

## Paints, Low-VOC

In 2006 I moved into a home that needed repainting. Since my wife is a “miner’s canary,” in terms of her sensitivity to all chemical emissions, we went in search of paint that wouldn’t leave a strong odor. After some looking, we found an “ecological” paint from a major manufacturer with only 3 grams per liter of Volatile Organic Compounds (VOCs), versus 127 grams per liter for their conventional paint. Thinking that would be just fine, we added the color we wanted and took it home. Guess what? The color added so many volatile solvents that the paint still bothered my wife significantly.

Fortunately there are options for buying low-VOC natural paints. In a city with an ecologically focused home-improvement store, you can get expert consultation on low-VOC paints. One unique approach to paint selection is at the Ecohome Improvement store in Berkeley, California. There, you can sit around a “paint bar” and a knowledgeable “paint-tender” will show you the choices.

Another approach is to choose an entirely new way to make paint. Green Planet Paints is headed by Meredith Aronson, an entrepreneur in southern Arizona with a Ph.D. in chemistry. She is beginning to hit the market with paints made from clay, marble, mineral pigments and a soy-based resin that makes the surfaces washable, all based on ancient Mayan techniques and ingredients. These paints have no VOCs at all. Of her more natural paints, Aronson says, “The environmental footprint of even ‘zero-



Ecohome Improvement, Berkeley

Paint bar at Ecohome Improvement in Berkeley, CA, designed and built by Salvage. The paint bar is made from Vetrazzo, a recycled glass countertop, and reclaimed old-growth redwood from a dismantled Bay Area water tank.

VOC' paint can include all kinds of synthetic materials to control flow, skinning, settling, etc. that ultimately don't support a vision of sustainability and goodness for the environment."<sup>111</sup>

In larger commercial settings, there are of course many options, and the LEED system has very defined rules for limiting VOCs in paints and coatings below threshold levels. These limits, 50 grams per liter for flat and 150 grams per liter for non-flat interior paints, are set by the Green Seal standard, GS-11.<sup>111</sup> They are still a far cry, however, from "zero-VOC" paints that must contain no more than 5 grams per liter.



## Paradigm Shift

Green buildings represent a major paradigm shift in architecture, engineering, construction and development. Instead of evaluating buildings on aesthetics or economics, we are now requiring that they be assessed against a set of criteria such as those which make up the LEED rating system, which look at energy, environment and health criteria. Make no mistake, this is a significant challenge to conventional wisdom and business as usual in the design and development business.

What is a paradigm? It is a dominant way of seeing the world, so embedded in our thinking that we don't/can't even consider alternatives.<sup>112</sup> A few examples are familiar to everyone: 500 years ago, proposing that the Earth was round and revolved around the sun ran counter to both religious and scientific dogma. Espousing this new paradigm was tantamount to religious heresy (think of Galileo's imprisonment in the early 1600s), yet the facts were increasingly at odds with the old paradigm. Indeed, by the time Magellan's crew returned from an around-the-world voyage in 1522, traveling only in one direction, the roundness of the Earth was no longer an issue for medieval society. Within 100 years, telescopes and careful observations by astronomers began to establish planetary rotation around the sun as fact.<sup>113</sup> To suggest otherwise today would be ridiculous.

In 1905 Einstein's remarkable special theory of relativity challenged more than 200 years of Newtonian physics that held that matter and energy were separate entities. By linking them together, Einstein overthrew the prevailing scientific orthodoxy and paved the way for a revolution in physics, as well as for atomic and hydrogen bombs, the development of nuclear power and nuclear weapons proliferation. In 1917 Einstein's

general theory of relativity blew away the notion that space and time were separate, paving the way for theories of an ever-expanding universe. In just a few years, this theory was confirmed by observation.

New research in medicine, neuroscience and other disciplines is attacking dominant paradigms about mind, body and consciousness that have ruled for hundreds of years since French philosopher René Descartes first postulated, “I think, therefore I am.” Global warming and sustainability concerns may be the forces that lead to a paradigm shift in our current dominant understanding of the world, one in which both unlimited economic growth and growing fossil fuel use are without consequence!

Given the major issues of global warming, loss of biodiversity, water and energy shortages in much of the world, green buildings represent the beginning of a paradigm shift toward truly sustainable design and development, restoration of ecosystem functioning and zero-net-energy urban settlements. As with most paradigm shifts, it’s hard to see how we’re going to get such results with our current systems of budgeting, planning, design, construction and operation of buildings and facilities. Yet, as scientist Donella Meadows famously observed in the 1990s, only a paradigm shift can make a significant change in complex human systems.<sup>114</sup>



## Passive Solar Design

Passive solar design refers to a number of intelligent building design techniques that reduce or eliminate the use of fossil fuels and electricity for heating, cooling and lighting buildings (during the day). The modern version of this traditional approach to building design was developed beginning in the 1970s and applied to a wide variety of building types throughout the US, with a focus on the West and Southwest.<sup>115</sup> The term “passive solar design” was chosen to contrast with the more prevalent — and far more expensive — active solar systems that used expensive copper or aluminum rooftop collectors and lots of fans, pumps and controls to heat and cool spaces. The idea behind passive solar design was to incorporate sunlight and natural ventilation into the basic design of the building, minimizing the need for mechanical systems. In many of the hot, arid climate zones of the US, this is an excellent design strategy. In hot, humid zones, more focus needs to be given to ventilation and less to heating.

In 1980 I built a passive solar adobe home in the San Francisco Bay