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City of Monterey Green Building Program: Examination of the Trial Phase of Monterey's Green Building Program

Samuel C. Arno

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Samuel C. Arno

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Golden Gate University, San Francisco, CA

Dr. Allen Roper

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Abstract

This study will attempt to examine the trial phase of Monterey's Green Building Program. This proposal will investigate the current process of green business certification and identify certain enhancements centered on current legislation. In addition, this study will focus on certain recommendations for future protocol of new building projects in Monterey. The purpose of this study is to examine the current green building trial phase of Monterey's Building Office. This trial phase is a tool used to promote responsible future building plans as a benefit for both the local business industry and the City of Monterey.

From this process, this study will show the importance of the current movement towards green building practices on our environment and economy. Thus, a great majority of this research will be used to improve upon current legislation, which will be explored and has already gone through certain changes. Ultimately, this study will define certain anticipated benefits and recommendations that would result from such an effectual change in the green building certification process.

This paper's research will seek to define the following:

1. Monterey's current trial phase regarding green building certification.
2. The benefits for having a green building certification program.
3. The benefits for receiving a green building certification.
4. The recommendations that have come from the trial phase.

This study will show certain possible anticipated benefits of increased certification of green building projects on the economy, environment and in the City of Monterey. In addition, there will be an analysis and comparison of sources and data collected regarding the use of green

building projects in Monterey. The final findings are not conclusive, however, data on this newly initialized program will give insight into the overall needs of the City of Monterey's Green Building trial phase.

Introduction

This study will examine the City of Monterey's trial phase of its Green Building Program in detail. Monterey's Green Building Program is a fairly new innovation in the development of its local structured business community. In the past, the idea of making a policy to certify buildings as "green" was seen as a needless and expensive proposition. Currently, there are plans in effect that call for change. In the US, by the year 2010, an estimated 38 million buildings will be constructed. It will be a challenge to build these buildings in ways that promote environmental sustainability (Global Green, 2004).

This change came as a result of local legislators' response to a need for enhanced environmental responsibility. This stemmed from a national trend of increased environmental control and ecological concern. One agency leading the way is the US Environmental Protection Agency (EPA). The EPA is charged with being at the forefront regarding the nation's environmental science, research, education and assessment efforts. The purpose of the EPA is to protect the health and the environment for the American people (EPA, 2008).

When compiled with statistics and empirical evidence, the facilitation of certified green buildings has been found to reduce the amounts of water usage, electricity usage and waste products associated with non-residential buildings. According to the Green Building Impact Report, at least 30 percent of water is reduced using green building standards (Greener Buildings, 2008).

In California, it is becoming an increasing practice for cities to take on a more responsible view of their businesses buildings. According to Carol Marshall (2008), there are 239 registered and 76 certified green buildings in California.

According to Zigelbaum (2008), as of July 17, 2008, California has enacted the nation's first statewide building code for green building standards. This legislation shows a growing trend for the enhanced stewardship of California's ecology, environment and responsible building tactics for future building projects.

This study will investigate the City of Monterey's Green Building Program as well as expand on benefits that arise from the facilitation of green building certifications. This is accomplished through the examination of the trial phase of Monterey's Green Building Program. By doing this, Monterey's Building Office can spur on the use of the green building certifications while attracting many new sole proprietorship businesses into the mindset of environmental awareness.

Ultimately, these additional certified buildings possess that ability to affect change to such a degree that would be welcomed. With the addition of these certified buildings, it can be understood that certain financial and environmental benefits, which would be created by the use of environmental protocols, would yield exponential gains. This study is a guideline that will examine Monterey's Building Office's trial phase of its Green Building Program with the purpose of making recommendations based on later mentioned benefits.

Literature Review

This study will examine the trial phase of Monterey's Green Building Program. In order to facilitate this, the review of literature examined the following six areas:

1. Nationwide Green Building Programs

2. Monterey's History of Green Building
3. Green Buildings Defined
4. Definition of LEED
5. Monterey's Certification Process
6. Benefits and Incentives for Green Building Certification

Nationwide Green Buildings Programs

On both coasts of the United States, it is becoming more common to see buildings that use less energy and are more environmentally friendly. According to the US Green Building Council (USGBC), in the US the total amount of buildings account for the following (USGBC, 2008):

- 39% of total energy use
- 72% of electricity consumption
- 38% of all carbon dioxide emissions
- 40% of raw materials use
- 30% of landfill waste
- 14% of potable water usage

To promote this trend, companies exist that serve to enhance green building programs. One such example is the A World Institute for a Sustainable Humanity (A W.I.S.H.) Green Building Program (AW.I.S.H. International, 2007). Their motivation is to support newly created green building programs in developing economies. A W.I.S.H. acts worldwide usually in low to moderate-income communities.

For owners of non-certified green buildings, financial concerns and a lack of understanding green building concepts are the biggest hurdles to overcome. The associated costs of using of

eco-friendly materials tend to add to construction costs. Additionally, owners of buildings are not always sure what is the step towards becoming certified. Due to the fact that buildings such as libraries, universities and government buildings receive federal funding, they are more likely to become green buildings before private companies.

Throughout the US the estimated value of certified green buildings has been steadily increasing. This trend is attributed to a rise in social interest, business incentives, and more responsible environmental stewardship. The following shows the growing trend from 2000 through 2007 (See Appendix A):

- 792 m in 2000
- 3.24 b in 2001
- 3.81 b in 2002
- 5.76 b in 2003
- 7.73 b in 2004
- 10 b in 2006
- 200 b in 2007

Monterey's History of Green Building

The history of Monterey's Green Building Program began in May, 2007 (Monterey, 2007). Monterey's Green Building Program was a combined effort on the part of the Monterey's Building Office, which gained approval of the community, to create the program. This process was later concluded and unanimously approved by the City Council, which led to the trial phase of the Green Building Program.

Currently, building inspectors for the City of Monterey are scheduled to become certified Leadership in Energy an Environmental Design (LEED) inspectors using standards that comply

with USGBC standards. The USGBC was enacted in 1993 and since then it has been providing LEED with green building guidelines for their inspectors to follow.

Currently, the City of Monterey is on a trial phase with their Green Building Program. This translates to builders and building owners working on a volunteer level for attaining a green building certification. Ultimately, Monterey's Building Office is planning to require all new building projects and remodels to be green building compliant.

Monterey's Green Building Certification Purpose

The City of Monterey Green Building Program is designed to aid in the construction and operation of potentially certified buildings. By doing this, buildings can have a significant positive effect on energy, efficiency of resources, solid and liquid waste reduction, and decreased generation of air pollution. In turn, the buildings occupants feel the benefits on their health and productivity over the life of the building. The second purpose is to create healthy work and living environments. This can have an increase on the productivity of workers, residents and visitors to the City of Monterey by improving indoor living conditions. The intent of the Green Building Program is to conserve natural resources, increase energy efficiency and improve indoor quality of life.

Green Buildings Defined

A certified green building is based on a quality design. These buildings are the foundation for the certified green businesses in the City of Monterey. The certification process of these buildings are centered on optimal construction techniques for long term anticipated maintenance needs. The main concepts behind the process of certifying green buildings are education and community improvement.

What is LEED?

LEED is a rating system developed by the USGBC as an industry used and accepted green building standard. For the use of this study, LEED is applicable towards non-residential construction and remodeling projects.

The LEED green building rating system is also a tool that accelerates and encourages global adoption of building standards, which are designed to be sustainable. LEED certified buildings seek to continue certain developed practices through current implementation and future creation of internationally understood and accepted performance criteria.

LEED acts as a third-party certification program between the city in which the building resides and the owner of the building. This is used as a benchmark for the construction, design and operation of certified green buildings. LEED offers owners of buildings the operational tools they will need to have in order to make a measurable impact on their businesses current and future performance.

LEED also promotes an approach of looking at the whole building in order to create a sustainable style of accountable performance. There are five key areas in the certification checklist which concentrate on human and environmental well being. While focusing on human and environmental health conditions, other areas that are important to consider are:

- Sustainable Site Development
- Water Savings
- Energy Efficiency
- Materials Selection
- Indoor Environmental Quality

LEED Stakeholders

LEED is a tool used by many working professionals. Professions such as architects, real estate professionals, facility managers, engineers, interior designers, landscape architects, construction managers, lenders and government officials employ LEED standards. LEED gives these professionals the skills to assist in transforming their projects towards environmental sustainability.

Many local and state governments throughout the US and internationally have adopted LEED for publicly retained and funded buildings. An example of this is the Executive Order (EO) 13423. EO 13423 is coined as "Strengthening Federal Environmental, Energy, and Transportation Management". EO 13426 was signed by President Bush on January 24, 2007, which mandates federal agencies to conduct their service in a manner that is environmentally, economically, fiscally sound and continuously improving (Fed Center, 2008). This includes many federal agencies, such as the Departments of Defense, Agriculture, Energy, and State where LEED is put into practice.

LEED Development

LEED rating systems were developed through an openly mass approved opinion based process. This rating system is used by many of the mentioned LEED associated agencies. These agencies act on a volunteer basis, which is made of a diverse group of practitioners and experts. Such groups represent the consensus of the professionals in the building and construction industry.

Within these groups, there are certain criteria that allow for USGBC's planning. Such planning includes a consensus process that is made of a balanced and transparent committee structure. USGBC's committees are comprised of what are known as technical advisory groups.

These advisory groups foster a scientific consistency, give opportunities for stakeholder comment, and allow time for the group members to cast a ballot for new rating systems (USGBC, 2008).

Certified green businesses have the potential to reach nearly all facets of the local economy in Monterey. These businesses and organizations include: manufacturers, industrial firms, service providers, automotive shops, printers, food and beverage companies, hardware stores, hotels, restaurants, landscapers, cleaning services, attorneys, engineers, marketing consultants, florists, grocery stores, gift shops, transportation services, and health care service centers (Institute for Green Business Certification, 2008). Nearly any business can apply for a green business certification.

Use of LEED Certification Nationwide

As research was completed regarding LEED certifications, it is important to note that the use of LEED building certifications are found in all fifty states of the US (See Appendix B). Part of the reason each state has LEED certified buildings is because of the relationship that exists between federal funding and governmental buildings.

Monterey's Certification Process

Monterey's green building certification is based on a point system. In order to attain a non-residential green building certification the building must have sixty-nine points. This system includes residential buildings, however for this study all research will be for non-residential buildings which relates towards public or private agencies.

The non-residential programs then are broken down further into:

- Remodeled Projects: 500-1000 sq. ft
- Remodeled Projects: over 1000 sq. ft

- New Construction Projects: over 500 sq. ft.

Sections within the checklist (See Appendix D) are:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Indoor Environmental Quality
- Materials and Resources
- Innovation and Design Process

Green building certification in Monterey is currently a voluntary process, which is facilitated by outsourced inspectors. For the City of Monterey, this makes sense because the program is still developing. This method is appropriate. According Dobel, "Too often moving functions into private and nonprofit institutions both escapes due process and creates networks that are opaque to accountability" (Dobel, 2001, p. 168). In many ways, it is a benefit for the City of Monterey to rely on green building certifications to be outsourced because it creates one method for gaining certification.

Methodology

Overview of the Methodology

The research methodology focused mainly on a review of relevant literature and applicable government on-line documents. The research focused on available literature from the USGBC's website, EPA, CIWMB, and Monterey's Building Office, all of which promote green building practices.

Several reports that were created and established by Monterey's Building Office afforded excellent research resources published, which were particularly valuable. The green building

certification program is a recent development for Monterey's Building Office. These building guidelines have helped to improve the level of participation in green buildings. Creating a new level of concern has also put a focus on the fragile ecology of Monterey.

Other reports were accessed from the Questia, a varied media research application geared towards educational information. Additional information was gathered from the implementation experience found at the Lead Inspectors Division at the Building Office in Monterey. The green building certification process was discussed amongst the leadership in the aforementioned office in order to have an accurate and measurable understanding of this process and potential areas of improvement.

The literature review provided certain information that was empirical and qualitative. While examining the trial phase of Monterey's green building program, close attention was paid to the ever-expanding use of the LEED certification throughout the nation. A survey was deployed to gather data regarding the state of affairs and future concerns of the officials in the Monterey Building Office, which is relevant to this study and the future progress of the program.

Limitations of the Research

The nature of this study was to examine the trial phase of the green building certification program for the City of Monterey. Monterey's Green Business Program is a new development and currently all participation in the program is on a voluntary level. The research was centered on building policies that can be presented as viable for the city. Research from other cities green building programs tended to be limited based on the many differences associated with the different cities.

Because of time limitations, it was more appropriate to focus efforts with contacting the officials at Monterey's Building Office. These professionals are in contact with governmental

agencies and other associated agencies necessary to create and maintain green building certifications. These officials are setting standards for other cities who are considering adopting a green building program. It is beneficial for this study to find local resources that can give clear and empirical information for this policy recommendation.

Data Collection

For this study, a survey was used using the Likerd scale. Local business were survey and respondents were given a choice of rating strongly agree, agree, no opinion, disagree, or strongly disagree. The survey (See appendix C) was deployed to local businesses in the downtown area of Monterey. This was accomplished in person at their respective businesses. It is important to note that the opinions of the people who were interviewed are not a representation of all the stakeholders in the green building program.

The survey was designed to get an overall impression of what Monterey's Building Office and local businesses knew about and felt towards its new Green Building Program. Respondents to the survey were tasked with rating how they felt about having outsourced LEED certified inspectors responsible for certifying green buildings. The survey shows that although all of the local businesses are relatively new to the green building process, it is agreed that there should be a clear separation between the City inspection office and the LEED certifying process. The following are the statements given to respondents for the survey:

- I am aware of the Monterey green building certification program
- I believe attaining a green business certification is beneficial
- I believe it is beneficial for the city to be responsible for all LEED certifications
- I believe the city should be separate from the green building certification process
- I believe it is best to outsource LEED specialists for green business certification

Statements 1 Defined

Statement 1: I am aware of the Monterey Green Building Program.

This statement asks local businesses their level of awareness regarding the Green Building Program. The nature of their response is used to find out if Monterey's Green Building Program has an effective advertising program and reachable to the public.

Statement 2 Defined

Statement 2: I believe attaining a green business certification is beneficial.

This statement asked how they felt about whether attaining a green business certification is beneficial. The nature of their response is used to determine the level of importance they feel about attaining a green business certification.

Statement 3 Defined

Statement 3: I believe it is beneficial for the City of Monterey to be responsible for all LEED certifications.

This statement asks local businesses to rate how they felt about how beneficial it is for the City to be responsible for all LEED certifications. The nature of their response is geared towards finding out if they feel the City of Monterey should have the sole responsibility for certifying green buildings.

Statement 4 Defined

Statement 4: I believe the City of Monterey should be separate from the green building certification process.

This statement asks local businesses how they felt if the City of Monterey should be separate from the green building certification process. The nature of their response is used to find

out if there is a want from the public to have the certification process separate from the routine process of the Building Office.

Statement 5 Defined

Statement 5: I believe it is best to outsource LEED specialists for green business certification.

This statement asked local businesses how they felt about outsourcing LEED specialists for green business certifications. Their response shows the importance of outsourcing LEED certified specialists for the purpose of green business certifications.

Findings

The following findings will hope to examine the trial phase of Monterey's Green Building Program. This information was determined using the aid of officials in the Building Office, extensive research, and deploying a written survey. Monterey's Building Office provided information and allowed access to their building manuals. The later survey, which was deployed to local businesses, assisted in determining a need for further understanding on the part of local businesses. Data was gathered from this survey would best predict the effectiveness of Monterey's Green Building Program. According to the survey, none of the local businesses were aware of the existence green building certification process.

The methodology for this study started with a review of relevant literature, contacting building officials, and informational research. The identification and understanding of the process, as described by the USGBC, used by LEED inspectors to certify green buildings was defined. Monterey's Building Office documents, environmental/financial savings statistics, and state agency web sites were accessed. The following are findings from research used to examine the trial phase of Monterey's Green Building Program:

- Business Incentives for Green Certification

- Benefits for Builders
- Benefits for the Client
- Benefits for Local Government
- Benefits for the Environment
- Use of LEED Certification Nationwide
- Current State of Monterey's Building Office
- Current State of Understanding of Monterey's Local Businesses

Business Incentives for Green Certification

For receiving a green building certification, businesses are offered certain incentives. These incentives are provided by the City of Monterey to encourage participation in the Green Building Program. Such incentives represent the current and ongoing facilitation of Monterey's adherence to its Green Building Program. The following are a list of incentives to encourage achievement within the standards of the Green Building Program (City of Monterey, 2008):

1. Green Building Award/Plaque/Public Recognition

Research indicates that this incentive has proven effective in many jurisdictions as it provides market differentiation for projects that incorporate green building practices. The Green Building Program will offer a plaque that can be affixed to green building projects, public recognition by the City Council at a semi-annual ceremony, and additional marketing and press releases.

2. Expedited Permitting

Projects that meet this incentive level will get a fast track through the building permitting process. Projects will be moved to the "front of the line" and will see a reduction in the processing by 25%. The Building Department will coordinate closely with Planning and Fire to ensure this incentive is met.

3. Top Priority for Inspections

Projects that meet this green building requirement will be given top priority for inspections, offering a "next-day" inspection schedule.

4. Increase in Floor Area Ratio

The Green Building Program will ease limits on Floor Area Ratio (FAR) for projects where an increase in FAR is directly related to green building methods. An example of this would be a project that uses straw bale technology. The amount of FAR taken up due to the thickness of the walls using straw bale technology would be directly offset with increased FAR.

5. Setback Flexibility

The Green Building Program will allow the Architecture Review Committee to modify setbacks for residential projects that use green building practices. Some commercial districts already have a zero setback so no increased flexibility is needed.

6. Increase in Building Heights to Accommodate Green Building Elements

The Green Building Program will ease limits on building heights to accommodate green building elements. An example of this would be a project that includes solar technology.

The importance of these benefits give credence to the fact that Monterey's Green Building Program does plan incentives for citizens who receive certification. This exemplifies the foresight on the part of the Building Office regarding the trial phase of its Green Building Program.

Benefits for Builders

There are financial savings for builders who are contracted to build new or remodel existing buildings. For these builders that employ green building methods, savings are found in the associated cost for waste disposal. Additional ways to save money are found in more efficient

use of construction materials that can be counted as potential future savings down the road. These builders will be setting a standard for the higher quality of product they produce while establishing a rapport with their clients. This relationship with their clients will add to their base of satisfied customers and also foster a marketing label that refers to the builders company as being green building compliant.

Benefits for the Client

For the client there are many benefits to reap. Clients that own and work in certified green buildings are more likely to be healthier. This health benefit represents an ability to be more productive at work and in their personal lives. According to Papke, Americans spend up to 90% of their time indoors (Papke, 2004). This average takes into consideration the time Americans spend at home and at work.

Another benefit for owners and those who manage green buildings are reduced maintenance costs. Additional savings come from lowered utility bills. These factors fit together to an end result of a potential increase in resale value. The concept is that if these businesses invest the funds today towards environmental improvements they can see a return of investment in the future. According to Holowka, buildings that have been LEED certified cost a mere 1 to 2 percent more in associated construction costs (Holowka, 2007).

These businesses that adopt certain financial policies that are eco-friendly can also be advantageous for their business. Such policies work towards gearing both new and older staff to get on board with furthering the company's reputation as being seen as green. According to Kavanagh and Williams, "These policies also serve as an ongoing context for management decisions, thereby providing consistency and quality control" (Kavanagh and Williams Pg. 9). This policy style works on the whole for the business and their local community, in which case,

the "Effective financial stewardship enhances the quality of life for a community" (Kavanagh and Williams Pg 10). The mentioned possible financial changes offer potential savings for the associated cost of heating, cooling, water, and electricity.

The resale value of certified green buildings are mainly set according to location. However, certain innovative modifications done to existing or new buildings have an exponential effect on their value. The following are list of modifications that can make such a change on the value of a particular building (City of Monterey Green Building Glossary, 2008):

- Cool Roof: Specialized roofing materials designed to reflect the heat of the sun away from building this reducing the cooling load and associated air conditioning costs. In Santa Cruz, because of our moderate climate there is less need for cool roofs than in a place like the central valley, however larger buildings can benefit from these roofing systems. The California Energy Code requires a cool roof to have a reflectance of .7 and an emissivity of .75.
- Earthen Flooring: Earth that has been compacted with straw or other fibers and conditioned with various oils to form a hard surface. Fairly labor intensive, but relatively easy to repair and usually very low bodied energy and inexpensive materials.
- Manufactured Locally: Generally this refers to products that are manufactured within a relatively short distance from the job site. Depending on who is making the definition, this can be within 100 to 1000 miles. The main intent is to be cognizant of long distance shipping and the energy expended and pollution created to move a product from greater distances.
- Photovoltaic Panel: These are panels that are typically roof or ground mounted that collect solar energy and through the use of special solar voltaic cells, convert the energy

to direct current electricity. A special controller called an inverter then converts this electricity to alternating current, making it usable in most residential and commercial applications. Electricity made in this fashion can be stored in batteries for later use, consumed as it is made to help offset the overall electrical use of a building, or placed into the commercial electrical grid for use in other locations. These panels only work when there is light, but can effectively produce electricity even on cloudy days.

- Radiant Barrier Roof Sheathing: Usually a foil faced plywood manufactured with proprietary methods that is used as the roof sheathing under the roofing material itself. The reflective surface of the material reflects heat away from the roof back through the shingles without significantly increasing the thermal load on the material, usually only 2 to 5 degrees. Other methods are rolled materials that are applied after the regular plywood or OSB sheathing is applied. Both materials can reduce attic and subsequent living area cooling loads significantly. Some manufacturers claim up to 97% effectiveness.
- Solar Water Heating: Generally, this is a method of heating domestic water by allowing ground or rooftop mounted panels to collect solar rays as the water flows slowly through a series of small tubes. The heat transfer is then stored either in a potable drinking water vessel (your water heater) or introduced into a closed loop transport system to provide environmental space heating.

Benefits For Local Government

Monterey has adopted a certain lifestyle centered on the concept of increasing revenue while preserving its local quality of life. Monterey's natural surroundings create an environment that includes many downtown businesses, beaches, mountains, and forests. The city's economy

has seen resurgence in its fundamental sources of income. These are hotels, restaurants, the Monterey Bay Aquarium, the Presidio of Monterey, and more. The use of green building certifications in Monterey demonstrates a level of leadership for other cities considering a similar green building program.

Leadership is a trait that is found in high performing organizations. The realization for high performing employees takes part when they achieve a paradigm shift. According to Osborne, this paradigm shift helps, "employees take personal responsibility for making change happen" (Osborne, pg. 552). The organization or for this study city can foster such a shift by creating a learning environment, which opens doors for open communication that may not otherwise be open. By doing this the Monterey's Building Office allows their staff the ability to gain a marketable asset to promote from within and possibly transfer to other forms of local government. This is a type of motivation for employees who work best for an incentive.

According to Popovich, the following characteristics are necessary for any high performing organization:

- Consistent, sustained leadership focused on high performance.
- Willingness to develop performance measures.
- Willingness to change whole organizations to provide higher quality and more appropriate services at equal or reduced costs.
- Willingness to allocate resources to continuous learning. (Popovich, pg. 33)

These incentives will encourage employees to become high performing in order to complete and perform tasks or projects at a rate that is faster and more effective. The focused goal for the city of Monterey is to have all its personnel in the Building Office working together towards this green initiative.

Benefits for the Environment

The main purpose of the green building certification process is to encourage energy and resource conservation. By doing this, buildings can reduce waste generated by current and ongoing construction projects. This increases the energy efficiency in the aforementioned buildings, making them lasting durable structures, which are economical and efficient to operate and own. As a benefit for the environment, certified green building can promote the vision of ecological stewardship for business owners, employees, and visitors to the City of Monterey.

Buildings using green building guidelines are less intrusive on the environments. Certified green buildings are less polluting than buildings that use standard building and remodeling procedures. These green buildings produce less greenhouse gases. According to the California Integrated Waste Management Board (CIWMB), green buildings are more efficient with their water usage and have better water quality overall (California Integrated Waste Management Board, 2008). This water usage principle is incorporated with an equally efficient solid and liquid waste reduction system.

The effect of certified green buildings on the environment has the potential for positive change. The following is a list of considerable changes used by green buildings, which are beneficial for the environment (City of Monterey Green Building Glossary, 2008):

- Circulation Loop: A system that loops cold water back to the water heater (instead of down the drain) until hot water reaches the faucet. This is the primary component of a structured plumbing system.
- Closed Combustion: A design for combustion equipment (e.g. furnaces, water heaters) in which the air provided to the combustion equipment is ducted from the outside, and all

exhaust gases are ducted directly to the outdoors. All elements of the system are sealed to prevent leakage of combustion exhaust into the home.

- Composite Wood: A product consisting of wood or plant particles of fibers bonded together by a synthetic resin or binder. Examples include plywood, particle-board, OSB, MDF, and composite door cores.
- Demand Controlled Circulation Pump: Circulation pumps use looped systems to ensure hot water is immediately available while keeping unused cold water in the system. The demand controlled circulation pumps uses a switch or motion sensor to automatically activate the circulation of water, thus it saves water and energy.
- Diverted Waste: Waste from construction or demolition that is not sent to a landfill or incinerator. Strategies for diverting waste include reclamation, recycling, or for certain materials mulching.
- Drip Irrigation System: An irrigation system that slowly applies water to the root system of plants to maximize transpiration while minimizing wasted water and topsoil runoff. Drip irrigation usually involves a network of pipes and valves that rest on the soil or underground at the root zone.
- Drywall Clips: Provide support for drywall at corners while eliminating the need for excessive wood backing.
- Dual-Flush Toilet: Toilets that have two different settings, usually 0.8 gallons for liquid removal and 1.6 gallons for full flush solid removal. On the average they use about 2500 gallons per year compared to a 1.6 single flush that uses about 4500 gallons per year.

- Engineered Lumber: Generally engineered lumber is construction materials designed to reduce the amount of material needed for framing a building. Sawn lumber requires less large grown trees to be cut and smaller dimension lumber can be

assembled in various configurations to span long distances with equal or superior strength. Trusses have always been a good example of engineered lumber by using smaller dimension lumber and distributing forces more efficiently, the materials needed are a fraction of that required to span the same distances with sawn lumber.

- Energy Star: Introduced in 1992 by the U.S. Environmental Protection Agency (EPA) as a voluntary labeling program designed to identify and promote energy efficient products to help reduce greenhouse emissions by identifying energy efficient products. Originally designed for computers and monitors, it has now expanded to include office products, major appliances, lighting, home electronics and more. New expanded programs now also include complete buildings such as homes, commercial and industrial buildings.
- Flow Reducer: A device attached either just downstream from the water shutoff valve to a building or at the outlet of a fixture designed to reduce or limit the amount of water flow in relation to the delivery pressure from the street. Flow reducers can cut the flow of water dramatically saving thousands of gallons each year in a dwelling or even more in larger buildings. Flow reducers are never installed on automatic fire extinguishing systems for obvious reasons.
- FSC Certified Wood: The Forest Stewardship Council is a non-profit organization that certifies various forests around the world exhibiting good sustainability and management practices based on specific management criteria. Using hybrid timber and advanced

forestry methods, these forests produce a renewable source of lumber. Other forests are simply carefully managed to limit the impact on the environment.

- Graywater: Waste water from lavatories, laundry, showers, baths and sinks only. This water can be stored in special equipment and may then be used to water lawns, gardens or other relatively benign non-potable uses such as groundwater recharge. Graywater systems must comply with the requirements of California Plumbing Code Appendix Chapter G to qualify as a green element. Water from toilets is called black water and is not eligible for any type of reuse under this program and must be properly drained to the sewer or septic system.
- Heat Island Effect: As cities replace natural landscaping with streets, buildings and other infrastructure, the average ambient temperatures within these areas begin to rise, as much as 10 degrees F higher than less developed rural areas. This increases the need for cooling energy, can exacerbate pollution problems and may be contributing to the problem of global warming. Heat islands can be effectively reduced by shading streets with trees and improving the urban forest.
- High Efficiency Toilets (HET): Toilets that use no more than 1.3 gallons per flush.
- Permeable Paving: Pavement that allows the passage of water into the ground. There are a variety of permeable pavement methods including spaced pavers with soil infill and newer specialized asphalt and concrete applications that actually allow rainwater to pass through the surface and help to keep the water table from being depleted.
- Reclaimed Material: Also referred to as salvaged, reclaimed or reused material consists of building components (wood) that has been recovered from demolition site, but is used in its original state (i.e. not recycled).

Current State of Monterey's Building Office

Additional information was was gained for this study through an understanding of the fact that the City of Monterey's Green Building Program is in a fledgling state. Also, currently the City of Monterey does not have a LEED certified inspector. Through correspondence with officials in the Building Office, it was determined the City does plan to have a LEED building inspector for the purpose of certifying local city and government buildings.

Current State of Monterey's Local Businesses

The information gathered from the current state of Monterey's Building Office is pivotal when coupled with the fact that not all of the local businesses have an understanding of the City's Green Building Program. Many of the surveyed local businesses were in fact not aware Monterey had a green building certification program.

Conclusion

Given national trends in LEED certifications, Monterey has become a part of a larger community that has chosen to adopt a more efficient, economical, and ecological building policy. This building program, which is still in its infancy, must above all be flexible. Monterey's Green Building Program is currently acting on a volunteer level. This means that businesses seeking to attain a certification are able to do it through out-sourced LEED accredited inspectors. Monterey's Green Building Program will make changes to adapt to the dynamic culture that comprises its local business and political environment.

Policy Recommendation

Based on the business incentives for green certification, benefits for builders, benefits for the client, benefits for local government, benefits for the environment, current state of Monterey's Building Office, current state of understanding of Monterey's local businesses, this

study provides the following recommendations for the City of Monterey's trial phase of its Green Building Program:

1. Create position or have a member of the Building Office certified as a LEED inspector.
2. Launch a public campaign.
3. Continue trial phase of Green Building Program.

Create a LEED Inspector Position

The Building Office is best designed to serve an inspecting agency used to enforce building codes. Thus, with its limited experience with LEED certifications and green buildings it is this studies recommendation for it to act separately. For City of Monterey, it is this studies recommendation to have a certified LEED inspector whose primary purpose will be to assist in the certification process of city, state and governmental buildings.

Launch Public Campaign

Based on the results from the survey, this study recommends the City of Monterey create a public campaign designed to release the information from the Green Building Program to local businesses. Prior to launching a public campaign, the Green Building Program would have to attain funds alloted for marketing. Such marketing would include the use of public seminars, radio and television promotions, and easy to read pamphlets which would be made available at the Building Office or upon request.

Continue Trial Phase

Until the City of Monterey gets a LEED inspector and starts an public campaign the City should continue its trial phase of the Green Building Program. In many ways, the Green Building Program is not ready to be fully implemented. Along with continuing the trial phase, the

Building Office would benefit from maintaining detailed analytical, data tracking results, and finding room for improvement for the program.

Areas for Further Research

This study examines the foundation for running a Green Building Program. As this area of study progresses, future research will be required as an ongoing assessment tool for Monterey's Green Building Program. The information gathered from the survey represents a small portion of the local business economy. Given less of a time restraint, it would have been appropriate to survey other types of local businesses, including the public sector. In addition, another important area of research is to devote a section within the study to future developments of the LEED certification process.

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Appendix References

Appendix A

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Appendix B

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Appendix D

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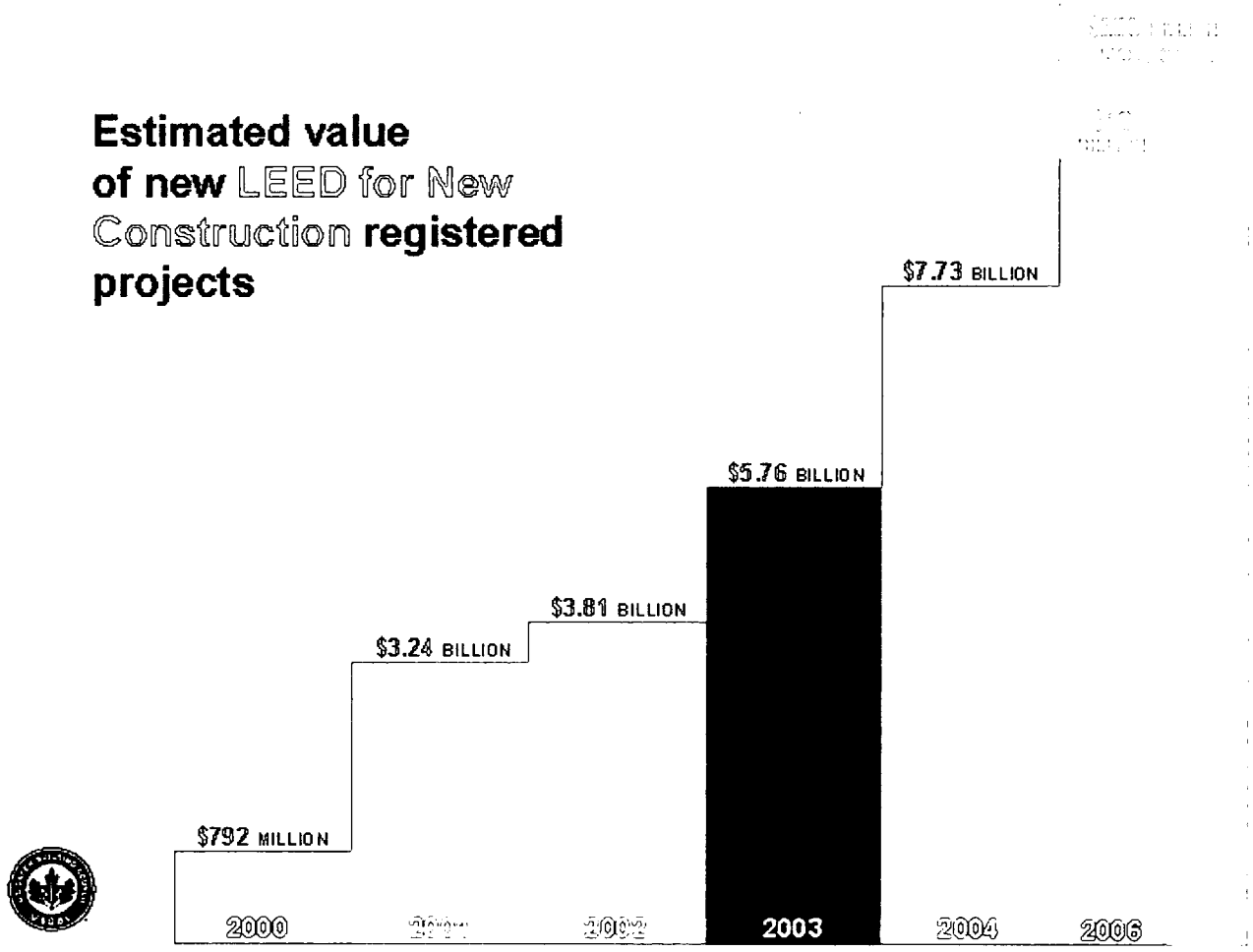
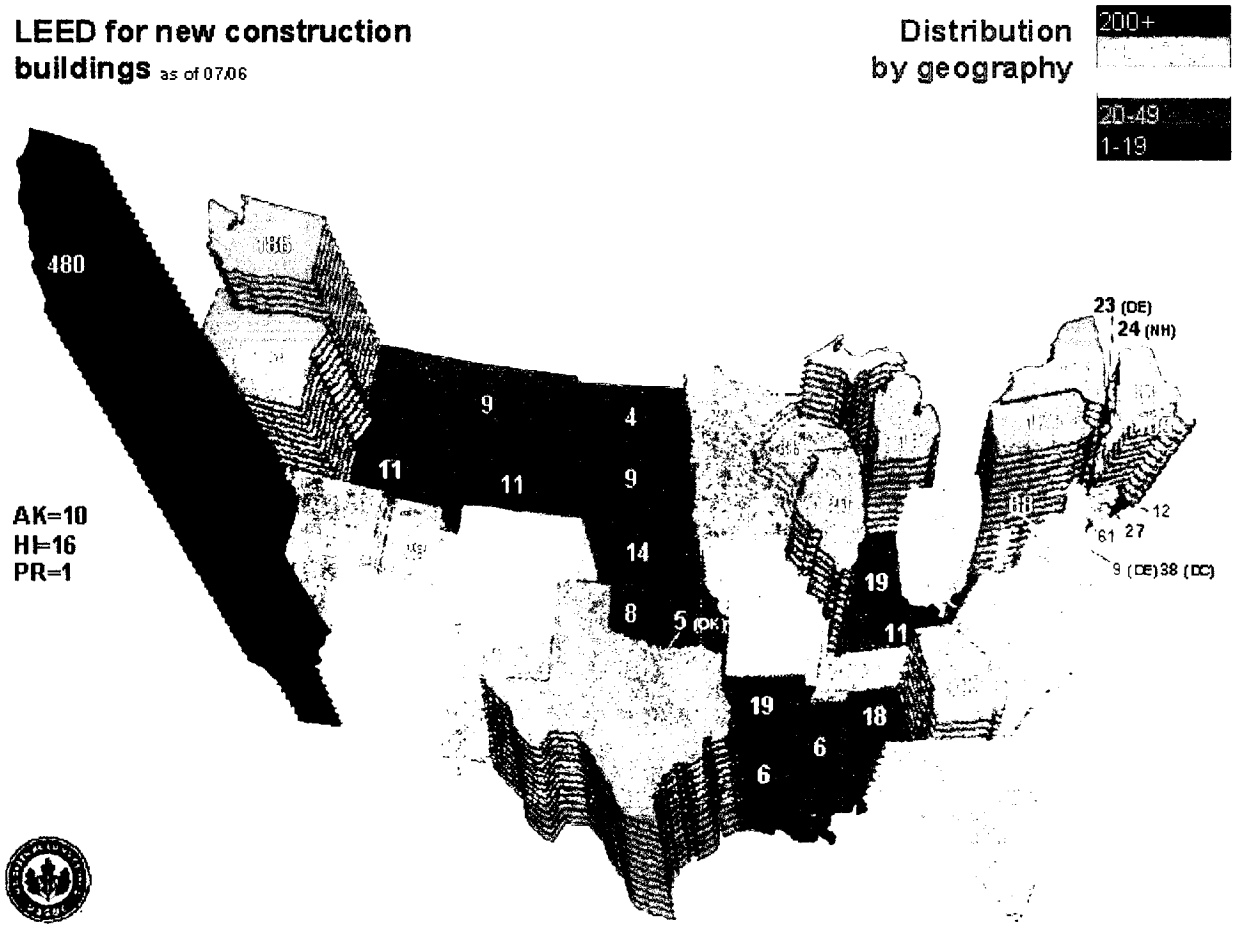
Appendixes

Appendix A



Appendix B


LEED for new construction buildings as of 07/06
Distribution by geography
200+
20-49
1-19
480
9
4
11
11
9
14
8
5 (OK)
19
11
19
18
6
6
23 (DE)
24 (NH)
12
61
27
9 (DE) 38 (DC)
AK=10
HI=16
PR=1

Appendix C

Monterey's Green Building Certification Survey Responses

Survey Statements	M
I am aware of the Monterey green building certification program	3
I believe attaining a green business certification is beneficial	3
I believe it is beneficial for the city to be responsible for all LEED certifications	3
I believe the city should be separate from the green building certification process	3
I believe it is best to outsource LEED specialists for green business certification	3
I believe the city of Monterey should assist in approving green business certifications	3

5 = Strongly Agree

4 = Agree

3 = No Opinion

2 = Disagree

1= Strongly Disagree

Note. Indicators were rated on a scale of 1 to 5, with 1 being the lowest priority and 5 the highest. The mode, represented in the "M" column, is the number that occurs most frequently. As these mode scores demonstrate, each of the surveys statements are rated at a level where those who were surveyed have no opinion regarding this matter. It is important to note that those who were surveyed are only a small amount of the total businesses in Monterey.

Appendix D

Non-Residential Green Building Program

GREENPOINTS CHECKLIST FOR NON-RESIDENTIAL PROJECTS
(Based on USGBC's LEED v2.2 Guidelines, directions can be found on the Monterey Green Building Program web site, http://www.monterey.org/building/greenbuilding/)

Prereq 1	**Construction Activity Pollution Prevention**	Required	
Credit 1	**Site Selection**	1	
Credit 2	**Development Density & Community Connectivity**	1	
Credit 3	**Brownfield Redevelopment**	1	
Credit 4.1	**Alternative Transportation**, Public Transportation Access	1	
Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1	
Credit 4.3	**Alternative Transportation**, Low-Emitting & Fuel-Efficient	1	
Credit 4.4	**Alternative Transportation**, Parking Capacity	1	
Credit 5.1	**Site Development,** Protect or Restore Habitat	1	
Credit 5.2	**Site Development,** Maximize Open Space	1	
Credit 6.1	**Stormwater Design,** Quantity Control	1	
Credit 6.2	**Stormwater Design,** Quality Control	1	
Credit 7.1	**Heat Island Effect,** Non-Roof	1	
Credit 7.2	**Heat Island Effect,** Roof	1	
Credit 8	**Light Pollution Reduction**	1	
	Sustainable Sites Total Available Points	**14**	
B. Water Efficiency			
Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1	

Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1	
Credit 2	**Innovative Wastewater Technologies**	1	
Credit 3.1	**Water Use Reduction**, 20% Reduction	1	
Credit 3.2	**Water Use Reduction**, 30% Reduction	1	
	Water Efficiency Total Available Points	**5**	
C. Energy & Atmosphere			
Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required	
Prereq 2	**Minimum Energy Performance**	Required	
Prereq 3	**Fundamental Refrigerant Management**	Required	
Credit 1	**Optimize Energy Performance**	1-10 points	
	10.5% New Buildings or 3.5% Existing Building Renovations	1	
	14% New Buildings or 7% Existing Building Renovations	2	
	17.5% New Buildings or 10.5% Existing Building Renovations	3	
	21% New Buildings or 14% Existing Building Renovations	4	
	24.5% New Buildings or 17.5% Existing Building Renovations	5	
	28% New Buildings or 21% Existing Building Renovations	6	
	31.5% New Buildings or 24.5% Existing Building Renovations	7	
	35% New Buildings or 28% Existing Building Renovations	8	
	38.5% New Buildings or 31.5% Existing Building Renovations	9	
	42% New Buildings or 35% Existing Building Renovations	10	
Credit 2	**On-Site Renewable Energy**	1-3 points	
	2.5% Renewable Energy	1	
	7.5% Renewable Energy	2	
	12.5% Renewable Energy	3	
Credit 3	**Enhanced Commissioning**	1	
Credit 4	**Enhanced Refrigerant Management**	1	
Credit 5	**Measurement & Verification**	1	
Credit 6	**Green Power**	1	
	Energy & Atmosphere Total Available Points	**17**	
D. Materials & Resources			
Prereq 1	**Storage & Collection of Recyclables**	Required	
Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1	

Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1	
Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1	
Prereq 2	**Construction Waste Management**, 100% non-hazardous construction material taken to a bonafide facility	Required	
Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1	
Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1	
Credit 3.1	**Materials Reuse**, 5%	1	
Credit 3.2	**Materials Reuse**,10%	1	
Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1	
Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1	
Credit 5.1	**Regional Materials**, 10% Extracted, Proc. & Man. Regionally	1	
Credit 5.2	**Regional Materials**, 20% Extracted, Proc & Man. Regionally	1	
Credit 6	**Rapidly Renewable Materials**	1	
Credit 7	**Certified Wood**	1	
	Materials & Resources Total Available Points	**13**	
E. Indoor Environmental Quality			
Prereq 1	**Minimum IAQ Performance**	Required	
Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required	
Credit 1	**Outdoor Air Delivery Monitoring**	1	
Credit 2	**Increased Ventilation**	1	
Credit 3.1	**Construction IAQ Management Plan**, During Construction	1	
Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1	
Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1	
Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1	
Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1	
Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1	
Credit 5	**Indoor Chemical & Pollutant Source Control**	1	

Credit 6.1	**Controllability of Systems**, Lighting	1	
Credit 6.2	**Controllability of Systems**, Thermal Comfort	1	
Credit 7.1	**Thermal Comfort**, Design	1	
Credit 7.2	**Thermal Comfort**, Verification	1	
Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1	
Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1	
	Indoor Environmental Quality Total Available Points	**15**	
F. Innovation & Design Process			
Credit 1.1	**Innovation in Design**: Provide Specific Title	1	
Credit 1.2	**Innovation in Design**: Provide Specific Title	1	
Credit 1.3	**Innovation in Design**: Provide Specific Title	1	
Credit 1.4	**Innovation in Design**: Provide Specific Title	1	
Credit 2	**LEED® Accredited Professional**	1	
	Innovation & Design Process Total Available Points	**5**	
		69	