

# The LEED Decision-Making Processes for Northern California Commercial Construction

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The purpose of this project was to establish a common decision-making process behind selections on the Leadership in Energy and Environmental Design (LEED) scorecard. This report describes the similar and dissimilar motives and processes that lead construction project teams to choose the LEED credits to be implemented. By interviewing experienced project executives, architects, project managers, and LEED accredited professionals at industry-leading companies in the Bay Area, a summarization of the motives behind credit selection have been reported and commonalities and differences in the process have been noted. Through these interviews, time, cost, efficiency, and sensibility have all been considered prioritizing factors in the LEED decision-making process; because this project involved diverse individuals with various background and reputable business of different sizes and specializations, the results not only speak to the companies involved in this project, but those industry wide as well. It was found that while the initial LEED decision-making process is similar throughout the industry, the credit selection process varies greatly based on the companies and individuals involved. This project serves as a structural outline for LEED decision-making meetings, a guide for credit-selection reasoning, and a resource for future projects striving for LEED accreditation.

**Key Words:** Environmental Sustainability, LEED Certification, Green Buildings, Decision-Making Process, Credit Selection

## Introduction

The twentieth century marks the first attempt to limit human impact on the environment. In doing so, critical bounds regarding the capacity of the natural world in relation to human activity have been highlighted – specifically the effects of the built environment. With growing importance in 1987, the World Commission on Environment and Development (WCED) published the Brundtland Report. This release introduced the concept of “sustainable development” and potential implementation strategies. In this document, sustainable development is defined as ensuring that development “meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987). Much of the premise of sustainable development is to preserve the natural environment within the limitations of present technology, social organization on environmental resources, and the absorption of the biosphere. Two of these factors, being technology

and social organization, are human-controlled and can be improved upon; however, the biospheric absorption limit remains unchanging. Hence, the stressed importance on manageable elements.

The effects of the built environment are notably one of the most important factors in resource consumption and, therefore, a major challenge in sustainable development. Based on a study done in 2019 by the United Nations, the buildings and construction sector accounted for 36% of energy use and 39% of carbon dioxide emissions in 2018 (Global Status Report for Buildings and Construction, 2019). Focusing in on the United States, buildings account for 38% of all carbon dioxide emissions, 13.6% of all potable water, and 73% of electricity consumption (Leadership in Energy & Environmental Design, 2021). Thus, buildings are recognized as large contributors to energy consumption, water usage, waste production, raw material depletion, and air pollution. In an effort to make development more sustainable and promote implementation, green building rating systems have been developed to mitigate the effects of buildings on the environment.

Leadership in Energy and Environmental Design (LEED) is one of the most utilized green building rating systems. Developed by the U.S. Green Building Council (USGBC), a non-profit trade organization, LEED was created as a tool to assess, measure, and promote achievements in sustainable design and construction. Focused on energy modeling and design, LEED concentrates primarily on a building's life cycle rather than merely initial construction. Hence, buildings are created to be more efficient for the entirety of their life span. Efficiency, in this sense, is defined in terms of energy consumption, water usage, air quality, and choice of building materials. According to the LEED website, the highest certification is responsible for 25% less energy consumption and 34% lower greenhouse gas emissions compared to a traditional building (Leadership in Energy & Environmental Design, 2021).

As a building standard, LEED certification represents an ethical system to promote sustainability and respect for the environment. This program aims to encourage environmental responsibility by providing clear criteria for green building throughout the design, construction, operation, and maintenance of a structure. Using scorecards as checklists, specific credits are chosen in order to acquire the points necessary for the desired level of certification. Credits can be earned through nine areas or categories: integrative processes, location and transportation, sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, innovation, and regional priority. Point allocations associated with each credit have been specifically tailored to the Environmental Protection Agency's Tools for the Reduction and Assessment of Chemical and Other Environmental Impacts and the National Institute of Standards and Technology to encapsulate each's potential environmental impact and human benefit. Based on these weighted credits and their assigned points, buildings can qualify for basic certification, silver, gold, or platinum. These certifications are applicable to all phases and sectors of building development including new and existing construction (LEED v4.1, 2021).

This paper is a culmination of interviews with industry professionals surrounding the LEED credit decision-making process. The following research provides insight into companies' decisions to pursue LEED and more importantly, their reasoning behind their credit selection. With this information, conclusions were gathered such as: the most commonly implemented credits or categories, the most avoided, the most expensive, and other findings.

## **General Background**

Before going forward, it is important to understand the history of LEED, the benefits and challenges of this particular green building rating system, and how the process behind choosing credits typically works.

### *History of LEED*

Originating almost 30 years ago, LEED certification has become one of the most widely accepted environmental rating system accreditations in the United States. More recently, the LEED rating system has evolved on an international level and is used on tens of thousands of projects around the world. According to the program’s website, more than 79,000 projects in 160 countries are utilizing LEED (Leadership in Energy & Environmental Design, 2021).

In 1993, the U.S. Green Building Council was founded. Piloted by the USGBC in 1998, the first version of LEED was released. Shortly after in 2001, a second version was released that contained more applications involving new designs and renovations of commercial, institutional, and high-rise residential buildings. Throughout the 2000s, new rating systems were developed based on construction type: building design and construction, interior design and construction, building operations and maintenance, neighborhood development, and homes. In 2006, the LEED program and all associated documentation went fully online. Nearly 10 years after the pilot program, the third version created the Green Building Certification Institute (GBCI), a third-party accreditation agency, for the purpose of administering and operating LEED certifications. This system allowed for the USGBC to center its attention on improving LEED standards (Cole & Valdebenito, 2013). Most recently in 2015, version four was released. This version has expanded each building category and provided additional building types such as data centers, warehouses, hospitality centers, and more (see Figure 1). Allowing for more specific criteria, this expansion requires project participants to understand higher levels of detail based on the type of building than previous versions (LEED v4.1, 2021). Although the LEED program has evolved over time, the basis of LEED remains the same – it is a point system involving credits used to rate how green a building is designed and constructed.

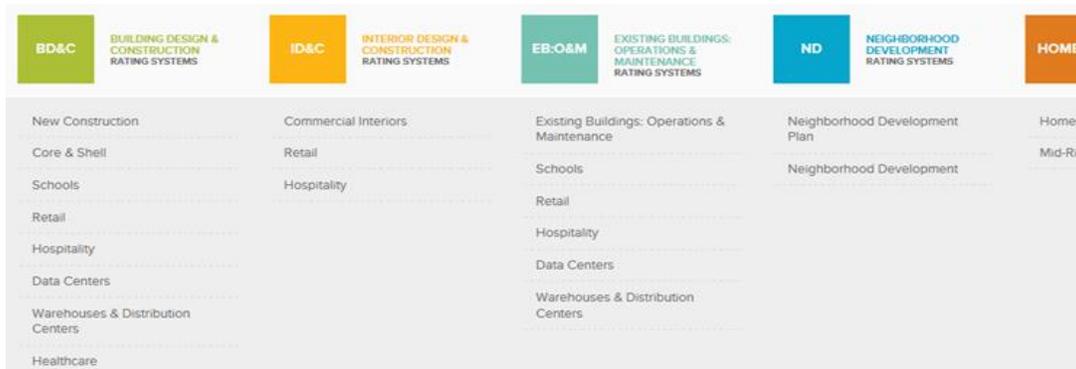


Figure 1. Rating Systems within LEED (Celidonia, 2014)

### *Challenges of LEED*

Many of the challenges of implementing LEED in construction are similar to those of sustainable construction. With cost and schedule being some of the main priorities of any construction project, LEED has the potential to negatively affect both. While budget and time constraints are typical in the

industry, certain LEED credits can increase expenses and prolong completion. Although this is not necessarily always the case, it is a common misconception that LEED accreditation is expensive for this reason.

In addition to time and cost, sustainable construction and LEED also require a higher level of project coordination. LEED implementation often requires more unique design elements – whether that be added equipment, delicate materials, specialty systems, or extensive overhead conflicts. Because these additional sustainability measures often require more effort than traditional methods, communication is key. Considering this, drawing coordination and coordination between the designers, engineers, contractors, and trades must be in place at all times.

It is important to note that LEED is sustainable construction, whereas sustainable construction is not necessarily LEED accredited. In addition to the general difficulties of implementing sustainable construction, LEED specifically is challenging due to its documentation requirements. This documentation process is extensive and is incredibly detail oriented. In order to successfully complete each credit and gain points, consistent submittal material must be submitted. If not, this paperwork must be appealed, revised, expanded, resurrected, or corrected for a cost; this fee is imposed upon by the USGBC and absorbed by the contractor as a schedule delay.

As is evident, sustainable construction is not without its challenges. Seeing as though time, cost, coordination, and documentation are strenuous on a traditional building, a LEED accredited building has an added complexity in addition to the building standard. With that being said, LEED is not without its benefits.

### *Benefits of LEED*

The Leadership in Energy and Environmental Design building certification is proof of excellence in sustainability. By fulfilling even the minimum points for accreditation, a building is esteemed for its green efforts. LEED is advertised as a program that lowers carbon emissions, conserves resources, reduces operating and maintenance expenses, and makes for happier and healthier employees and occupants. Aside from the tangible advantages of green design, LEED certification is also beneficial for local economies - it functions as a marketing tool which is viewed as more competitive in the building industry. In society, this accreditation attracts residents, increases rental rates, produces tax incentives, and provides public relations community benefits. Because of this, it creates a demand for green building materials and green construction (Leadership in Energy & Environmental Design, 2021). For these reasons, LEED provides a competitive differentiator in the real estate market.

In a 2015 national study published by Sage Journals, data was collected in an effort to understand the perceived role of LEED in the business recruitment process. Through surveying economic development professionals, the results suggest that the financial, health, and environmental benefits of LEED provide developers with enough incentive to support this type of building construction. However, the results also showed that the most likely deciding factor in the decision to pursue LEED is cost (Suzanne, Read, & Wittry, 2015).

LEED is an ideal sustainability program because it allows for financial gain and sustainability simultaneously. In the event that a project does not require or prioritize health and environmental benefits, LEED may still be an option due to its cost-effectiveness. It is common to construct and maintain a LEED building that costs less than or equal to a traditional building. In other words, the economic benefits may be reason enough to pursue LEED in a variety of occasions. Therefore, despite the results in this study reporting less significance placed on the sustainability goal of the LEED

program, it still projects that the interest in and quantity of LEED projects is growing and will continue to grow in the future. Any reason for utilizing LEED is a good reason.

### LEED Scorecard

The LEED scorecard is used as a guide by the design, engineering, and construction teams to track the credits needed for accreditation. Figure 2 is an example of the LEED v4.1 Building Design and Construction Checklist for Healthcare construction. Each credit is associated with a point allocation. These credits are listed under eight categories that divide them into classifications. Based on the complete prerequisites and total number of points achieved (with proper documentation), a LEED certification is attained.

LEED v4.1 BD+C: Healthcare		Project Name	
Project Checklist		Date:	
Y	? N	Prereq	Required
Y		Integrative Project Planning and Design	1
		Integrative Process	1
<b>0 0 0 Location and Transportation 9</b>			
		LEED for Neighborhood Development Location	9
		Sensitive Land Protection	1
		High Priority Site and Equitable Development	2
		Surrounding Density and Diverse Uses	1
		Access to Quality Transit	2
		Bicycle Facilities	1
		Reduced Parking Footprint	1
		Electric Vehicles	1
<b>0 0 0 Sustainable Sites 9</b>			
Y		Construction Activity Pollution Prevention	Required
Y		Environmental Site Assessment	Required
		Site Assessment	1
		Protect or Restore Habitat	1
		Open Space	1
		Rainwater Management	2
		Heat Island Reduction	1
		Light Pollution Reduction	1
		Places of Respite	1
		Direct Exterior Access	1
<b>0 0 0 Water Efficiency 11</b>			
Y		Outdoor Water Use Reduction	Required
Y		Indoor Water Use Reduction	Required
Y		Building-Level Water Metering	Required
		Outdoor Water Use Reduction	1
		Indoor Water Use Reduction	7
		Optimize Process Water Use	2
		Water Metering	1
<b>0 0 0 Energy and Atmosphere 35</b>			
Y		Fundamental Commissioning and Verification	Required
Y		Minimum Energy Performance	Required
Y		Building-Level Energy Metering	Required
Y		Fundamental Refrigerant Management	Required
		Enhanced Commissioning	6
		Optimize Energy Performance	20
		Advanced Energy Metering	1
		Grid Harmonization	2
		Renewable Energy	5
		Enhanced Refrigerant Management	1
<b>0 0 0 Materials and Resources</b>			
Y		Storage and Collection of Recyclables	
Y		FBT Source Reduction- Mercury	
		Building Life-Cycle Impact Reduction	
		Environmental Product Declarations	
		Sourcing of Raw Materials	
		Material Ingredients	
		FBT Source Reduction- Mercury	
		FBT Source Reduction- Lead, Cadmium, and Copper	
		Furniture and Medical Furnishings	
		Design for Flexibility	
		Construction and Demolition Waste Management	
<b>0 0 0 Indoor Environmental Quality</b>			
Y		Minimum Indoor Air Quality Performance	
Y		Environmental Tobacco Smoke Control	
		Enhanced Indoor Air Quality Strategies	
		Low-Emitting Materials	
		Construction Indoor Air Quality Management Plan	
		Indoor Air Quality Assessment	
		Thermal Comfort	
		Interior Lighting	
		Daylight	
		Quality Views	
		Acoustic Performance	
<b>0 0 0 Innovation</b>			
		Innovation	
		LEED Accredited Professional	
<b>0 0 0 Regional Priority</b>			
		Regional Priority: Specific Credit	
		Regional Priority: Specific Credit	
		Regional Priority: Specific Credit	
		Regional Priority: Specific Credit	
<b>0 0 0 TOTALS Possible</b>			
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 69 points, Platinum: 70 to 79 points, Platinum Plus: 80 to 89 points			

Figure 2. LEED v4.1 BD+C: Healthcare Scorecard (LEED for Building Design and Construction, 2021)

### Methodology

In order to have a clear idea of this complex process, a deep understanding of LEED credits and the selection process is necessary. This project was a case study based on interviews with industry professionals at undisclosed companies throughout Northern California. The research analyzed was qualitative and was found through six interviews with perspectives from each major stakeholder involved in the LEED decision-making process - included in the group are construction managers,

architects, and owner’s representatives. Several interviewees have experience in one or more of these roles. These semi-structured interviews took place via twenty to forty-minute phone calls and Zoom meetings. These meetings consisted of four to five open-ended questions regarding the LEED process that were given to interviewees ahead of time and used to guide the conversation (see Table 1). These questions allowed the participants to have a background on the topic and prepare their thoughts prior to the actual discussion. By utilizing this approach, an open dialog was created, relevant answers were given, and related topics were approached and considered. Responses were analyzed based on narrative analysis – this frame made it possible to interpret the experiential data within the LEED context.

Table 1

*Table of Interview Guide*

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Interview Questions
1. What is your professional background and experience level with LEED construction?
2. Have you personally been involved in the process behind deciding which LEED credits to implement in a building? If so, what type of building?
3. If involved, what does that meeting/series of meetings look like? Who is there? How long does it take? Is there one party with the most influence?
4. From your experience, what is the biggest factor when deciding which LEED credits to implement and why?
5. From your experience, which credits are the most commonly/least commonly implemented and why?

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## **Results and Analysis**

Based on the interview guide, the LEED decision making process was broken down into two portions: the LEED implementation process and the LEED credit decision-making process. The LEED implementation process focused on question three of the interview guide while questions four and five gave a better idea of credit-selection reasoning. In gathering responses, a common meeting process was identified while credit-selection reasoning varied based on background, employer, and position.

### *The LEED Implementation Process*

Overall, the responses regarding the LEED implementation process were incredibly similar. Initially, it seemed as though all companies and all parties began the LEED process with the same steps – typically in the form of two to three meetings. Once the project is agreed upon by the owner, architect, and contractor as an ideal fit for achieving LEED, this process begins.

First, the initial meeting takes place. This meeting is usually held between the primary parties (the owner, architect, and contractor) to go over LEED motivations, goals, impacts, and experience. In this meeting, the parties discuss applicable credits that align with these overarching factors. In many cases, this results in the first draft of the credit scorecard.

Next, the second meeting takes place. At this point, more perspectives are brought in to give their professional opinion on their specialty trades and relevant credits. These secondary trades include – but are not limited to – mechanical, electrical, plumbing, structural steel, precast concrete, landscape, elevator, curtain wall, and precast concrete subcontractors. In some instances, LEED specialists,

commissioning agents, inspectors, and sponsors are also invited to provide feedback during this stage of credit selection. Following this meeting, each trade looks further into their credits and their ability to successfully implement them.

Lastly, the third meeting is held. With all primary and secondary parties involved, the LEED credits to be completed are selected. Through the review taking place between the second and third meetings, all trades are able to give their final input and reasoning behind their credit preferences in this meeting. In doing so, it allows each trade partner to fully detail out their approach and have a thought-out response. Following this often-substantial rework, the owner then gives final review.

With this two-to-three step series of meetings, LEED goals are set, input regarding credits is given, rework is completed, and final owner approval is obtained.

### *The LEED Credit Selection Process*

While the responses surrounding the LEED implementation process were very similar, it became clear early on that the LEED credit selection process varied greatly based on each interviewer and their experience (see Table 2); however, three common themes were scope, schedule, and budget – a three-legged approach.

Table 2

*Table of Interviewees*

Interviewee	Experience
Jennifer Lauritzen	Project Executive for Construction Manager – Commercial and Healthcare Sector
Petya Kisyoova	Architect for Architectural Firm and Senior Project Manager for Owner – Educational, Healthcare, and Commercial Sector
Garrett Mitchell	Project Engineer for Construction Manager – Commercial Healthcare Sector
LaTaunynia Campbell	Project Engineer for Owner – Commercial and Healthcare Sector
Stacey White	Principal Architect for Architectural Firm – Commercial Sector
Matthew Susank	Project Manager for Owner employed by Construction Manager – Commercial Sector

Based off of Jennifer Lauritzen’s interview, the main factor in choosing which credits to pursue is based on the owner’s “WHY” for pursuing LEED in the first place. She explained that the first step in deciding which credits to complete comes from reinforcing the owner’s reasonings. For example, a hospital building utilizing LEED would be more likely to prioritize the “Daylight” and “Quality Views” credits since natural light has been proven to improve patient healing. With these goal credits sorted out – and from her experience – the process then shifts to credits that “make the most sense financially, but also feasibly and sensibly.” From this point on, credits that are not possible are marked as unattainable and the rest are evaluated for cost/return benefits.

From LaTaunynia Campbell’s perspective, a completely different approach is taken. In her experience, the construction manager she was employed by usually gave her team a template that had already been tailored to each project. From there, system credits such as those under the categories of “Energy and Atmosphere” and “Water Efficiency” were figured out first since the majority of points

on the scorecard come from certain credits within them. Next, the “low-hanging fruit” credits were given priority – these points were either already obtained in the plans and specs or “easy to build off what was already in place.” To gain the final points required for their particular achievement goal, the team focused on common sense and practicality – factors such as return on investment, cost, ease of implementation, and positive effect on users were the main reasonings behind these final decisions.

Working at the same company as LaTaunynia, Petya Kisyova offered a similar-but-different approach. With LEED prerequisites having been met, the first step was choosing the “low-hanging fruit” credits. In Petya’s words, these credits have the “highest impact and ease of implementation.” Following this credit selection, the next step is identifying the credits that could be improved upon – this usually is found in the categories lacking credits. For example, if the category of “Sustainable Sites” had the least number of points, available and accessible credits would be chosen to boost the scorecard and the project’s LEED diversity.

According to Stacey White, client motivation has the biggest impact – similar to Jennifer Lauritzen’s main priority. In an example given with the LEED plaque being the reasoning behind LEED, the cheapest credits would be chosen in an effort to keep cost low while completing the goal of becoming LEED certified. Stacey noted that the companies that she has worked with in the past pushed for certain categorical credits after choosing the credits for client motivation. In her experience, credits regarding energy and water were prioritized due to operational advantages, energy conservation contributions, human health improvements, and sustainability benefits. On the opposite side, the category of “Materials and Resources” was the least likely to be pursued due to the fact that many of these credits are already regulated by building code and the documentation required by LEED is time-intensive with minimal impact on operation energy usage.

As is evident, each individual has a differing perspective on the credit-selection process. While some have the initial goal of appealing to the client’s motives, the following methodology in the process is contrasting. Between “low-hanging fruit”, lacking categories, point allocation, and operational advantages, a solid credit-selection process could not be discerned. With that being said, most of the credits are chosen based on the general goals of completing project scope, executing on budget, and finishing the building on-time.

Note: While six interviews were successfully completed throughout this study, four interviews were viable and complete for an effective analysis on questions four and five of the interview guide.

## **Conclusions**

After analysis, there were two main takeaways from this research project. The goal of these interviews was to establish a common process behind LEED decision-making and to identify particular motivations behind the credits initially selected. Through this research, it was found that the process of initiating LEED credit-selection is similar throughout the Northern California construction, engineering, and design industries. This common process usually involves two to three meetings filled with owners, architects, engineers, construction managers, and specialty trades. However, while the LEED credit-selection process is the same across the board, the credit-selection varies between companies, and even individuals. Striking similarities between motivations have been found, but the differences far outweigh the commonalities. In this sense, it is not unusual for companies to prioritize credits that fulfill the goal set originally by the owner. Also, it is not unexpected that companies aim to attain the points associated with inexpensive-to-implement credits. While most companies can

agree that owner motivation behind pursuing LEED, cost, operational advantages, sustainability benefits, and occupant satisfaction are the main factors, each stakeholder may disagree on the degree of importance of each factor when compared to the others. For example, a hospital may argue that it is more important to focus on occupant satisfaction, while an office building seeking the LEED recognition may suggest that low cost is more significant. Also, individuals at the same company might find the most value in different ways. Within a company, an engineer might prioritize operation advantages, while an architect may stress the importance of the owner's goal being met. The tricky aspect of credit-selection is that it is opinion-based – formed from experience, expertise, or other factors. Although the LEED process may look rather similar in the industry, the decisions made for individual projects are certainly not the same.

### **Future Research**

While the goals of this research project were successfully fulfilled, there is always more research to be done on sustainability with it being a rather recent development within the construction industry. Based on the information gathered through this report based on the LEED decision-making and credit-selection process, it would be interesting to see not only why the LEED credits have been implemented, but if the final goal was achieved occupant health and satisfaction? Did the “Daylight” and “Quality Views” really improve occupant health and satisfaction? Did the water efficiency measures actually reduce cost? Did the credits met within the “Location and Transportation” category meet the owner's expectations? With these questions in mind, a future scholar could document one building's initial LEED process compared to the final outcome.

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