

Architecture and Sustainability

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Architecture and Sustainability:

Critical Perspectives for Integrated Design

Generating Sustainability concepts
from Architectural Perspectives

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The Limits of LEED

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INTRODUCTION

The USGBC has successfully positioned LEED as the measuring stick for sustainable building in the US. Ubiquitous adoption of LEED reveals an uncritical acceptance of this rating system as a panacea for concerns of sustainability in the built environment. In light of this alarming trend, some incisive thought about the strengths and weaknesses of LEED is warranted.

LEED was privately developed by a group of building industry professionals, and the system naturally caters to their interests. Loopholes in the rating system allow developers to easily accrue points toward LEED certification and parlay this label - awarded before a project has proved it operates sustainably - into higher sales profits, municipal tax breaks, and other financial benefits. Even if the point system was restructured to demand significant improvements in building practices and certification was awarded based on actual performance, LEED would still be too homogenous to adequately measure sustainability. A nationally uniform standard is not nuanced enough to accommodate regional variegation. Sustainable development needs to be assessed and directed by programs that account for local environmental, cultural, and political conditions. As a result, legitimate concerns exist about whether the vision of this privately promulgated national standard can ever truly align with the public's best interest.

LEED should be viewed as a marketing and business tool, not a long-term solution. To see true change in building practices, we cannot rely on privately directed, optional programs. Governments must take the reins and develop contextualized sustainability standards capable of achieving measurable impact in their communities.

DEFINING SUSTAINABILITY

Effective assessment programs must accurately define what they seek to measure. LEED claims to measure green building design, construction, operations and maintenance solutions.¹ The program however upholds a particularly narrow definition of sustainability and what qualifies as "green". Coined in the 1970s and popular since the 1990s, the term "green" connotes environmental responsibility in a world where man and nature are viewed as conflicting entities. This rhetoric constructs unproductive binaries: man versus nature, the built environment versus the natural environment (Figure 1). In reality, man and nature are part of a single ecology with a complex network of interactions - not a one-way cycle of damage. We must search for a more productive understanding of this relationship and expand our definition of sustainability beyond environmental impact and energy consumption.

Abstract

LEED, Leadership in Energy and Environmental Design, is a sustainable building certification program established by the USGBC, United States Green Building Council. The rating system proffers a positive first step toward sustainable growth by injecting the topic into public discourse. As a privately developed, nationally uniform approach, LEED fails to address public interests at a community level. Local governments must take control to establish more efficacious, regionally appropriate sustainable building programs. When crafting these mandates, municipalities must think beyond the architecture of single buildings to address those larger scales of development that characterize contemporary urbanization.

An apropos definition of sustainability would value economy and affordability. On the contrary, LEED implies a positive correlation between cost and sustainability. Affordability receives scant consideration. The current system places tremendous value on expensive building products and technologies while downplaying passive strategies and common sense. A LEED pursuant can earn points for purchasing mechanical louvers that protect his building from solar heat gain; he does not, however, lose points for deciding to orient the building's glazed façade toward the sun and enabling excessive heat gain. The system is rife with contradictions that force people to choose between affordability and sustainability. This is a function of the conflict of interest inherent when members of the building industry, via USGBC, are determining what constitutes sustainable building.

The certification process itself poses a financial hurdle that limits participation to only those clients who can afford it. Instead of paying \$30,000 for certification processing, the Park City Utah Sports Complex opted to invest this money in testing wind turbines capable of powering their facility. As Park City decided to allocate its resources toward renewable energy rather than purchasing the LEED label, the USGBC did not classify the project as an environmentally responsible development. Such examples prompt us to consider whether the USGBC values the label of sustainability over actual sustainability. Private developers who can afford to purchase certification generally leverage LEED status to stretch profit margins by marketing buildings as environmentally friendly and demanding higher rates from buyers. Consequently, end-users ultimately pay more to occupy a "green building". For the USGBC this poses no contradiction; in the LEED metric, affordability and economy are not determinants of sustainability. They should be.

The personal health of building occupants, builders, and neighbors is another critical component. LEED hardly factors personal health into its equation. A mere 6% of points available toward certification address indoor air quality, perhaps the top determinant of human health in the built environment.² Despite the well-documented detrimental effects of off-gassing from toxic building materials, indoor environmental quality goes largely ignored. LEED's promotion of buildings that are increasingly airtight for the sake of energy conservation only exacerbates the potential damage from noxious gases emitted by highly processed chemical compounds present in most modern structures. Considering Americans spend an average of 90% of their time indoors, and as much as 97% for children fixated on media, LEED's misdirection is creating a dangerous public health scenario.³

RATING SYSTEM FLAWS

Many critics have rightfully pinpointed glaring mistakes and omissions within the LEED rating system.⁴ Among these mistakes is the privileging of energy savings as the primary determinant of sustainable building. Nevertheless, energy is what LEED was designed to measure. The rating system, however, certifies the potential for energy efficiency, not actual measured energy savings. LEED certifies projects before occupancy and use, basing its ratings on design intent and computer models that predict performance. Certifying projects before occupation is problematic considering the significant influence oc-

cupants have on energy usage. Optimal building performance requires educated users who understand how to operate the building. Taking a step in the right direction, the USGBC recently added a requirement for occupants to report on the energy performance of their structures for a five-year period after construction.

Another cause for concern is LEED's inexplicable points-to-impact calculator. Points are not weighted according to a design element's efficacy or impact. Many low-impact design appendages such as signage carry the same weight as high-impact, resource intensive strategies like brownfield remediation. Recognizing this loophole, builders seek the cheapest path to certification - resulting in minimal to no improvement on sustainability and inconsistent standards. To eliminate inconsistency and ensure certified projects meet a baseline standard of sustainability, the points-to-impact needs recalibration.

Even a well-calibrated checklist has inherent limitations and biases. Checklists are prescriptive. They steer designers toward specific ways of achieving "sustainability." With LEED, designers must utilize building products and technologies. But why does LEED have a bias for products? For one, it makes the certification process easier and cheaper for USGBC. Product specifications provide assumptions about performance - low emission paint will emit x% less noxious gasses than standard paint - making the potential impact easy to calculate. Otherwise, measuring the impact of underlying design decisions and passive strategies - optimized floor layouts or good solar orientation - takes more effort and requires post-occupancy evaluation. LEED was designed to offer minimal points for these underlying design decisions that generally have much greater impact on a project. This bias unfortunately deters designers from imagining creative sustainable solutions that go beyond a simple amalgam of green products.

In addition to limiting creativity, a prescriptive program with a nationally uniform point system enforces a one-size-fits-all approach and does not account for regional character and site specificity. The definition of sustainability is highly dependent on context and the natural, social, political, and economic environment of a place. The route to achieving sustainable development differs from city to city, even project to project, and continues to evolve in response to fluid contexts. By attempting to provide a single guideline for all US contexts, the LEED point system ignores this key characteristic of sustainability and creates unequal opportunities for certification. For example, projects earn points for being sited near a transit hub.⁵ Proximity to a transit hub can be viable for commercial and residential buildings, although not preferable for all project types. A large industrial complex may be more appropriately located away from a bustling city center for spatial, acoustic, and logistical concerns. These idiosyncrasies are overlooked. The industrial complex has less point-earning potential and a smaller chance of certification than other projects. Similarly, LEED undiscerningly offers points for water protection measures regardless of project location. In the drought stricken desert of Las Vegas, Nevada, water protection is far more challenging and valuable than in rainy Seattle, Washington. Should a project that manages to protect water in the desert earn the same number of points as its counterpart in a wet region?



Figure 1: LEED's misguided definition of sustainability places architecture in opposition to the environment instead of in symbiosis with it. Source: "Chrysler Building," Wikipedia, last modified July 7, 2013, https://en.wikipedia.org/wiki/Chrysler_Building. "Aerial view of the Amazon Rainforest, near Manaus, the capital of the Brazilian state of Amazonas. Amazon - Brazil, 2011," Neil Palmer, accessed July 10, 2013, www.flickr.com/photos/cifor/5660237957/.



Figure 2: Unsustainable building practices can result in localized externalities and harms, such as energy over-consumption, landfill overcrowding, and poor water quality. Source: Nicolas Rivard (2013)

LEED OR THE LAW

Despite a history of ecological degradation, governments have traditionally given minimal consideration to the effects of building practices. Since the industrial revolution, the story of constructing and operating buildings has been a compounding of negatives: expend the earth's natural resources and produce harmful environmental effects. At this point, buildings and infrastructure contain nearly 90% of all materials ever extracted from the earth; in return they generate almost 40% of all greenhouse gas emissions and 30% of all landfilled materials.⁶ Should governments take action to address these local, regional, and global consequences, or is LEED adequate for realizing significant change in the US building industry?

The key to reforming building practices is enacting an appropriately oriented framework with enough authority to spur change. LEED is not that framework. We have already discussed the program's misguided definition of sustainability and restrictive point system, but more importantly LEED lacks authority and sufficiently strict standards. Many certified projects exhibit unsustainable performance.⁷ Even if the standards were strict enough to modify building habits, the program is voluntary and incapable of enforcing change. Governments must take the lead. Unlike privately promulgated standards, ordinances established by the government can require compliance by all members of the building industry. So how should different levels of government work together to take responsibility for the built environment?

Many experts are calling for international regulation of building practices. They present two supporting theories. First, the "Matching Principle," which argues that the size of the geographic area affected by a problem should determine the governmental level of response.⁸ Accordingly, international mediation would seem appropriate in lieu of global environmental concerns. Second, a "Race to the Bottom" argument that in the absence of international regulation, local governments eager to attract investment will lower the level of environmental protection required in their jurisdiction.⁹ But before buildings ever contribute to global environmental problems, they affect the communities where development begins (Figure 2). The desire to minimize localized consequences such as water and energy over-consumption, erosion and sedimentation, and degraded air quality should give municipal governments enough incentive to mandate sustainable building practices within their jurisdiction. Think NIMBY. If governments care about the future of their own communities, there will be no race to the bottom. As these local governments begin acting from self-interest, their efforts will have a positive collective impact on global environmental issues.

Governing sustainability at a local level has several advantages. As US municipalities are charged with issuing building permits, they have the power to enforce sustainability regulations by withholding permits until projects demonstrate compliance. Additionally, municipal governments can impose property tax penalties for buildings that fail to meet specified post-occupancy criteria. Local regulation will also allow for a contextualized approach to sustainability. As with successful architecture, local legislation should demonstrate a contextualized, native understanding of how buildings interact with their endemic environment.

EXISTING FRAMEWORKS

Accepting the municipality as the appropriate entity for governing sustainability, let us examine possible frameworks for enactment. Currently, there are three dominant trends among US cities attempting to usher in a new regime of sustainable building, all of which rely on the LEED system: (1) municipalities that incentivize LEED certification by offering expedited permitting and tax breaks; (2) municipalities that require LEED certification before issuance of a municipal construction permit; (3) municipalities that indiscriminately adopt LEED standards into local law.

Trend 1. Las Vegas, Nevada is one of 200 jurisdictions nationwide that currently gives LEED builders tax breaks and other incentives. When a city incentivizes developers to achieve LEED, the conversation shifts from environmental stewardship to financial gain. The city subsequently relinquishes its authority and empowers a private interest group, the USGBC, to decide which buildings are sustainable enough for a taxpayer subsidy. In 2008 the Las Vegas Sands Corp. was developing its Palazzo Hotel and Casino and needed just a few more LEED points to earn a \$27-million tax break from the city. To win the cash prize, the company made a few last-minute design alterations: adding bike racks in the garage and printing room cards to inform guests when towels are replaced (Figure 3). These "green" afterthoughts ultimately cost Las Vegas taxpayers millions and have done little to minimize the impacts from building the 50-storey casino complex in the desert. When relying on LEED's poorly calibrated point system, cities that remunerate developers for certification often pay a steep price for faux sustainability.

Trend 2. Since 2008 the City of Los Angeles has mandated LEED certification for all new buildings over 50,000 square feet or 50-units¹⁰. LEED certification as one of the requirements for a building construction permit raises questions of practicality and timing. How can LEED be a prerequisite for a building permit when the certification is awarded after construction occurs? In light of this timing issue, cities accept proof of compliance with LEED standards and do not require the actual certification. Given that initial design and final construction are rarely identical, municipalities that forego verification upon final construction risk having buildings that do not match their salubrious intent. Cities seeking measurable change in development practices must look beyond design intent and demand proven performance.

Trend 3. For the New York State tax law on green building credits, standards for building materials, finishes, and furnishings were adopted directly from LEED¹¹. Absorbing LEED into local laws makes sense from a human resources perspective. This method allows a city to institute a sustainable building program more quickly and economically when compared to developing independent standards. However, municipalities that undiscerningly absorb LEED standards into their laws and accept responsibility for enforcing compliance still face many of the same challenges: reliance on standards set too low to achieve real benefits; operating under a rigid, one-size-fits-all view of sustainability; and most importantly, allowing a private interest group to dictate public policy.

Defining and governing sustainable building at a municipal level will take significant effort. State and federal governments also have important roles to play. A multi-level



Figure 3: From 2005 to 2010, the Palazzo and six other LEED projects in Las Vegas saved a combined \$138 million in taxes by incorporating "green" features. Source: "Hotel Lies," Alan Levine, last modified April 28, 2008, www.flickr.com/photos/cogdog/2451665887/.



Figure 4: Municipalities must begin think beyond the architecture of single buildings and address the larger scales of development that characterize urbanization today. Source: "Aerial image of Christchurch suburbs," Wikimedia Commons, last modified February 27, 2011, http://commons.wikimedia.org/wiki/File:Aerial_image_of_Christchurch_suburbs_-_Flickr_-_NZ_Defence_Force_%282%29.jpg.

approach is needed. New national legislation should require local governments to take charge of building practices and offer human and capital resources to municipalities for taking on this new responsibility. Cities that avoid shortcuts and invest in thorough development processes will be rewarded with an efficacious framework for realizing measurable changes in development practices.

SCALING OUT

Given the limits of LEED, local governments - not private interest groups - should establish sustainability standards for the built environment. Governmental frameworks are enforceable, can expand the definition of sustainability, and account for regional variegation. Global change starts with local action. Effective local action will consider that development today consists of blocks, landscapes, and territories with implications dwarfing those of single buildings (Figure 4). Rome wasn't built in a day, but today cities twice the size of Rome are being built seemingly overnight. To respond to contemporary scales of development, governments should shift from individual building assessments to cultivating a culture of sustainability. Ultimately buildings do not achieve sustainability, people do.

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