IS BOSTON BUILDING BETTER? AN ANALYSIS OF THE LEED CERTIFIABLE STANDARD IN THE BOSTON ZONING CODE

Sandy Beauregard[1], Simi Hoque[2], Paul Fisette[3], and Benjamin Weil[4]

ABSTRACT

In 2007, Mayor Menino and the Boston Redevelopment Authority implemented Article 37, an amendment to the Boston Zoning Code requiring new construction approved under Large Project Review be designed and built to meet the U.S. Green Building Council's LEED certification. The amendment was intended to promote green building practices in the city and reduce the environmental impacts of buildings larger than 50,000 square feet. Article 37 dictates that buildings be LEED "certifiable," but does not require that they actually achieve LEED certification. This study examines how this policy has affected building practice in the city. This research relied on several data sources including public records, communication with public officials, and qualitative research interviews with building industry professionals working in Boston. Interviews were conducted with 9 individuals at 7 firms. Both architecture and engineering firms were included and all have worked under Article 37. The experiences of each firm were treated as a case study, and cases were considered in relation to each other. A cross-case analysis was completed using the qualitative research methods of interpretation, synthesis, meaning condensation, and meaning categorization. It was concluded that Article 37 has advanced sustainability goals in Boston and has provided an educational benefit to building practitioners and clients. However, Article 37 has not had a substantial impact on building practice in the city. The LEED certifiable standard is not actually equivalent to LEED certification and does not set an aggressive goal. This research fills a gap in the literature and is an important step in critically examining the outcomes of green building policy. This understanding of how Article 37 has influenced building practice in Boston is valuable not only to the city, but also to the numerous municipalities that have adopted LEED-based requirements for private construction.

[1]Department of Environmental Conservation, University of Massachusetts Amherst, 160 Holdsworth Way, Amherst, MA 01003, sjbeaure@eco.umass.edu
[2]Corresponding Author, Assistant Professor, Department of Environmental Conservation, University of Massachusetts Amherst 160 Holdsworth Way, Amherst, MA 01003, simih@eco.umass.edu.
[3]Associate Dean for Budget and Operations, The College of Natural Sciences, University of Massachusetts Amherst, 80 Campus Center Way, Amherst, MA 01003, pfisette@cns.umass.edu
[4]Extension Assistant Professor, Department of Environmental Conservation, University of Massachusetts Amherst, 160 Holdsworth Way, Amherst, MA, 01003, bweil@eco.umass.edu

1. INTRODUCTION

1.1 Climate Action in Boston

In 2000 Mayor Thomas Menino began positioning Boston to be a leader in confronting the challenges of climate change by joining the Cities for Climate Protection campaign and committing to develop a local action plan to curb greenhouse gas emissions. In accordance with this commitment, Mayor Menino appointed an Energy Advisory Committee in 2001 and, in 2003, established a Green Building Task Force (GBTF) to better understand the role of the building sector in greenhouse gas emissions and how sustainable building strategies could help the City achieve its climate change goals (City of Boston, 2007, 2013).

Following the recommendations of the GBTF, Mayor Menino and the Boston Redevelopment Authority (BRA) implemented Article 37 in January 2007. Article 37 (Green Buildings) is an amendment to the Boston Zoning Code requiring new construction approved under Article 80B (Development Review and Approval: Large Project Review) be designed and built to meet the United States Green Building Council's Leadership in Energy and Environmental Design (USGBC LEED) certification. This amendment is intended to promote green building practices in the city and reduce the environmental impacts of buildings larger than 50,000 square feet. Article 37 does not require that the buildings actually achieve LEED certification, but they need to be LEED *certifiable* as determined by an interagency review committee and with the endorsement of a LEED Accredited Professional.

The determination of whether or not a project is LEED certifiable is made during the permitting process. The Article 37 review takes place within the context of Large Project Review, which is triggered at a threshold of 50,000 square feet and is a more comprehensive process than that for smaller construction projects. The documents submitted to fulfill the Article 37 requirements are only parts of the larger documents required by the Article 80 procedures. Other factors addressed by the project team during the review process include Transportation Impacts, Environmental Protection, Urban Design, Infrastructure Systems, Historic Resources, Site Plan, and Tidelands (Boston Redevelopment Authority, 2007).

For Final Design Approval, the project team must submit a Green Building Report that includes the final LEED checklist, final construction drawings, a narrative detailing how each LEED credit will be achieved (with specific references to the construction drawings and specifications), and a Letter of Design Certification. The Letter of Design Certification must be signed by the LEED AP or "other BRA recognized professional" certifying that, to the best of their knowledge, the project has been planned and designed to meet the certifiable standard by achieving the points identified in the checklist. Based on this documentation, the BRA makes the final determination that the project is in full compliance with the regulations of Article 37 and issues a building permit so construction can begin.

It is unclear why the Boston Redevelopment Authority chose not to require LEED certification for new construction. According to John Dalzell, Senior Architect at the BRA, "the misalignment of the timing of LEED Certification and building permitting is the paramount reason why [they] do not require USGBC Certification" and that, although "one could raise other considerations such as how to link City project approval to a third party approval," he does not believe that Mayor Menino's GBTF explored these issues (Dalzell, 2012). However, James Hunt III., Chief of Environmental and Energy Services for the City of Boston, was quoted at the time describing the LEED process as "lengthy, onerous in documentation, and costly" and stated that the city did not want to rely on a third party such as the USGBC (Palmer Jr., 2006).

1.2 Research Objectives

This study has two distinct objectives. The first is to better understand how environmental policy goals have been translated into practice by exploring and illuminating the experiences of those working under the policy. Reading the policy language and procedural documents tells only part of story. These demonstrate the intentions and goals of those who enacted the policy and show how the policy should work, in theory. By telling the stories of those who have firsthand experience working with the new zoning requirements, we can understand what this policy actually looks like in practice and how it is perceived by those working within its constraints. A policy cannot truly be good if people, especially those it affects directly, do not believe in it.

The second objective is to determine whether or not the policy has influenced practice. The City of Boston aims to reduce carbon emissions by 25% by the year 2020 and 80% by the year 2050 and to be successful there needs to be a shift in the current building and construction paradigm. Article 37 was enacted to help achieve the City's goals by changing the way we build and the way that buildings impact the environment.

2. BACKGROUND AND LITERATURE REVIEW

Green building policies are being implemented at federal, state, and local levels throughout the country. The first LEED-based public policies were enacted in 2000 by the cities of Seattle, WA, Austin, TX, and Santa Monica, CA (Koski, 2010). LEED has now been adopted or referenced in public policies by 384 cities and towns, 58 counties, 34 state governments, and 14 federal agencies or departments (U.S. Green Building Council, 2011). This count includes legislation, ordinances, executive orders, resolutions, and incentive programs. In addition to Boston, the list contains six regulations that specifically use the term "certifiable" and more than 35 policies that require or encourage a LEED checklist be submitted but do not actually require LEED certification (U.S. Green Building Council, 2011).

In an analysis of how this policy diffusion took place, Koski found that by 2008, 119 U.S. cities had implemented LEED-based policies with adoption happening at a rate of 15 or more new city policies each year from 2004 to 2008 (Koski, 2010). At the same time, a body of criticism was mounting against the LEED rating system, focusing on the issue of energy savings of LEED certified buildings. One study of 100 LEED certified commercial buildings found that, on average LEED certified buildings saved energy compared to code-built buildings, but 18–35% of the buildings actually use more energy (Newsham, Mancini, & Birt, 2009). Another study using the same data found that while smaller LEED certified buildings saved energy, larger buildings were able to achieve LEED certification without any demonstrable energy savings, refuting the findings of Newsham, Mancini, & Birt (Scofield, 2009). Furthermore, the energy performance predicted at the time of certification is often unrelated to the post-occupancy performance of these buildings. In 2008 the New Buildings Institute evaluated the performance of 112 LEED certified commercial buildings and found that approximately half of the buildings met or exceeded the predicted energy performance while the other half failed to meet expectations. A full 25% of the buildings had energy use intensities that were significantly lower than the design projection (Turner & Frankel, 2008). In another post-occupancy study of 11 LEED certified buildings one building exceeded its predicted energy use by 300% because of HVAC and lighting systems control issues. While 6 of the buildings in the study exceeded expectations, none were within 20% of the design performance (Turner, 2006).

In response to the identified flaws in the certification system the USGBC is continuously reviewing and revising the LEED protocols. For example, the newest version accounts for regional differences such as awarding more points for innovative water-conservation techniques to a building in a hot, arid climate than a building in a wetter climate where water efficiency is less important. While changes like these can improve the rating system, it also means that public policies using LEED have established a constantly moving target. This is one of many issues raised by a growing body of literature in the legal community that questions the legality and wisdom of using a private standard in public policy (Keller, 2012; Prum, Aalberts, & Del Percio, 2012; Schindler, 2010; Wolf, 2011).

Knowledge of LEED's shortcomings and problems extend beyond the building industry as criticisms of LEED have been prominently featured in national publications including USA Today, the New York Times, and on National Public Radio (Cater, 2010; Frank, 2012; Navarro, 2009). In spite of this, the number of municipalities adopting LEED-based policies has increased threefold since 2008. And while LEED-based policies have seen rapid, widespread adoption across the United States, scholarly examinations of these policies is limited. The literature focuses primarily on the types of green building policies being implemented, policy implementation strategies and, as cited above, the legality of LEED mandates. There have been no studies of the policy outcomes, perhaps deferring to the literature regarding LEED itself to address these concerns.

In a 2007 study of state-level green building policies for public sector projects, researchers surveyed 9 of the 11 existing policies and conducted interviews with officials at the corresponding government agencies. They identified and compared policy options for the public sector and developed criteria for evaluating the likelihood of success of a policy (Pearce, DuBose, & Bosch, 2007). It did not evaluate specific policies, nor did it address attendant policy outcomes. Nevertheless, it provides valuable guidance for public officials working to develop a green building policy by outlining and explaining policy types to consider and criteria that can be used to determine whether they will be able to actually implement the policy.

A 2008 study explored the green building policies that had been implemented at the local, state, and federal levels throughout the country (Sentman, Del Percio, & Koerner, 2008). The study found that the majority of green building policies at all levels of government are LEED-based, but did not provide an account of policies that used LEED compared to those that did not. The policy in Boston was noted as being the "most interesting" private mandate because of the controversial LEED certifiable standard.

Boston has elected to incorporate their green building policy into the zoning ordinance. While claiming to be the "first in the nation" to do so, the city is not alone. A 2009 study examined how the LEED building rating system had been incorporated into planning regulations (Retzlaff, 2009). Retzlaff identified 60 cities and counties that had LEED-based green building policies at the time (October 2007) and, using available policy documents as well as a survey sent to policy administrators (n=34), examined the details of the policies as well as the opinions of the administrators for 55 jurisdictions. The policies mandated that the buildings actually achieve certification from the USGBC in all but four of the jurisdictions. Twelve of the cities in the study had LEED mandates that applied to private developments. None mandated LEED for all private construction, but typically made the determination based on zoning district or project size. Retzlaff found that the majority of the jurisdictions adopted LEED verbatim and that only five had made modifications. For the majority of the jurisdictions (64%) the green building policies were administered by the planning department,

whereas only 24% of the policies were the responsibility of the building department. Retzlaff also found that on average, cities with a LEED mandate only for public buildings, built 3.06 LEED certified building under the policy while those that had policies in place for private construction averaged 25 certified buildings under the ordinance. Another interesting finding of this study was that, although administrators gave specific reasons for implementing a green building policy, none could offer any specific reasons for choosing LEED over any other certification program. This research differs from the previous studies in that it goes beyond classifying types of policies, and looks specifically at the technical details and makes an assessment of the policy outcomes.

The enactment of Article 37 in Boston sparked a controversy regarding the use of LEED certifiable as a green building standard rather than requiring LEED certification. From a legal perspective, it was noted that the tactic could help the City avoid potential lawsuits that would result from mandating a private standard (Inside Green Business, 2007). From the perspective of an engineer and building scientist, Hoque characterized the certifiable standard as a missed opportunity and a weak dilution of the LEED certification process (Hoque, 2008). She argued that "certifiable" has no clear definition and that, due to the lack of a clear determination process, it is unverifiable. Other press regarding Article 37 or the certifiable standard concluded that it was a reasonable compromise considering the legal and political challenges associated with mandating LEED certification for private construction (Palmer Jr., 2006; Pollack, 2007; Wendt, 2008; Zezima, 2006).

While there is a substantial body of literature regarding LEED certification, scholarly research regarding the LEED certifiable standard is entirely nonexistent. In addition, there is no research addressing the outcomes of green building policies, whether they are based on LEED or otherwise. In cases where LEED has been mandated, perhaps it is reasonable to defer to studies addressing LEED certified buildings, but there are a significant number of policies that have modified LEED in some way or do not actually require certification. As the number of such policies continues to grow, it is critical to assess the effects of these policies and determine whether they are truly a desirable course of action.

3. RESEARCH METHODS AND PROCEDURES

3.1 The Qualitative Paradigm

Quantitative studies aim to report the number of observations in a particular category or the relationship between two categories and their findings are able to be presented as a table of numbers (Weiss, 1994). Quantitative research is valued for its ability to test hypotheses and generate numerical observations that can be replicated by another researcher (King, Keohane, & Verba, 1994). Alternately, qualitative research is often regarded as unscientific because it does not typically generate numerical data that lends itself to such statistical analyses; however, qualitative research methods are able to produce rich descriptions of events and experiences and often uncover considerable amounts of knowledge and understanding about particular phenomena (Weiss, 1994).

There are several reasons why a qualitative investigation is particularly well suited to the aims of this study. First, we am interested in developing a detailed description of the work being done under the requirements of Article 37 (Weiss, 1994). Since we am not conducting this work ourselves, we can be considered outside observers to the inner workings of architectural practice in Boston. By conducting interviews with architecture practitioners we am

able to gain an understanding of the policy outcomes from the unique perspective of those on the inside. Secondly, the interviews allow us to integrate multiple perspectives into our understanding of the policy outcomes (Weiss, 1994). A flexible interview format is critical to collecting this information as each informant will respond differently to a certain question. Treating the interview as a conversation rather than a survey, allows for follow-up questions and a deeper, more holistic insight into the informants' experiences and opinions. Qualitative interviews provide access to a breadth and depth of information that data from a single source could never provide.

3.2 Data Sources

3.2.1 Public Records and Public Officials

Information gained through meetings with officials at the Boston Redevelopment Authority as well as conversations carried out through email were invaluable to this research and helped to form understanding of the history and implementation of the green building amendments to the Zoning Code. In addition, BRA staff was able to provide several procedural documents, project documentation, and memoranda that could otherwise not be located among the official records available online. Other documents, records, and press releases were easily found on the BRA website. Building Permit records located at the Inspectional Services Department in Boston were used to identify large developments in Boston and to quantify the number of projects that had been completed under Article 37. Although quite limited, newspaper accounts of the policy helped to frame the discussion and public opinion of the zoning amendments

3.2.2 Identifying Informants

A project architect often serves in a managerial role and functions as the interface between the client and other members of the project team such as engineers and contractors. Ensuring compliance with relevant zoning and codes often falls under their scope of responsibility which, in the case of Article 37 of the Boston Zoning Code, means the project architect determines and endorses the LEED certifiable status of the building. This uniquely positions the architect to understand the policy and to speak to how it is affecting their practice as well as the influence it might be having on their clients and colleagues in other related disciplines. It could be argued that the developers are those most directly affected by the policy, but since it falls to the architect to interpret and administer policy for their clients, it is this perspective that is explored here.

A qualitative approach to assessing Article 37 allows for a broader view of the effects this policy has had on the building industry in Boston. While it is certainly valuable to quantify how it has affected building performance, it is also necessary to understand the more subtle and perhaps more complex influences that this change to the zoning code has had on building professionals and the building industry in the City of Boston. Article 37 seeks to create a semi-prescriptive path for creating high-performance buildings, but also tries to achieve this by compelling project teams to implement a more integrated approach to design and construction. The conviction that integrated design is essential to producing good buildings is widespread among experts in the field of green building and is certainly held by the members of Mayor Menino's Green Building Task Force, as was evident in several of their recommendations.

In this study, data collection was done through semi-formal, qualitative research interviews with building professionals; consequently, the information presented here is inevitably a subjective reality informed by the experiences of those interviewed. While subjectivity is generally considered an unwelcome bias in scientific research, in this case understanding that reality is crucial, as it is the opinions and beliefs that have been wrought from these experiences that will determine whether this policy succeeds.

3.2.3 Selecting Informants

While quantitative research relies on probability sampling methods, non-probability sampling is often better suited to the goals of a qualitative research project. In this study, informants were selected using purposive sampling, meaning that they were selected based on our own understanding and judgment about who would be able to provide valuable information with regards to the purposes of this research (Babbie, 2001). To assist with selecting interview subjects, a file containing all of the large projects that had been approved since Article 37 was implemented was obtained from the BRA (Kowalcky, 2011). This was used in conjunction with the Certificate of Occupancy (CO) records maintained by the Inspectional Services Department to identify completed projects that had undergone the Article 80 review process. At the time this study was undertaken, only ten projects that met the new Green Buildings requirements had been issued a CO.

After completed projects were identified, available project documentation was used to identify firms that had worked on a completed Article 37 project. This approach is likely to have captured many of the architecture firms that had experience working with the Green Buildings requirements. However, some projects may have been initiated but not yet received any permits from the City which would exclude them from the results of this search. In an effort to capture these as well, an internet search was used to determine the names of architectural firms that work on large projects in the City of Boston. The website of each firm was then used to identify a specific person at the firm that is responsible for sustainability measures or who was known to be the architect on one or more of the previously-identified large projects. When this information could be ascertained, an email was sent directly to this person inquiring if they would be interested in participating in this study. In cases where the appropriate individual could not be identified, an email was sent to the contact email address provided on firm's website.

The emails contained a brief introduction, description of the project, and an explanation of what would be expected if the recipient wished to participate; a more in-depth explanation of the study was provided in an information sheet included in the email. In addition to the purposive method of identifying interview subjects, we utilized snowball sampling meaning each interview was concluded by asking if the participant could suggest any other professionals that might be interested in participating (Weiss, 1994). Overall, 20 firms were contacted and interviews were arranged with nine individuals at seven different firms.

3.3 Data Collection

The primary research method utilized in this study is the qualitative research interview. The interviews conducted were semi-formal in that an interview guide was used to facilitate discussion but a fixed set of questions was not answered by each informant. This style of research interview differs from questionnaires and survey interviews in several important ways. A questionnaire typically has fixed questions and fixed responses, whereas a survey interview may

allow for open responses but still requires that the same questions be asked of all respondents. The flexible format of a semi-formal interview allows the interviewees "to speak freely in their own terms" and can also be thought of as a "guided conversation" (Lofland & Lofland, 1995). Steiner Kvale uses the term "semi-structured life world interview" to characterize these interviews that enable us to "understand themes of the daily lived world from the subjects' own perspectives" (Kvale, 2007).

Whenever possible, the interviews were conducted in person but when scheduling conflicts made this prohibitively difficult the interviews were conducted over the phone. Interviews with four of the firms were conducted over the phone while the other three were in person. The interviews were intended to be open-ended and as conversational as possible so, while a prepared a list of questions was used to facilitate discussion, the participants were encouraged to discuss whatever aspects of building practices in Boston were of interest and any issues or ideas that might surface during the interview. With the permission of the participant, each interview was digitally recorded and was later transcribed manually. Interviews ranged in length from 22 minutes to 67 minutes, with a mean length of 43 minutes and a median of 40 minutes. The interview guide can be found in Appendix A.

Before an interview was conducted, each subject signed a form agreeing to participate in the study, to have the interviews transcribed and archived, and expressed whether they consented to having their name used or if the preferred to remain anonymous. Although some subjects agreed to be identified by name in transcripts, publications, or presentations resulting from this research, every effort was made to mask the identities of all of the participants in order to best protect the identities of those who requested confidentiality. This guarantee of anonymity allowed participants to speak more openly and critically, without fear of retribution or damage to their professional reputation, about a first-in-the-nation policy of which the City is very proud. Therefore, the names of the building professionals and firms discussed in this research are fictional.

3.4 Data Analysis

3.4.1 Quantifying Interview Responses

The analysis of the interview texts focused primarily on understanding and interpreting the meaning of the experiences of the interviewees. Initially, meaning condensation and categorization, two methods of content analysis, were used to quantify the subjects' responses and understand the overarching themes of each interview (Kvale, 2007). To complete the meaning condensation, long statements from the interview text were condensed into shorter sentences and then rephrased to capture the essential meaning of the interviewee's response. The transcripts of each of the seven interviews were coded in this way and then the responses were categorized based on whether they expressed positive or negative experiences or opinions of Article 37 (Babbie, 2001). This allowed the number of positive and negative expressions to be quantified, as well as the number of interviews that described the same opinion or experience.

3.4.2 Qualitative Methods of Analysis

This study relies on the synthesis of information from multiple sources including interviews, news articles, personal communication, and official documents. New knowledge is gained from this synthesis and a deep and critical interpretation of meaning (Kvale, 2007). Because this study is concerned with the impact of Article 37 on architectural practice the unit of

analysis in this study is the firm, represented by an interview rather than the interviewee. Each interview can be thought of as a case study and the findings of this study constitute a cross-case interpretation of their experiences and perspectives.

3.5 Validity and Generalization

Qualitative interviews are often criticized as being an invalid research method because of the inherent subjectivity and the findings are frequently dismissed as being specific to a small number of subjects that cannot be generalized to a larger population (Kvale, 2007). In many ways, social researchers can only rely on the quality of their interviews and their ability to check, question, and theorize throughout the study to ensure the validity of the material (Kvale, 2007; Weiss, 1994). However, there are also several tactics available to examine and address potential sources of invalidity, including checking for representativeness, checking for researcher effects, and replicating the findings (Kvale, 2007; Miles & Huberman, 1994). Most relevant to this study is the issue of representativeness and replication.

While the sample in this study is largely one of convenience, meaning it is not a probabilistic sample (Weiss, 1994), it is likely to contain a representative from nearly all of the firms that had experience with Article 37 at the time the interviews were conducted. Development, particularly of large projects, was so limited during the economic recession that followed the enactment of Article 37 that there were very few firms that had worked under the new zoning requirements. As a result, there was a very small subset of architects from which to sample. In this case, many members of the subset were able to be identified, but it would have been nearly impossible to identify all of them (Babbie, 2001). Not only are many of the firms captured in this study, but the informants span a range of specialties and of corporate and personal philosophies regarding sustainability. Because of this, we argue that the experiences described in these interviews are representative of the impacts that Article 37 has had in the first several years it has been in place.

In quantitative research, a study is considered replicable when the described methods can be followed to reproduce identical data and results. In qualitative research, replicability is also desired but must be considered through a slightly different lens. If another researcher were to attempt to replicate this study it is not likely that they would reproduce the exact interview texts despite utilizing the same methods, interview guide, and interview subjects. However, this researcher might draw many of the same conclusions when presented with the interview texts that have already been generated. It is in this sense that a qualitative research study can be considered replicable (King et al., 1994).

In this particular study, each interview represents an individual case. By considering these cases in relation to each other we are able to identify many instances of similar experience or opinion that support the validity of the findings (Miles & Huberman, 1994). For example, if one respondent reported that he or she was not required to sign an affidavit stating the project was in fact LEED certifiable, it is reasonable to question whether this had actually occurred or if perhaps the informant simply forgot about the requirement since some time had passed. However, when the same experience is described by multiple informants with different levels of and/or more recent experience with Article 37, it can be concluded that this actually indicates an administrative issue with the policy. Conducting comparisons between cases and identifying similar results in multiple cases, which is known as triangulating, provides corroboration of the findings and further evidence of their validity (Miles & Huberman, 1994).

Since there are more than 40 municipalities that require private construction meet some standard of LEED certifiability, it is important to assess the degree to which the findings regarding Boston's policy extend to these similar policies. In qualitative studies such as this, we cannot make statistical generalizations about the findings but instead use reasoned judgment to develop an analytical generalization (Kvale, 2007). While practitioners operating under another similar policy may not report the exact same opinions, it is likely that their experiences are reflected in the results of this study. The experiences described herein are also relevant to other jurisdictions in that they constitute the educated opinions of experts in the field of architecture and represent the only exploration of the after-effects of a green building policy.

4. RESULTS

All of the informants expressed positive opinions regarding the green building amendments to the Zoning Code. Every one believed that legislating sustainability was the right thing for the City to do and were pleased that action was taken to address sustainability in the building industry. While the informants described themselves as being pleased with the policy in a general sense, the number of critical or negative expressions about the new policy far outweighs the number of positive comments. As can be seen in Figure 1, this is true for all but two of the firms.

To better understand the characteristics of the firms that might contribute to differences in experience with and opinion of Article 37, a measure of "greenness" of each firm was created to allow for quantitative comparison. In Table 1, several indicators of "greenness" were used to calculate a "greenness score" for each firm. These included the number of years the firm

FIGURE 1. Positive and negative observations by firm. The total is calculated by subtracting the number of negative observations from the number of positive observations (Positive – Negative = Total).

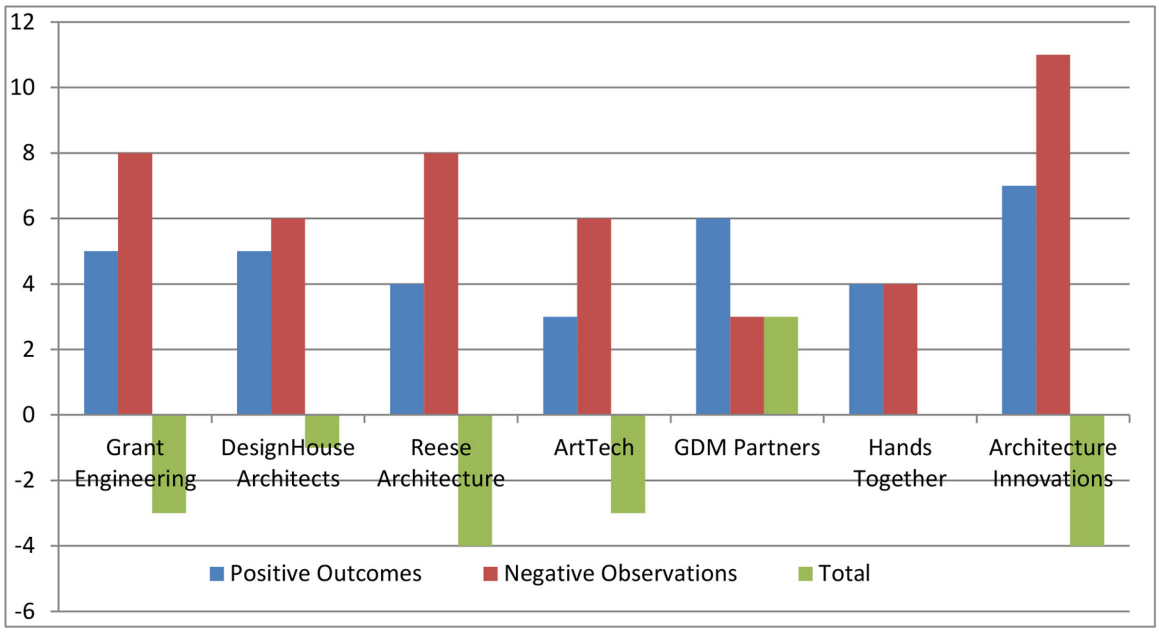


TABLE 1. "Greenness" of each firm.

	Years USGBC/ Years LEED[1]	Architecture 2030 Challenge[2] (binary)	Sustainable Corporate Philosophy[3] (binary)	Integrated Design Firm[4] (binary)	% Staff LEED Credentials[5]	Previous LEED[6] (binary)	Greenness Score (sum)
Grant Engineering	0.92	1	1	1	0.19	1	**5.11**
DesignHouse Architects	0.77	1	1	1	0.22	1	**4.99**
Reese Architecture	0.23	0	1	0	0.23	1	**2.46**
ArtTech	0.85	1	1	1	0.72	1	**5.57**
GDM Partners	0.00	0	0	0	0.09	0	**0.09**
Hands Together	0.23	0	0	0	0.13	1	**1.36**
Architecture Innovations	0.69	1	1	1	0.15	1	**4.84**

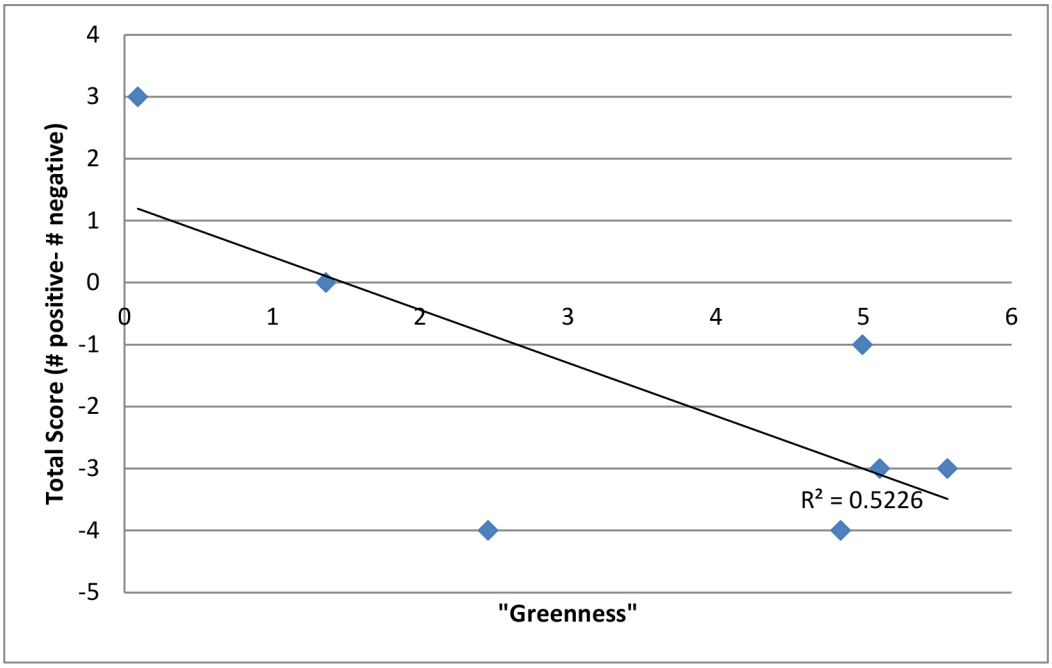
[1]The year each firm joined the USGBC was obtained from the USGBC directory (U.S. Green Building Council, 2013). The years as a member is considered to be from the year joined (x) to 2011, when the interviews were conducted (Years USGBC = 2011- x). LEED was introduced in 1998 (Years LEED = 2011-1998).
[2]From the directory of adopters of the 2030 Challenge (Architecture 2030, 2011).
[3]Based on information presented on the company websites and LinkedIn profiles.
[4]Based on information presented on the company websites and LinkedIn profiles.
[5]Number of staff was determined using company websites, LinkedIn profiles, and interview responses. Number of staff with LEED credentials is from an online directory of LEED professionals (Green Building Certification Institute, n.d.)
[6]Based on interview responses and information presented on company websites.

had been a member of the USGBC divided by the number of years that LEED has existed, whether the firm adopted the 2030 Challenge, whether the firm addresses sustainability in its profile or philosophy, whether the firm is an integrated firm or explicitly uses an integrated design process for all projects, the percentage of staff with LEED credentials, and whether the firm had experience with LEED prior to their experience working with Article 37.

In Figure 2, those with positive opinions of Article 37 are the least green of the firms while those with more green credentials have more negative opinions. As a firm becomes "greener" they have more experience and understanding of the issues and are better-positioned to develop a well-informed, critical opinion about the regulation. Those who are not very green are those that see the greatest benefit from the regulation. This is primarily due to Article 37 leading to a more integrated design process for these firms as they were not previously utilizing any degree of an integrated approach. The City of Boston believes they are leading the way with Article 37, when in reality they are only pushing up the bottom. This policy would be much stronger and influential if it had an impact on firms at both ends of the green spectrum.

The imbalance between the number of positive and negative outcomes and observations indicates that those interviewed think sustainability does need to be legislated and want to see the City regulate development in this regard, but do not necessarily believe that the specific requirements of Article 37 and the LEED certifiable standard were the best way to achieve this.

FIGURE 2. Total interview score vs. "greenness" of firm. Total score is calculated as the number of negative observations subtracted from the number of positive observations.



5. DISCUSSION OF FINDINGS

5.1 LEED Certifiable is not equal to LEED Certified

5.1.1 Article 37 Lacks Enforcement

The most prevalent criticism of the policy was that it lacks any sort of enforcement mechanism. It is significant that those affected by the policy are actually asking for more stringent regulation. The informants in this study range from being minimally involved with sustainability issues to being at the forefront of the movement, yet every single one of them advocates for stronger enforcement mechanisms for green building policies in Boston. Despite having varied approaches to compliance, all of the interviewees believe that they are doing the right thing and that their projects are fully in compliance with the letter and intent of Article 37. All of them also question whether others are carrying out the task so faithfully and some have seen projects that they believe blatantly fail to meet the certifiable standard.

There seem to be two major factors at play here. The first is that there is no verification mechanism in place and no threat of consequences if the building fails to achieve the points agreed upon during the approval process. The Article 37 review procedures states that the BRA must be notified of any design or construction changes that would reduce the LEED point score, but there are no consequences for failing to do so and, without any follow-up or site inspections no one will ever know if the building fails to achieve the pre-determined credits. Without such enforcement procedures, a less scrupulous project team may choose not to implement the green building strategies required to earn the points. The second issue is that there is no way to determine if the credits have actually been met without the level of documentation and verification that is required by LEED but not by the BRA. Architects in some

of the leading sustainable design firms have expected to achieve a much higher level of certification for a project only to find during the verification process that they missed a number of points that they believed they had earned. If even the most experienced professionals are susceptible to this error, than those with little experience with LEED are certainly overestimating the points achieved as well. This potential for both accidental and intentional failure to achieve the anticipated and approved LEED credits is a serious weakness in the green building regulations and introduces ambiguity into the standard. Implementing more stringent enforcement and verification procedures would improve the policy outcomes in terms of building quality and would demonstrate to building professionals and the public that LEED certifiable is a meaningful and defensible standard.

Currently, the BRA seems to address this issue by requiring the project LEED AP sign a Letter of Design Certification during the review process and a Letter of Construction Certification when construction is completed. These affidavits certify that the project was designed and built to achieve the agreed upon LEED credits with a minimum point score equal to that needed to be LEED Certified. Without any sort of verification mechanism, this becomes an exercise in professional ethics more than anything else and allows all parties involved to abdicate responsibility. It seems that the primary function of these affidavits is to remove any liability in case an evaluation of LEED certifiable buildings constructed under Article 37 revealed that they actually fail to meet the LEED standards. The City is able to shift blame to the project team that swore the project actually achieved the required number of LEED credits. The signatory LEED AP can use the language of the affidavits, which emphasize that the project meets the standard *to the best of their knowledge,* to avoid being held accountable. This game of liability hot potato would best be avoided if the City implemented a rigorous verification procedure to ensure that the projects truly are LEED certifiable.

5.1.2 "Certifiable" is Unclear

Mayor Menino's Green Building Task Force (GBTF) believed that "clear standards are essential if Boston is going to commit to green building" and proposed the requirements of Article 37 as a solution (Conway et al., 2004). However, LEED certifiable seems to be a standard that is clear only to the members of this task force. The participants in this study found the standard to be ambiguous at best and some even believed it to be completely meaningless. Article 37 does not require energy modeling, commissioning, or performance monitoring so these critical activities are not being done for the majority of the projects unless they actually seek LEED certification. Without an evaluation of the building after construction is complete, there is no way to determine how certifiable buildings compare to those that have achieved certification or to those that were built prior to the enactment of this policy. This, in addition to the lack of verification and documentation, creates ambiguity around the term certifiable and what it means in terms of building performance and sustainability. Design professionals are unable to find clear meaning in the term and the general public is left to assume that certifiable and certified are synonymous although there is no evidence to confirm this.

Although the City has described the LEED certification process as too great a burden, they cite timing as the primary reason for not mandating LEED certification. However, other municipalities have found solutions to this issue. San José, California, which is a larger city than Boston, requires developers to pay a Green Building Refundable Deposit before issuing a building permit and then returns the money once LEED certification has been achieved. Babylon, New York and Chamblee, Georgia have similar policies requiring payments up to

$0.03 per square foot when the project is completed and a temporary Certificate of Occupancy is issued. This fee is refunded with proof of certification and the final CO is issued. If a project does not achieve certification, the payment is forfeited as a penalty for failure to comply. Perhaps a true LEED mandate for private construction was politically untenable in Boston, or perhaps there was a lack of political will. Examples from other cities demonstrate that it can be done and such action would truly establish clear standards for the City of Boston and eliminate the ambiguity of certifiable projects.

5.1.3 Certifiable is Easy to Achieve

Of primary concern is that achieving the level of LEED certifiable is just too easy. In many cases, nothing extra needs to be done. Part of this is due to the nature of developing in a dense urban area with a strong public transportation system. Another key factor is that other regulations including stormwater management policies, the ban on comingled dumpsters, and especially the more recently enacted MA Stretch Energy Code contribute so many LEED credits that the certifiable standard is achieved automatically. If the City truly wanted to be innovative and change the way development happens in Boston, they must set a higher standard. A target that is largely achieved automatically will do little to change the building culture in Boston or improve the quality of the built environment.

5.2 Limited Impact on Practice

Article 37 has had little effect on the design process for the majority of firms. The greatest impact has been with those who had little or no experience with LEED prior to working on a certifiable project. For those firms, the LEED checklist and credits were new and much of the learning occurred through gaining a familiarity with LEED. There was already a shift in the building community toward a more integrated approach prior to the enactment of Article 37. Many of the participants in this study routinely utilize an integrated design process because they are an integrated architecture and engineering firm, because of requirements of funding agencies, or because they always strive to achieve high performance buildings. Others reported that the process for an Article 37 project is slightly more integrated than a typical project but much less integrated than for a LEED certified project. This is because a lot of the integration that occurs during the LEED process is not only a function of required design charrettes, but also because the stakeholders need to work together to ensure that all of the necessary documentation is maintained and available for submission to the USGBC. Since Article 37 does not require this level of documentation, the project team does not need to work together as closely. That mechanical systems and energy models are typically not included in the LEED checklists submitted for review provides further evidence that Article 37 has not led to a more integrated design process. If teams were truly taking an integrated approach, the engineers would have been involved in all stages of the project and more efficient mechanical systems could be considered early enough to be specified for the project and contribute to the LEED point score.

Instead of facilitating an integrated design process, Article 37 seems to encourage a checklist based approach that is more akin to chasing LEED points. As several of the interviewees described, when a client elects LEED certification, they typically want to strive for the highest level they can achieve. This leads to a process where sustainability goals are established and then the design team determines how to substantiate those goals using the LEED checklist. The checklist is meant to be a design tool, not the primary design mechanism. Article

37 has established LEED as a minimum standard rather than as an aspiration. This changes the design process to a point and checklist driven approach. Rather than working with pre-established performance goals, the goal is now simply to earn the 26 points needed to be LEED certifiable. In this process, the first step is to determine how many points are achieved by default or by compliance with other regulations and assess how far away the project is from the requisite 26 points. Then the checklist can be consulted again to identify which credits would be easiest to achieve to fill in the gap. If the project only falls short by a couple of points, no more is needed than to specify some zero-VOC paint and a bike rack and the certifiable standard has been achieved. This checklist-driven design process does not require significant levels of project team integration and has minimal impact on the building outcomes.

5.3 Records are Poorly Maintained

The difficulty defining and defending the certifiable standard is further exacerbated by poor record keeping. When asked, no one at the BRA could provide the project documentation for buildings approved under Article 37 or even give a simple count of the number of projects that had undergone the review process. All of these records are considered public information and should be readily available on request, but it seems that no one is actually keeping track of them. Without access to the project documentation, we were not able to cross-check reports from the informants against the records that should be maintained by the BRA. This poor record keeping stymies external scrutiny and makes internal evaluation of the policy impossible.

5.4 Educational Benefits

The green building policy picture in Boston is not entirely bleak; Article 37 has had some positive impacts. For those with more limited experience with sustainability and the LEED process, undergoing the Article 37 review process can be beneficial. Most importantly, these professionals have been able to identify cheap, easy to implement actions that improve building performance. They are then able to specify these same measures on future projects as a matter of practice. Some of the building professionals that are slower to adopt sustainable building practices would eventually come around and catch up, but others need this regulatory push to engage with sustainability at all. This is particularly important for those who do not plan to occupy or own the building and so don't see direct incentives to implement green building strategies. Eventually the market might push this, but Article 37 can speed up adoption for those that are reluctant. Similarly, for architects that are not working in an integrated environment, Article 37 helps to ease the communication challenges between architects and engineers as the architect must consider other aspects of the building while working through the LEED checklist. In these situations, learning really comes from engaging with LEED for the first time through the Article 37 process. It is likely that everyone in the building industry will eventually be asked by a client to seek LEED certification voluntarily and the extent to which Article 37 has accelerated this introduction to LEED is unclear.

5.5 Increased Openness to Sustainability

The participants in this study have found that Article 37 has increased the openness of their clients to sustainability measures, particularly among the more reluctant developers. The clients do not want to see any delays in permitting or construction so they are less resistant to green features since these measures will facilitate compliance with the new regulatory

requirements. Some architects have also found that Article 37 provides a great enough incentive that they are more easily able to convince the clients to seek LEED certification. At the very least, the requirements ensure that the decision of whether to seek certification is made in the beginning of the design process.

5.6 Increased Awareness

The greatest benefit of Article 37 is that it raises awareness and signals that green building is an important issue. As more agencies regulate sustainability, it becomes a higher priority. Article 37 has made green building a more salient issue and that it is not just the concern of those in affordable housing development or for far-left environmentalists. Even if the policy does not have a real impact by other standards, it shows that green building and the sustainability of our built environment are everyone's responsibility.

6. CONCLUSIONS & FUTURE RESEARCH

While Article 37 has raised awareness about green building and forced reluctant participants engage with sustainability, it seems that these same positive outcomes could have been achieved by another green building policy that does not carry the same criticisms as Article 37. Forcing reluctant developers to consider sustainability measures is certainly an admirable goal, but could certainly be achieved by any number of regulatory frameworks and would be even more effective if it was mandated by a policy that included some sort of enforcement mechanism or penalty structure. Article 37 sends a message to the development community that City officials care about green building, but it seems to allow them to address the concern by simply paying lip-service to sustainability initiatives.

If the standard of LEED certifiable is as easy to meet as the informants described, then the policy is essentially large-scale greenwashing. Implementing this policy gave Boston a greener image and the appearance of being progressive and forward-thinking. In reality, the policy requires little beyond what is already being done and has had almost no impact on the design process. We began these interviews with an interview guide that focused on integrated design and whether or not Article 37 had led to a more integrated approach. We quickly found that, for most respondents, these questions were irrelevant as they had been using this paradigm for years. In some cases this can specifically be attributed to other regulatory or funding requirements, but is often the result of a corporate philosophy that embraces and advocates for sustainability. As several respondents expressed, this legislation really just codified an intent that already existed in the design community. So, while Boston has been advertising their "first in the nation" policy, it is actually a policy that does little to advance the green building agenda and simply paints typical construction with a green brush. If the real goals of the policy are to reduce greenhouse gas emissions and energy consumption, Article 37 is not a success. Even BRA staff admit that no one is pursuing these measures under the policy requirements. A counterargument may be that the Stretch Code addresses this issue and negates the need for Article 37 to mitigate climate change. If is true that Article 37 has been superseded by other regulations, then there is no need to continue to enforce a largely symbolic policy.

By not mandating LEED certification for private development, the City has retained control over the approval process and making the final determination that the policy requirements have been met. If LEED certification were actually required, this power would shift to the USGBC and Green Building Certification Institute (GBCI). The standard of LEED

certifiable is seen as a way to use the USGBCs standard without actually engaging with the USGBC or ceding any control over development in the City. It is understandable that Boston would like to have the final decision over whether or not a project will be approved, but this creates an issue where the expertise of City staff is not equal to that of the GBCI. THE USGBC and GBCI are the experts on LEED and what can be done to achieve LEED credits; they literally wrote the book on it. This gap in knowledge is another mark in favor of certified buildings being better than certifiable. While it would be undesirable to develop a new building rating system specific to Boston, it does not seem to make sense to implement another organization's standard and then not utilize their expertise assessing whether the standard has been met.

If the City has particular goals that they hope to achieve by mandating LEED certifiable, perhaps they could be better met by identify the particular aspects of LEED that would address those issues and developing mandates specific to those credits or to at least prioritize those credits during the review process. There are a lot of building regulations that have very specific targets and these would be no different. They would still allow for flexibility in meeting the requirements but the determination of whether or a project was in compliance would be much easier and transparent. If the City feels that LEED is truly the best way to achieve their sustainability goals, it seems that LEED certification is a clear standard with a defensible validation and verification procedure. Rather than compromise by mandating an ambiguous certifiable standard, it would be better to incentivize LEED certification or to enforce certification as has been done in other municipalities.

This study contributes to the literature in advancing green building policy research to actually examine the policy outcomes and provide evidence for future policy decisions. There is still much to be done to advance evidence-based green building policies and even more research needed to better understand Boston's green building regulations. An important dimension that needs to be addressed is a comparison of how LEED certifiable buildings perform compared to LEED certified buildings. At the onset of this study, because there were so few completed projects at the time, this was not feasible. It would also be informative to analyze the project documentation that has been submitted to the BRA to determine exactly which LEED credits are being pursued on certifiable projects. This would allow for a more complete understanding of the extent to which these buildings differ from those that were constructed prior to the enactment of Article 37. It would be important to ground-truth the projects and determine whether or not the credits proposed in the permitting documents were actually implemented during construction.

Overall, there needs to be a greater scholarly focus on green building policy evaluation to facilitate the adoption of efficient and effective policies on all levels. Unfortunately, few policies include evaluation timelines and mechanisms, but given Mayor Menino's genuine commitment to climate change mitigation, perhaps the city will implement an evaluation and review procedure for Article 37.

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APPENDIX A: INTERVIEW GUIDE

1. What is your square footage of build-out in Boston each year?
2. How would you characterize your clients' openness to ideas that save energy?
   a. Have you seen any difference in this since Article 37 was enacted?
3. Did you get the sense that the developers you worked with were interested in creating better buildings or did it seem that they were doing it to fulfill the requirements?
4. In your opinion, are these buildings actually better (in terms of energy performance) than typical buildings or are they essentially the same?
5. In your experience, did the building team take a whole-building systems approach to the design and construction?
6. Can you tell me a narrative of how a certifiable project went compared to a project that doesn't need to be certifiable?
7. Can you walk me through your most recent Article 37 project?
   a. When did you have meetings, how many/how often, who came?
8. How was it decided which points were pursued to achieve certifiability?
9. Do you have any sense of the proportion of points that are achieved by default (meaning by meeting other code requirements or simply by nature of being in an urban environment) versus those that require design decisions?
10. Do you think Article 37 had any impact on when and how the different parties (architects, engineers, plumbers, electricians, etc) came to the table and interacted with each other?
11. Has your design process changed at all?
12. Has the process for non-Article 37 projects been influenced by anything you learned by going through the Article 37 requirements/process?
13. Do you think Article 37 is an effective policy? Do you think it is helping Boston achieve its climate action goals?
14. What changes, if any, do you think would make Article 37 better?
15. Is there anyone else you would suggest that I talk to?
    a. Can I use your name when I contact them?