



COLORADO REAL ESTATE JOURNAL

THE COMMUNICATION CHANNEL OF THE COMMERCIAL REAL ESTATE COMMUNITY

OCTOBER 7, 2009 – OCTOBER 20, 2009

Moving Colorado owners to carbon-neutral buildings

Gov. Bill Ritter's Climate Action Plan goal, which President Obama has adopted, calls for a 20 percent reduction in greenhouse gas emissions by 2020 compared with a 2005 baseline energy usage.

So, why do we need to create carbon-neutral buildings in Colorado? In order to achieve a 20 percent reduction, we must do much better than we are doing now in terms of what is required with regard to government mandates, policies and utility incentives.

Here in Colorado, the term "climate change" refers to temperature fluctuations that are currently linked to the pine beetle epidemic, increased health problems, water shortages, fires and the recession of St. Mary's Glacier. Coloradans – many of whom selected this state for its natural environment – should have special concern because the state's elevation strengthens the effects of global warming. Electricity and fuel consumption for residential and commercial buildings accounts for 47 percent of the total greenhouse gas emission in Colorado, so reducing the energy footprint of buildings can have a positive effect on Colorado's environment.

Next, what is carbon neutral? Passive-solar architect Ed Mazria created the 2030 Challenge (www.architecture2030.org) to highlight the impact that building industry professionals can have on climate change by committing to making all buildings carbon neutral by 2030. This means that buildings should emit no



Renee Azerbegi,
CEM, LEED AP
President, Ambient Energy, Denver

fossil-fuel GHG emissions by 2030 with incremental steps toward that goal from now until 2030. As energy consultants working with public and private building owners, we believe that carbon neutrality is attainable now. As building professionals working in Colorado, we have a heightened responsibility to change the real estate markets to carbon-neutral operation.

So, how do we accomplish carbon neutrality success?

■ **Learn from past successes.** We can learn from the days prior to air conditioning when buildings were daylit, had operable windows and were passively cooled and heated. At our houses and in our offices, we can live and work comfortably with an evaporative cooling system. In Colorado, simply utilizing evaporative cooling systems and expanding the comfort range – through choice of wardrobe and access to operable windows – will make some of the most significant changes in GHG emissions. The industry has now mastered the technology and eliminated the maintenance headaches associated with earlier-generation evaporation systems.

■ **Don't believe everything you see.** The least expensive way to build a carbon-neutral



Linda Morrison,
CEM, LEED AP, PE
Team leader, Building Performance Engineering Team, Ambient Energy, Denver

building is first to focus on the full architectural envelope (before the architect falls in love with his design). Energy modeling, if done in early concept design, can help with building massing, orientation, window-to-wall ratios, etc.

For example, those LEED green buildings that are made entirely from glass send the wrong message. Consider each façade as an opportunity to optimize glazed area with mass, heat gain and heat loss. The R-value – the effectiveness of materials, the higher the value the better – of a typical wall assembly is R-12 to R-25. In comparison, the R-value of the average commercial-grade window and window frame assembly is R-2 to R-4. Thus, it makes sense to put windows only where you need them based on orientation with wall assemblies for the rest to provide the most optimized energy solution. Bottom line: Cut the amount of glass and invest in good windows.

■ **The best resource may be under your nose.** Use energy resources available in close proximity. Natural gas often is the better choice for heating compared with electricity, for example, if it's avail-

able at your building. If you total the energy consumed at the building, called "site energy," then add the generation, transmission and distribution losses as well as the efficiency of the power plant, you get the total energy used to create the power, which is called "source energy." Coal-fired power plants, which the Energy Information Administration shows Colorado relied on for 61 percent of its electric consumption in May 2009, converts 36 percent to 48 percent of coal to electric power; the rest is wasted as heat rejected from cooling towers at the power plant. According to the Department of Energy, there also is at least 9.5 percent lost in the transmission and distribution of that electricity from the source to the site, for an overall efficiency of 33 percent to 43 percent. By comparison, natural gas is an 80 percent- to 98 percent-efficient source and uses less carbon per unit of energy.

The bottom line is that we, the building industry in Colorado, can have a big impact on climate change if we optimize facades based on orientation of each wall; naturally daylight buildings and provide passive heating, cooling and ventilation; and consider site versus source energy and total greenhouse gas emissions part of our building buying decisions.

The benefits of initiating these changes include protecting our sense of place in Colorado, maintaining the beauty of our unique landscape, strengthening the tourism industry it creates and sustaining the health of our communities.▲