

# At the Bioneers Conference, Living Building Challenge is a Growing Idea

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Bioneers has just celebrated its 20th anniversary conference at the Marin Civic Center in San Rafael, Calif., where I live, and I stopped in to listen to many of its speakers. The conference is known for its eclectic mix of topics and personalities, and for bubbling up disruptive green ideas that find their way into our mainstream culture a few years later.

This year, Annie Leonard (from The Story of Stuff), Dr. Andrew Weil, Michael Pollan (author of The Omnivore's Dilemma) and Jerome Ringo (president of the Apollo Alliance) were among the speakers. Also addressing the assembly was architect Jason McClennan, CEO of the Cascadia Green Building Council and creator of the Living Building Challenge.

The Cascadia Green Building Council (CGBC) was one of the first groups to embrace the LEED rating system for buildings and represents green practitioners in Canada and the Pacific Northwest. The Leadership in Energy and Environmental Design (LEED) green building rating system is a third-party certification program and the nationally accepted benchmark for sustainable design, construction and operation of high performance buildings.

The Living Building Challenge is also a voluntary third-party program of sustainable building certification that was launched by Cascadia in 2006. Its creators see it as the next step beyond LEED and a precursor to the kind of regenerative design ultimately needed. Since its metaphor is a flower, and its slogan is to design buildings as efficient and elegant, I thought I would look at it in light of my interest, biomimicry.

Rather than scoring credits, the program requires that simple prerequisites be met. Simple, in this case, does not mean easy. For a building to qualify it would have to be a zero-net energy and water user, and introduce no new toxins from an established "red list" into the environment. Additionally, it could not be built on undeveloped land. In all there are 16 requirements for such a building and the list includes a category for "beauty and spirit" that includes "education and sharing." All the prerequisites are mandatory, criteria are performance based, and that performance must be actual and documented rather than projected.

The program's developers freely admit that the bar has been set higher than current practices achieve, and have identified the biggest roadblocks to its wider adoption: Building codes and upfront costs. In some places, for instance, it is illegal to recycle water on site for drinking, and controlling the cost of sustainable materials is subject to market pathways that are still maturing.

On the other hand, there is wide latitude for innovation because the rating is performance driven. There are many different ways to achieve the general goals, and the CGBC does not concern itself with dictating best practices, reasoning that rigorous results will ensure good methods. Unlike LEED, however, the challenge provides no partial participation; you are either certified as one of the most rigorously green buildings in the world, or you are not. *GreenBiz.com* has previously covered LEED's phenomenal market success and the Living Building Challenge in its infancy.

Three years on, McClennan says the challenge has four built structures that are completing the required 12-month performance review period and about 60 projects that have declared their intention to apply. Cascadia is also about to launch a 2.0 version of the Challenge that will include landscape and infrastructure, renovation and neighborhood-scale criteria.

One of the marquee candidates for certification is the Phipps Conservatory in Pittsburg, Penn. They have an ambitious plan to create a 20,000 square foot Center for Sustainable Landscapes in a \$20 million third phase of development.

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To reach their zero-net energy and water goals, the designers have resorted to a wide combination of techniques: passive heating and lighting design, building mass, geothermal heating and cooling, dessicant dehumidification, smart building management system, photovoltaics and solar hot water collectors, wind turbines, demand controlled ventilation, sustainable materials, green roof, native landscaping, rainwater harvesting and natural stormwater collection and treatment, and constructed wetland sanitary waste treatment.

These techniques embody some of the biomimetic concepts that I have written about in this column: substituting information for energy, in the case of demand controlled ventilation where CO2 levels from occupants trigger HVAC response and therefore prevent the heating of empty rooms; surfing for free, in the case of using geothermal, where the temperature gradient between the ground and air is used to both heat and cool the building; and substituting structure for energy, in the case of all the passive forms, from shading to trombe walls to filtration beds, that harvest light, heat or clean water without the use of power.

The Omega Center for Sustainable Living (below) in Rhinebeck, New York, will, perhaps, be the first building to be certified a Living Building. It was designed by BINM Architects and was completed in May 2009. The 6,200 square foot building contains a classroom, laboratory, and a 4,500 square foot greenhouse for Omega's living machine, the Eco Machine, which will treat more than 5 million gallons of wastewater annually in a series of tanks, vegetated ponds and filtration beds.



It is not surprising that both of these pioneering projects were for clients who are in the business of educating their visitors about the very practices that their new buildings will model. For these nonprofit educational institutions the value added was worth the cost of the increased design and construction efforts. Indeed, officials at the Phipps Conservatory credit the “greenness” of their endeavor with their success at fundraising in an atmosphere of donor fatigue.

It remains to be seen if this will hold true for the next tier of applicants with more diverse missions, but the conventional wisdom that sustainable construction always has to cost more is being challenged with the clever ways that designers are saving money. For example, the Phipps Conservatory has projected a 30-40 percent reduction in capacity requirements for HVAC systems, which has implications for construction, as well as the more expected 50 percent reduction in energy usage in maintenance and operation.

The importance of integrating building systems was also a shared critical component, and that integration seems, by necessity, to have been forced beyond the buildings' walls. In order to close the loop on water, for instance, one has to both capture it outside from the air and return it to the earth for filtering. Landscape architects and civil engineers were important members of these teams because of their expertise in these kinds of systems. Finally, because of this, the very forms of the buildings themselves were determined by the demands of this integration and the collaborative design process necessary to achieve it.

While some of the techniques used to achieve certification in the Challenge were clearly using biomimetic concepts, with a few exceptions, such as bio-filtration system design, most have come from a strictly engineering tradition. Nevertheless, the trend toward more bio-innovation is evident. These tactics, however, are being generated by the individual project teams; what about the Living Building Challenge program itself?

To be labeled “biomimetic,” a third-party certification challenge that doesn't recommend specific building methods or overtly promote biological principles might seem a stretch. Moreover, the metaphorical talk of buildings as the reproductive part of a plant might also seem thin, especially to a botanist.

There is that germ of an idea, though, that is growing into a powerful meme. It is this: Why not hold nature as the ultimate measure of our success? It is precisely the same message so assiduously spread by Janine Benyus of the Biomimicry Guild all these years. Holding that idea up as a goal for a common, everyday activity like building is, let's face it, audacious, and, once we think about it, long overdue. I look forward to seeing what clever bio-designers, inspired by this challenge, come up with in the years to come.

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