



Touchstone for Sustainable Development? The Promises and Pitfalls of LEED-ND

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TOUCHSTONE FOR SUSTAINABLE DEVELOPMENT? THE PROMISES AND
PITFALLS OF LEED-ND

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ABSTRACT

The way human settlements are planned and arranged is a crucial dimension of environmental and societal sustainability. Accordingly, the US Green Building Council, Congress for the New Urbanism, and Resources Defense Council developed and released a nationwide standard entitled Leadership in Energy and Environmental Design for Neighborhood (LEED-ND) to promote and recognize development designed to be friendlier for communities and the environment. The three goals of the present study are: to assess the function and viability of LEED-ND as a tool for fostering sustainable development, to develop a research agenda by which to judge the program's success, and to advance the way research is communicated between researchers and to the general public. Toward these goals, the study employs a qualitative research design in which interviews are conducted with key participants from the program's pilot phase. Results provide early, subjective evidence that the rating system will be successful, so long as it is able to adapt and evolve amidst the complexity and volatility of the development world.

BIOGRAPHICAL SKETCH

Adam M. Weber, the son of Gary B. and Lorrie K. Weber, was adopted from Bogotá, Colombia on 21 January 1985. Shortly thereafter, following a prosperous childhood and tumultuous adolescence, Adam graduated from the Mechanicsburg Area Senior High School in May 2003. Subsequent to his high school graduation, Adam set out from his hometown of Mechanicsburg, Pennsylvania in pursuit of a Bachelor of Arts degree in Psychology at Ithaca College in Ithaca, NY. After completing his undergraduate course of study in May 2007, Adam resolved to remain for two years more in the mythical, magical city of Ithaca, this time in pursuit of a Master of Science in Human-Environment Relations at Cornell University. Almost exactly three years later, at the dawn of the second decade of the second millennium, Adam has finally terminated his formal education – barring the unlikely event that he decides to chase a doctoral degree. Fresh from the surreal world, Adam M. Weber wonders.

For my grandfathers

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I wish to offer heartfelt gratitude and respect to:

1. God

Parents

Country

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Introduction

As of 29 April 2010, the Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND) rating system became available for use by the general public. The release of LEED-ND will likely cause manifold changes to the way growth takes place in the U.S. and beyond. Because of the magnitude of its potential impact on policy, planning, and development, LEED-ND demands careful scrutiny from the research community.

In response to this necessity, the present study seeks to advance a discourse on the nature and merits of the LEED-ND program. The first component of the research explores what role, or function, LEED-ND might assume in the real world of development. The second addresses several critical issues related to its implementation. These issues include: its applicability to various development settings, the factors that will speed or slow its widespread adoption, its effect on the provision of affordable housing, and its procedures for certifying projects. The research findings are then used to outline a research agenda by which to judge the success of the LEED-ND program.

To date, very little research has been published directly on LEED-ND. The research is thus designed to be an inductive, or bottom-up, investigation. Absent a preexisting theoretical framework to evaluate the LEED-ND program, the study seeks to identify critical issues related to its function and implementation in order to draft a pragmatic series of hypotheses for use in future research. In other words, the present study seeks to gather all the puzzle pieces involved in examining LEED-ND so other researchers may more easily figure out how to put them together.

To grant some preliminary insight into this novel research subject, the study employs a qualitative research design. First, to establish a sense of context, a brief background summary is provided regarding the historical and philosophical

underpinnings of the LEED-ND initiative. Then, existing academic literature and published expert opinion are used to characterize the promises and pitfalls of LEED-ND, as per its draft and pilot versions. Finally, semi-structured interviews with key individuals involved in various pilot projects are used to corroborate and elaborate the current understanding of the mechanics of LEED-ND.

What It Is

LEED for Neighborhood Development is a point-scale rating system that encourages and certifies sustainable development at the neighborhood scale. It serves as a comprehensive evaluation program for urban design and planning (Martin, 2008). It is market-driven, voluntary, and intended to go above beyond the regulatory requirements of local zoning ordinances (Garde, 2009).

The rating system consists of a set of prescriptive criteria that comprise the principles of urbanism, green building, and smart growth. These criteria, in the form of 12 prerequisites and 110 aspirational credit points, are organized into five categories that address various aspects of a project's design.



Figure 1. Breakdown of points in LEED-ND

These categories, effectively weighted by the point distributions shown in Figure 1 (LEED, 2010), include Smart Location and Linkage, Neighborhood Pattern and Design, Green Infrastructure and Buildings (formerly Green Construction Technology), Innovation and Design Process, and Regional Priority Credit. The intent of each of these categories is listed in Table 1 below (USGBC, 2010).

Table 1. Intent of LEED-ND credit categories

Category	Description
Smart Location and Linkage	<ul style="list-style-type: none"> • To encourage development within and near existing communities and public transit infrastructure. • To encourage improvement and redevelopment of existing cities, suburbs, and towns while limiting the expansion of the development footprint in the region to appropriate circumstances. • To reduce vehicle trips and vehicle miles traveled (VMT). • To reduce the incidence of obesity, heart disease, and hypertension by encouraging daily physical activity associated with walking and bicycling.
Neighborhood Pattern and Design	<ul style="list-style-type: none"> • To promote transportation efficiency, including reduced vehicle miles traveled (VMT). • To promote walking by providing safe, appealing, and comfortable street environments that support public health by reducing pedestrian injuries and encouraging daily physical activity.
Green Infrastructure and Buildings Innovation and Design Process	<ul style="list-style-type: none"> • To encourage the design, construction, and retrofit of buildings that utilize green building practices. • To encourage exemplary performance above the requirements set by the LEED for Neighborhood Development Rating System and/or innovative performance in green building, smart growth, or new urbanist categories not specifically addressed by the LEED for Neighborhood Development Rating System.
Regional Priority	<ul style="list-style-type: none"> • To encourage strategies that address geographically specific environmental, social equity, and public health priorities.

LEED-ND certification consists of three stages, because it is aimed at neighborhood-scale projects, which usually take years to reach full build-out (Garde, 2009). The three-stage approach allows applicants to make sure they are abiding by the system's guidelines. It also allows them to leverage LEED-associated approval to more quickly overcome the various permitting obstacles that can delay the progress of a development project. With Stage 1 certification, which is optional, projects for which 50% or less of the total square footage have received land-use entitlements are recognized with a Conditionally Approved Plan. Stage 1 certification is intended to help projects secure financing, expedite the permitting process, and attract prospective tenants. In Stage 2, projects that have received their entitlements and have completed 75% or less of construction can receive a Pre-Certified Plan. Stage 2 acts as a checkpoint in which projects reaffirm or reestablish compliance with the standard. The certification process culminates in Stage 3, in which projects become Certified Neighborhood Developments.

Where It Came From & How It Was Developed

LEED-ND is the most recent addition to the LEED family of rating systems. LEED, launched in 1998 by the U.S. Green Building Council (USGBC), is a national standard for certifying environmentally responsible buildings. Since its inception, LEED has quickly become a popular standard for recognizing environmentally responsible building practices.¹ Owing to its rise in popularity, the USGBC has developed rating systems to deal with specific building types, ranging from homes to healthcare facilities. LEED-ND differs from the other systems under the LEED banner in two important and related ways. For one, LEED-ND expands the purview of the LEED program. Whereas its predecessors focus almost exclusively on the

¹ On 8 March 2010, the organization that handles the actual certification of LEED projects, the Green Building Certification Institute (GBCI), announced the certification of the 5,000th project under the LEED program. (GBCI, 2010)

environmental performance of individual buildings, LEED-ND addresses the sustainable design of whole clusters of buildings and their related infrastructure. The creation of LEED-ND represents an evolution in how sustainable development is conceived; it is a response to the realization that “no building can be considered truly green unless it’s in a green urban neighborhood.” (CNU, 2009) According to Rick Fedrizzi, the USGBC’s President, CEO, and Founding Chair:

LEED-ND is the next generation of green building thinking. By applying what we’ve learned about individual green buildings to entire neighborhoods, we’re linking urban planning and environmentally friendly design and construction in a whole new, beneficial and healthy way.

LEED-ND can be applied to new, existing, whole, partial, or multiple neighborhoods (USGBC, 2010). Furthermore, it is intended for primarily urban, but also suburban settings. It is not designed for use in existing institutional campuses, and though not explicitly stated within the rating system document, it is putatively not meant for use in rural settings.

ND also differs from the other LEED rating systems in that it is the product of a multi-party effort. The rating system was developed by a partnership between the USGBC, Congress for the New Urbanism (CNU), and the Natural Resources Defense Council (NRDC). CNU, founded in 1993 by a group of architects, considers itself the leading organization promoting walkable, neighborhood-based development as an alternative to suburban sprawl. CNU advocates its position “by educating other design professionals, policy makers, and the public; by changing policies and practices that perpetuate destructive development practices; and by forming a network of like-minded groups that can effect change at all levels,” (CNU, 2000, p. 2). The Natural Resources Defense Council, founded in 1970, is a national nonprofit organization devoted to safeguarding the Earth’s people, plants and animals, and natural systems.

As an environmental action group, the NRDC represents an expansive grassroots network on diverse issues ranging from global warming, to environmental justice, to smart growth.

As a consequence of their partnership, the interests of each of these organizations are reflected in the tenor and composition of the LEED-ND criteria. In this way, the standard is a respective blend of the principles of green building, urbanism, and smart growth.² Green building can be understood in terms of the single building-related categories of the other LEED rating systems. These include Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. The rating system's New Urbanist contributions were derived from the 27 principles delineated in the CNU's Charter. These principles offer design guidance for the various levels of development, including The Region: Metropolis, City, and Town; The Neighborhood, The District, and The Corridor; and The Block, The Street, and The Building. Finally, the smart growth elements were derived from the movement's ten principles, which are outlined by the NRDC's partner, the Smart Growth Network. These principles relate to issues of Community Quality of Life, Design, Economics, Environment, Health, Housing, and Transportation.

The release of LEED-ND represents the culmination of nearly a decade of research and development on the part of the USGBC, CNU, and NRDC. The process began in 2003, when a Core Committee of 15 individuals was appointed by these organizations to produce a draft of the rating system (Javid, 2007). In 2005, the Core Committee completed its task, and shortly thereafter, the first version of LEED-ND was subjected to a larger Corresponding Committee for 45-day comment period. After revising the rating system's criteria in response to the more than 4,000

² As a point of clarification, whereas green building is to the USGBC as urbanism is to CNU, smart growth is only one of numerous issues that compose the NRDC cause.

comments received, a finalized version was introduced for pilot in early 2007 (Farr Associates, 2008).

The pilot phase, which took place from 2007 to 2009, allowed the rating system to be tested – and popularized – in the real world. Of an initial pool of more than 370 applicants (Black, 2008), 238 projects were ultimately included in the pilot. Of these, 205 are distributed throughout 39 U.S. states, with the remaining 33 located in 5 foreign countries (USGBC, 2007). Most of the pilot projects are located in urban areas and along the country’s east and west coasts (Criterion Planners, 2007). California is the state with the most projects with 54, while Washington, D.C. is the city with the most with 10 (Criterion Planners, 2007). During the pilot phase, two more comment periods – this time accessible by the general public – were held in addition to numerous conference calls and focus groups with pilot project participants. The goal was to obtain as much feedback about the rating system as possible. It is important to mention that throughout this process, the USGBC and its partners have been proactive and forthcoming in making available many of the details regarding the rating system’s research and development. Based on the pilot experience, five changes were made to the rating system’s fundamental structure (Campagna, 2008), in addition to numerous errata corrections. As noted, the finalized version of LEED-ND was made publically available on 29 April 2010. To mark the occasion, celebratory ceremonies were held in Washington, D.C. and Chicago (Benfield, 2010), the latter being the home of CNU’s headquarters. Subsequent to its release, LEED-ND is now in a three-year evaluation process; major changes will not be made until at least 2012 (The Architect’s Newspaper, 2010).

Scientific Support for Purported Benefits

Researchers have already begun to investigate the claimed environmental, social, and public health benefits offered by the USGBC and its partners regarding the

LEED-ND development model. Ewing and Kreutzer (2006) report on the body of literature examining connections between the built environment and a number of variables related to public and social health, which are listed in Table 2. Based on their review, Ewing and Kreutzer find these variables related to various aspects of urban design, also shown in Table 2.

Table 2. Ewing and Kreutzer (2006) dependent and independent variables

Hypothetical Dependent Variables – Public and Social Health Issues	Hypothetical Independent Variables – Aspects of Urban Design
<ul style="list-style-type: none"> • Respiratory and Cardiovascular Health • Fatal and Non-Fatal Injuries • Physical Fitness • Social Capital • Mental Health • Special Populations 	<ul style="list-style-type: none"> • Regional Accessibility/Location of Development • Population and Employment Density • Land Use Mix • Access to Transit • Streetscape Design/Pedestrian Amenities • Bicycle Amenities • Access to Recreational Facilities • Distance from Roadways • Diversity of Population/Income in Communities • Roadway Network • Street Cross Sections

Of the hypothetical dependent variables included in their review, Ewing and Kreutzer (2006) find the design of the built environment to be most strongly

associated with respiratory and cardiovascular health, as well as fatal and non-fatal injuries. For respiratory and cardiovascular health, the pair of researchers trace a lengthy chain of causality between disparate studies to uncover a connection with the built environment. According to their theoretical model, compactness of development and organization of transportation infrastructure affect number of vehicle miles traveled (VMT), which affects pollution emissions and walking behavior, which in turn affect respiratory and cardiovascular health. The relationship between fatal and non-fatal injuries is more direct. Increased VMT, increased travel speed, and street environments with little bicycle and pedestrian traffic – variables influenced by the design of the built environment – have all been shown to be associated with increased traffic-related injuries for both drivers and pedestrians.

Ewing and Kreutzer (2006) find weaker support for the relationship between the physical environment and physical fitness, social capital, and mental health. They identify various methodological flaws in the physical fitness studies conducted thus far and regard the pertinent social capital and mental health research as fledgling. Ewing and Kreutzer conclude their review with a call for further research regarding the suggestion, based on scant research, that auto-dependent land use may disproportionately affect special populations including women, children, the disabled, the elderly, low-income populations, and the disabled.

For all these variables, Ewing and Kreutzer indicate that the evidence supporting a relationship between the built environment and public health is correlational, effectively ruling out absolute causal inferences. Though they seem to favor the likelihood that the urban design features listed have a causal influence on each of these public health variables, they leave the onus of proof to future research.

In 2007, an interdisciplinary panel of experts, sponsored by the Centers for Disease Control convened to identify, line by line, which LEED-ND criteria could be

linked to public health benefits (Farr Associates, 2008). The panel, which reviewed the pilot version of the rating system, identified four of the nine prerequisites to be relevant to public health. Of these, they found two (50%) to be consistent with public health data (Farr Associates, 2008). The panel identified 47 different topics addressed by the rating system's criteria, of which 21 were relevant to public health. Of these 21, they found 19 (90%) to be consistent with public health data or expert opinion. The panel classified the remaining prerequisites and credit topics as opportunities for future research. In its concluding recommendations to the LEED-ND Core Committee, the panel noted that much of the evidence linking the built environment to public health is based on correlation (Farr Associates, 2008), thus limiting the ability to state that specific aspects of urban design cause specific public health outcomes.

To these findings regarding public and social health, Younger, Morrow-Almeida, Vingidni, and Dannenberg (2008) add that the built environment also impacts climate change. Specifically, Younger *et al.* (2008) find ample support that greenhouse gas emissions are directly related to three components of the built environment: transportation, buildings, and greenfield land use. For each of these components, these researchers delineate a strategy for ameliorating the relationship between the built environment, climate change, and public health. Several times, Younger *et al.* (2008) specifically call for the adoption of LEED-ND guidelines in their recommendations.

Taken together, the conclusions of Younger *et al.* (2008), Ewing and Kreutzer (2006), and the ad hoc panel of experts (Farr Associates, 2008) lend modest credibility to the claimed benefits of the sustainable development principles embodied in LEED-ND. It is reasonable to conclude that they will have some degree of positive impact on environmental, social, and public health. Before moving on to a discussion of the

potential negative effects of LEED-ND, a word about judging the program based on its empirical support. As indicated above, irrefutable causal evidence linking the built environment to environmental, social, and public health is, as yet, lacking. However, concerning sustainable development strategies, it is advisable to act according to the precautionary principle. Given the stakes, those involved in the formation of the built environment should not wait for definitive scientific evidence before applying what are otherwise sensible design principles.

Limitations, Shortcomings, and Adverse Side Effects

In addition to exploring scientific evidence in support of the benefits of LEED-ND, it is important to also look into its detriments. A litany of concerns has already been raised by researchers and experts, the most important of which are described below

First, LEED-ND has its limits. In a letter to CNU members introducing a referendum seeking approval for the post-pilot version of LEED-ND, CNU Chapter Secretary Laurence Aurbach (2009) bluntly demarcates the rating system's boundaries. To summarize:

“LEED-ND is not simple. The system is a complex, sprawling chunk of bureaucracy.”

“LEED-ND is not holistic... Its quantitative, opinion-free approach is more important than ever, but it means elements that are essential to the art of urban design are simply absent.”

“LEED-ND does not address beauty and spirit... It is silent on architectural style, composition, and harmony... It does not incorporate the Transect³ or any other method of coordinating design elements.”

³ Within the transect model of planning, sustainable design prescriptions are calibrated to the density of a project along a continuum from urban to rural, thus allowing them to be more context-sensitive.

“LEED-ND is not finished...and probably never will be. It is an ongoing work in progress.”

To this Kaid Benfield, Director of the Smart Growth program in Washington, D.C., adds, “LEED-ND doesn't *prevent* anything. It only defines that category of development worthy of green certification” (2009a).

Despite these limitations, ND may very well come to enjoy the same rising popularity as other systems under the LEED banner. But who will actually adopt its sustainable development standards? Might its patronage come largely from those already entrenched firmly within the “green” camp? An article in Business Lexington (Reed, 2010) asks, “Will the USGBC's new certification system encourage more developers to adopt sustainable practices, or are they already utilizing “green practices”?” Says one developer from the Lexington area, “The new LEED-ND process formalizes what responsible developers who are dedicated to sustainability are doing already.”

At issue with these questions is whether the LEED-ND certification process will actually have a substantive impact on the *design* of development projects. It may not, if the pilot projects are any indication. From a series of interviews with pilot participants, Garde (2009) indicates that the rating system seems to have little impact on the actual design of projects. Instead, it seems to attract developers with projects already designed to be sustainable. Observes Sokol (2009), “This group was self-selected, meaning, importantly, that participants’ design teams had prefigured the principles of Smart Growth, sustainability, and conservation that informed the pilot rating system.” However, Garde (2009) does add that LEED-ND can influence a project’s design when a developer’s client shares the standard’s values and is willing to pay for them.

Beyond the issue of *who* in the development industry will pursue LEED-ND certification is the issue of *which* project types the rating system's criteria fit best. As a national standard, is LEED-ND equally appropriate for projects in the Northeast and the Southwest, for projects in blighted inner cities and bucolic rural fringes? As an international standard, is LEED-ND exportable from a developed country to a developing one, from a relatively stable society to an unstable one? LEED-ND may not be the most appropriate standard for rural development, for which strict density and public transit prescriptions are infeasible (Garde, 2009). Because it was not developed for a specific region, it may also be incompatible with local conditions. Moreover, the conceptualization of sustainable development may itself shift depending on context (Black, 2008). If the design tactics vary too greatly from setting to setting, a national standard may be impractical.

Theoretically, the greenest building – or the greenest development – is the one that is never built. Might LEED-ND end up legitimizing unnecessary or reckless development? Though the standard has much to say about how new development should take place, it says nothing about whether it should take place at all. Jessica Cockburn (2009) questions the development of New Songdho City, one of the 33 international projects in the LEED-ND pilot. She argues that the “eco-friendly” features of the city’s design are negated by its location in a “greenfield” mud flat. “The area currently being reclaimed for the development of New Songdo City includes some of the last remaining undisturbed inter-tidal mudflats in the Incheon area.” Addressing the issue directly, Cockburn demands, “How can a development like New Songdo City claim to be environmentally sensitive, when its development has increased pressure on already vulnerable and endangered species?” With all its location-related prerequisites, it’s unlikely that projects will end up in such sensitive

areas. However, the case begs the question: Should LEED-ND have guidelines for denying certification to projects deemed unnecessary?

Some LEED-ND credits, important though they may be, may be neglected, because of their relative weight in the system compared to the time and money required for their implementation. Developers will presumably reach for the low hanging fruit before attempting to incorporate more ambitious sustainable design features. Garde (2009) finds that pilot projects seeking Certified or Silver LEED-ND status are significantly less likely to incorporate Green Construction and Technology criteria that enhance energy and water efficiency than are projects seeking Gold or Platinum certification. Garde (2009) notes, “The [pilot] rating system has placed a heavy emphasis on projects’ location-related characteristics and much less emphasis on important items in the green construction and technology category (p. 435),” concluding that “LEED-ND certification alone cannot guarantee sustainable neighborhood development,” (p. 424).

LEED-ND may impinge upon a neighborhood’s socioeconomic climate. The goal of LEED-ND is to help create communities that are not only environmentally sustainable, but also economically prosperous and equitably accessible. The rating system’s standards aim to ameliorate – and certainly not exacerbate – socioeconomic disparities, but the issue has become the subject of debate. As Vandana Sinha (2008) of the *Washington Business Journal* puts it, “As the green building wave hits the residential market, some housing and development insiders fear the area’s neediest residents are getting swept out to sea.”

Some argue that the rating system does not allot enough credits for affordable housing to ensure that developers will create mixed-income neighborhoods (Garde, 2009; Sinha, 2008). Are the rating system’s affordable housing credit allotments merely “token,” as they were described by one land-use law expert from the D.C. area

(cf. Sinha, 2008)? At least one of the rating system's developers has expressed that affordability should be incorporated into the standard as a prerequisite, and not merely as an aspirational credit (Benfield, 2009B). The issue of affordable housing is further complicated by budgetary priorities. As building green costs extra and building affordable cuts profits, they could conceivably end up as competing causes (Sinha, 2008).

Due process may be another issue impacted by the release of LEED-ND. In an online real estate periodical, Suder (2009) asks:

Will [LEED-ND communities] be as diverse as they are sustainable? Will LEED-ND turn urban areas into bedroom communities of the wealthy? Does a sustainable community have warehouses and manufacturing uses? How will developers who do not specialize in in-fill development cope with the demand for LEED-ND certification?

Suder argues that the LEED-ND standards will come to wield more influence over the use of land use than local zoning ordinances. He fears individuals will be deprived of the right to dispute any undesirable consequences of what he predicts to be the rating system's eventual rise to industry dominance. According to his argument, the USGBC – characterized as “the new sheriff in town” – does not provide the same opportunities for judicial review as local municipalities.

There is one final anecdote worth mentioning in order to summarize all of the above problems. In a series of blogposts entitled “The New LEED-ND Standards: What's New, What's Good, and What's Not,” Kaid Benfield (2009a; 2009b; 2009c) shares his reflections on the emergence of the program he helped develop. He systematically goes through each of the categories, detailing conflicts of interest that arose during the rating system's development, focusing specifically on criteria that do not mesh perfectly with the principles of smart growth as well as criteria that may not

be strong-worded enough to achieve their intended outcome. Apparent from his assessment is the fact that, though they have a mutual interest at stake in the conception of LEED-ND, the three organizations that forged it have nuanced views on how to codify and weight the rating system's criteria. Benfield's commentary reveals a deeper truth about LEED-ND as a broad-brush initiative: It is impossible to design a perfect standard for a complex issue such as development. That is, the properties and impacts of development are too dynamic to capture and control within the confines of a single set of rules and guidelines.

That is not to say LEED-ND will be ineffective and quixotic. Benfield does share misgivings about criteria across all of the rating system's four categories, keying on aspects large and small (Benfield, 2009a; 2009b; 2009c). However, he also makes it a point to repeatedly express his overall approval of LEED-ND, an endorsement culminating in his blog post "LEED-ND Deserves our Enthusiastic Support (Benfield, 2009d). In sum, LEED-ND is no panacea for growth in the 21st century. It may even exacerbate problems it is meant to solve or create new ones. Nevertheless, its positive outcomes will almost certainly outweigh its negative ones. LEED-ND will only get better over time. The remainder of this study is devoted to figuring out how.

Method

Participants

Interview data were provided by 20 individuals who were directly involved in 20 projects. In some cases, two interviewees provided data on one project, whereas in other cases one interviewee provided feedback on multiple projects. The data file for one respondent regarding one project was lost, leaving the final count at 19 for both respondents and interviewees. Due to a technical malfunction, the data file was truncated for one interview with two respondents regarding one project. Fortunately,

the interview was cut off toward the end of the interview. Table 3 shows the characteristics of the projects worked on directly by interviewees.

Table 3. Characteristics of interviewees' projects

Location	Size (Acres)	Attempt Status	Certification Status	Interviewee Occupation
Chicago, IL	1,140	Stage 1	Uncertified	City Planner
Chicago, IL	7.00	Stage 2	Uncertified	Sustainability Consultant
Riverdale, IL	19.9	Stage 3	Stage 3	Sustainability Consultants (2)
Seattle, WA	340.0	Stage 2	Uncertified	<ul style="list-style-type: none"> • City Planner • Sustainability Consultant
Hailey, ID	22.11	Stage 3	Stage 2	<ul style="list-style-type: none"> • Sustainability Consultant
Seattle, WA	4.7	Stage 2	Uncertified	<ul style="list-style-type: none"> • Sustainability Consultant • Developer
Portland, OR	1.00	Stage 3	Stage 2	<ul style="list-style-type: none"> • Sustainability Consultant
Washougal, Wa	2.50	Stage 2	Uncertified	<ul style="list-style-type: none"> • Sustainability Consultant
Washington, DC	15.50	Stage 1	Uncertified	<ul style="list-style-type: none"> • Sustainability Consultant
Portland, OR	4.50	Stage 3	Stage 2	<ul style="list-style-type: none"> • Developer
Oakland, CA	7.20	Stage 2	Stage 1	<ul style="list-style-type: none"> • Developer • Sustainability Consultant
San Francisco, CA	19.08	Stage 1	Uncertified	<ul style="list-style-type: none"> • City Planner
Los Angeles, CA	19.08	Stage 1	Uncertified	<ul style="list-style-type: none"> • Community Leader
Los Angeles, CA	16.77	Stage 2	Uncertified	<ul style="list-style-type: none"> • Developer • Architect
Denver , CO	3.33	Stage 1	Uncertified	<ul style="list-style-type: none"> • Sustainability Consultant

Table 3 (Continued)

Denver, CO	2.40	Stage 3	Stage 2	• Sustainability Consultant
Snowmass, CO	80.00	Stage 2	Uncertified	• Sustainability Consultant
Incheon, Korea	1,500.00	Stage 2	Uncertified	• Sustainability Consultant
Santa Fe, NM	12,800.00	Stage 2	Uncertified	• Community Development Non-profit (2)

The occupations of the 19 respondents varied. Interviews were conducted with eight sustainability consultants, four developers, three city planners, two land use nonprofit employees, one architect, and one community leader. The characteristics of the pilot projects discussed also varied. Eighteen were located in the United States, with the nineteenth located in South Korea. The projects within the U.S. were distributed over seven states and the District of Columbia. In size, they ranged from 12,800 acres down to 1 ($M^* = 177.67$, $SD = 427.43$). Thirteen of the projects (68%) were considered in urban environments. Two were located in suburban settings and two in rural settings. In terms of Stage of certification, nine were involved in Stage 2, five in Stage 3, and five in Stage 1, at the time of interview. One of the Stage 3 projects had received full certification. Across these variables, the projects discussed in the interviews were fairly representative of the pilot population (*cf.* Criterion Planners, 2007), the lack of eastern sites notwithstanding.

* This is the mean and standard deviation less the 12,800-acre outlier, which wildly skews the measures of central tendency. With this project included, the mean jumps to 841.99 acres and the standard deviation to 2,925.42.

Procedures

Candidates for inclusion in the study were selected based partially on convenience and partially to obtain a sample of projects representative of the pilot population as well as a sample of interviewees representative of users of LEED-ND. Convenience was a matter of the interviewees' locations; travel limitations restricted the potential pool of respondents to those located in or near major U.S. cities. An attempt was made to match participating projects to the pilot population according size, geographical location, level of urban density, and Stage of certification. A further attempt was made to include as wide a variety of interviewees as possible, relative to professions of individuals that might use the rating system.

Potential participants were contacted largely via email, prior to the data collection trip. The location and contact information for these participants was ascertained from a project characteristic spreadsheet made available by the USGBC on its website. Follow-up emails were exchanged with affirmative respondents to determine a time and place for an interview, and also with negative respondents, in order to provide closure. A second round of emails was sent to those who did not reply, which resulted in the addition of several interviews. Finally, phone calls were placed with those who did not reply to either round of emails. This measure of last resort resulted in the addition of two interviews. One interview was scheduled mid-trip. Another was missed due to unforeseen time conflicts

Data were collected tête-à-tête with all 19 respondents in a total of 15 interviews. The purpose of the in-person interviews was to allow for the possibility of site visits, to enable a more in-depth discussion than would be possible over the phone or via email, and to provide audiovisual content for the study's website component. The interviews were semi-structured, meaning a series of pre-interview, topical questions was used to guide, but not dictate, the discussion. An effort was made to

ask follow-up questions. The topics covered by the interview guide were those addressed in the aforementioned literature review as well as a few based on personal speculation. A copy of the interview guide is included in Appendix A. The interviews lasted between approximately 40 and 90 minutes.

Materials

A hand-held video camera, slightly larger than a typical MP3 device, and proportionate tripod was used to record four of the interviews and the all of the contextual footage obtained at each location. An audio recorder was used to record the remaining 11 interviews. Pen and paper were used to record especially important discussion points and also to record follow-up questions. A copy of the interview guide was brought to each interview. A consent form was distributed to – and signed by – each interviewee. Press releases for inclusion in the study’s website component were also distributed to interviewees, although most declined to participate.

To minimize the environmental impact of the data collection trip, travel was undertaken almost exclusively via alternative modes of transportation. The majority of long-distance travel was accomplished via rail, with a small number of segments traversed via bus. Various modes of transportation were utilized within each destination, including foot, bus, light rail, commuter rail, and personal automobile.

Data files were transcribed with the assistance of software the enabled the manipulation the recordings’ speed and sonic qualities.

Results

The feedback gleaned from the interviews is organized according to the study’s two overarching research topics, the function and implementation of LEED-ND. The implementation section is further subdivided according to the four pertinent topics raised in the interviews. These include: the applicability of the program to various

development settings, the factors that will speed or slow its widespread adoption, its effect on the provision of affordable housing, and its protocol for certifying projects.

Function

How will LEED-ND operate in the real world? More directly, why is it an important or valuable initiative? Interview data revealed the standard to have numerous distinct functions, listed and then depicted below. According to the data collected, LEED-ND:

- Challenges people to rethink what it means to be sustainable
- Helps public officials better serve their constituents through better planning
- Provides recognition for sustainable design best practices
- Guides the sustainable design of projects at the development scale
- Creates a marketable brand and identity for sustainable development
- Forces designers to commit to sustainable development practices
- Promotes the creation of neighborhoods that, in the long-term, save residents energy and thus money

This list is not complete. The program may assume other roles for governments, developers, and people that are as yet unforeseen. Moreover, the function of LEED-ND will likely evolve over time. The novelty of LEED-ND makes it impossible to predict just how it will behave now that it is finally out of the pilot phase.

Challenges people to rethink what it means to be sustainable...

The presence of LEED-ND may spark a shift in how people conceive of sustainability. The program will be a tool for public education, expanding people's understanding of what it means to be sustainable. Sustainability means not only recycling and eating organic; it also means living close to the places people love and need to get to. One architect relates such a shift in consciousness to his own community, saying:

Take my little community, which is very progressive, supposedly. But when it comes to development, they're anti-development. Period. That's progressive. The developer is the man, and has money, and is interested in profit, and they're interested in people and the status quo. But see the status quo is actually not sustainable. I mean look at all the cars. Where's the mass transit? It's not a sustainable status quo. So sure we can grow some apples in our yard, and a couple people can bike, and change the compact fluorescents, and have some electric chargers in the parking garage, but that's a drop in the bucket. You know, we're going have to densify. We're going to have to make it more transit-friendly, pedestrian-friendly. And that runs against these NIMBYs who themselves would think of themselves as green. What LEED-ND does is it basically puts it back at them. It says, you know folks, you're part of the equation. And it creates a dialogue.

Generally speaking, people are becoming more aware of the planet's environmental woes. Furthermore, they are becoming keener as to what they can do as citizens and consumers to be environmentally responsible. Should it become more prevalent, LEED-ND may stimulate a greater understanding of the built environment's role in climate change, pollution emissions, and resource consumption. The program may also inform developers and policymakers of the sensibility of sustainable development. Says one sustainability consultant who worked on four pilot projects:

It's going to change the way we look at cities, because it's going to change the way we look at community development. It has the possibility of finally measuring, finally putting some metrics, on these sustainable qualities in neighborhoods that we know are there. We know what makes us feel good. And this is going to give us the opportunity to say well this is what actually is good.

Helps public officials better serve their constituents through better planning...

LEED-ND will serve as a guide for municipalities to modernize their zoning codes. By asking questions such as “What is stopping LEED-ND from happening here?” municipalities can start to talk about how to institute sustainable development solutions. Municipalities can use the standard to evaluate and amend the local zoning ordinance to incorporate sustainable development principles. That was the explicit intent of one city planner interviewed. Working in San Francisco, a city with already high standards for green development, he used LEED-ND to examine what sustainable design considerations may have been overlooked by existing requirements. He explains:

We sort of took it as, okay here’s this national benchmark for green planning, we’ve got this project, and the community wants it to be green. Let’s overlay what the city’s standard practice and compare it to what these criteria are credit-by-credit in LEED-ND, and if there’s something reasonably able to take the intent of the credit and put it in the design for development document, we’ll explore that. So that we’re sort of baking in the LEED-ND credits within our planning guidelines.

His approach was echoed by others as one of the greatest benefits of having a standard like LEED-ND available. The aforementioned architect described meetings in which public officials proactively sought feedback regarding what aspects of their zoning code prevented the use of LEED-ND in their city. Another city planner noted that the standard would be useful for policymakers in developing financial incentives for sustainable development.

Provides recognition for sustainable best practices...

LEED-ND certification gives developers recognition for pursuing environmentally responsible design practices, while also providing them a credible

marketing label by which to attract investment and prospective residents. These benefits speak for themselves. And yet, might there be a downside to the pursuit of such recognition? Interviewers confirmed the concern that the standard may be used more often to receive recognition for projects that would have been sustainably designed anyway than as a tool by which neophytes could adopt sustainable design principles. At issue here is whether LEED-ND will catalyze a paradigm shift in the industry or whether it will merely cater to the minority of developers who have already gone green. In the words of one interviewee, enrollment in LEED-ND “takes a certain kind of developer,” adding that, ultimately, its function may be “preaching to the choir.”

Indeed, nearly all of the projects discussed were designed to principles of sustainable development prior to enrollment in the pilot. One developer captures the problem succinctly, stating:

It’s this question of whether you’re just pinning a medal on projects that are already doing something, or if you’re trying to make an aspirational system to influence developers to move in the right direction from wherever they started. And I think unfortunately it’s more of the former.

Despite this concern, prevalent among the interviewees, others saw the issue in a different light. The sustainability consultant who worked on four projects conceded that though the program may attract green-friendly applicants, it could still be useful in identifying overlooked sustainability measures. He reasoned that even a sustainably minded designer could discover new green tactics within the comprehensive standard. A second consultant, in another interview, viewed the practice of retroactive certification as not only a means to receive due recognition, but also as a means of showcasing sustainable design for others. He explains:

It is awarding people who are already doing it and I think that's a big part of it. There should be some form of reward for that, because obviously what we're doing on this project and what other people are doing on similar transit-oriented projects should be exemplified to allow other people to look at it. At first, the program may largely attract applicants who intend to use it to recognize projects previously designed to be green. However, the collective identity bestowed upon these progressive projects by the LEED-ND label would eventually catch the attention and favor of developers unaccustomed to practicing sustainable design. Multiple interviewees independently suggested that this is the path LEED-ND would take toward swaying the overall development industry.

Guides the sustainable design of projects at the neighborhood scale...

There were a small number of interviewees for whom the rating system was used to inform their projects' design. At the outset, the certification program will likely attract mostly users already familiar with sustainable practices. As its popularity and credibility grow, however, LEED-ND will likely draw more newcomers to the arena of sustainable design. In this case, the standard will be highly valuable as a checklist for how to create green developments.

One sustainability consultant who worked on a project on the rural fringe believed the program would be particularly useful as a guide for smaller areas that would not otherwise have the resources to understand and implement sustainable development. She describes:

We were able to use the program to educate both the public and the planners that you can have density and still create great human habitat at the same time. It goes beyond the buzzwords. Everybody knows what a green building is and how green works and that sort of thing. But getting people to think beyond just their single building and beyond their construction...

Two other examples involve projects that were unable to stay in the pilot. One was an urban ecovillage that was forced to abandon its pilot efforts in order to deal with an escalating battle over the school district's decision to divert traffic flow to a new parking through the community's main street. A community leader representing the ecovillage's interests explained that they intended to use LEED-ND to supplement the community's plans to sustainably renovate the neighborhood's dilapidated dwelling units. She expressed an intent to still use the standard as a guide even though certification had become infeasible.

Another ex-pilot project intended to use LEED-ND in conjunction with several other sustainable design standards in order to evaluate every aspect of a greenfield project in rural New Mexico. For them, LEED-ND would be but one of several checklists used to optimize the sustainable features of their project's design. They planned to pick and choose elements from the various sustainable design standards to devise the greenest rural development possible.

Worth noting with these two examples is that neither intended to receive LEED-ND certification. This intention is opposite the practice of obtaining retrograde recognition through the program. Whereas for some projects, LEED-ND offers the opportunity to receive an award for truly good work, for others it offers a roadmap for building a truly sustainable development.

Could there be an upside to retroactive certification? What if development projects embodying the features of LEED-ND will increasingly and consistently demonstrate themselves to be a popular and profitable product in the housing market? Whether they are designed to be certified under the standard or not, such projects would likely serve as a beacon to the substantial segment of the industry that remains reluctant to abandon the conventional, unsustainable, approach to growth. In this case, the LEED-ND label would function as a lighthouse for that beacon. In effect, the

LEED-ND program and its certified projects would work in tandem to coax a sea change in the development industry. On the one hand, the projects' collective success would speak for itself as not only an environmentally responsible, but also commercially viable, development strategy. On the other hand, the LEED-ND label would serve to amplify the projects' success by unifying them under one banner. Taken together, the industry would be gifted with a proven set of design guidelines and a systematic means for implementing them. Perhaps, then, retroactive certification should be considered not so much a misuse of LEED-ND as a means of speeding its dissemination.

Creates a marketable brand and identity for sustainable development...

Interviewees also indicated that LEED-ND provides developers with a brand name to attract to prospective tenants and residents. Explains one consultant, "LEED has a pretty good brand. People are starting to put some value on that. Hopefully they can attach some value to the LEED-ND label." For another pair of consultants working on a suburban project, proof of the marketability of LEED-ND was already evident. One of them depicts the situation as follows:

People are coming – it's like an attraction. People are coming and wanting tours and all that, so it's definitely creating some excitement in community and not just from people outside who want to come in and live in a green community; it's people who are living down the street who want to check out the new thing in town.

The LEED-ND brand may even overcome people's perceptions of neighborhoods regarded as poor or unsafe. Earlier, the same consultant described the same project as a "declining neighborhood", for which the LEED-ND component of the project was "definitely revamping interest in the community." A city planner, who worked on the pilot's largest urban project, describes a similar prospect for wooing not only potential

residents, but also developers. In asking how to rebrand a community with a reputation for being “contaminated old Rust Belt,” she explains that, “over time it will get known as the LEED neighborhood development in the market place and those are the types of developers you will attract.” One developer emphasized that the LEED-ND label out there would showcase the successes of urbanist projects for developers accustomed to building sprawl-like development. In other words, being able to readily check the track record of LEED-ND projects would soften the perception of risk associated with sustainable development.

The other major stakeholder group, public officials, would also likely be affected by the LEED-ND brand name. In telling the story of a redevelopment pilot project in San Francisco, one city planner says, “The Board of Supervisors hear from their constituents that they want this project to be as green as possible. What does that mean? Well in this day and age, it probably has something to do with LEED if it’s a built environment thing.” Should the popularity of LEED continue to snowball with citizens, public officials will more and more look in the program’s direction for how to institute and incentivize development that is environmentally, economically, and civically sustainable.

Forces designers to commit to sustainable development practices...

Several interviewees noted that enrollment in the LEED-ND program would force developers to stick to sustainable principles throughout the build-out of long-term projects. In the words of the planner from San Francisco:

What’s good about the stringency of the program is obviously that they make you follow through on it. And for a ten-year project, a lot of things are going to change. But for the developer – because the community has already got it in their mindset that this is going to be a green development, that this is going to

be a LEED project – it’s going to force them to make sure that they maintain the integrity of some of these things that are important.

The urban planner involved in the pilot’s largest urban project noted that she would not be with the city forever. Nevertheless, she felt confident that, though she would be gone for most of her LEED-ND project’s 20 to 40-year build-out, the city’s commitment to certification through the program would ensure that it would be developed sustainably.

Promotes the creation of neighborhoods that, in the long-term, save residents energy and thus money...

Finally, through gains in energy efficiency, LEED-ND may bring down the cost of living for residents. One developer who worked for a firm dedicated to affordable housing projects took a more humanist than environmentalist tack in stating what he believed made the standard important and valuable. He noted that its environmental benefits were secondary to the benefits of long-term cost savings. For him, the overriding question is, “How will [a project] benefit the families that are going to live in those units?” In his case, the energy savings ensured by following the LEED-ND criteria would translate into more affordable home expenses for clients who live on a small budget.

From these findings, it is clear LEED-ND will assume multiple functions for various people. With the exception of the trend in which projects seek certification as a “pat on the back”, as it was described by one interviewee, these functions all appear to be related to the program’s intent of promoting “healthful, durable, affordable, and environmentally sound practices in building design and construction,” (USGBC, 2010, p. xiv). With these various functions in mind, the focus now shifts to the implementation issues raised by interviewees.

Implementation: Development Settings

Can a national standard for sustainable development encompass development projects from coast to coast and city to countryside? To which settings is LEED-ND most applicable? Are there any settings for which it is inappropriate? The interviews revealed challenges related to numerous dimensions along which projects will vary.

First, the interviews revealed that the rating system seems ideally suited for a limited range within the spectrum of project size. On the one hand, one consultant repeatedly noted that a single building should not be considered a neighborhood, referring to one of the first projects certified under LEED-ND. On the other hand, exceptionally large urban projects can be too unwieldy for the rating system. Several interviewees noted that attempting to document the sustainable features of a project slated to take decades to develop is not only onerous, but also unrealistic. The ideal use of LEED-ND seems to fall broadly between extremely small and extremely large projects. It is debatable whether single buildings, or even single blocks, should be considered neighborhood developments.⁴

In addition, the rating system's applicability seems limited in terms of the spectrum of urban density. Primarily, LEED-ND does not seem to be an appropriate certification system for projects in rural settings. Here the two land use nonprofit interviewees had much to say. For their project, located in rural New Mexico, the Smart Location & Linkage requirements posed the biggest problem. However, they also felt the standard was ill equipped to award efforts to conserve and restore open space. In their words, "All the open space we're protecting, we don't really get any value or credit for... In terms of all the open space, the protecting, and the stewardship, and the restoration, [LEED-ND doesn't] address that at all."

⁴ Based on their own pilot feedback, the USGBC and its partners have revised the standard to encourage enrollment of projects that fall between the extremes (USGBC, 2010).

Interviewees differed in their emphasis on whether the rating system was more suited to suburban or urban settings, although they mostly agreed that it could be applied to both. One developer believed it to be ideal for rehabilitating grayfield sites, such as dead malls and old parking lots. One of the city planners indicated that, for lack of large, undeveloped tracts of urban land, the rating system would be best employed in the suburbs at the city's fringe, e.g., along the periphery of the Berkeley and Oakland metro area. A different developer complained that the rating system disproportionately favored dense urban projects, saying "these suburban projects were really trying their best, while urban projects were making a half-hearted effort with the criteria." The urban projects to which he referred were able to meet the criteria with a "half-hearted" effort because of their auspicious location near existing transit service. Conversely, interviewees of another project believed urban projects were not be adequately rewarded for their transit-friendly characteristics, saying, "we didn't feel there was a fair distribution of points because someone that had a couple bus stations might be able to get a couple points, like three or four, whereas we were only getting seven, but had over three or four thousand transit options." Because of the differences urban and suburban settings, a faction of interviewees favored having separate rating systems, one for each. One went so far as to suggest using the transect model of planning to "funnel" the projects into different rating systems.

Finally, several interviewees took issue with the rating system's inapplicability to different regional and local context. One used the example of air conditioning; the rating system's documentation requirements for air conditioning were extraneous to the Pacific Northwest. Another said the standard might not be a useful tool in cities that already have progressive environmental policies. One of the sustainability consultants interviewed suggested developing local equivalents of the standard to deal with the more fine-grained matters that may face a specific project.

Implementation: Widespread Adoption

Should government incentives be instituted to facilitate the adoption of LEED-ND as a guide for developers? Interviewees were divided on the topic of whether LEED-ND will become successful with developers on its own merits and brand cachet, or whether it will need to be propped up by government incentives. Some believed the development product type encouraged by LEED-ND would demonstrate itself as a popular and profitable alternative to producing more sprawl. Others were convinced that subsidies or regulations would be needed to steer the industry in the direction of LEED-ND.

Says one interviewee, “Developers will figure it out. I mean there is a market for transit-oriented environmentally responsible projects. I think the market is good at figuring this stuff out.” Another, more towards the middle, claims, “I think there’s a market sort of cachet with being a LEED-certified project, but when it comes down to where do we end up in terms of our certification level, and how much effort we put in to it, it really is based on how much [government] incentive.” A third speculates that, “I think the way you get people to take risks and try things is to bring in a funding mechanism to prove that it works, or find out if it works.”

The variety of responses to this issue indicates that it is, at this point, impossible to tell whether or not LEED-ND will need government-side incentives to succeed. In reality, the answer may be much more nuanced as per the differences from region to region and city to city. The LEED-ND brand name may enjoy the high recognition and demand to sell itself to developers in some areas, whereas in others, the program might benefit from municipal support, in the form of expedited review processing and construction cost subsidies, for example.

Implementation: Affordable Housing

Arguably the most pressing and controversial implementation issue included in the study is that of affordable housing. Assuming communities modeled off LEED-ND are highly desirable in terms of their environmental, social, and public health benefits, everyone should have the opportunity to live in them. However, socioeconomic realities make the hope of such universal access idealistic. According to the architect interviewed, “any nice neighborhood is going to inflate in value and people want to live there because there’s not enough of them. And so the very things that are desirable are going to be the things that make it unaffordable.” Thus, it is crucial to question the degree to which the LEED-ND program has a responsibility to maximize its accessibility to people of lower income. The rating system does include a number of credits pertaining to the provision of affordable housing. One of the sustainability consultants interviewed sums up the situation, saying, “I think the point of LEED is to create a more appealing neighborhood and that will probably end up driving up home prices. I think at the same time, it creates one that makes provisions for less fortunate, less well off people to live in an area that may be experiencing gentrification or increased housing prices.” But are there enough credits allotted in the rating system for rental and affordable housing? Moreover, should there be an affordable housing prerequisite?

Unanimously, interviewees did not feel the rating system’s affordable housing credits alone would ensure equitable access. Short of that, many also felt the rating system should do more to make certified neighborhoods affordable. One suggested the addition of more affordability-related credits, in lieu of a prerequisite. Another believed the existing affordability measures should be reworked to ensure that some portion of a project’s dwelling units would remain affordable in perpetuity. Other interviewees believed the responsibility of bolstering projects’ affordability lay beyond the purview of LEED-ND. Here two separate interviewees commented on

affordability as being part of their respective companies' missions. Another described the public sector as the party that should issue "carrot and stick" incentives to provide affordable housing.

Another facet of the issue is that the provision of affordable housing may be at odds with the incorporation of green technology. For the developer, on the one hand, green technology and infrastructure requires higher costs. On the other hand, the provision of affordable housing entails lower returns. A prime example concerns the work of the developer for whom the value of LEED-ND is a matter of people first, then environment. He explains:

There have been some items that obviously have a cost implication in terms of what you can do feasibly for the site. Things like solar panels. There's things that you can score points on that you say, okay it sounds great, yeah let's do it, but what is the cost of doing it. And on a building or on a site where you have affordable housing, you always have to kind of put that into perspective in terms of what could we realistically pay for.

One developer's company discovered a potential compromise to the quandary of green versus affordable. They circumvented the issue by scaling down the size and finishes of their dwelling units in order to offer homes that were at once more affordable and more sustainable. Conceivably, smaller units would contribute to the compactness of a development while also remaining somewhat affordable over time. In sum, the issue of affordability in LEED-ND developments remains convoluted and controversial.

Implementation: Certification Protocol

The study's final implementation topic relates to the process by which projects are certified. Interviewees expressed general satisfaction with the flexibility captured by having various options for credit compliance. However, several felt there should also be some sort of subjective component of certification. These respondents claimed that

only a human element could process the unlimited number of possible special circumstances that projects could face. Says the architect,

You can't predict everything that you could encounter. So you always need a mechanism, you must have a mechanism that's built in to allow the exceptions. And somebody has to judge that. There has to be somebody somewhere that's fair, that can have the intellectual credibility and capability, and I mean a group of people probably, to be able to evaluate. That just has to be. But I don't think you should make it a free-for-all where everything is done that way.

Multiple interviewees were displeased with the rigidity of the USGBC in granting exceptions to rules based on projects' unique circumstances. One noted that the GBCI would certainly continue the pilot phase practice of allowing applicants to submit Credit Interpretation Requests (CIRs) to gain clarification and possible exception for documentation ambiguities. He added that CIRs would likely have a price in the final version, whereas they were free in the pilot. Two other interviewees worried that the USGBC was too rigid in processing the CIRs, saying that they were not in tune with the issues of local context. For example, one project was denied a request to waive a slope protection requirement for man-made slopes in an urban environment.

A more general criticism voiced by numerous respondents was that the criteria were too prescriptive and meticulous. One developer declares, "LEED-ND is going to be a clumsy tool. I think the danger for USGBC might be in being more prescriptive than descriptive. So instead of describing the outcome you're trying to achieve, describing what you need to do to achieve that outcome." Another expresses doubts about the rating system's prescriptive language:

I kind of feel like they have to be careful they don't create their own bureaucracy. And that the processing and the lingo, they have to make sure it still applies to the projects. I feel like you're creating this whole other level of

review that you have to know the lingo to get through, which goes against the whole idea. The idea is to create better projects, more sustainable projects, and that should remain their focus.

Evident from these criticisms is that striking a balance between flexibility and rigidity is crucial to the program's success. If the requirements are too rigid, they will end up discouraging participation and possibly end up being out of touch with their intent. If they are too loose, they may also fail to achieve their intent, while allowing certification of projects with dubious sustainable development features.

Discussion

The release of LEED for Neighborhood Development will significantly change the landscape of development in the years ahead. The purpose of this study has been to provide some preliminary insight into the nature of this change as well as direction for future research. With regard to the preliminary insight, the above results are promising. Though each and every pilot project interviewee expressed general and specific misgivings with the standard, collectively they exhibited confidence in its forthcoming success. The next part of the discourse will be devoted to charting a course for future investigation into LEED-ND.

Future research LEED-ND must include quantitative data alongside qualitative data on the promises and pitfalls of LEED-ND. Following are ten concrete strategies for examining the most critical issues outlined above.

1. The USGBC and its partners should be as scientific as possible in their ongoing research and development efforts. In particular, they should exercise the ability to randomly manipulate select variables between projects to provide convincing evidence for or against elements of the standard. For instance, the USGBC could

2. Independent researchers should take the lead in developing a rural version of LEED-ND. They could use existing initiatives aimed at rural sustainable development to devise a standard consistent with the LEED framework. Such a concerted effort would save the USGBC the trouble of developing such a standard themselves, while also challenging them to offer options for all projects along the spectrum of urban density.
3. Tests need to be conducted to determine whether LEED-ND positively impacts its target areas, namely environmental, community, and public health. For environmental health, between-subjects studies on projects certified and uncertified under LEED-ND as well as within-subject studies before and after certification could be carried out to measure the standard's effects on VMT.
4. For community health, the same types of studies could be carried out to assess different measures of social capital. In this case, within-subjects studies in preexisting areas would be particularly useful in overcoming the self-selection bias in which civically inclined individuals bring their community-oriented behaviors with them to newly minted neighborhoods.
5. For public health, between-subjects and within-subjects could also be conducted to measure such things as fatal and non-fatal automobile accident injuries and biking behaviors.
6. If LEED-ND developments come to be a prized product among consumers, researchers should seek to learn why. Survey data could be collected from residents to determine whether they moved into LEED-ND neighborhoods because of brand recognition, because they were drawn to certain desirable design features, e.g., transit accessibility, a combination of the two, or some other reason(s).

7. Research should be conducted to gauge the standard's use by municipal governments. Archival and survey data could be used to tally the number of municipalities that use LEED-ND to assist in the revision of their comprehensive plans and zoning ordinances, as well as the types of incentives offered by governments to projects seeking LEED-ND certification.
8. Studies should examine the popularity and use of LEED-ND in the development industry. Longitudinal surveys could show the number of developers familiar with sustainable design principles, the number familiar with LEED-ND, and the number who have or would use the standard in their own work. Furthermore, interview data could reveal the ratio of how often the standard is used to gain recognition for projects preconceived to be sustainable versus how often it is used to guide the actual design of projects.
9. The affordability of ownership and rental units in LEED-ND developments needs to be watched closely. Researchers could track the real estate values of LEED-ND developments and compare with regional benchmarks for affordability. Affordability varies from locale to locale, so it is important to operationalize the concept on a sliding scale to properly calibrate measurements. Should the results reveal a strong association between gentrification and LEED-ND certification status, the USGBC and its partners should consider altering the standard to make it more equitable, even to the extent of including an affordability prerequisite.
10. The USGBC and its partners should weigh the merits of including a subjective component of LEED-ND certification. This could be accomplished by tracking the number and nature of CIRs submitted. Depending on the volume of CIRs and whether there arise backlogs in processing, additional resources could be allocated to expedite review, the process could be offered free of

charge or factored into the application fee, or the process could be integrated into the certification protocol.

These rudimentary strategies constitute only a sample of a research agenda for the further study of LEED-ND. The purpose of this menu of options is to stimulate interested researchers as well as the program's creators to think critically and creatively about how best to study LEED-ND so that it may be crafted into the most effective development tool possible. There exists a research imperative for both verifying the claimed benefits of LEED-ND and also understanding its manifold effects on the realm of development. The LEED rating systems for single buildings have had a huge, mostly positive, impact on the field of architecture. The same prospect cannot be taken as a given with LEED-ND; it is addressing an entirely different, more complex, design industry. Though its specifications will plausibly yield environmental, social, and public health benefits, it may also have undesirable side effects. The program needs to be scrutinized by researchers to reveal any such effects and highlight strategies to avoid or overcome them. Furthermore, the rating system's criteria are bound to have flaws. As noted earlier, the program is now on a two-year review-and-update cycle. Researchers should work to provide its editors with as much credible information as possible related to these flaws and how to solve them.

Limitations

The study is limited in a number of ways. First, LEED-ND is very new. As such, there is not yet an existing body of literature on which to rely for topical theory, research questions, and research design. Furthermore, insufficient time has elapsed since the release of rating system to gather meaningful longitudinal data on the success, function, and implementation of the program.

The inferential capacity of the study is further limited by its qualitative research

design. As explained earlier, the research approach is inductive, meaning that it uses systematic observation to develop theory, not the other way around. Appropriately, then, hypotheses were purposefully omitted. Causal claims regarding LEED-ND and its effects thus were not, and could not be, included in the discussion.

The research, in retrospect, could have been served more efficiently by making minor modifications to its design. A greater effort should have been made to more concretely define the study's core research question(s) well in advance of the interviews. Though understanding the mechanics and prospects of LEED-ND was always the essential objective, these aims were not operationalized in sufficient detail prior to conducting interviews. Consequently, conversations with interviewees often meandered off topic, which ended up drastically extending the laborious transcription effort. Moreover, many interesting details regarding interviewees' projects are simply absent from the manuscript because they were impertinent to the study's focus.⁵ Truly, the amount of data gleaned from the interviews could have been used as the basis of a case study for each project.

Accompanying Website

An Internet website, entitled White Coat on the Village Green (<http://www.whitecoat-on-the-villagegreen.com>) was created to serve as a multimedia companion to the present manuscript. The purposes of the website were to take advantage of information technology to help revolutionize the way research is communicated between researchers and to the general public, and to provide an animated, engaging perspective on what was a deep and broad research endeavor. Research should be celebrated and it should be shared. Because LEED-ND is such an important initiative in the realm of design, its examination by researchers should be

⁵ The transcripts of these interviews have been happily made available at the complementary website, <http://www.whitecoat-on-the-villagegreen.com>.

expressed to the general public in a way that is intelligible, thought provoking, and fun.

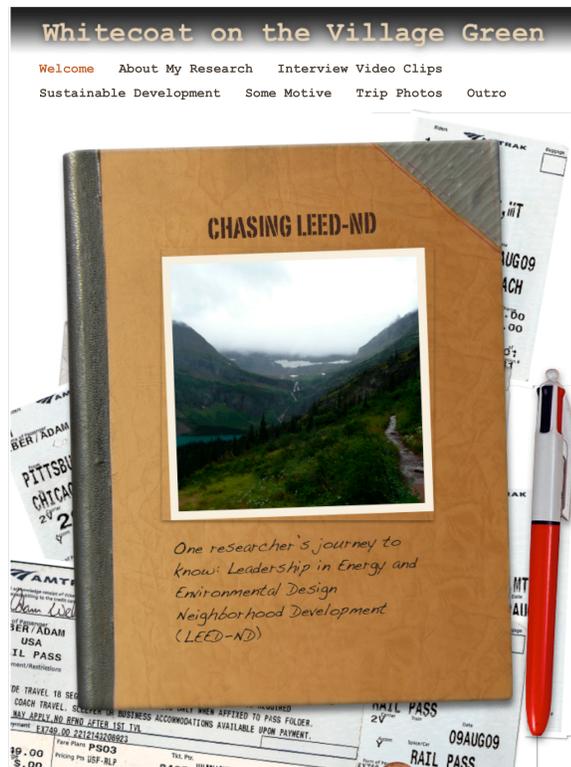


Illustration 1. Homepage of Whitecoat on the Village Green website

Features of the website, the homepage of which is shown above in Figure X, include a synopsis of the research purpose, methodology, and results; a video primer on sustainable development; contextual pictures from the data collection trip; an intro and “outro” video; and a video conveying the motive behind the researcher’s desire to study LEED-ND.

Conclusion

LEED-ND will in all likelihood become a successful standard for promoting sustainable development. Already the program is establishing a sphere of influence. For instance, on 21 August 2007, Illinois became the first state to pass legislation related to LEED-ND. The law passed, The Green Neighborhood Grant Act, provides

funding equivalent to 1.5% of development costs each year for up to three select projects that have achieved LEED-ND certification (Illinois General Assembly, 2007). Another example involves Connecticut. The state was able to funnel \$16 million of federally distributed Recovery Zone Economic Development Bonds/American Recovery and Reinvestment Act funding toward the development of Harbor Point in Stamford. Harbor Point, a LEED-ND Gold certified project, was allocated this funding in part because of its transit-oriented development qualities.

It is reasonable to assume LEED-ND will have at least a modest positive impact on environmental, social and public health. In addition, it may very well inspire a better understanding of what sustainability means in the 21st century, and subsequently a better relationship with the world. In the words of one particularly optimistic interviewee:

As a step in the right direction, LEED is the only step, the best step that I can think of that's out there right now that really breaks down each individual category. It has it all. And so that's the most important thing that LEED-ND is, is measuring that. And hopefully that can be adopted by cities, and these urban designers can start to adopt these principles, and then it can really start changing things on a scale that makes a world of difference.

APPENDIX A

Interview Questions

- **Background/Narrative**
 - Please provide a step-by-step description of the application process for LEED-ND.
 - Describe/explain your positive experiences with LEED-ND.
 - Describe/explain your negative experiences with LEED-ND.
 - Regarding sustainable design generally and the LEED-ND rating system in particular, what challenges arose that you feel are unique to your project?
 - What challenges have arisen for you in attempting to obtain certification for [project name]? For example, LEED-ND's requirements for the number of units in an acre can exceed the maximum permitted by a municipality's zoning ordinance; have you encountered conflicts between zoning ordinances and the requirements of LEED-ND?
 - Which specific credits in the LEED-ND rating system have posed the greatest challenge? Have any been irrelevant or impractical for your project?
 - Why is there a need for LEED-ND? Why is LEED-ND important?
 - How has the current economic downturn impacted your participation in the LEED-ND pilot? Do you believe the success of the rating system is very dependent on the state of the economy?

- What types of individuals were involved in the application process for your project, e.g., sustainability consultants, developers, architects, and engineers?
- **Importance of LEED-ND**
 - Do you believe the added time and financial costs of obtaining LEED-ND certification are worth its purported environmental, social, and public health benefits?
- **LEED-ND and its Three Goals**
 - **Sustainability**
 - Does the ND rating system address the need for urban infrastructure to adapt to significantly different climate conditions as they unfold in the 21st century?
 - How successful do you believe LEED-ND in general and your project in particular will be in solving the climate change crisis?
 - How successful do you believe LEED-ND in general and your project in particular will be in conserving local resources, e.g., wetlands, farmland, water bodies?
 - **Social/Civic Revitalization**
 - To what extent do you believe community can be designed?
 - How successful do you believe LEED-ND in general and your project in particular will be in supporting civically engaged, socially connected communities?
 - **Public Health**
 - How successful do you believe LEED-ND in general and your project in particular will be in promoting healthy lifestyles?
- **LEED-ND's Rating System**

- How difficult was it for you to meet the prerequisites for ND? Which credits proved to be the most difficult to obtain? Site Location and Linkage? Neighborhood Pattern and Design? Green Buildings and Infrastructure? Innovation and Design Process? Regional Priority Credits?
- How did you determine which level of certification you would seek for your project? Why?
- **LEED-ND and Zoning/Development Issues**
 - How do you foresee LEED-ND impacting the development/contracting professions?
 - Is the LEED-ND rating system compatible or incompatible with your city's zoning code? If there were conflicts between the requirements of the rating system and the zoning code, how were they resolved?
 - What type of pressure might the introduction of LEED-ND put on the development industry?
 - Will developers mostly be accepting or resistant to LEED-ND compliance?
 - Do you foresee local/national governments offering incentives for LEED-ND, e.g., shorter wait periods for approval?
 - How do you believe LEED-ND will fare in a capitalist marketplace? For example, are its requirements too strict to garner much popularity? Will public demand for sustainable practices help to make it successful?
- **LEED-ND and Socioeconomic, Social Justice Issues**
 - Do you believe the introduction of LEED-ND will lead to gentrification? Are the credits allotted for affordable housing enough

- to ensure individuals and families of all income classes will have equitable access to ND communities?
- How do you feel LEED-ND credits accommodate community development, e.g. job growth, the availability of affordable housing?
 - Do you perceive a danger in the lack of due process with the USGBC's system vis-à-vis the opportunity to appeal to governmental bodies regarding zoning decisions?
- **LEED-ND and Geographic/Historical Context Issues**
 - Do you believe the LEED-ND rating system's regional credit allotments sufficiently address issues of geographic context? For example, do you believe one system could be equally applicable in Boston, Massachusetts and San Diego, California?
 - Similarly, do you feel such a system can adequately accommodate projects of drastically different sizes (e.g. 1 acre vs. 1,400 acres) and population densities (i.e. rural vs. urban)?
 - Does the ND rating system adequately address New Urbanism's emphasis on a project's region, neighborhood, and block
 - Does the LEED-ND rating system promote a respect for historical trends in urban form?
 - Is LEED-ND capable of reclaiming/retrofitting the suburbs?
 - **LEED-ND Pilot Phase and Beyond**
 - How responsive do you believe the USGBC has been with feedback/criticism from the general public and the projects included in the pilot?
 - Are you still in the LEED-ND pilot? If so, for how many projects? If not, why not?

- What do you think will be the positive impacts of allowing the public to shape the final rating system? What do you think will be the negative impacts?
- What do you foresee as the future of development in the United States?

REFERENCES

- Architect's Newspaper, The (2010). How the USGBC's neighborhood program, LEED-ND, could reshape architecture and urban design. *The Architect's Newspaper*. Retrieved from http://www.archpaper.com/e-board_rev.asp?News_ID=4550
- Aurbach, L. (2009). *An introduction to LEED-ND for CNU members*. Retrieved from <http://www.cnu.org/node/3019>.
- Benfield, K. (2009a, May 7). The new LEED-ND standards: What's new, what's good, and what's not (part 1). Retrieved from http://switchboard.nrdc.org/blogs/kbenfield/the_new_leednd_standards_whats.html.
- Benfield, K. (2009b, May 8). The new LEED-ND standards: What's new, what's good, and what's not (part 2). Retrieved from http://switchboard.nrdc.org/blogs/kbenfield/the_new_leednd_standards_whats_1.html.
- Benfield, K. (2009c, May 9) The new LEED-ND standards: What's new, what's good, and what's not (part 3). Retrieved from http://switchboard.nrdc.org/blogs/kbenfield/the_new_leednd_standards_whats_2.html.
- Benfield, K. (2009d, August 20). LEED-ND deserves our enthusiastic support. Retrieved from http://switchboard.nrdc.org/blogs/kbenfield/leednd_deserves_our_enthusiast.html.
- Benfield, K. (2010, April 29). LEED for Neighborhood Development formally

- launches to promote smart, sustainable land use. Retrieved from http://switchboard.nrdc.org/blogs/kbenfield/leed_for_neighborhood_developm.html.
- Black, E. (2008). Green neighborhood standards from a planning perspective: The LEED for Neighborhood Development (LEED-ND) [electronic version]. *Focus: Journal of the City and Regional Planning Department*, 5(1), 41-47.
- Campagna, B. (2008, November 24). Smart locations, neighborhood patterns, green infrastructure: A look at LEED Neighborhood Development. Retrieved from <http://blogs.nationaltrust.org/preservationnation/?p=1938>.
- Cockburn, J. (2009, October 15). New Songdho City: How eco-friendly is it? *The Korean Times*. Retrieved from http://www.koreatimes.co.kr/www/news/opinon/2009/10/137_53593.html.
- Congress for the New Urbanism (2007). *LEED for Neighborhood Development pilot launches*. Retrieved from <http://www.cnu.org/node/717>.
- Congress for the New Urbanism (2009). *Letter of support*. Retrieved from <http://www.cnu.org/node/2999>.
- Criterion Planners (2007). LEED for Neighborhood Development characteristics of pilot projects. Retrieved from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>.
- Ewing, R., & Kreutzer, R. (2006). *Understanding the relationship between public health and the built environment: A report prepared for the LEED-ND Core Committee*. Retrieved from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=77>.
- Farr Associates (2008). *An expert review on the strength of the data in support of*

proposed community design standards in LEED for Neighborhood Development. www.farrside.com/firm/documents/CDC-LEED-ND_Report2.pdf.

Garde, A., (2009). Sustainable by design?: Insights from US LEED-ND pilot projects. *Journal of American Planning Association* 75(4), 424-440.

Green Building Certification Institute (2010). *GBCI certifies 5,000th LEED project.* Retrieved from http://www.gbci.org/org-nav/announcements/10-04-11/GBCI_Certifies_5_000th_LEED_Project.aspx.

Illinois General Assembly (2007). *Green Neighborhood Grant Act* (Public Act 095-0325). Springfield, Illinois. Retrieved from <http://www.ilga.gov/legislation/publicacts/fulltext.asp?Name=095-0325&GA=095>.

Javid, D. (2007). LEED-ND is coming: Are you ready? How to implement green planning and design principles now [electronic version]. *California Chapter of the American Planning Association, March-April*, 13-15.

Martin, S. C., (2008). Old standbys, new standards: evaluating LEED-ND through existing models of green urbanism. *Massachusetts Institute of Technology.* Retrieved from <http://hdl.handle.net/1721.1/44332>.

Reed, N. L. (2010, January 7). A greener tomorrow: USGBC to begin registering certified LEED neighborhood developments in 2010. *Business Lexington.* Retrieved from http://www.bizlex.com/Articles-c-2010-01-06-90975.113117_A_Greener_Tomorrow.html.

Rell, J., Office of (2009, December 17). State approves first round of financing for Stamford's Harbor Point. *NorwalkPlus*. Retrieved from

http://www.norwalkplus.com/nwk/information/nwsnwk/publish/News_1/State-approves-first-round-of-financing-for-Stamford-s-Harbor-Point_np_6930.shtml

Sinha, V. (2008, May 23). Critics say new green rating hurts affordable housing.

Washington Business Journal. Retrieved from

<http://washington.bizjournals.com/washington/stories/2008/05/26/story2.html>.

Sokol, D. (2009). Won't you be my neighbor? *GreenSource*. Retrieved from

http://www.events.construction.com/printNew.asp?REF=http://www.events.construction.com/features/other/2009/01_LEED-ND.asp.

Suder, S. S. (2009). *Certifying place with the new LEED-ND designation*. Retrieved

from <http://www.kmklaw.com/news-publications-78.html>.

U.S. Green Building Council (2007). *238 new developments nationwide join*

pioneering LEED for Neighborhood Development pilot. Retrieved from

<http://www.usgbc.org/News/PressReleaseDetails.aspx?ID=3304>.

U.S. Green Building Council (2010). *LEED 2009 for Neighborhood Development*

rating system. Retrieved from

<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>.

Younger, M., Morrow-Almeida, H. R., Vindigni, S. M., & Dannenberg, A. L. (2008).

The build environment, climate change, and health: Opportunities for co-

benefits. *American Journal of Preventive Medicine*, 35(5), 517-526. Retrieved

from

www.cdc.gov/healthyplaces/publications/AJPM_BECCandHealth2008.pdf.