
EVALUATING INSTITUTIONAL GREEN BUILDING POLICIES: A Mixed-Methods Approach

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ABSTRACT

Sustainable or green building practices have been adopted recently by many higher education institutions for their new campus buildings and major renovations. To date, no formal study has been conducted to determine if policy is essential for sustainable building practices and the implementation of LEED® for these institutional green buildings in North America. A mixed-methods approach consisting of a quantitative survey and qualitative interviews was undertaken with senior facility professionals at higher education institutions in North America. The survey evaluated the institution's use of a policy, guideline, standard, law or goal related to sustainable building practices and the interview identified specific practices as well as issues such as leadership, policy compliance and barriers to adopting sustainable building policies. This paper provides a framework for an institutional sustainable building policy that is suitable to use as a template for senior facility professionals and their specific policy development. This work contributes to a foundation for future research related to sustainable/green building policy development and its application to the higher education sector.

KEYWORDS

sustainable buildings, green buildings, higher education institutions, facility services, leadership, LEED®, policy

INTRODUCTION

The sustainability movement in higher education has been emerging from its early stages over the past five years or more. Most of the tangible indicators have occurred in campus operations, particularly in energy conservation and renewable energy, purchasing, transportation, waste management, water conservation and sustainable building designs (Elder 2008).

New green buildings, often referred to as sustainable buildings, are a growing trend on higher education campuses across Canada and the United States. These facilities are being constructed as universities and colleges strive to incorporate into their campuses a built environment that reflects the movement to sustainability and “green” facilities.

A significant attempt to define the sustainable university was made in the Talloires Declaration of 1990 that recognized a university's responsibility

to increase the awareness, knowledge, technologies and tools to create an environmentally sustainable future and to provide the leadership necessary to respond to the challenge. A key action of the Declaration was to encourage all universities to engage in education, research, policy formation, and information exchange to move toward a sustainable future (Clugston 1999). Many international higher education institutions have now responded to the major challenge of sustainable development by making sustainability central to the critical dimensions of university life and this movement is growing (Clugston 2003).

Senior facility professionals, by the very nature of their position and its corresponding autonomy and authority, provide leadership and play a key role during the planning, design and construction of new buildings and major renovations at their respective campuses. They perhaps have the most

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strategic impact and influence on the achievement of sustainable outcomes for these new facilities and are charged with the ongoing operation and maintenance of the building after the construction process.

The development of this paper was undertaken by the lead author who is a senior facility professional at a Canadian university (McMaster University in Hamilton, Ontario) and a member of APPA (formerly the Association of Physical Plant Administrators), the association of choice serving higher education facilities professionals. (For information on APPA, please see website www.appa.org.) Also, the lead author is a registered Professional Engineer in the Province of Ontario.

Leadership in Energy and Environmental Design (LEED®)

Many Canadian and American higher educational institutions have now adopted a policy, guideline, standard, law or goal to ensure that green buildings or green practices will form part of the built environment on their respective campuses. These approaches typically utilize a formal green building or sustainable building rating assessment system to validate that their efforts actually produce a “green” building. Whether a policy or non-policy (i.e. guideline, standard, law or goal) is used by the institution, the most common identified building rating assessment system is the Canadian Green Building Council’s (CaGBC) or the United States Green Building Council’s (USGBC) Leadership in Energy and Environmental Design (LEED®) standard. (For information on the CaGBC, please see website www.cagbc.org and the USGBC see website www.usgbc.org.)

Several assessment rating systems are used throughout the building industry to evaluate designs, however, in the North American market LEED® is the most dominant system and is being adapted to worldwide markets (Fowler and Rauch 2006). LEED® has also shown to be a commonly referenced metric within many existing U.S. policies (Pearce et al. 2005). Developed in the United States and now in place in Canada, LEED® is a nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED® was created to transform the built environment to sustainability by providing the building

industry with consistent, credible standards for what constitutes a green building. There are subtle differences that exist between the CaGBC’s LEED® document and the USGBC’s LEED® document. LEED® Canada for new construction (LEED® Canada-NC) and major renovations (LEED® Canada-EB) is an adaptation of the USGBC’s LEED® rating system and is tailored specifically for Canadian climates, construction practices and regulations. Another clear difference of importance between the two systems is that LEED® Canada has one additional point when compared to the USGBC’s LEED®. This credit is identified as MRc8 - Durable Building. This additional credit was developed as a result of the many building envelope failures experienced in the British Columbia condominium market from units that were constructed in the 1980’s and 1990’s. This credit incorporates building envelope commissioning principles and formalizes the material selection process for the building envelope by utilizing updated federal standards.

Both the CaGBC and the USGBC recognize institutional environments and the challenges presented by a campus setting and they have supplemented their general guidelines with an application guide for campuses. The fundamental intent of the application guide is to clearly define how campus projects can address the challenges of completing LEED® documentation for projects implemented on large sites with a shared campus infrastructure. This shared infrastructure includes such items as CFC reduction in HVAC equipment, stormwater management and innovative wastewater technologies (CaGBC 2008). It must be understood that LEED® is not without some shortcomings and in some instances can result in unintended consequences. Building professionals must recognize that any rating system should not be blindly followed (Bray 2006).

A Need for Policy

The United States has over 4,100 higher education institutions and according to the United States Green Building Council (USGBC) website on LEED® initiatives in governments and schools, as of November 2008, only forty-one have practices or formal policies listed that promote sustainable buildings (USGBC 2008). Canada has over 140 higher education institutions and 33 are registered

members with the CaGBC (CaGBC 2007). It is not clear how many of these institutions have policies or practices that promote sustainable facilities with a requirement to achieve LEED® certification, as the CaGBC does not track this information. However, it does provide an indication of the level of interest from institutions for green buildings and LEED® certification in Canada. As of November 2008, higher education projects represented 13 of the 124 LEED® certified projects in Canada (2008 e-mail to lead author; unreferenced) and McMaster University has been awarded two LEED® certified projects of the 13 identified in Canada. As well, McMaster University is a member of The Association for the Advancement of Sustainability in Higher Education (AASHE) (see www.aashe.org/). This leading organization maintains a list of campus building guidelines and green building policies, with thirty-three policies identified and listed on file as of January 2009 (AASHE 2009). As well, AASHE maintains the American College and University Presidents' Climate Commitment (ACUPCC) Reporting System (for information on ACUPCC please see <http://www.presidentsclimatecommitment.org/> and the ACUPCC Reporting System see: <http://acupcc.aashe.org/statistics-search.php?r=1>) which contains a list of 368 institutions that have indicated they have established or are in the process of establishing a green building policy for all new construction and major renovations. It was outside the scope of this research paper to evaluate this relatively new and changing resource, however the information is significant and highly relative and will be an important resource for future related research. While the number of available policies provides a general level of institutional commitment to sustainable buildings, this study identified that the relative percentage of institutions with a policy is extremely low and is estimated to be less than ten percent.

In an examination of institutional policies related to environmental sustainability, it was concluded that university sustainability policies are important because they seem to determine the degree to which a university will attempt environmental change and engage in sustainable initiatives (Wright 2002). While there has been excellent research on policy options in the broader public sector in the United States (Pearce et al., 2007), to date no overview has

been conducted within higher education applications amongst senior facility professionals in the context of green building policies and their development and application along with the corresponding use of LEED®.

It has become evident through literature reviews, web searches and referencing appropriate organizations that track policy documents related to green or sustainable buildings for higher education institutions in Canada and the United States, that an opportunity exists to enhance policy development and its application in higher education as it relates to the promotion of sustainable building practices and the application of LEED®.

The primary purpose of this paper is to determine if policy is essential for sustainable building practices and the implementation of LEED® for new construction and major renovations of higher education institutional green buildings in Canada and the United States. This paper illustrates the importance of policy versus the use of guidelines, standards, laws or goals amongst the higher education sector. Survey and interview outcomes will be identified, with a specific focus on leadership, policy compliance and barriers to adopting a sustainability policy. In addition, this paper provides a synthesis of opinions and existing practices related to institutional green buildings of member institutions of APPA. Information and data obtained from participants in the voluntary web-based survey and follow-up interviews, as well as the assembly, comparison and review of over 40 higher education policies from Canada and the United States has provided the foundation for a policy template that is suitable for institutions to utilize in their respective green building applications. The paper concludes with opportunities for future research within the higher education sector regarding sustainability policies and institutional green buildings.

APPROACH AND METHODOLOGY

A comprehensive quantitative web-based survey was developed by the lead author to poll members of APPA, including all member Canadian universities, on their use of policies or non-policies for sustainable development and the specific use of LEED® applications for new construction and major renovations on their campuses. The intent was to determine if

institutional policies are an important criterion for their sustainable building practices and their use of LEED®. The survey questions were tailored through two streams. One set of questions was provided if the participant's institution had a green building policy in place and a separate set of questions was provided for a participant whose institution used a non-policy (i.e., a guideline, standard, law or goal). Each participant was asked if they wished to be contacted for a follow-up qualitative telephone interview. For the purposes of this paper, the general brief definitions and applications of the words policy, guideline, standard, law or goal are as follows:

- A Policy is “a course or principle of action adopted or proposed by an organization or individual” (AskOxford: Compact Oxford English Dictionary 2009). This would typically be a policy adopted by a higher education institution and approved by their governing board.
- A Guideline is “a general rule, principle or piece of advice” (ibid.). Most Facility Services departments have general building and operation guidelines to provide to their staff or professional consultants.
- A Standard is “a required or agreed level of quality or attainment” (ibid.). Most Facility Services departments typically have written standards for their construction and maintenance of specified equipment and are used by both staff and professional consultants.
- A Law or more specifically a Statute Law is “the body of principles and rules of law laid down in statutes” (ibid.). Generally referring to legislation in the form of executive orders from a state or statutes from a province that require the institution to follow a certain course of action for sustainable practices.
- A Goal is “an aim or desired result” (ibid.). Many Facility Services departments or their institution may have a goal to achieve sustainability in the absence of anything more specific.

Following Research Ethics Board approval at McMaster University, and consent from participants, the web-based survey was distributed to the designated institutional representatives of APPA's

member institutions and was completed over a four week period commencing in May 2008. The total number of member institutions with designated institutional representatives approaches 1,100. These representatives are typically the senior facility official at their respective institution and are responsible for the management of higher education facilities across Canada and the United States. These individuals generally have a professional designation such as a Professional Engineer or an Architect. The survey did not request participants to compromise their anonymity. This research was initiated and performed in cooperation with APPA's Center for Facilities Research (CFaR). (For information on CFaR, see www.appa.org/Research/CFaR/index.cfm.) The Center was established to engage in a deliberate search for knowledge critical to policy making in education.

Follow-up telephone interviews were conducted with a subset of respondents from the web-based survey who agreed to participate in this second phase. The interviews provided an opportunity for the researcher to qualitatively explore and supplement components of the web-based survey and to gain greater insight as to the strategic application of sustainable facility initiatives at their respective institutions. APPA is divided into six geographic regions encompassing Canada and the United States as shown in Figure 1. Four participants were selected from each region to provide a geographical balance across each country.

Interview questions are shown in Table 1 and a similar policy question/non-policy question stream was utilized. The duration of each interview was 30 to 45 minutes and all answers and dialogue were transcribed for later review and analysis, and will remain confidential. This mixed-methods approach provided valuable information beyond what is available from published sources, and was an essential ingredient to the research performed.

The analysis of the survey responses included identifying trends or patterns amongst the institutions with specific reference to matters regarding policy and non-policy such as: leadership and policy development, policy compliance, barriers to the use of policy and policy relationships to LEED®.

The information gathered in the follow-up interviews was synthesized to determine if any common



FIGURE 1. APPA’s six geographical regions ([Geographical Regions Map] 2007). [Reproduced by permission]

TABLE 1. Interview questions regarding policy and non-policy.

Q1. Please elaborate on your choices for the development of your institution’s tool or instrument for green buildings. Tell me about your highest rating(s)? Why did you rate them so?
Q2. Policy Question. Please tell me more about applying your institution’s green building policy with your design team? What barriers to using the policy have you experienced with the design team?
Q3. Policy Question. If your institution has a green building policy, are you adhering to it? If yes, what had facilitated this? Have you had challenges adhering to this policy and what are they? If you haven’t been able to adhere to it, can you please tell me more about that?
Q4. Policy Question. Have you ever registered for LEED® with a goal of obtaining a specific level, and not achieved it? What were the reasons for missing the goal? If applicable, have you taken steps to minimize this outcome to ensure you obtain the desired level?
Q5. Non Policy Question. In the survey, you were asked your opinion about barriers to adopting a policy; please elaborate on your highest rated barriers? What are your suggestions for overcoming these barriers?
Q6. Non Policy Question. In the survey, you were asked if you have ever been in a scenario where you wished you had a policy to ensure a particular level of LEED®, have you ever experienced a scenario where members of the design team suggested a lower level of LEED®? Why do you think they were suggesting this? What was the outcome of that situation?
Q7. Non Policy Question. If you do not have a green building policy but a guideline, standard, law or goal, are you adhering to it? If not, please tell me more?
Q8. Non Policy Question. Have you ever considered initiating a project with a specified LEED® target, but never actually following through with the LEED® registration, documentation, etc. as a cost saving measure or for any other reason?
Q9. Non Policy Question. If you received a template for a sustainable policy, would that be something your institution would readily accept and put in place? Would you be the driver for that or someone else?
Q10. Do you retain a professional consultant to assist you in the LEED® registration and subsequent documentation and follow-through to certification with your Green Building Council? Do you find the professional fees and application fees too high? Have you ever considered undertaking this process yourself?

regional preferences, patterns or idiosyncrasies were evident from each APPA geographic region. This paper also provides an evaluation of existing higher education green building policies and non-policies that were available from the participants of the follow-up interviews. Compliance of the policy or non-policy was of particular interest in this research.

A green building policy template, suitable for a higher education institution, was developed following the assembly and review of over 40 green building policies. An institutional governance policy framework was used and developed in the context of a public policy and the formal policy process of the Privy Council Office of the Government of Canada (Canada. Privy Council Office 2009).

SURVEY AND INTERVIEW: FINDINGS AND OUTCOMES

For the purposes of this paper, only the principal findings and outcomes are identified and discussed. A total of 218 accessed the survey and 213 participants completed the survey. Twenty-four individuals participated in the follow up interviews. One individual agreed to participate in the interview and then declined to be interviewed at the time it was scheduled to commence. It shall be acknowledged that there may be a potential for respondent bias in evaluating their own roles and responsibilities in the establishment of green building policies.

Demographics

The web-based survey was predominately received by senior facility management (n=186) including several facility planners (n=7) and sustainability officers (n=8). It is not clear whether or not these individuals (the planners and sustainability officers) and their respective roles are within the Facility Services/Physical Plant department, however the assumption is made that they had sufficient departmental knowledge and information to adequately respond to the survey.

The distribution of institution size is well-balanced and generally is evenly distributed from small institutions with a size up to 500,000 square feet (n=15) to the largest with greater than 10 million square feet (n=20). The most common sized institution ranged from 1 million to 2 million square

feet (n=51). It is estimated that the respondents represented almost 700 million square feet of campus space that they would have the responsibility to manage and operate. The total number of buildings in each institution indicated a random distribution of responses and subsequent ranges with the most common being 50 to 75 (n=36) or greater than 100 buildings (n=50) on one main campus and other locations where applicable. For reference, the researcher's university has 60 buildings with over 5 million square feet on one main campus.

Policy and Non-Policy Development

The survey indicated that over 85 percent of the respondents acknowledged they have either adopted or are in the process of adopting a "green" building policy, guideline, standard, law or goal. This high percentage is likely reflective of the ongoing movement towards sustainability on campuses. The researcher was specifically interested in *who* was most responsible for the development of the document (i.e., the policy, guideline, etc.) and *why* was it developed from the respondent's perspective.

The participants acknowledged that primarily, a team of staff members in various departments was responsible for the development of the document (n=69) followed by themselves individually (n=36) nearly 25 percent of the time. Two survey responses recognized their institution's President was most responsible. Follow-up interviews revealed that the institution's President had an important contribution in some cases, but there did not appear to be any correlation between an institution having a policy and the President having signed the ACUPCC. Similarly, in a study on the state of sustainability in higher education in Atlantic Canada, it was found that signing or bypassing the Talloires Declaration seemed to have no effect on an institution's sustainability performance (Beringer et al., 2008).

Further to the survey and the follow-up interviews, it was recognized that several states and two provinces were providing leadership with recent legislation regarding sustainability and the construction of new buildings in their jurisdictions. Many states have now approved similar legislation in the form of executive orders and this has been well-documented and analyzed (DuBose and Bosch 2007).

The *why* response was more revealing with the following key findings:

- Firstly, the participants rated the response that their institution wanted to engage in sustainability initiatives and attempt environmental change almost equally with the response that the policy or non-policy provides an opportunity to reduce a building's operating cost.
- Secondly, they acknowledged that the development of the policy or non-policy was the vision from either themselves or another senior official. Follow-up interviews reinforced this finding that senior facility professionals are playing a key role in policy and non-policy development at their respective institutions.

Facility professionals are becoming more informed about the benefits related to sustainable initiatives and building operating costs. The reduction of building operating costs is well-documented (Kats and Alevantis 2003).

Respondents have also recognized the important role that students are playing by influencing administration to move toward more sustainable initiatives. Students are being buoyed by increasing environmental curriculum in higher education across North America. An example of this is both the undergraduate and graduate curricula in sustainability at Arizona State University. In their new Tempe-based School of Sustainability, the first of its kind in the world, doctorate programs are being offered (Blanchet 2008).

Institutions with a Policy: Outcomes

The survey diverged into two specific streams in an effort to more accurately understand the issue of institutions with a policy and those using a non-policy approach to achieving green buildings.

Approximately one-quarter of the respondents (n=49) indicated that their institution has adopted a sustainability/green building or similar policy as the specific tool or instrument that requires or guides their campus to have a "green" building.

The following outcomes were observed:

- The building assessment rating system of choice was LEED® (n=34). Other responses included

Green Globes (n=1), B.R.E.E.A.M. (n=1) and LEED® equivalencies (n=4).

- The most common level identified in their policies was Silver (n=21), followed by the Certified level (n=14).
- The majority of these policies (n=34) were less than two years old.
- Less than 40 percent (n=18) reviewed their policies on an annual basis.
- Over half of respondents (n=27) acknowledged that as a member of their "green building" design team, that they had to use their institution's policy to insist on obtaining a particular LEED® level (or other rating system) with their stakeholders, users or other team members.

These findings were supported by the dialogue in the follow-up interviews. Several interviewees commented that their institution's policy avoided challenges with their design team when some members were more concerned about space and program. Several institutions perceived themselves as early adopters and already had a LEED® building on campus. Most notably, all interviewees with a policy felt that it assured them of reduced building operating costs.

Institutions without a Policy: Outcomes

The following outcomes and principal results, from institutions that did not have a policy, were as noted:

- The building assessment rating system of choice was LEED® (n=82). Other responses included Green Globes (n=1) and LEED® equivalencies (n=2).
- The most common level identified in their guidelines, standards, laws or goals was Silver (n=45), followed by the Certified level (n=27). Over 20 percent of the respondents (n=21) did not reference any system.
- Over 60 percent (n=59) indicated that their guidelines, standards, laws or goals are not mandatory and are only a target to meet or exceed that requirement.
- Fifty-one participants would welcome a policy that would require all new buildings or major renovations to be "green" and the requirement identified would be LEED® Certified.

- Almost 60 percent of respondents (n=56) acknowledged that in their capacity as a member of their “green building” design team, it would be desirable to have a green building policy to ensure that the team could obtain a particular “green” building standard such as LEED® and/or a particular level of LEED® that others may be arguing against for various reasons.
- Almost 90 percent of the respondents (n=84) without a policy acknowledged that a green building/sustainable building policy template would be considered a valuable tool for implementing a policy at their institution.

In order to test the statistical significance of the two groups (policy versus no policy) on the two questions of interest, a Pearson Chi Square test was performed. The two questions of interest were: If you have a green building policy, what assessment rating system do you use or if you don't have a policy, what assessment rating system do you use for measuring a green building? Secondly, what is the minimum level of LEED® you wish to achieve, whether you have a policy or not? The answer to the first question revealed that the differences between the groups (policy versus no policy) was not statistically significant ($p=0.202$), but what was noteworthy was that both groups overwhelmingly chose LEED® as a green building policy (69.4% and 79.4% respectively). With respect to the level, the differences between the groups (policy versus no policy) was not statistically significant ($p=0.176$), but what was notable was that both groups identified Silver as the most common minimum recommended level of policy (42.9% and 45% respectively).

HIGHER EDUCATION AND FACILITY LEADERSHIP

Many senior administrative officials in higher education would understand that moving toward a more sustainable future will require the active support of all stakeholders at their respective institution. Higher education needs its governing bodies and senior administration to recognize its primary role of student learning and that failing to reach sustainability is not an option to be considered (Wojciechowska 2003). Achieving sustainability

will be a challenge and it will require leaders in each institution to step forward and contribute.

In a 2000 study at seventy-nine Canadian universities on environmental management, it was concluded that the support and oversight of a senior administrative body is more important than a set of guiding environmental principles in driving improved environmental performance (Herremans and Allwright 2000).

An outcome of the qualitative follow-up interviews was the acknowledgement by the participants that when asked about the development of their institution's tool or instruments for green buildings, 19 of the 24 participants indicated that they were either the driving force or major influence behind the document. Most importantly, this was in evidence in each case where the institution has a policy. This fact speaks to the leadership provided by these senior facilities officers. As well, many indicated that they were active members and participants in administrative committees for sustainability, environmental and/or a green building team. In the opinion of the interview participants, the institution's President has provided important senior support in some cases. Over half of these Presidents (n=13) have signed the ACUPCC, with one interview participant noting that their President had former facility experience.

APPA held a *2008 Thought Leaders Symposium* to assess the future of higher education and the implication of that future on educational facilities. Facilities leaders were joined by various institutional experts in academic affairs, human resources, student services, administration and finance. Representatives were comprised of community colleges, private institutions and state universities. One of the top facility issues and challenges was to make sustainability central to facility operations and to take on the leadership role for this strategic issue. Higher education institutions in general, and facilities departments in particular, need to demonstrate that they are making responsible, green decisions across all aspects of their operations. It was concluded that it was critically important for senior campus facility professionals to understand major trends affecting higher education and to ensure alignment of the facility department's mission with that of the institution (Lunday 2008).

Senior facility professionals, who participated in the survey and follow-up interviews, appear to be taking on this challenge and demonstrating success within their respective institutions.

In a recent case study on green buildings at an Ontario university, it was concluded that strong university leadership is necessary to champion green buildings and this leadership needs to come from those on campus who have decision-making authority for new building construction. As well, this leadership is tied to the successful implementation of green building policies and it was acknowledged that if the administration at this particular campus looked at green buildings as an opportunity to showcase its innovation to incoming students, this may attract and retain additional students and faculty to the campus (Richardson 2007).

In a study of state-wide green building policies, interview findings suggested that successfully passing or implementing a formal green building policy, without a strong champion in a position of power or authority, is unlikely (DuBose and Bosch 2007). This is reflected in the findings of this current study as well.

POLICY AND NON-POLICY COMPLIANCE

A specific focus of the follow-up interviews was to ask participants whether or not their institution was complying with their sustainable policy or their guideline, standard, law or goal. Nine of the participants work with institutions that are guided by State or Provincial legislation, while 15 are not.

Table 2, which has been sorted by APPA Region, represents an attempt to correlate interview responses from each participant and to determine if policy or non-policy compliance is evident. The following observations are made:

- Eight of the 24 institutions have been identified with an institutional policy that requires them to obtain a LEED® certification for new buildings and major renovations.
- Two of the 16 institutions without a policy adhere to their state's legislation to guide them for their sustainable building practices.
- In each case, an institution that is guided by policy or legislation has complied with the policy or legislation (and reached their LEED® target)

for their new buildings or have acknowledged that they are utilizing the policy or legislation for the first time on their first building and intend to comply.

- LEED® Silver (n=13) is the most common level to be achieved amongst institutions with policy.
- Three institutions with a non-policy did not comply with their guideline, standard, goal or state legislation although one interviewee acknowledged that their institution intended to meet a specific level of LEED® in accordance with their guidelines but did not receive their anticipated level (a lower level was approved) from their Green Building Council.
- Not reaching the anticipated LEED® target was experienced by three institutions that registered for certification.
- The fact that ten institutions are seeking their first LEED® certification is testimony to the newness of the process for many.
- There appears to be no correlation between the signing of the ACUPCC and whether or not an institution has a policy.
- From a regional perspective, both ERAPPA and MAPPA appear to have no state or provincial legislation for these institutions along with no policy as well. Yet there is some recognition for the effort to obtain LEED® certification in the majority of cases.

BARRIERS TO ADOPTING A POLICY

A key research initiative for this paper was to identify barriers to adopting a sustainable building policy. While most of the respondents (n=154) are taking some initiative to promote sustainable buildings and practices, they are doing so with non-policy tools or instruments that are generally not mandatory at their institution. When asked in their opinion what the barriers to adopting a policy were and to what extent did they agree or disagree with a list of possible barriers, the following principal responses were received in the rank order:

- Consulting and other costs to apply for LEED® registration and designation.
- Green buildings are more expensive than traditional buildings.

TABLE 2. Policy/non-policy and LEED® comparisons with interview participants.

Interview No.	APPA Region	Policy (Yes/No)	Government (Prov./State) Legislation	ACUPCC (Signed/Not Signed)	LEED® Reference	Compliance with Policy/Non-Policy	LEED® Target Reached	LEED® Consultant Used
5	CAPPA	No	Yes	Signed	Certified	No	No	No
4	CAPPA	No	No	Signed	Silver	Yes	Yes	Yes
6	CAPPA	Yes	No	Not signed	Silver	Yes	Yes	No
7	CAPPA	Yes	Yes	Not signed	Silver	Yes	Yes	Yes
1	ERAPPA	No	No	Not signed	Silver	No	No	Yes
2	ERAPPA	No	No	Signed	Certified	Yes	No	Yes
3	ERAPPA	No	No	Signed	Certified	Yes	Yes	Yes
14	ERAPPA	No	No	Signed	Gold	First building	N/A	Yes
8	MAPPA	No	No	Not signed	Silver	First building	N/A	Yes
9	MAPPA	No	No	Not signed	Certified	Yes	Yes	Yes
23	MAPPA	No	No	Not signed	Silver	First building	N/A	Yes
15	MAPPA	No	No	Not signed	Silver	First building	N/A	Yes
16	PCAPPA	No ¹	Yes	Signed	Silver	First building	N/A	Yes
22	PCAPPA	Yes	Yes	Signed	Certified	First building	N/A	N/A
24	PCAPPA	Yes	Yes	Not signed	Silver	Yes	Yes	Yes
18	PCAPPA	Yes ²	Yes	Signed ²	Silver	Yes	Yes	Yes
11	RMAPPA	No	No	Not signed	None	N/A	N/A	N/A
12	RMAPPA	No	Yes	Signed	Silver	First building	N/A	No
13	RMAPPA	No ¹	Yes	Signed	Highest	First building	N/A	Yes
25	RMAPPA	Yes	Yes	Signed	Silver	First building	N/A	No
19	SRAPPA	No	No	Not signed	None	No	No	N/A
21	SRAPPA	No	No	Signed	None	Yes	N/A	No
17	SRAPPA	Yes	No	Signed	Silver	First building	N/A	Yes
20	SRAPPA	Yes	No	Not signed	Highest	Yes	Yes	Yes

Notes:

- Interviewees 13 and 16 are with institutions that do not have a formal policy but treat their state legislation as if it were a policy for their institution and department.
- Interviewee 18 is with an institution that utilizes their sustainable development policy as their sustainable “building” policy and the institution has signed a Provincial equivalent to the ACUPCC.

- A guideline or standard is sufficient to meet the intent.
- A policy would limit their flexibility on a given project.
- No one has taken the time or made the effort to draft a policy.
- State or Provincial law supersedes a need for a policy.

Follow-up interviews reinforced these results amongst those institutions that did not have a policy. An attempt was made to determine why interviewees perceived these to be barriers and various responses were noted. Several interviewees acknowledged senior management apathy, lack of institutional leadership and insufficient institutional inertia. One interviewee felt that LEED® criteria were

arbitrary and that there was no business case for a LEED® building, while another indicated that there was no single impediment to having a policy but there was some angst from senior officials for having a policy regarding green buildings.

Several interviewees, from institutions that had a policy, acknowledged that they were able to overcome these barriers with a unified front of student engagement, senior management leadership, curriculum advancements and professional consultants active in sustainability. One interviewee specifically recognized their institution's Board of Governors for their leadership, while another confirmed that their institution has a long established culture of sustainable initiatives and their current level of sustainability is a vision of a number of champions, including past facility directors, campus planners and the institution's President.

The following analysis and discussion will address the two most frequently identified barriers to a sustainable building policy: firstly, consulting and other costs and secondly, green building costs.

Consulting and other Costs

In an attempt to place the consulting cost into perspective, this researcher will summarize the costs associated with a current project on the McMaster

University campus. The university is currently constructing a new Faculty of Engineering research building with a total project value of \$48 million and approximately 125,000 square feet in size. The anticipated opening is summer 2009. The total project value is broken down into soft costs (i.e. architect's fees, related consulting fees, permit costs, project management fees, etc.) of \$5 million and hard costs (primarily general construction and related fit-out) of \$43 million. A LEED® consultant has been retained and the associated fees for the specific scope of activities are shown in Table 3. (Permission granted by the Vice-President, Administration of McMaster University.) It is shown that the LEED® consultant represents only 2.78 percent of the total soft costs and 0.29 percent of the total construction value.

These values, when put into perspective of the entire building cost and when referenced to other related soft costs, are small and less than other project soft costs that appear to add less value to the greening of the project. The timeline and duration of the activity required for LEED® certification is often neglected when assessing the fees. A sizeable capital project as noted here typically requires the LEED® consultant to be part of the project team for several years (early planning to post construction)

TABLE 3. LEED® consulting costs versus other soft costs.

LEED® Consultant Scope and other Soft Costs in the New Building Project	Associated Fees	Percentage of Soft Costs (\$5M)	Percentage of Hard Costs (\$43M)	Percentage of Total Costs (\$48M)
Energy Efficiency Design, Energy Review and Final Model, LEED® Design, Verification and Site Review	\$55,700	1.11%	0.13%	0.12%
LEED® Certification	\$14,000	0.28%	0.03%	0.03%
CaGBC LEED® Fees (est.)	\$9,300	0.19%	0.02%	0.02%
Measurement and Verification	\$30,000	0.60%	0.07%	0.06%
Green Education	\$30,000	0.60%	0.07%	0.06%
Total LEED® Consultant	\$139,000	2.78%	0.32%	0.29%
Architects and Sub-consultants	\$3,800,000	76.00%	8.84%	7.92%
Other Consultants (geotechnical, storm water management, landscaping, etc.)	\$300,000	6.00%	0.70%	0.63%
Building Permit	\$197,000	3.62%	0.42%	0.38%
Other Costs (internal, project management, etc.)	\$580,000	11.60%	1.35%	1.21%

and the costs and related value need to put into that perspective. The only way to validate the LEED® effort is to retain a third-party or utilize existing staff to follow through with the registration, documentation, correspondence and submission to the respective Green Building Council to obtain the approved certification. Interview participants generally acknowledged that their respective departments did not have the available skilled resources to perform this effort themselves. Some institutions, who anticipate a large capital development plan, have retained staff or trained existing staff to manage the LEED® registration and certification process themselves and felt that it was better value to do so. Several institutions now retain the Architect, in their role as the prime consultant, to perform the LEED® certification process and it appears that this overall approach is growing based on the interviews with each APPA region.

Opposition to LEED® certification in the U.S. has been demonstrated for state-level green buildings in the form of industry lobbies and state agencies (DuBose and Bosch 2007).

Green Building Costs

The cost of incorporating sustainable design features in building projects has been a subject of discussion and argument amongst institutional facility professionals on both sides of the U.S.-Canadian border for many years. Several survey respondents, who participated in the follow-up interviews and have been in their roles as facility professionals for more than a decade, acknowledged that the cost of providing sustainable design features into their new buildings has been offset by improved operating costs since the late 1980's. These costs not only included energy costs but maintenance costs as well.

Several industry reports have attempted to address the question of the costs of incorporating sustainable design features into projects. In a report for the CaGBC in 2005, it was concluded that green buildings cost more than conventional buildings to design and construct, largely due to the design time and the implementation of non-standard materials and systems. The increase in capital costs are, however, overshadowed by operational benefits and occupancy benefits (Lucuik 2005).

In one of the most definitive cost benefit analysis of green buildings ever conducted, a sustainable buildings task force (Kats and Alevantis 2003) demonstrated conclusively that sustainable building is a cost-effective investment. The average reported construction cost premium for LEED® certified green buildings is less than two percent and would, on average, result in a life cycle savings of 20 percent of the total construction costs or more than ten times the initial investment in green building features.

A recent comprehensive case study concluded that significant economic savings may result from green construction by improving employee productivity, providing health and safety benefits as well as savings in energy, maintenance and operating costs (Ries and Bilec 2006).

In an updated look at the cost of building green which included the use of the USGBC's LEED® rating system as a parameter for determining the level of sustainable design, it was found that there is no significant difference in average costs for green buildings as compared to non-green buildings. As it relates to this research, it was recognized that the cost of documentation remains a concern for some project teams and contractors but as teams become more experienced, this concern is somewhat abating (Matthiessen and Morris 2007).

POLICY TEMPLATE

A research objective for this paper was to develop a sustainable building policy template for other institutions to utilize for their policy development process. A review was performed of eight sustainable policies gathered from interview participants who indicated that their institution had such a policy. As well, a review was completed of 33 known sustainable/green building policies, guidelines and/or standards of institutions that have these documents identified through the listings of the USGBC and AASHE. As noted earlier in this paper, almost 90 percent of the survey respondents acknowledged that a green building/sustainable building policy template would be considered a valuable tool for implementing a policy at their institution. Interview participants without a policy also acknowledged their desire for such a template.

Common themes emerging from the review of the assembled documents are as follows:

- All institutions (with the exception of two) referenced LEED® and the most common level/requirement was Silver. Several institutions use a minimum level of LEED® Silver and hence accept higher levels if they can be obtained. This level/requirement is referred as LEED® Silver (minimum). Two institutions did not reference any building assessment rating system.
- Twenty-four institutions had formal policies approved by the governing Board of their institution.
- The typical document size of a policy is one to two pages.
- Ten institutions reference or are impacted by State or Provincial legislation. With the exception of one State, all legislation originates from western States or Provinces.
- The typical policy document was structured with a policy framework that included: a Purpose, Policy statement/Guiding principle, Definitions and Authority/Responsible individual.

Interview participants welcomed a policy template and many indicated that they would desire the template to be straightforward and not to exceed two pages. The general acknowledgement from the interview discussions regarding policy was that many of the facility professionals are required to adhere to a variety of policies within an institutional environment and that many of these policies can be cumbersome to administer. Previous policy research at Pennsylvania State University has found that expressing policy suggestions in single-page, succinct documents increase the probability of implementation. It was acknowledged that long, complex documents are less likely to be read than a single page and limiting the concept to a single page will also guarantee improved focus for easier implementation (Pearce and Uhl 2003).

Public policy has many definitions and interpretations including, “a course of action or inaction chosen by public authorities to address a given problem or an interrelated set of problems” (Pal 1997). However, for the purposes of this document, the Government of Canada through the Voluntary Sec-

tor Initiative defines public policy as follows: “A set of interrelated decisions, taken by public authorities, concerning the selection of goals and the means of achieving them.” (Voluntary Sector Initiative 2003). In addition, public policy development is seen as the complex and comprehensive process by which policy issues are identified, the policy agenda is shaped, the issues are researched, analyzed and assessed, policies are drafted and approved, and their impact is assessed upon implementation (Voluntary Sector Initiative 2003).

A senior facility professional, working with his/her administrative team, may reference the following formal policy process used by the Privy Council of Canada. This process consists of five stages and is recognized as follows: Setting the Policy Agenda, Policy Development, Policy Review, Policy Approval and Implementation Approvals (Canada. Privy Council Office 2009). These stages are integrated with typical institutional processes and are shown in Table 4.

A template policy document was developed in the context of the following:

- Senior facility professionals, who participated in the survey and follow-up interviews, requested a one or two page policy document.
- Many observed policies contained document headers that provided for a Policy Title, Policy Number, Approval Authority, Approval Date and the Responsible Authority.
- Many observed policies contained a LEED® Silver rating as the level to be achieved.
- A stated purpose and defined principles was necessary for clarity and structure. (University of Alberta 2009).
- Definitions, LEED® and other related information would form part of an appendix or other support documents.

A template document that is suitable for other institutions to use for their policy development is provided in Appendix A.

OPPORTUNITIES FOR FUTURE RESEARCH

As evidenced by the number of institutions that are engaging in their first venture into green building certification, the lead author intends to follow-up

TABLE 4. Policy process stages and corresponding institutional actions.

Policy Process Stage	Institutional Actions
Setting the Policy Agenda	This planning stage is the opportunity to establish that this policy be ultimately approved at the highest level of governance, (i.e. Board of governors, regents, trustees etc.). The Facility Professional may address this as a written report or policy development plan to the senior administrative council.
Policy Development	For the purposes of this paper, a Policy Template is provided for this stage of the process. The Template forms the foundation for a final policy document. An Annual review shall form part of policy detail.
Policy Review	The Template is provided to senior levels of governance: The Planning, Building and Environmental Committees (i.e. standing committees of the Board) with formal reports for information, comment and review. Provide sufficient related documentation and detail regarding CaGBC/USGBC/LEED® to allow an informed decision to be made. All appropriate institutional stakeholders (senior staff, faculty, students, community, etc.) need to be consulted. Edits to template are made if necessary. Senior administrative team to support approval to standing committees of the Board.
Policy Approval	Final Report to senior levels of governance for approval with recommendation to the Governing Board for approval.
Implementation Approvals	Implementation approvals will include: integration of policy content into departmental standards and guidelines, information to Green Building Teams, procurement strategies for Professional consultants, contractors, LEED® Consultants. Staff training initiatives to be implemented. Advise appropriate Green Building Council and AASHE of the policy.

with these institutions to help complete the documentation cycle identified in Table 2. As noted earlier and experienced by the lead author, the cycle may take several years and the first building is a learning experience for the entire building team.

Additional research and understanding is needed on the correlation between Provincial and State Legislature, the ACUPCC (as well as Canadian derivatives) and institutional policy and non-policy compliance. Often these can be out of step. No higher education institution should rely solely on other legislation to meet their sustainable building objectives. It is noted that the ACUPCC initiatives are still in the early stages and early signatories are just now coming to the stage where their climate action plans are due. Correlations with institutions that have a green building policy may appear in the very near future.

While there has been excellent research on the cost of green buildings in relation to non-green buildings, more needs to be done to educate higher

education stakeholders responsible for planning, designing and operating green buildings. As the number of green buildings grows in the higher education sector in Canada and the United States, facility professionals in these institutions can contribute to the research needed to improve on the cost and performance of these green facilities.

A specific focus was undertaken in both the survey and the interviews regarding water conservation practices incorporated into new institutional green building construction or major renovations. The findings will inform future researchers to describe best practices for water conservation across APPA member institutions.

Limitations

There is an acknowledgement for potential limitations in this study. It is recognized that the study participants may also be green building stakeholders in their respective institutions and there is always a possibility that they will not be impartial. Did those

institutions without a policy in place feel intimidated by a survey asking expressly about green building policies? The authors are satisfied that there was representation from institutions without green building policies. Conversely, were institutions with a policy in place more attracted to completing a survey about green building policies? Again, the authors are satisfied that there was not over-representation from those institutions. As well, the participation in a survey by the designated representatives of APPA may not guarantee broad-based participation, however, the authors are satisfied that they had complete data from a variety of institutions representing small, medium and large institutions across various regions of North America. Regardless of study limitations, there are important recommendations for practice.

CONCLUSIONS

A quantitative survey and qualitative follow-up interviews with institutional facility professionals has provided an excellent opportunity to evaluate sustainable building policies in higher education across the United States and Canada. Using a mixed-methods approach has provided clear evidence that these institutions are contributing to the growth in sustainable practices in higher education and that the facility professionals are contributing to the much needed leadership in this field. Campus sustainability should not be an isolated initiative divorced from such areas as facility operations, maintenance and capital renewal. The integration and balancing of these areas are often overlooked pieces to sustainability. Facility professionals should be major contributors to developing any large scale sustainability program on campus.

Previous research, along with the findings in this paper, indicates that policy development and application is an important component of sustainability in higher education. Institutions that have implemented sustainable/green building policies for their new buildings or major renovations are exhibiting policy compliance and meeting their LEED® targets, while some institutions that utilize non-policy practices are not complying. Challenges will still remain with institutions on reaching their target level and some institutions may experience this outcome as they work their way through their first

LEED® building. Provincial and State legislation appears to support higher education sustainable initiatives and is the catalyst to compliance for some as exhibited in the western regions of APPA. The findings also confirm that the motivator for many institutions with a policy is assured lower building operating costs. It is hoped that the developed policy template will provide some institutions with the incentive and framework to move forward with the creation of their own sustainable building policy and the use of the LEED® building assessment rating system. The high percentage of participants requesting a policy template is testimony to the need for such a template.

Facility professionals will be required to help navigate through the barriers to adopting a sustainable policy and related practices. Additional research and education will assist in that endeavor. As their green building portfolio grows, these individuals are in a privileged position to enhance the profile of green buildings through their knowledge of planning, design and operation of these facilities. These efforts will ultimately enhance and positively impact the global environment of the future.

ACKNOWLEDGEMENTS

The lead author would like to express sincere thanks to Karen Szala-Meneok for assistance on the Ethics Board submission, Deridor Collier for the development of the survey, and Regina Bendig for assistance with references. As well, Christina Hills for the survey coordination and distribution, and Kim Nagel for research assistance and the survey review and analysis. Thanks to APPA for their cooperation regarding this research initiative and to their members who contributed to the data.

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APPENDIX A:

Policy Template for Institutional Green Buildings

INSTITUTION LOGO

Complete Policy Title:
Sustainable Building Policy

Policy Number (if applicable):
No. 1

Approved by:
Board of Governors, Regents, Trustees

Date of Most Recent Approval:

Date of Original Approval(s):
Date Here

Supersedes/Amends Policy Dated:

Responsible Executive:
Senior Facility Official

Enquiries:
University Secretariat

DISCLAIMER: *If there is a discrepancy between this electronic policy and the written copy held by the policy owner, the written copy prevails.*

Purpose

(Institution name) will provide leadership in the conservation, protection, improvement and sustainability of the environment.

Policy Statement

It is the policy of *(Institution name)* to:

- Develop new and undertake major renovations of occupied facilities to meet or exceed the Silver Level Rating of the LEED® (Leadership in Energy and Environmental Design) Rating System.
- Implement sustainable building principles in all new and existing buildings to achieve measurable life cycle cost savings.
- Support and promote sustainable building principles and operational initiatives, including energy reduction, water conservation and improved air quality.
- To support, promote and adhere to Federal, State or Provincial legislation *(insert appropriate legislation title and number here)*.