Sustainable Built Environment Imaginaries as a Mechanism for Symbolic Corporate Environmentalism

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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As populations grow so has the demand for structures as well as the optimization of their carbon emissions. Incurred throughout construction, occupancy, and renovation, buildings contribute 40% of greenhouse gas emissions, 40% of drinking water pollution, and 24% of all air pollution. Additionally, construction globally consumes 12% of potable water reserves and 55% of forestry products all while producing 45-65% of all waste (Kurnaz, 2021). As the population and thus demand for more built spaces increases, creating sustainable codes and rating systems is paramount in regulating and reducing the negative implications of buildings on the natural environments around them. Regulatory bodies support and help paint the picture of building an imagined sustainable future through these codes (Cidell, 2009). “Green building certification systems measure and evaluate the sustainability level of buildings within the scope of the established standards” but despite genuine intent, recent applications of such codes have called into question the feasibility of real-world performance (Kurnaz, 2021, p. 73). Considering the social implications of how multiple parties engage with this built environment imaginary provides a clearer depiction of the overall sociotechnical system. Though not exhaustive, the parties considered; individuals, designers, organizations, and regulatory bodies, cover many bases of who could encounter an idealized version sustainable building. Examination begins to reveal a concerning trend wherein a growing individual environmental consciousness spurs an increased demand in green products, answered by for profit organization’s use of sustainable building imaginaries as a tool for symbolic corporate environmentalism. Regulatory bodies’ imagined future of sustainable building practices are used as a mechanism to market trendy greenwashed company values to the masses.

Sustainability & Green Building Imaginaries

Calls to reduce impacts associated with the construction of buildings has become a global focus. With the advent of steam powered machines during the industrial revolution, factories established in city centers pushed mass production and urbanization as well as the unlimited growth of industrialization and population. Initially exciting economically, over time environmental considerations began to grow, cautioning the uses of our natural resources and limiting air pollution. To combat these issues, the concept of sustainability developed and grew, as global warming threatens all with seasonal shifts and sudden flooding. Kurnaz presents Akgül's description of sustainability as, "an environmentalist world view that aims to use environmental and natural resources by taking into account the rights and benefits of today's people as well as future generations" (Kurnaz, 2021, p. 74). Additionally, sociotechnical imaginaries are defined as "collectively held, institutionally stabilized, and publicly performed visions of desirable futures" (Tozer & Klenk, 2017, p. 175). It is then appropriate to consider how society, regulatory bodies, and organizations culminate as the political ecology of a sustainable built environment (Cidell 2009). One idealized imaginary of sustainable or green buildings may consist of actively related building structures that consider a wholistic life cycle whilst prioritizing renewable and clean energy. While these ideas of sustainability and green buildings already exist within the general social conscious of individuals, regulatory bodies supply and manage a more rigorous definition and codification of green building standards (Cidell 2009). Their rating and certification of these buildings provides reference for future projects as well as accelerating and encouraging the rest of the world's green buildings (Kurnaz, 2021). Organizations and designers seeking to align themselves with green practices can use these codes to participate in the construction and engage actively or passively with the imaginary of a more sustainable future, for better or for worse.

Individual Engagement

Given that buildings make up 40% of all greenhouse gas emissions, and continue to increase with population growth, it is no surprise that a sustainably conscious individual might bring their performance into question. Construction industry has been criticized publicly for its major contributions to carbon emissions and global warming (Doan, 2016). These individuals will be interested in the comfort and success of future generations to come and want to see sustainable design that will last and not leave grandchildren with irreversible climate damage. This mentality around the green building imaginary has increased the popularity of being green and living sustainably. Individuals will buy into organic foods, electric cars, and solar houses just to feel as though they are contributing to living more sustainably. Buying in generates a passive consumption of this sustainable future imaginary. For example, Bowers mentions a 2009 study that examined around 700 office buildings. Conclusions showed that green buildings were earning around a 9% premium in “effective” rents (Bowers, 2020). Additionally, a separate study looked at 15,000 buildings while only finding an effective rent bump of around 4-5% for green buildings (Bowers, 2020). These tenants were more than willing to pay a premium for a defined green space, whether out of conscious or subconscious desire to do the best for the environment or at least appear as though they care. Many can easily latch onto an imaginary of a sustainable green future because it is the “on trend” thing to do. Though not inherently bad, this blind following involves a complication as we move onto how organizations and regulatory bodies engage with and actively shape the exact same imaginary.

Regulatory Body Engagement

With increased attraction to green building infrastructure, economically developed countries began to create green building certification systems, making an entirely new subsector to fulfill an environmental agenda (Kurnaz, 2021). Sharing the same basic view of a future with sustainable buildings, these regulations hope to supply a more stringent definition for the actual construction of this kind of building. The first green building rating system Building Research Establishment Environmental Assessment Method (BREEAM) was established in 1990 by the Building Research Establishment (BRE). Since its inception, more than 2.2 million buildings are registered with BREEAM, a whopping 80% of the market share in Europe (Kurnaz 2021). Established after BREEAM in 1998, the Leadership in Energy and Environmental Design (LEED) rating system by the United States Green Building Council (USGBC) has shaped knowledge, implementation, and largely the success of green building practices in the United States. To this point, their codification has incentivized the construction of many green building projects. Their reference guide proclaims that, “Establishing sustainable design objectives and integrating building location and sustainable features as a metric for decision making encourages development and preservation or restoration practices that limit the environmental impact of buildings on local ecosystems” (USGBC, 2007, p. 21).

An overarching concept used by LEED is an emphasis on iterative development, and continuing to identify opportunities for improvement (Todd, Pyke & Tufts, 2013). Focusing on six main categories; water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation in design, groups of volunteer experts work to provide requirements and descriptive language for requirements that are then passed along to another team that reviews market feasibility. Revised versions of the rating system are also released for public comment. Given that this design process is community driven, outside influencers like designers and other organizations can share and attempt to implement changes as the green imaginary continues to evolve into the future. While these standards are developed as by consensus, USGBC member organizations are the only parties allowed to vote on actual standards, tipping the power dynamic more towards the larger organizations. Cidell asserts that, "it is important to consider how voluntary these standards really are, as well as who is in favor of their implementation and who is not" (Cidell, 2009, p. 7).

Despite a flexible system to encourage innovative new designs, many buildings that achieve a LEED or BREEAM certified or passing score respectively fail to achieve the planned design in a reasonable real-world application. The University of Texas Health Science Center – Houston School of Nursing provides an excellent example of this lackluster performance (McDermott, 2010). Despite receiving numerous awards for groundbreaking sustainable design, the building was not without major issues. Failing to consider operation over time, the rainwater collection system saved around $12k per year and cost $1.5m to install. After 6 years of use, its storage tanks were rusting and with a replacement cost of $19k per tank, the intent of the green design was not realized. Additionally, the building's design intended to make use of solar PV panels on the roof at a cost of $1m. Although mounting locations for this feature was constructed on the roof, they remain empty. The engineer's design failed to take into account the insufficient payback for this system and the University opted to pay for green power off the grid. In both cases insufficient analysis of the building system's authentic performance led to LEED credited green designs falling by the wayside. "One of the biggest criticisms toward LEED and BREEAM certificates so far is that the necessary examination are not made after the construction is finished and when the building is being used", instead "these certificates are obtained on the assumption that the building will meet the criteria exactly as it was designed". It has even been revealed that around 30% of buildings that obtain LEED certification are not really energy efficient (Kurnaz, 2021, p. 83). LEED's flexibility on standards focuses on reducing overall impact rather than achieving a specific standard (Cidell 2009). These flexible approaches to green design emerged to achieve sustainable building practice for the future but are often not used as intended by other for-profit organizations who engage with this imaginary in a different way.

Organization Engagement

Pulling ideas from both the individual and regulatory engagement sections above, the shortcomings of real-world application for LEED and BREEAM start to become a little clearer. As a result of increased environmental awareness among consumers, many companies and organizations integrate sustainable buzzwords in their marketing to garner respect and more importantly revenue from a greener consumer class (Kurnaz 2021). Companies have since been eager to capitalize, many taking the competitive advantage to respond to such issues since it has been shown that individuals are willing to pay a premium for a more environmentally friendly product. For these organizations, sustainability is all about public perception and an excellent way to prove organizational "commitment" is to rent in a building certified by green building codes. For example, Bowers, Boyd, and McGoun outline how a substantial number of banks have publicized construction of green office buildings potentially in effort to offset bad press following the mid to late 2000s. Public statements from institutions such as, PNC Bank, Wells Fargo, CitiFinancial, Deutshe Bank, and TD Bank all share a same general sentiment of environmental stewardship and their commitment to sustainability. Given that finance companies have gained LEED certifications on over 141 million square feet up to 2014, there is little question that banks have invested heavily into green building. While motive for these organizations can not be immediately watered down to greenwashing, such aggressive green expansion for financially conservative groups seems out of line with the slow payback timeline of a green building (Bowers, 2020). Such companies would participate in greenwashing because, "the brand value of the green building certification system is more important than the sustainability value of their projects" (Kurnaz, 2021, p. 79).

Unfortunately, the nature and structure of credit based green building codes like LEED and BREEAM lend themselves to manipulation by organizations as a marketing tool. Using LEED as a brief example of structure, we see only fifteen mandatory credits out of 110 possible and only a score of 30 to pass across its six main categories described earlier (Doan 2016). With a minimal number of mandatory points, organizations planning green building construction can ignore select criteria and collect points from easier criteria to boost their score. "Even if a building fails to score on key environmental factors such as energy efficiency, it can achieve its overall target score by scoring higher on other criteria that are less important or necessary" (Kurnaz, 2021, p. 79). Now circling back to an example from The University of Texas Health Science Center – Houston School of Nursing, the issues with individual building components presented, appears to be clearer. The Siemens Gebze Site in Turkey is useful as another illustration of lacking real world LEED performance. The design accrued pointes for bicycle parking areas, showers, and personnel changing rooms meant to reduce vehicle use. Further, the site provided special parking areas for carpool and energy efficient vehicles (Yaman, 2009). While these design practices did receive points towards LEED certification, upon closer inspection, public transport is uncommon in this area and a vast majority of people do not own energy efficient vehicles, making bicycle transportation unsuitable (Yaman, 2009). The green design was largely unsuccessful in its use while still claiming credit for its intended sustainable design. Organizations, especially in countries with different local individual contexts from where a green building code developed, can easily manipulate their public perceptions with these codes as a tool.

Designer Engagement

An additional angle to analyze the green building imaginary is from the engagement by designers. Whether this be the architect, engineer, or facilities personnel, they play a key role in how green buildings come to life. This grouping of individuals has a unique opportunity to choose whether to shape the imaginary passively or actively. As passive actors, they engage with the future of green buildings in the same way that an individual might, taking what they see at face value and nothing more. However, this creates a problem where these designers may become implicated in the greenwashing of organizations as they attempt to deceive the market. Designers could even be asked to shoehorn existing projects into LEED sustainability categories halfway through project development. An important choice for these designers is choosing to be active in the role in sustainability. They should seek to question intentions and think about whether choices around building design are truly sustainable or if they are just checking a requirement for a certificate. As seen before, many real world factors like locality have huge influence on the outcome of green building so it should be only natural that an honestly sustainable building brings all these considerations together early on in the design development phase.

Looking again into corporate greenwashing now in developing countries raises, important considerations for designers interacting with those projects. A study done on two green designed buildings in Colombia, the “Terra Bio-Hotel Medellín” and the “Nave industrial Valle Sur INGEOMEGA,” are both excellent examples of how sustainable design and intent does not necessarily have to correspond with the use of green building codes (González, 2012). The Terra Bio-Hotel with over 25,000 square feet was not originally designed using LEED specifications, however applying the building to the code after the fact reveals that the building could receive eighty-seven points, landing it in LEED platinum territory. The designers were able to meet and far exceed the expectations of a LEED certified building all with an honestly sustainable design mindset, proving that code guidelines are not the end all be all to the future of sustainable buildings. For example, LEED credits the same number of points to a building that utilizes a natural ventilation system and one that uses an approved efficient mechanical system. For the Bio-Hotel in Medellín, the average temperature lands around 72°F with only about one to two degrees in variation year-round. This meant it was feasible for the Bio-Hotel to be designed with passive architecture, not requiring forced air conditioning. Interestingly, the LEED system values a low-power consumption solution as equal to a no-power consumption alternative (González, 2012). González continues that LEED is a valuable tool for sustainable buildings in the US, but outside of that context in Colombia the costs related to LEED certification are not feasible for smaller projects. He concludes that, “an honestly sustainable project, with no stamp, will generate greater environmental benefits at lower costs than a project that has been certified as green building with the minimum possible points” (González, 2012, p. 5). Engineers and designers can and should actively participate in the development of the green building imaginary, by choosing to make honestly sustainable choices taking into account more than just a couple of checkboxes.

Discussion and Conclusions

All things considered, green building codes such as LEED and BREEAM that seek to guide us into the future of sustainable buildings are not inherently bad. Others may seek to misconstrue their words and outlines in a way that benefits them, appealing to the general sense of sustainability in the public but without honest intent for real change going forward. Engineers and designers on green designated projects, play a critical role in balancing out organizations that continue seeking to game the system to their advantage. With honestly sustainable intentions from the outset, despite certification level, project designers can attain real world performance with lasting impact into the future. Let us now examine an interesting situation unfolding across higher education institutions, more specifically at the University of Virginia. For this case allow students, potential students, and investors to be categorized as individuals, the University itself as an organization, the sustainability department as a regulatory body, and associated facilities personnel and engineers as designers as outlined in the sections above. In 2007, the university announced plans for every new building constructed on ground to be at least LEED certified as well as phasing existing buildings into LEED code (UVA Sustainability, 2022). For example, reopening in 2016 Thomas Jefferson's Rotunda underwent significant renovation to be classified as LEED Silver with 54 points under the 2009 LEED new construction code (USGBC, 2017). This commitment and others by UVa sustainability beckon to incoming students and investors in the same way that green buildings were able to garner a 9% increase in effective rent (Bowers, 2020). As recently as February 2022, UVa has further updated its green building standards in alignment with its goals to be carbon neutral and fossil-fuel free by 2030 and 2050 respectively. "Starting this year, new buildings are restricted from adding infrastructure for the on-site combustion of fossil fuels, such as natural gas, for heating or other uses, unless required for safety or emergency back-up systems" (UVA Sustainability, 2022). The University's sustainability department plays an interesting role, while they set out to outline sustainability goals for the school in the future, desirable for the imaginary, they also produce a vast amount of content lauding the University's green and sustainable performance. And while UVA does have a number of excellent climate goals, we cannot ignore some of the university's less sustainable practices. The university operates and maintains an enormous district heating and cooling system with over 150 miles of underground systems that deliver hot steam and chilled cooling water to most buildings on grounds. Their steam utility is fed by heating plants spread out strategically, each one burning natural gas, coal, and oil to provide 84% of UVa's heating energy (Facilities, 2022). Data on exact resource usage from the school was nearly impossible to come across online, nevertheless a live presentation from facilities in September of 2021 revealed the following. For just heating buildings in 2020, a year where grounds were nearly empty, UVa burned 5,390 tons of coal, 46,611 gallons of Oil #2, and 654,738 gallons of natural gas (Zmick, 2021). As we approach our 2030 and 2050 goals, the University facilities and engineers need to be very careful in their design considerations. While the school and sustainability project a picture of a perfect green utopia, designers must check and balance with truly sustainable plans for the future, preventing them from using the green building imaginary as a marketing tool, effective as it is.

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