

You can't judge a building by its cover...well, sometimes you can

RETROFITTING AND SUSTAINABLE ARCHITECTURE

BY AIMEE WELCH



According to the U.S. Environmental Protection Agency (EPA), buildings and their construction account for 39 percent of total energy use, 12 percent of total water consumption, 68 percent of total electricity consumption, and 38 percent of the carbon dioxide emissions in the United States. In an era when conservation and sustainability are becoming increasingly imperative for future generations, those big numbers present a big problem.

Simply put, the majority of existing U.S. commercial buildings (all 70 billion square feet worth), aren't very green...far from it. An estimated 75 percent of these buildings were built before 1979—before energy codes existed—and before modern sustainable practices were on anyone's radar. Water-guzzling toilets, allergen-infested carpets, inefficient windows and HVAC systems—just a few of the “not green” culprits lurking inside.

But over the last few decades, the tide has started to turn. Consumers' growing demand for sustainable solutions has unleashed a green juggernaut across many industries, and commercial building is no exception. New regulatory measures and energy guidelines, advances in renewable energy, tax incentives, and the establishment of effective non-profits dedicated to supporting green building efforts have presented more tangible benefits for using sustainable building methods and technologies.

With tangible benefits comes change. As we've learned to recognize the enormous impact green building can have on the environment, the economy, human health and the greater good, we've started to change our ways. The industry is going green. From new construction projects to retrofitting old buildings, architects and interior designers are using the latest materials, techniques and technologies to bring greener living to big buildings.

SUSTAINABLE BUILDING...WHAT EXACTLY DOES THAT MEAN?

Generally speaking, buildings are considered sustainable if they're designed and built to have minimal impact on the environment, and on human health. They're constructed using technology, materials and energy systems that conserve water, reduce waste, promote a healthy space for occupants and are energy-efficient.

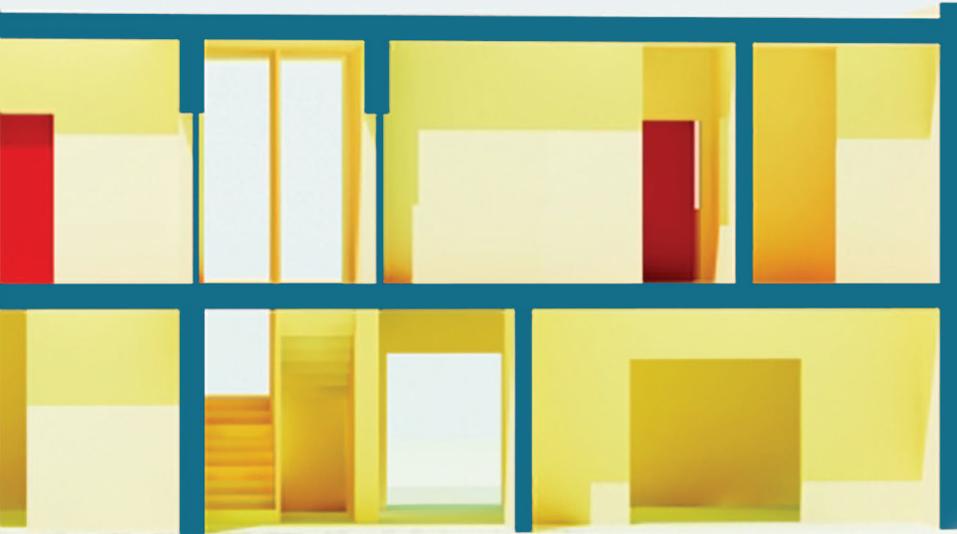
Because generalizations don't make good blueprints, in 2000 the U.S. Green Building Council (USGBC) developed the Leadership in Energy and Environmental Design (LEED) green building certification system, which is now the most widely used measure in the U.S. Internationally recognized, the LEED system includes four levels—Certified, Silver, Gold, and Platinum—which provide a framework for achieving sustainability goals in five categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality. By earning points, projects can achieve LEED status, which comes with benefits ranging from improved public perception to financial incentives.

Mark Roddy, AIA, LEED AP and design principal for SmithGroup's Phoenix office, says the introduction of LEED was a catalyst that brought greater awareness to the concept and benefits of green building. Ten years ago, LEED certification for architects was a differentiator, according to Roddy, but today you'd be hard-pressed to find an architectural firm that doesn't employ LEED certified architects. And today, architects no longer have to encourage clients to pursue LEED certifications, because they're already on board—onward!

WHY BUILD GREEN?

Well, if the sustainability of the planet for future generations doesn't suffice, there are still plenty of other compelling

THE COMMERCIAL BUILDING INDUSTRY IS GOING GREEN, INSIDE AND OUT.



reasons—the economic and social benefits of green building are becoming progressively more apparent.

According to the U.S. Energy Information Administration (EIA), buildings consume more energy than any other sector in the U.S. (including transportation and industry), and are the largest contributor to climate change. By implementing greener building designs and techniques, we can minimize pollution, enhance and protect biodiversity and ecosystems, conserve and restore natural resources, improve air and water quality, and reduce waste streams to landfills.

But the environment isn't the only winner.

“For smart business owners, it has everything to do with the bottom line,” Roddy said. And being green brings in the green through reduced operating costs, enhanced employee productivity, and increased asset value. The USGBC states, “An upfront investment of 2 percent in green building design, on average, results in life cycle savings of 20 percent of the total construction costs – more than ten times the initial investment. Additionally, sale prices for energy-efficient buildings are as much as 10 percent higher per square foot than conventional buildings.”

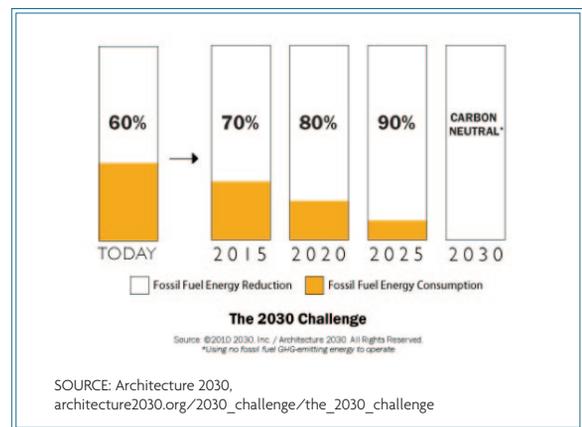
SETTING GOALS

The LEED guidelines help us build efficiently and give us good reasons to do so - but what about long-term goals? What are we really trying to accomplish and when? How about a completely carbon-neutral U.S. building sector by the year 2030? That's exactly what non-profit organization Architecture 2030 set out to do in 2002 when it issued The 2030 Challenge to the global architecture and building community. Through the use of sustainable design strategies, on-site generation of renewable power and/or purchasing renewable energy, the organization

believes this goal can become reality. This is true for a growing number of organizations, universities and businesses across the country, and from every level of government.

Many cities—including several cities in Arizona—are adopting mandatory LEED standards. In 2005, Scottsdale established a Green Building Policy, making it the first city to require new city buildings and remodels to be built to the LEED Gold certification level. And Chandler's Green Building Program requires that all new, occupied city buildings achieve a minimum LEED Silver certification.

The sustainable building stars have aligned—green organizations are in, the government is on board, technology is improving, demand is increasing. Who's up next? It's the architects and designers who really know how to pull it all together, from a building's layout to its surrounding landscape features, right down to the “green” paint on the wall.



SUSTAINABLE DESIGN IN ACTION

What's all the rage, anyway? Some of the top trends in sustainable design, according to Mark Roddy, are: 1. *Daylight views* 2. *Open office environment* (no more outer-edge offices hogging all of the windows) 3. *Minimizing energy usage* 4. *Water efficiencies*. Roddy balances all of the above as a designer at SmithGroup, and has witnessed many trends in the industry over the years.

An occasional glimpse of the sun, some fresh air, and not having to store a parka in your desk drawer in July...these are things employees of the 21st century expect, and that's why these aspects top Roddy's list. People want a high-quality work environment, and they're more productive when it's available.

INTERIOR DESIGN

Interior design means a lot more than making the inside look appealing. The finishing touches inside a sustainable building contribute heavily to indoor air quality, which, studies show, can be more polluted than even the biggest cities' outdoor air.

"Interior designers must be knowledgeable and make healthy choices when purchasing products in order to lessen/avoid sick building syndrome," said Robin Motzer, a Tucson-based award-winning interior designer with 23 years of experience. Some of those healthy choices include paints with low or no volatile compounds (low or no VOC); formaldehyde-free furniture; carpets and curtains made from bamboo, hemp or organic cotton; and eco-friendly flooring, countertops, and cabinets that do not emit unhealthy gases, collect dust mites, mold or other allergens. "I believe green means clean," Motzer said.



Photography by Robin Motzer

Robin Motzer designed this eco-friendly office using American clay for most of the walls, reclaimed hardwood and chemical-free glue. Additionally, on all walls and ceilings she used no-VOC, natural pigment paints and reused some of the existing furniture, art and accessories of the client.

LANDSCAPE ARCHITECTURE

Historically, lush green lawns surrounding office buildings, hotels and public spaces have not been uncommon in arid states. Fortunately, over the last two decades, people have started to act,

and plant, like they're living in the desert. In Arizona, sustainable landscape design practices are now considered standard practice, according to Tiffany Halperin, owner and principal at Logan Halperin Landscape Architecture.

"Ten years ago, it was more common to see clients and even municipalities default to old ways of thinking about water and the desert and insist on high-water-use landscapes, but that is not the case now. Most landscapes that are new designs or renovations utilize low-water-use plant material and drip irrigation systems," she said.

It is well known that water conservation is a vital concept in Arizona, and one of the state's fastest-emerging trends is the use of reclaimed/graywater for irrigation. However, it's not without its challenges. In many cases, cities have made the commitment to provide graywater systems for property owners but haven't yet been able to complete the systems due to funding issues.

Xeriscaping, rainwater harvesting systems and the use of permeable pavements and other non-heat-absorbing materials are other commonly used techniques, and some newer advancements are making buildings even greener...literally. Living roofs, and strategically placed green walls made with native plants cool buildings in the summer and insulate them in the winter. These methods are all highly effective in reducing energy usage and the urban "heat island" effect.

"Native and low-water plants are widely accepted and expected in this region. There is less support and/or requests to make Arizona look like Michigan or Oregon."

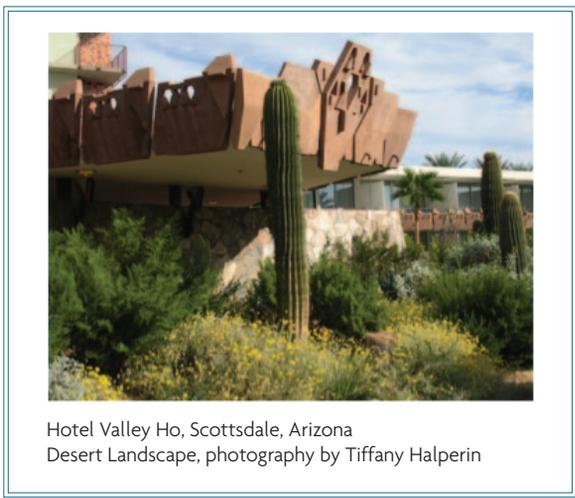
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Hotel Valley Ho, Scottsdale, Arizona
Desert Landscape, photography by Tiffany Halperin

RETROFITTING

Sustainable building is making incredible progress—the framework for building more energy-efficient, healthier buildings is in place. But what about that 70 billion square feet of energy-sucking, cubicle farming, waste-producing, toxin-emitting existing commercial space? There’s hope for those too—retrofitting. Taking what’s old and making it green.

Commercial energy retrofits often include replacement or upgrades to lighting, insulation, windows, water and waste management, and can deliver the same benefits and savings as newer green buildings. Thanks to the 2006 Energy Policy Act 179-C, which provides tax deductions for energy-efficient

design, construction, and renovation of existing commercial buildings built between 2006 and 2013, a growing number of government-funded buildings, schools and hospitals are now being refurbished.

“Using existing buildings is the most sustainable thing you can do...it’s the right thing to do,” said Mark Roddy. And while he concedes that LEED won’t solve all sustainability issues for our planet, he believes it’s a great start for the industry and, within the next 20 to 30 years, buildings could be net zero thanks to the low-tech options we’re creating today. “No electric bill. That’s where the industry is going.”

“There is an opportunity to slash energy use in half while saving money and resources within 10 years, and begin to make considerable progress toward achieving energy independence and reduced global warming emissions by retrofitting buildings to be more energy-efficient.”

- New Energy Future Reports, 2009.

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DPR HEADQUARTERS NET ZERO BUILDING

SmithGroup's Phoenix office has partnered with DPR Construction to reposition an underutilized, 16,500-square-foot, 28-year-old retail building along the new light rail corridor at Van Buren and 44th Street. Once completed, the building will serve as DPR's new headquarters, and will seek LEED Platinum status and net zero energy usage.

The building's office-less, open space floor plan utilizes existing structure and walls, allowing flexibility and the reuse of existing furniture. The design incorporates outdoor courtyards and daylight views for all employees, provided by large operable windows cut into the east and north facades and strategically placed ducted skylights throughout the facility. The design virtually eliminates the need for artificial lighting during normal business hours.

Other sustainable strategies will include a grid-tie solar power system designed to generate more electrical power than the building consumes, a solar chimney designed to improve natural air flow throughout the building, cooling towers that use water instead of Freon, and giant fans for circulation. The building is scheduled for completion in October of 2011.



THE NEXT CHAPTER IN GREEN BUILDING

Here's to the next chapter—to constructing and retrofitting our way to a carbon-neutral business sector over the next 20 years and making energy-saving sustainable building practices the rule, not the exception. That's an enormous leap forward...but is it enough?

As William Janhonen, LEED AP, NAHB-CGP recounts in his *Green Living* article "Technology versus Methodology", "We as a country have not fully embraced the building science behind the methodology necessary to use critical thinking to create long-lasting, sustainable homes and buildings." Meaning, we occupy bigger-than-necessary spaces, buy new buildings when we could fix an existing one, expect every room to be a comfortable temperature all year round, and haven't experienced life without

water, electricity and a full tank of gas. Perhaps this chapter is still a work in progress. 

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