vostok Ice Core, Antarctica. *Nature* 399:429-436.

More news on the science

Anderson Cooper televised a series called 'Planet in Peril' on the CNN channel over the Christmas Holidays which covered several stories that showed how the entire planet was a connected system and that the various nations were impacting each other and the environment to the detriment of both. If any of you saw some of these episodes, you might agree that the investigative reporting which Anderson normally brings to his stories was present in full force for this series special.

Coverage of the science was done by interviews with authoritative experts in their respective fields. Segments traveled the globe with stories about the Arctic ice cap shrinking and endangering Polar Bears from the Alaskan coast [the proverbial canary in the coal mine] ; Lake Chad in Africa drying up and creating life-threatening conditions for the communities surrounding it which had depended on the Lake for food, water, livelihood and survival; the loss of thousands of acres of Amazon rainforest which accelerates species extinctions and the transfer of millions of tons of carbon dioxide

into the atmosphere through mass burnings; the demonstration project in Yellowstone National Park with the re-introduction of wolves into the habitat and how it resulted in physical changes in the landscape [showing that the loss of just one species can have a crucial impact on the land so just think what hundreds of species lost must mean] ; and many more stories. If you haven't seen this series or only caught a few episodes then you can purchase copies at the following website www.cnn.org/planetinperil/DVDs.html

Local news melds with National news

Mayor Driscoll announced the release of the final SDAT report from AIA national at a press conference held at city hall on December 19th, 2007. The full report is available on the AIA website as well as the following local websites www.syracusesthenandnow.org , www.syracuse.ci.ny.gov

Next month we share this theme slot with David Ashley, AIA, senior partner at Ashley McGraw Architects, Syracuse, NY. Recipient of the Presidents' Citation at the '07 AIA CNY Chapter awards banquet.