How have "green building" rating systems such as LEED impacted the motivations and practices of stakeholder groups within the construction industry?

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By

Benjamin Redfern
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Approved by Prof. Kent Wayland, Department of Engineering & Society

Intro

As a means of measuring a project's greenness, rating systems such as LEED have come to symbolize sustainability in the marketplace. But understanding how this rating standard has impacted the various groups within the construction industry is essential in better understanding whether the actual drive behind its heavy presence in the marketplace is actual belief in LEED's mission statement of sustainability or is the perception of sustainability to drive business. Whether it be for its actual positive impact in constructing and operating a building sustainably or more as a means to draw business and employees through the shiny LEED plaque and what people believe that certification represents, the reasons why the industry is increasing their emphasis on achieving green ratings can clarify the motivations and behavior of the different stakeholder groups that have formed within the network of the construction industry in one cohesive document. The only effective way to have an ideal "green" society is to have clarity between the stakeholders about each other's stances on current practices, which will in turn improve the potential for mutually beneficial collaboration by identifying the priorities of different groups.

Context

Over time there have always been trends guiding movement within the construction industry. The most recent trend has been towards sustainable building. Since the 1970's, there has been a modern surge of environmentalism due to various publications and events forecasting a grim outlook on society's future should the environmental maltreatment continue unchecked. As a result, the US Green Building Council created Leadership in Energy and Environmental Design (LEED) as a third-party certification system to incentivize construction of buildings that

excel in key eco-friendly metrics. The five principle tenets of LEED are sustainable sites, water efficiency, energy and atmosphere, materials, and indoor environmental quality. There are several different versions of LEED that each pertain to a different field of construction, with each having their own criteria needing to be met in order for a project to attain certification. A few of these include LEED rating systems for healthcare buildings, data centers, and single and multifamily homes, among many others. Developers select the rating system most in line with the project that they hope to make LEED certified. The rating program itself is a credit-based system that awards points based on a project's compliance with different aspects of sustainability relating to the five principle tenets. The credits, as well as the requisites needing to be met to earn them, are clearly listed in the version of LEED being used for a specific project, and are worth more points if they promote the most human benefit with the least environmental impact. An example of the system is an innovation credit that in order to be earned must have at least one main stair in the building that comes with seven required features, with the goal promoting the health of building users through physical activity. Amassing more overall points by going after credits that best fit a project can help that project attain a higher level of certification, ranging from basic Certified once a certain point threshold is reached, to Silver, Gold, and Platinum.

An important trend that has become more prevalent with this newest wave of environmentalism is "greenwashing", which occurs when companies and organizations use deceptive PR to make it seem as though their products, services, and actions are more environmentally friendly than they actually are. Ranging from multi-million-dollar corporate marketing campaigns to seemingly harmless environmental imagery on packaging, this trend has come under intense scrutiny since it first became acknowledged by the public (Watson, 2016). In its earliest iterations, LEED was also used by various companies who wanted to give the

impression to the public that they were focused on reducing their environmental footprint. Back when the USGBC's goal was merely introducing a rudimentary level of green accountability within the construction industry when there had previously been little to none, there were several credits that were essentially "freebies". These credits were easy to earn, low in cost, and offered little to no actual impact on the building's overall efficiency, and were exploited by companies in order to earn a certification without actually putting in the work (Schnaars, 2013). For these reasons, the LEED rating systems are updated every few years with certain credits being replaced to make it more difficult for a building to reach certification and continuously raise the bar within the industry.

Literature Review

As it stands, the current scholarship regarding LEED and its impact throughout the construction industry and society in general is scattered. The USGBC website regularly publishes updates and articles about the LEED system but in order to nurture a well-rounded perspective on the topic, outside sources were consulted that were free of some of the internal biases that could be present in USGBC sponsored articles. News articles, research studies, government documents all exist but most focus primarily on the impact of LEED on a specific stakeholder group, rather than studying how it has influenced the interactions between them and the industry overall. Most major construction companies and general contractors have detailed websites exhibiting the different facets of the company. These company sites also typically have an "About Us" section that contains the company values and will typically address any innovative strides the company is taking towards greener construction and sustainability (Taylor, 2019). Also accessible are legislative articles from different state governments and agencies that

discuss the sustainability requirements/incentives of each entity as it pertains to new construction projects. For example, since 2012 the District of Columbia passed legislation requiring that all non-residential buildings reach a LEED Silver certification. Many polls also exist that help measure public opinion about their experiences in certified buildings, as well as their overall thoughts on green building in general.

There are several existing studies about the benefits of LEED certification, from actual energy saving practices and design features that mitigate a building's impact on the environment, to better health and improved morale amongst clients using the constructed buildings. On the USGBC website for LEED, there are continuous reports on the everchanging rating standards and various surveys conducted by the USGBC that gauge overall employee experience in LEED buildings. Outside sources were also investigated to have a well-rounded understanding of the current perception of the rating system in the industry and society in general. Apart from looking up specific studies regarding the actual environmental impact that LEED certified projects have, there are news articles published that consolidate several of these research studies in their narrative.

Methods

Upon consolidating all of the relevant literature, reviewing the material and drawing information about the main actant groups in the construction industry will be the next step. Some of these include construction companies, their clients, sustainability consultants, the general public, and government groups. Researching some of the more prominent construction companies and government entities' standards and practices will provide more information about these groups' motivation for using LEED and how the existence of the system has changed their

mindset about green building. Apart from studying already published literature, I conducted an interview with a work colleague of one of my construction professors, Christopher Gorthy of DPR Construction, the general contractor for which both he and my professor still work full-time. His feedback will also be included in my analysis of the current stakeholder groups, along with my findings from gathered literature and reports. As well as the information regarding the different stakeholder groups, I gathered data regarding the energy conservation rates and other sustainability-centered values from the various reports on the performance of LEED certified buildings that will outline the actual effectiveness of the rating system in leading to the construction of green buildings. I also looked further into LEED's effectiveness in actually meeting its touted goals of energy efficiency and improved human experience is also important to give a well-rounded view on the system's impact. In order to gauge nationwide opinions on the LEED system, I also analyzed polls conducted by Echelon Insights that were first addressed in an online article published by ACHR News (ACHR News, 2015).

Results & Discussion

Public's View of LEED:

On the whole, most people in society today are aware of the impact that humankind has on the environment, and sees lessening our footprint as a positive goal to strive towards. With the development of nuclear technology came a new wave of environmentalism, with the public

starting to place more priority on sustainability. This trend translated directly to the marketplace, with companies of varying industries placing more emphasis on being environmentally friendly or green. How truthfully effective companies were in adopting practices that actually made a difference varied wildly over the years, with LEED being a primary target of misuse in its earliest iterations by companies wanting to get certified by only meeting the most basic of criteria. These instances of misuse led to a variety of investigative news articles that were heavily disparaging towards the rating. While the US Green Building Council has worked since then on the various succeeding LEED iterations to close these loopholes that were being taken advantage of, these lapses left room for the publication of several national news stories lambasting the efficacy of the rating in the late 2000's. A prime example is an article written by USA Today regarding the Palazzo Hotel and Casino in Las Vegas, which in 2008 was declared the world's largest certified building at the time. Many of the LEED credits the hotel earned towards its certification came from cheap purchases and low effort decisions rather than actual investments in new technology or labor-intensive alternatives, such as buying bike racks or offering preferred parking for fuel-efficient vehicles (Schnaars, 2013).

One of the primary critics of the rating system has been mechanical system designer and consultant Henry Gifford, who has operated in the New York City area for over 20 years helping make buildings more energy-efficient. After the release of a 2008 study by the USGBC which highlighted their data showing the energy efficiency of LEED certified buildings compared to non-certified argued that the underlying methodology of the study was flawed. The study was composed of data that came from companies that agreed to volunteer the reports of their LEED buildings energy consumption, which he argued introduced an inherent bias to the study. His

main point was that the certification is awarded before energy savings data can even be examined, making energy usage not an underlying requisite of the system (NPR, 2010).

Unfortunately, the currently available methods of measuring a certified building's energy efficiency don't paint the clearest picture due to the complexity involved in breaking down and presenting the data. And even after taking the difficulties of analyzing this data into account, another hurdle that LEED still faces in improving public perception is that many people still don't associate green buildings as a viable avenue to increased energy savings. From a research report commissioned by the USGBC, only 11% of those surveyed associated green buildings with being an integral part of lessening our negative impact on the environment (Long, 2019). However, the majority of the informed public seems content with the benefits of LEED's other pillars. Based on a poll from 2015 conducted from 800 citizens deemed to be a representative sample group of nationwide voters, almost three-fourths agreed that having a national green building standard was necessary (ACHR News).

The Federal Government and other government entities' view of LEED:

Since the inception of the US Green Building Council in 1993, its founders have worked closely with various federal agencies in attempting to get more environmentally friendly building regulations put in place. With the creation of the LEED rating system in the late 1990's, the relationship has only become more closely entwined. Today more than 8 government bodies either require or highly encourage the use of LEED in their new projects, including big names such as NASA, the State Department, and the three main branches of the military. According to a report published by the office of the Federal Environmental Executive, the lack of a reliable

budgetary structure for green buildings is one of the principal limiting factors of the federal government's capacity to more readily internally incorporate sustainable practices on a wider scale. Budgeting decisions have historically been based on an initial cost basis, not taking into consideration the savings that could be accrued over the life cycle of a project, a concept that is most pertinent when it comes to sustainable construction. Some other detractors against the incorporation of a government wide endorsement of LEED cite inappropriate weighting for certain credits, such as how installing a vegetated roofing system and installing an outlet for electric cars are both worth a single credit. Certain departments such as the Army have complained about unique operational needs that go beyond the scope of the rating system, including features such as Operations & Maintenance and more design flexibility for building modifications (Howard). Despite these concerns, the federal government's relationship with LEED remains an amicable one, as agencies such as EPA continue to work closely with the USGBC on the updated versions of the rating system and continue to highly encourage LEED as the guiding framework for construction.

Apart from the federal government, various state and local government entities have also accepted LEED into their legislation. Some, like the District of Columbia, have mandated that new projects earn a LEED certification. Since the early 2010's, Washington D.C. has been putting various initiatives in place with the goal of making the city the "healthiest, greenest, and most livable city in the United States" within the next 20 years (Marino, 2018). With the goal of continuing to stand by the targets of the Paris Climate Accord even as the U.S. withdrew from the agreement, D.C. has continued to use LEED as the basis for its sustainability and clean energy initiatives. In 2018 this came to a head when the capital became the first city in the world to attain LEED for Cities Platinum certification (Marino, 2018). Apart from the tight knit belief

in LEED exemplified in D. C's local policies, several states instead of mandating adoption of the system have over time begun to offer incentive programs to promote developers to strive to get as high a rating as possible. Some like Illinois offer interest rate reduction for loans intended for energy efficiency upgrades, with the only requisite being having a LEED professional working on the project pursuing certification. Others like Maryland and New Mexico provide tax credits for certified buildings (Hansen).

While thirty-four states and D.C. have accepted LEED construction, there are those such as Mississippi and Alabama in the process of passing amendments that would effectively ban state buildings from pursuing LEED certification. According to one source, those behind the ban are primarily groups in the timber, plastics and chemicals industries who are reportedly unhappy that most of their product line does not meet the LEED standard. These industries, many of whom remain voting members of the USGBC, have even come up with their own green building standards called Green Globes which are much laxer. The USGBC's previous policy director Lane Burt has mentioned that there is an unfortunate divide that is becoming evident between red and blue states in how they approach adoption of LEED into their infrastructure as a result of lobbying by these disgruntled industries (Badger, 2013).

Private Contractors' Views of LEED:

For the longest time, general contractors and other building companies have been resistant when it came to both adopting new disruptive technology and employing the proper methods to effectively use that technology (LaBarge, 2015). At the turn of the century this mainly included the computerization of correspondence and other construction documents as

well as adoption of building software such as Computer Aided Drawings and Building Information Modeling. Over the past couple decades, sustainable construction and green engineering have quickly moved to the forefront of the industry. The prevalence of owners of buildings new and old trying to reach LEED certification has helped make greener materials and products more available for purchase from both large-scale suppliers and local retailers (Barth, 2018). If you go to the website for just about any major general contractor these days, one of the company pillars is almost always centered on sustainability. Once thought of as a fad, the green building industry now makes up about half of the marketplace in new construction.

From the insight offered by DPR Preconstruction Executive and LEED Professional Christopher Gorthy during our interview (personal communication, February 14, 2020), the LEED rating system has been the most transformative influence in guiding the market trend towards green building. Mr. Gorthy's current role within the company is that of a pre-construction executive as well as their lead sustainability mentor. Over the course of his 20 plus years in the construction industry, Mr. Gorthy has been a board member on the US Green Building Council, of which he remains an active member, as well as a board member for the Virginia Sustainable Building Network. He went on to mention that LEED has affected almost every aspect of how contractors operate, from how they recycle to the materials selected and built, to increasing the energy efficiency of all building systems. The way that most general contractors get awarded work is by either submitting their bid for a project to central forum or getting personally invited by the owner/developer to submit their bid. Apart from usual factors such as a company's reputation for safety, employment of skilled professionals, and a portfolio of past projects, having experience in sustainable and green construction in the current market is "often a limiting factor in even getting invited to respond to a bid proposal.". LEED has become

a driving force in the industry by representing the level of a project's commitment to sustainability and environmental friendliness, and according to Chris has helped make contractors "more responsible for the impact" that they have on the environment.

How Effective LEED Actually Is:

As was previously mentioned, due to the complexity involved in breaking down and presenting the data it is still difficult to accurately determine whether the building standards of the LEED system actually result in significant energy savings. There was an attempt by the USGBC to quantify the energy reduction that was implied would follow for LEED certified buildings in 2008. They commissioned a study by the New Buildings Institute (NBI), which after analyzing energy data from over 120 buildings, concluded that the certified buildings were saving almost 30% more energy as conventional buildings (Scofield, 2016). Further research was conducted by Professor John Scofield of Oberlin College, who believed that the methodology behind the previous USGBC study was particularly flawed due to the bias introduced by only using volunteered LEED building data. Scofield used data that had been recently been made public in 2011 in order to avoid the selection bias of the previous study, and after analyzing the NBI-provided data of 21 certified office buildings in NYC found negligible energy reduction compared to other office buildings. Finding similar results after analyzing data from Philadelphia as well as from another peer reviewed study of certified-buildings' energy consumption, Scofield determined that with a more rigorous analysis it was evident that the findings of the USGBC's 2008 study were at best greatly inflated.

While analyzing public perception is important to an external understanding of LEED's impact in the industry, gaining an insight on whether the benefits implied by a building's certification are actually tangible to the people working in certified buildings is even more so. Of LEED's principal tenets, the last category, Indoor Environmental Quality or IEQ, focuses on improving the human experience within buildings in order to promote increased productivity and morale. Key items in this category include air quality, thermal comfort, and others. A detailed study of occupant satisfaction drawing data from a sample size much larger than was previously used came to an interesting conclusion (Altomonte, 2013). Conducted as a joint venture the Universities of Nottingham and California Berkeley, the study was meant to serve as a more definitive judgment on whether LEED certified buildings actually offer better living experiences than non-certified buildings. After comparing their data from over 20,000 responses, half of which were from LEED buildings, the authors concluded that at best buildings with a LEED certification offered a marginal improvement in occupant experience that was negligible overall. Even with that in mind, a 2018 poll from the USGBC showed that almost 80% of workers surveyed said that all other aspects of a job being equal, that they would choose to work in a LEED-certified building over one that was not. Given the marginal quantifiable improvement in occupant experience between certified and conventional buildings, the biggest draw for employees would seem to be brand association with LEED and what that implies in terms of a company's values.

Significance & Conclusion

As most of the developed world strives to combat harshening climates and lessen our carbon footprint, understanding how policy and infrastructure changes within the construction industry impact different stakeholder groups can help identify areas for improvement moving forward. The chief catalyst of change within the past 20 years is undoubtedly the concept of third-party verification for green buildings embodied by USGBC's rating system. Based on these findings, it is fair to say that LEED has helped promote change in both public and private perception of the importance of green construction in today's society. While the actual energy efficiency of buildings using the LEED system cannot yet be ubiquitously quantified as better or worse than conventional buildings, most groups agree that LEED has helped pivot the industry for the better and actively try to emulate the program's values in how they operate. Promoting collaboration within the marketplace can help push our infrastructure forward and develop future, more impactful iterations of the LEED system that consistently strive to raise the ceiling so that the industry never gets complacent. That kind of healthy collaboration can only occur with a clear understanding of how construction and societal groups have grown due to this certification system. As Mr. Gorthy's viewpoint as an expert on LEED and sustainable construction, "... its [LEED] perseverance has shown that collectively we can do better, we can do more."

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