5.0 LEED Certification Analysis

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5.1 Problem Overview

American University, Owner of The Katzen Arts Center considered going for a LEED certification during the conceptual phase of the building. However, they decided to forgo the certification due to additional costs that would be incurred, amongst other things. 'Green' design has been incorporated into The Katzen Arts Center, although the building is not going for a LEED rating.

While the number of incentives for using the LEED standard is growing, it is not enough to get all of the projects who are registered with the USGBC to complete the certification process. Of the projects that register, approximately 10% percent become certified (Yudelson).

Reasons that the certification process is not completed include the added cost and time associated with becoming certified. Costs incurred consist of using the USGBC as a resource and an added 1-3% of additional building costs, as opposed to that which would be spent if not building 'green' (Dixon). In addition, there are further costs associated with designer fees, such as LEED program research and client education, product research, project team management, special specification writing, design documentation of credits, etc. (Leonard).

The construction manager or general contractor is also affected by the LEED process as extra staff and time must be dedicated to monitoring the rating system and preparing/collecting the correct documentation.

5.1.1 Research Goal Evolvement

Initially, the goal of this research was to make the LEED certification more desirable to industry members by creating a user friendly, electronic method for completing LEED credit documentation. The intent was to streamline the process so that the cost of learning documentation requirements and collecting and compiling submittals would be reduced for the design team. The main objectives of the electronic method were to create a tracking system for project submittals and simplify the documentation by making requirements easy to identify and available in one location.

However, as part of LEED NC Version 2.1 that came out Fall 2004, the USGBC added Letter Templates to the submittal process and announced that this was their first step to implementing an online, "all-in-one" electronic workspace due out with LEED NC Version 2.2 in Summer 2005.

Due to the fact that the USGBC already had an electronic workspace in the works, it did not make sense to duplicate the effort. Instead, the intent of this research was adjusted to determine if the USGBC's goals, of streamlining the certification process, were aligned with the needs of the building industry.

5.1.2 Research Proposal Summary

Goals:

- Determine what the USGBC is doing to make the documentation system more "user friendly" and what they plan to do in the future.

- Identify current satisfaction with the LEED rating system and documentation process by surveying building industry members who have at one time completed documentation on a LEED project.

- Identify most often/least often achieved credits. Determine how the contractor influences these particular credits.

- Compare the objectives of the USGBC and the opinions of the building industry to establish if their needs are being met. If the building industry's needs are being met, conclude on what can further be done; if not, offer suggestions for improvements.

Tasks:

1. Interview USGBC member in order to attempt to identify:
    - History and organization goals
    - Statistics on LEED project applicants versus actual project certifications
    - Credits most/least often applied for
    - Process/Timeline of version revision

2. Identify and contact building industry members who are familiar with the LEED Certification documentation process. Invite members to participate in a Survey (See Appendix D) that will allow me to obtain an understanding of how LEED credit documentation is completed and current satisfaction with the process and particular credits.

3. Compile survey results and compare to goals of the USGBC.

4. Conclude on how the contractor fits into the overall LEED certification process in terms of credit influence and whether or not the needs of the industry correlate with the current/planned process of certification. Offer suggestions as to where further improvement can be made and/or how to meet the current needs.

Results:

Based on this analysis, it was determined that a number of credits are easier to achieve than others based on project type and location, and that all members of the project team influence the certification process in their own way. Contractor's influence is limited on designer and owner influenced credits, until implemented, and contractor's have a strong influence on material selection and processes described in LEED.

Results of the USGBC interview and building industry survey show that the building industry is impartial to the current certification process, but that they are looking forward to the release of the LEED Version 2.2 Rating System as it addresses some of the needs that are not currently met.

5.2 LEED Background Summary

5.2.1 Leadership in Energy and Environmental Design (LEED)

LEED stands for Leadership in Energy and Environmental Design and is a national standard for developing sustainable buildings that was conceived by the United States Green Building Council. LEED was created to "define 'green building' and establish a common standard of measurement, recognize environmental leadership in the building industry, stimulate green competition, and raise consumer awareness of green building benefits." In an effort to transform the building industry LEED creates a way to assess performance and meet sustainability goals in a number of areas. These areas include sustainable sites, water efficiency, materials and resources, indoor environmental quality, and energy and atmosphere (USGBC).

Four levels of LEED certification are available; Bronze, Silver, Gold, and Platinum. The levels are based on the number of credits achieved out of a total of 69 available credits in addition to seven prerequisites. The first step to LEED certification is registering the project with the USGBC. After registering, the project team should begin to collect and prepare documentation for all credits being implemented. Following substantial completion, project submittals are sent to the USGBC for review and verification in both a preliminary and final evaluation. The final evaluation determines the certification level (USGBC).

5.2.2 Benefits of LEED

Building 'green' offers life-cycle cost saving and user health benefits such as increasing indoor air quality and natural daylighting, amongst other things. However, owners who use the LEED standards of measuring green do benefit in other ways that depend on the perceptions of the market place.

The benefits received from perceptions in the market place include third party validation for achievement, possibility of qualifying for a growing array of state and local government incentives, contributing to a growing knowledge base, a LEED Certification plaque to mount on building, an official certificate, and marketing exposure through USGBC web site, case studies, and media announcements (USGBC).

These incentives are not directly seen by the Owner during the design and construction phase; they are more apparent following the completion of construction and the LEED Certification. If the Owner takes a look at what the LEED Certification can do for them in the future, during the conceptual and design phase, they will see that they will benefit in a numbers of ways. This includes having a healthier and more productive space and acknowledgement for their achievement and dedication to the environment by the public as press that can be used as a form of 'free' advertisement.

5.3 Interview – LEED Program Coordinator, USGBC

Sabrina Morelli, LEED Program Coordinator, was interviewed regarding the current and future certification process. The following includes a transcript of the items that were discussed and additional notes that were taken from her references to the USGBC web page. Note: A number of the stated objectives (Section 1.1.2 Research Proposal Summary) were not able to be collected due to unavailability and/or confidentiality issues.

Can you describe the changes that were implemented in LEED NC Version 2.1?

In terms of documentation, the LEED NC Version 2.1 saw the addition of Letter Templates. These Letter Templates are located in an excel document and are the first step to a complete web-based application for documentation.

The LEED Letter Template Excel Database's Introduction states that "LEED Version 2.1 Letter Templates replace LEED Version 2.0's LEED Application Template and LEED Calculator. Letter Templates simplify the submittal and certification process by prompting for correct and complete documentation and incorporating straightforward and integrated calculators."

What is happening right now in terms of the certification process?

An all-in-one workspace for LEED NC, CI, and EB Version 2.2 is in the works; the LEED Letter Templates were the first step. The end result will be a workspace that allows information to be posted, communication between the project team, and submission of documentation for certification, etc. In addition, operating system glitches with the Letter Templates will be resolved.

The release of LEED NC, CI, and EB Version 2.2 is anticipated summer 2005.

Do you feel that there is less interest with each successive version of the rating system? Do you think that this makes it difficult for the project team to keep up with the changes?

Updates do not occur that frequently in order to prevent users from being confused. Changes are considered a positive thing to continue to streamline and better the process.

In addition, there is always the grandfather clause which allows all projects to complete the certification process using the rating system that was current at time of registration. If a new version comes out in the middle of the process, they are given the option to continue with the current rating system, revert to the new rating system, or use a combination of both.

Where does feedback come from in regards to newer versions?

Currently, comments come from committee groups and the online database. These comments are reviewed, and a draft is created to launch to the public. Drafts comments, which are made to the online database, are evaluated and second draft is created. The second draft is again launched for public comment. Final comments are incorporated into the rating system and it goes to the board for approval and then USGBC members give it the go ahead or not.

How are comments made on particular credits, etc.? Do you notify the public that it is a "comment" period? How so?

There is a public forum available online for project team members to comment regarding their specific projects, instances, etc. In addition a notice is sent out to USGBC membership and there is a web posting. Word of mouth is also a primary source of communicating the comment period; last time, thousands responded.

Who is responsible for creating/revising the sustainability metrics of the credits?

For the five major groups of the rating system: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources and Indoor Environmental Quality, there is a Technical Advisory Group (TAG). TAG is comprised of professionals in the industry and they are responsible for the credits, CIR's, updates and revisions, and are used as a general knowledge base for those topics.

General Questions:

How many projects have applied for certification?

This information is not shared with the public.

Of the project applicants, how many achieve certification?

Approximately 99%; the number is very high.

Does the USGBC keeps statistics on the most/least often applied for credits?

The USGBC tracks achieved credits, based on the final review of a project. Refer to Appendix E for a list of all Projects Certified under Version 2.0 from 2000 to December 2004.

Who is the documentation aimed towards? (Designer, CM, GC, etc.)

Credit fulfillment tasks (documentation) are aimed at anyone on the project team. The reference guide generally states "Architect or responsible party". However, there are particular credits that are geared towards architects/engineers. Regardless, the person who takes responsibility must be the one who signs off that "x, y, and z" are done in the end.

Who do you believe is generally responsible for completing the documentation/fulfilling credits? Do you believe that designers or subcontractors are taking on the responsibility of designing and incorporating 'green' ideas into the project?

No response; the USGBC is focused on project documentation and building.

How does the documentation review process work?

There is a preliminary documentation review where the credits are assigned a label of pending further documentation, denied, or anticipated to be achieved.

If documentation is 100% based on LEED NC Version 2.1 it goes through an audit. If documentation combines portions of LEED NC Version 2.0 and 2.1, it is not subject to audit unless the majority is based on 2.1. An audit occurs during this first round of the review process, which occurs after Substantial Completion. Comments are returned within 30 days of receiving the documentation.

Why is documentation submitted following construction? Wouldn't it be beneficial to check it during the process?

Yes, the project must be substantially complete before the documentation can be submitted. Some of the credits require submittals that cannot be completed until the end of the project.

5.4 Building Industry Survey Results

5.4.1 Survey Goals

- Determine why Owner's choose not to go for/complete a LEED certification.
- Determine the current process used to document credit fulfillment.
- Determine satisfaction with current LEED documentation requirements.
- Identify how familiar the industry is with current changes in the process and if they believe they are positive.
- Identify difficult credits to achieve and why.

5.4.2 Summary of Survey Results

Although, a strong attempt was made to collect at least 35+ surveys; only 12 were returned. All results will be interpreted; however, because of the low participant outcome results are not 100% reliable or conclusive. Suggestions and recommendations here forth will be based on the collected results and include some speculation. To view a copy of the complete survey results, refer to Appendix F. In addition to the online survey, comments from a single phone interview were considered.

- When asked "Why Owner's choose not to go for or not to complete the LEED Certification?" the most prevalent answers were:
  - Additional cost of materials to meet LEED requirements
  - Additional cost/time associated with documentation
  - Other (The general consensus was that Owner's did not fully understand the concept and/or the benefits of building green.)

  This suggests that Owner's are not yet fully educated on the benefits of building LEED, both for themselves and the people who will inhabit the building. Also, there is a misconception that building green has to cost more in terms of materials. While it is believed that there are additional costs incurred due to the design, tracking, and documentation preparation, this will soon decrease with the continuous streamlining of the process and also a decrease in the learning curve.

- Very prevalent was the type of documentation system currently being used on site. Most teams are using customized Excel Sheets created by the team to document what is required, track it, and a comment between the team. The excel spreadsheet is then used as a basis for creating the required documentation binder. The advantage to this method is ease of recording and tracking definite and possible credits. Disadvantages include the fact that it is not integrated into the construction process and the large amounts of paper that must be processed to put the books together.

- Eight of the twelve respondents stated that they were "Undecided" or "Unsatisfied" with the current LEED certification process. Disadvantages to the current process include the overwhelming amount of paperwork, even with the addition of the Letter Templates. In addition, responses included the amount of time spent to educate themselves and subcontractors on the LEED requirements. Another common thread was that documentation requirements should be more explicitly stated, where it stands now it leaves too much to be questioned in terms of what and what is not acceptable.

- Respondents believed that an online, paperless documentation system would be a very positive step to improving the LEED certification process. Most believe that this type of communication between team members is already occurring within each company and that the less paper required to be collected, the less time, and therefore less costs incurred.

- Specific credit problems are difficult to conclude from the few responses. However, issues that came up dealt with the fact that some credits are difficult to put into the one size fits all rating system. In addition, it was stated that some credits were difficult to interpret, in terms of wording.

5.5 Analysis

5.5.1 Certified Projects Credit Analysis

Based on information that was taken from the USGBC Certified Projects List, it was possible to determine which credits are most often achieved and break them down based on whether the project gained a LEED Certified, Silver, Gold, or Platinum Rating. Graphs 1-6 represent the 148 projects certified as of December 2004 using the LEED Version 2.0 Rating System. The graphs display the percentage of projects to achieve credits by certification level. Under Version 2.0, 65 projects were rated LEED Certified, 42 Silver, 36 Gold, and 5 Platinum.

Although the survey produced poor credit feedback, the information taken from the USGBC Certified Projects List made it possible to analyze most often and least often achieved credits and their direct influence. Credits that were achieved in less than 20% of the projects are considered "least often achieved" (Table 2), whereas credits achieved in more than 80%, are considered "most often achieved" (Table 3). While platinum is represented in the graphs, it will be excluded for the purposes of this analysis due to the fact that it only represents 5 of the 148 projects.

Table 2: Credits Achieved Least Often

Credit	% Achieved	Title
SS2	15.4	Urban Redevelopment
SS3	10.5	Brownfield Redevelopment
WE2	20.3	Innovative Wastewater Technologies
EA2.1	11.9	Renewable Energy (5%)
EA2.2	7.0	Renewable Energy (10%)
EA2.3	7.0	Renewable Energy (20%)
MR1.1	14.7	Building Reuse (75% of Existing Walls, Floors, Roof)
MR1.2	7.0	Building Reuse (100% of Existing Walls, Floors, Roof)
MR1.3	1.4	Building Reuse (100% Shell/Structure and 50% of Non-Shell Structure)
MR3.1	12.6	Resource Reuse (5%)
MR3.2	6.3	Resource Reuse (10%)
MR6	4.9	Rapidly Renewable Materials
EQ6.2	18.2	Controllability of Systems (Non-Perimeter Spaces)

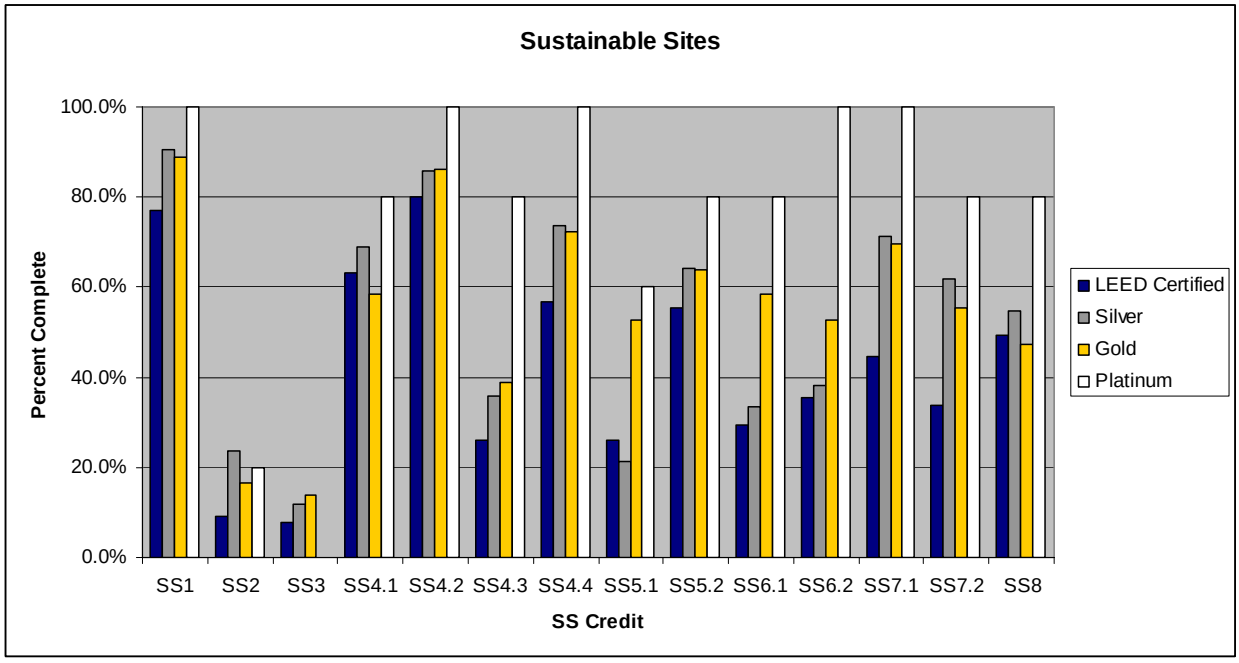
At first glance, it seems as though there are many credits that the project teams have not taken advantage of. However, after reviewing the LEED Reference Guide, a correlation can be made between contractor influence and credit achievement. The credits listed in Table 2 represent areas that are outside of the contractor's influence and are generally based on initial decisions made by the owner and/or designer. For example, credits SS2, SS3, and MR1.1-MR1.3 are determined at the very beginning of the project by the owner's site selection when the contractor is not yet involved. Implementation of the remaining credits depends on designer influence and owner preference. Contractor involvement in these particular credits is low until the designer or owner makes a decision regarding implementing the credit. Up until that point, the contractor can help "sell" the design and detail benefits gained, but only after the decision is made to go ahead do the contractors have direct influence.

Table 3: Credits Achieved Most Often

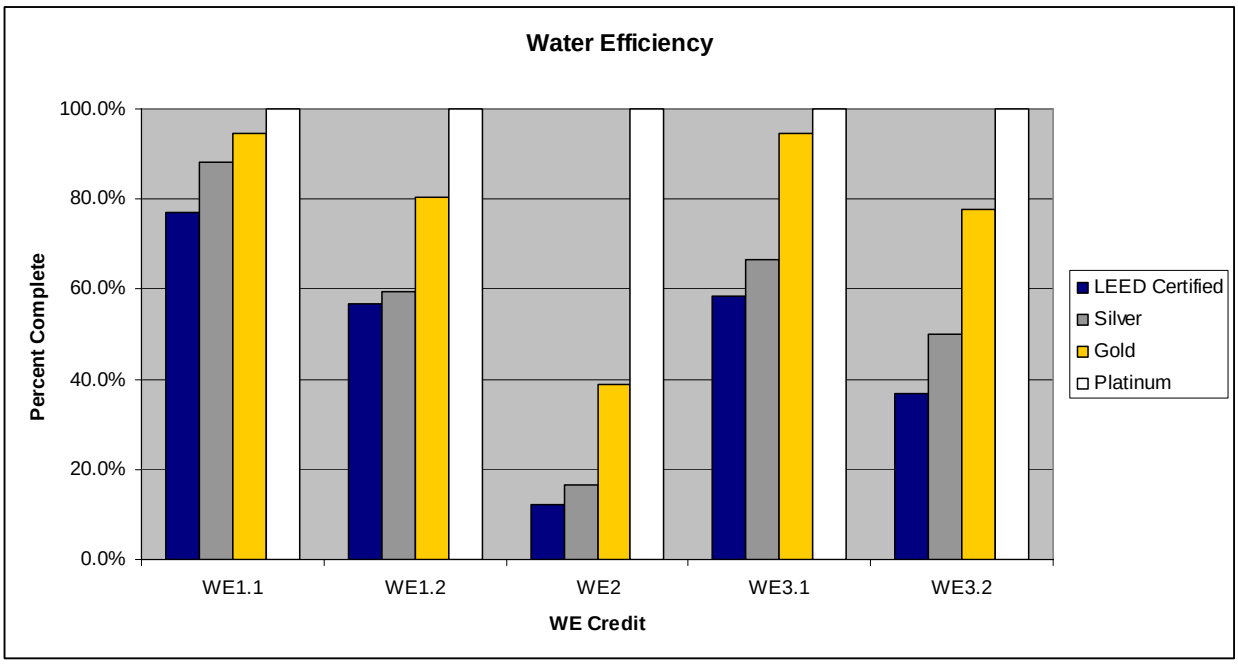
Credit	% Achieved	Title
SS1	83.9	Site Selection
SS4.2	83.2	Bicycle Storage & Changing Room
WE1.1	84.6	Water Efficient Landscaping
EA1	87.8	Optimize Energy Performance
MR2.1	79.7	Construction Waste Management
MR4.1	86.7	Recycled Content
MR5.1	95.8	Local/Regional Materials
EQ4.1	80.4	Low Emitting Materials (Adhesives and Sealants)
EQ4.2	83.2	Low Emitting Materials (Paints and Coatings)
EQ4.3	93.0	Low Emitting Materials (Carpet)
ID1.1	92.3	Innovation in Design
ID1.2	80.4	Innovation in Design
ID2	99.3	LEED Accredited Professional

Credits most often achieved are credits that are applicable to many project types and relate less to the physical design of systems and more to project materials and activities. Based on this fact, contractor's have a great amount of influence in determining whether or not these credits are achieved and need to remain knowledgeable and updated on these particular credits.

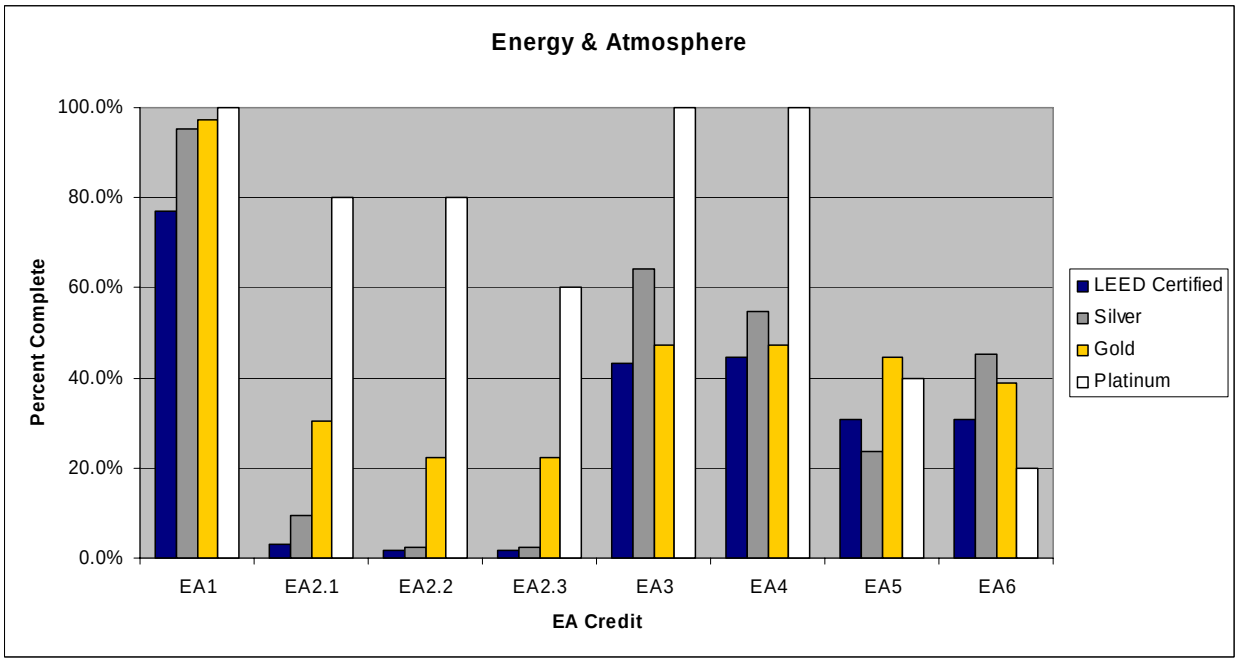
Graph 1: Percent of Sustainable Site Credits Achieved (by certification level)



Graph 2: Percent of Water Efficiency Credits Achieved (by certification level)

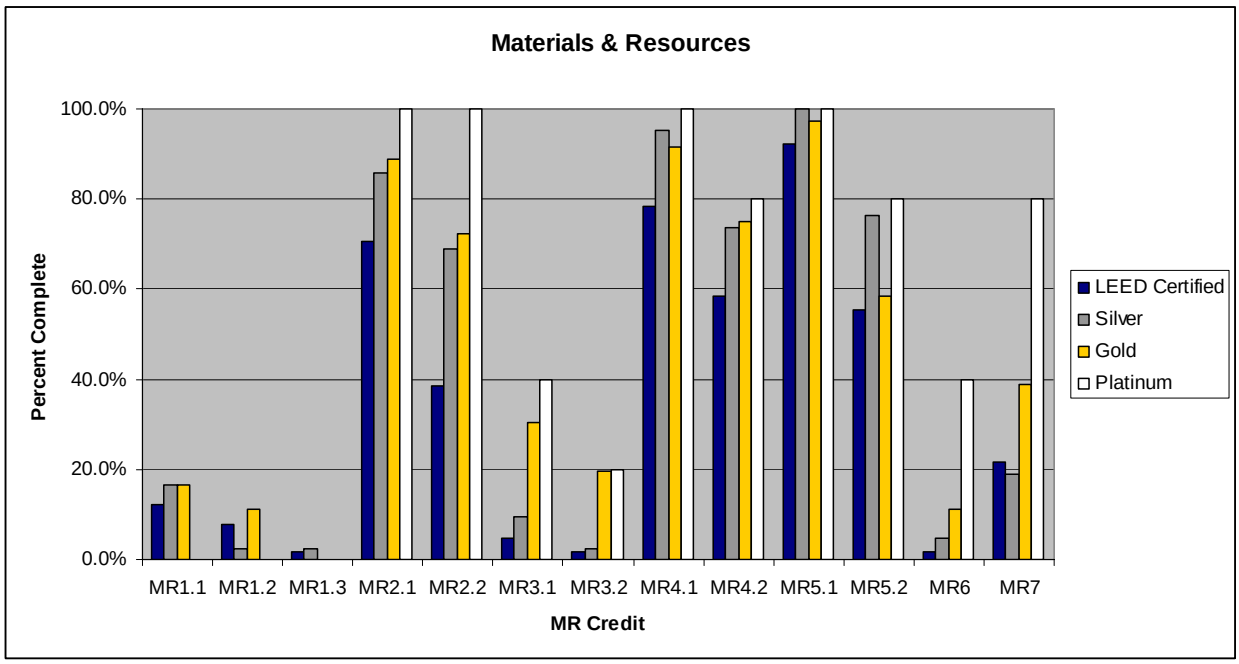


Graph 3: Percent of Energy & Atmosphere Credits Achieved (by certification level)

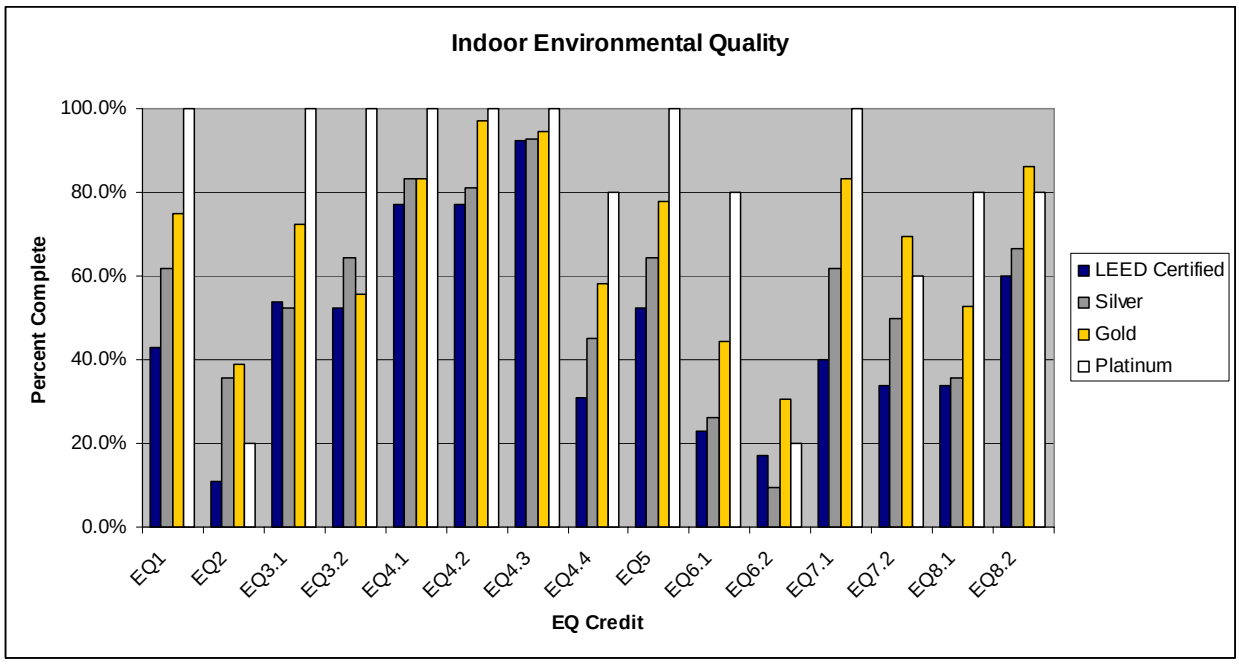


*Note: Credit EA1 represents the number of projects achieving the overall average of 4.9 points.

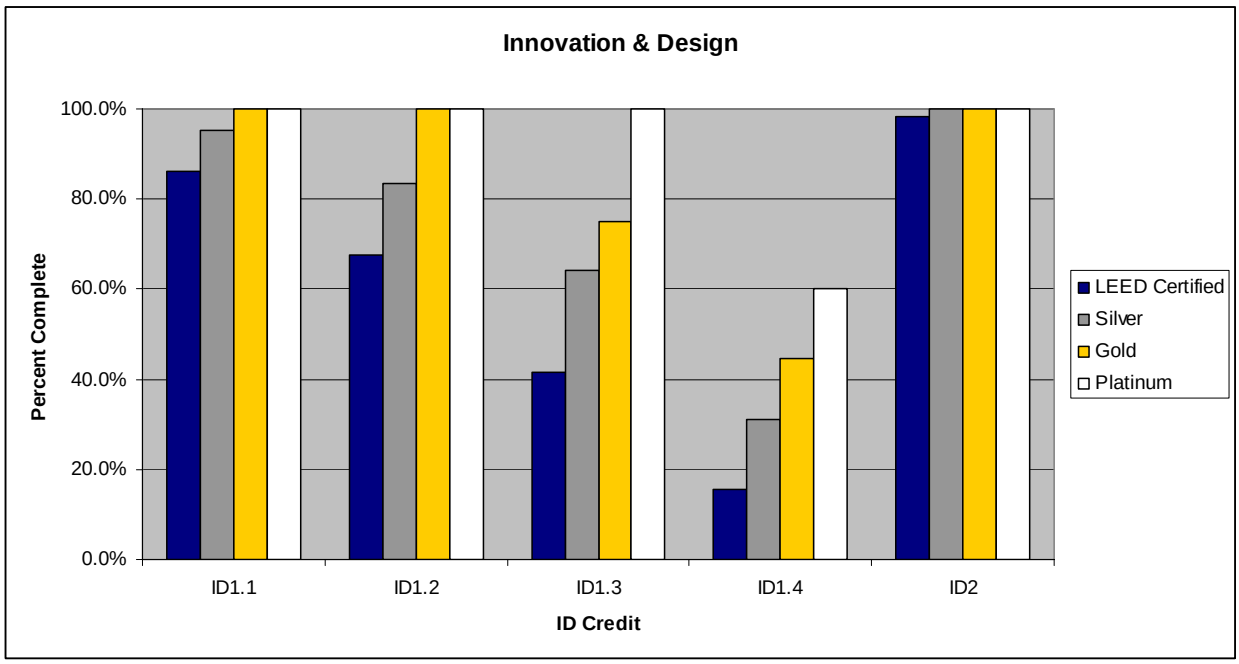
Graph 4: Percent of Materials & Resources Credits Achieved (by certification level)



Graph 5: Percent of Indoor Environmental Quality Credits Achieved (by certification level)



Graph 6: Percent of Innovation & Design Credits Achieved (by certification level)



5.5.2 Interview-Survey Comparison

Table 4 summarizes the results taken from the building industry survey and USGBC interview. A number of issues were compared including opinion on LEED Letter Templates, submittals, Rating System language and focus, timing of submission and updates, and finally outlook on the Version 2.2 Rating System. Overall, the comparison shows that the building industry is impartial to the current certification/documentation process and they are satisfied with the changes that are soon to be implemented.

Table 4: Summary of Opinions on LEED Issues

Issue	USGBC	Building Industry
LEED Letter Templates	●Computer based system	●Simplified the submittal process; however you still need to print all templates and submit on a CD.
	●Assists in Submittal Calculations	●Tracks basic requirements to fulfill intent; but would be more useful if specific credit submittal details were included.
	●Prompts for correct documentation	●Reduces the amount of paper to be submitted, but complete documentation is still required in the case of an audit.
		●Aimed towards designer, as opposed to contractor.
Documentation Requirements/Submittals	●All requirements are necessary to prove that the credit has been implemented as intended.	●Necessary, but ambiguous in some cases. Detailed submittal requirements for each credit would be useful. ●Timely ●Overwhelming amount of paperwork ●Has a "one size fits all" approach.
Rating System Language	●Created by Technical Advisory Group (TAG) consisting of professionals in the building industry.	●Not contractor friendly; aimed toward designers.
Project Team Involvement	●Aimed to be completed by any member on the project team (Architect, Engineer, CM, etc.)	●Reference guide is geared toward designers; not contractor friendly. ●Tremendous amount of learning required from the Contractor and Subcontractor standpoint.

Certification Process Timeline	●Occurs following Substantial Completion due to the fact that some credits require documentation that can not be completed until the end of the project.	●Leaves the certification level to chance; submittals are completed with "hope" that what was completed is sufficient.
	●An initial review is completed in which credits are tracked; followed by a second review.	●Makes it difficult to change what has already been implemented/completed on site.
		●Initial and second review offers the team multiple chances to completely fulfill submittals.
Timing - Rating System Updates	●Do not occur that frequently (1-2 years).	●Occur too frequently; have to "relearn" guide and process just as they are getting a handle on things.
	●"Grandfather Clause"	●Allows for positive changes, such as simplification and clarification, to be made to the reference guide and certification process.
	●Allow the USGBC to streamline/update the reference guide and certification process.	
Outlook on Version 2.2 Rating System	●All-in-one online workspace that allows for tracking, team interaction, etc.	●Will simplify the reporting and documentation process.
	●Allow USGBC to resolve glitches in Version 2.1 Letter Templates	●Worried that online documentation system may have a "one size fits all" approach.
		●Producing a final product in online form may be difficult due to submittal requirements that are collected such as drawings, reports, certificates, etc.

Based on the results that were summarized above, the following actions are suggested:

USGBC:

- Provide a detailed list of specific credit requirements, either within the LEED Letter Templates or online at www.usgbc.org. In addition, further clarify these requirements by noting them required or suggested for particular project types.

- Modify the reference guide so that designer and contractor requirements are addressed separately or create individual designer and contractor guides.

- Offer assistance with credit evaluation throughout the course of the project, rather than after Substantial Completion, to those that request it.

- Or, create a position at the USGBC for LEED Inspectors. Inspectors could periodically visit the site and work with the project team to review and assist them in fulfilling credits that are being tracked.

- Continue to find ways to streamline the documentation process and reduce the amount of time and paperwork that is required to put submittals together. If all goes well, the online project work space will have a positive impact on the certification process, however there is also the possibility that it could backfire and cause confusion. It is suggested that a pilot version be run to ensure that it is user friendly and applicable to multiple project types and situations.

Building Industry:

- Take an active part in the public comment period.

- Offer contractor focused LEED training to associates and subcontractors to clarify LEED certification process and rating system. Focus training to areas where contractors can have the most impact.

5.6 Conclusion and Final Recommendations

Ultimately, the success of a LEED project lies in the hands of the project team. Without a thorough understanding of the requirements and efficiency in completing the process, green goals are easily dismissed. As determined by the credit evaluation, the owner, designer, and construction manager each have varying levels of influence on credit achievement. In order for green building to continue to thrive, the USGBC and building industry must work together to streamline the certification process and reduce ambiguity. This in turn will reduce costs currently associated with green design.

While industry satisfaction with the current process is impartial, the outlook for the future, including Version 2.2 of the Rating System, is positive. The USGBC's current goals seem to be on track to meet the needs of the building industry. Two issues that the USGBC should focus on are reducing the quantity of required documentation and making the Reference Guide more "contractor friendly".

Suggested actions include modifying the reference guide so that contractor issues are addressed separately and providing a detailed list of credit requirements within the guide or online. In addition, the USGBC should consider assisting with the certification process throughout the design and construction phases by offering a "per request" onsite credit evaluation or by creating a formalized position for a LEED inspector. While action needs to be taken to simplify the certification process, the building industry can move forward by continuing to education themselves on the certification process and take an active role in 'green' building.

Currently, the most important step is making sure that the upcoming online project workspace succeeds. Taking additional time to receive proper feedback and running a pilot program to make sure that the glitches are worked out will allow there to be less confusion when implemented. The release of LEED Version 2.2 Rating System, and the continued effort by both the USGBC and building industry to streamline the certification process is the first step to reducing the up front owner costs of LEED.