
OBSTACLES AND REWARDS OF ENTERPRISE SUSTAINABILITY AND THE NEED FOR A DIRECTOR OF SUSTAINABILITY

Winston Huff¹

INTRODUCTION

During a recent typical LEED meeting we reviewed the available LEED credits and the cost associated for each credit. The cost was added so the credit could be removed later during cost management meetings. It was soon realized because there was no clear sustainable direction from the owner, that sustainability here is a piecemeal approach that adds another layer of responsibility for middle managers.

In contrast, during a schematic design meeting an owner took an enterprise approach to the project and developed a facility and program that made sense with the site. A green approach was used in the whole site design. As a result, clusters of LEED credits were obtained and the construction cost of the site was reduced. With this integrated enterprise approach it is very hard to remove individual sustainable credits; the procedure is integrated with the middle managers' current tasks and is not an added layer.

The earth's biosphere has evolved into a complex thriving sustainable system. In contrast, organizations are an unsustainable force that threatens the earth. In response to this trend, some sustainable-minded organizations are now developing policies to take them in a new direction. In this journey they realize that while the earth may have been created in six days, instilling good sustainability policy takes much longer.

THE ENTERPRISE APPROACH

What made these two approaches different and how can an organization move from a reactionary piecemeal approach to a comprehensive enterprise approach to sustainability? The intent of this paper is to highlight two case studies of organizations that are beginning a process to develop an enterprise approach to sustainability. It will show how organizations can recognize the importance of developing an Office of Sustainability with a staff to coordinate sustainability efforts of the institution. A department with authority from top organizational leadership can help achieve sustainable goals, maintain a workable procedure, and aid in the efficient operation of the institution.

The enterprise approach, when applied to a building project, begins with looking at the overall region, community, site, owner, operator, budget, concerns, and space requirements before designing the project. This approach produces a building where sustainable systems complement and work together with other sustainable elements to produce an efficient sustainable facility. The end result will bring clusters of sustainable elements and LEED credits to a facility. This is in contrast to the typical bottom up approach to

sustainable building where an owner/design/construction/maintenance team looks at the individual sustainable elements or LEED credits of a project and then develops designs to meet each of these elements.

EXAMPLES

Vanderbilt University: The Commons, Sutherland and Crawford Houses

This large project is an example of an institution making an enterprise top level decision to require these facilities to be LEED certified. This commitment gave a clear direction to the project team to develop a process that met this goal. As a result; the team did not waste valuable time and energy running on two parallel paths—one a LEED path and the other a standard path.

The announcement that these projects would be LEED certified changed the sustainable environment in the region dramatically. There were some individuals promoting LEED and there were a few small LEED projects underway. This was the first major project in the area to go LEED.

Large segments of the local construction professional community had never heard about LEED.

1. CPD, LEED®AP, SSR Engineers, www.ssr-inc.com. Mr. Huff may be reached at whuff@ssr-inc.com.

The announcement resulted in a rise in LEED AP examinations and a growth in local chapter attendance. There was initial skepticism that the project would cost too much and never be built, or that the result would be an exotic building that is impossible and expensive to maintain.

The project when complete will house 1,600 freshmen that will live in a cohesive community and will offer instructional learning in the residential houses—senior faculty living with a community of scholars. Vanderbilt decided to go LEED as a result of the encouragement of students.

Some of the LEED credits include:

- Individual heating and cooling controls.
- Increased outdoor fresh air ventilation that exceeds minimal code requirements.
- Occupied spaces provided with access to natural light.
- Access to exterior views provided throughout the project.
- Occupied spaces provided with operable windows.
- Interior materials including carpets, paints, sealants, wall coverings, and adhesives with low VOC ratings.

Vanderbilt had a primary mandate that the new structures would fit within the powerful historic context of the Peabody campus. “Within this context the planning team sought to make common-sense choices for all materials and systems that furthered the sustainability of the overall project,”* said Baird Dixon Architect. The following are steps toward achieving this goal.

- In an effort to match the existing 1920s brick, materials were found in close range of the project, reducing the need for cross-country transport.
- The area is served with an old combination sewer and stormwater system. To reduce the amount of stormwater runoff, pervious paving is furnished at perimeter parking bays.
- Low flow shower heads and faucets help reduce the amount of sewage flow into the combination

* The Commons, Sutherland and Crawford Houses Vanderbilt University, E. Baird Dixon, AIA LEED-AP, Principal Architect, USGBC Middle Tennessee Chapter Newsletter, February 2007 Vol 2, Issue 2.

FIGURE 1. Vanderbilt had a primary mandate that the new LEED structures would fit within the powerful historic context of the Peabody campus.



- system and reduce the amount of energy used by the facility domestic hot water system.
- Reflective roofs reduce the heat-island effect and reduce building cooling loads. In this part of the country the cooling load is a large portion of the energy use.
- Student rooms have dual-stage lighting controls to reduce illumination levels.
- The design team incorporated sustainable education opportunities for the students by utilizing sustainable materials in the flooring such as bamboo hardwood flooring and terrazzo flooring containing recycled glass and linoleum.

At the end of the project the team realized that many of the sustainable elements were already incorporated into existing university standards. Stephen Clinton, mechanical engineer, reports, “Vanderbilt has high standards on the mechanical equipment. For example, they tested many of the units that are used in the room to make sure it would meet their standards. As a result, they chose high quality efficient equipment.”

Noticeable construction cost increases to build green were not in evidence. There were some added design fee costs to cover the efforts to look at new design alternatives and to pay for extra commissioning and facilitation fees. Many of these added design costs will not be incurred again in future LEED projects because these facilities have set the new standard.

Some new design sustainable elements will require added effort to incorporate into a project. For

the dining portion of the project this occurred with the desire to install no-water urinals. The owner felt it was important to incorporate sustainable features to show the public its commitment to sustainability. No-water urinals are one of these features.

Installing no-water urinals provided a good example of how new sustainable features are added to a facility. Organizations have to be sensitive to the steps needed to be taken for some new design features. One obstacle was how the users would respond to the fixture. In this case several urinals were installed in different places on campus that included student, public, and staff areas. Comment cards were provided for the public to respond to these fixtures.

As a result there was positive feedback on the urinals. Seventy-one percent of the respondents said that the product worked terrific, better than usual; 25% said adequate, same as usual, and only 4% of the respondents said that the waterless urinals were not adequate, worse than usual. The majority of users also felt that the touch-free aspect of the waterless urinals was a nice attribute.

Another obstacle was that no-water urinals also require the replacement of a cartridge or trap seal material on a regular basis for the units to operate properly. This required the coordination of two worker organizations: the housekeeping staff and the maintenance staff. The end result is that the liquid is being ordered and replaced. Both the housekeeping and maintenance staff were stakeholders in this decision and they had input on the types of fixtures that worked best for them.

A third obstacle was the city plumbing code department. Current code did not allow for the fix-

FIGURE 3. The Vanderbilt project located near downtown Nashville changed the look of the city and the attitude of the area toward LEED and sustainable construction.



tures, while new code editions did make provisions. As a result, the university, along with the consulting engineer, had to make several presentations to code officials and review boards to educate them to the way the fixture works and then gain approval. As a result of the university's leadership other facilities are installing these fixtures.

At the end of the first phase of the project, Vanderbilt and the construction team are now reaping the benefits. The first benefit was that the construction of the facility did not cost more to go green. The added cost centered around the extra design fees for LEED coordination meetings, LEED facilitation submissions, and added commissioning. Because the design team was sensitive to sustainability, they were encouraged to look for new opportunities to incorporate sustainable elements into the project.

Some elements were accepted while others were abandoned. During the design an underground water source was found. With the help of the civil engineer, several options were designed and priced to use the water for irrigation or other sources. It was soon discovered these options were not practical for this project.

Another reward is that the university has developed new standards for materials such as brick, flooring, and paints. Several types of HVAC equipment were studied with a sustainable standard now in place. Future LEED submissions efforts are now reduced.

FIGURE 2. Results of user feedback after using no-water urinals.

Compliments	Users
Worked Great!	80%
Touch-free is a nice attribute	76%
Complaints	
Odor Problems	4%

The project is now the largest LEED facility in the area and it has encouraged other owners to follow this lead. The city is now reviewing whether to require Metro buildings to comply with LEED and will help expedite LEED projects through the code review process.

Johnston Memorial Hospital, Clayton, North Carolina

Another example of the enterprise approach is a new hospital for a green field site in Clayton, North Carolina near Raleigh. While walking the gentle rolling field overlooking a pond, architects envisioned the many possibilities for a green-built hospital here.

The approach to the development of a new facility can show some of the basic structure of an organization and how it balances the needs of running a business with living in the natural world. Healthcare facilities have a code in their makeup to uphold the Hippocratic Oath: *to do no harm*. Hospital officials wanted this new facility to make a positive impact to the community.

The process of building a healthcare facility will expose the basic composition of the organizational structure and values of the people. Elements of the building reflect the vision of the facility administration. To build a new facility intending to save money by building a code-minimum grease trap with no commissioning to verify proper installation sends a negative message to the community when it subsequently stops up and creates offensive odors.

In contrast, staff can realize the administration cares about their working environment when they take the extra design time to create work areas with natural daylight and views to the outdoors. Asthma patients will notice the facility is concerned about the indoor environment when the administration makes the extra effort to eliminate VOCs in the environment.

The facility is a place of healing and health. From the health care staff to the administration, all have the goal to do no harm to the patients that enter a facility and receive care from the facility. In addition to the staff, the building structure should also do no harm and aid in healing and health. The facility should be an example of this approach to patient, staff, visitor, and community.

Hospitals have to show the community elements that set their facility apart from other healthcare fa-

cilities in the same market. In the Clayton project, it can be a challenge for a new facility to compete next to the larger, well known facilities that are near the “City of Medicine.”

After walking the site at Clayton, the design team met with the city officials. It was not long before the team realized that the city had similar goals for a green, pedestrian friendly city. While this was the goal of the city, a green design might not meet all the standards of the city.

To Boldly Go Nowhere. At this point a team can decide to have a standard approach to a project with little or no sustainable elements in a project. In this case the project team could have decided to use the existing city standards and design a very standard building. Too many times project teams and owners abandon the sustainable facility and revert to the comfortable mode of doing things the same way every time.

However, as the sustainability movement grows, the same old way is getting harder to maintain. Regulators, financiers, users, and customers are now beginning to demand sustainability. At some point projects with the same old procedures will cost owners and users more money.

Boldly Go Green. On the Clayton project the Civil Engineer and Landscape Architect were brought in early during the design phase. Because the budget is very important to the owner, the design team provided two schematic designs for pricing. The first design was a standard type design while the second was a green design.

The standard design included a typical parking area with several catch basins and underground piping to carry the stormwater away from the site. The green design provided bioretention swales where stormwater would drain off the parking area into a swale where plants could treat the water as it percolated back into the soil. The soils were piped together in an overflow system that ultimately fed into the on-site pond.

This reduced the amount of underground piping when compared to the standard design. The stormwater would flow into the swales and reduce the amount of curb and guttering when compared to the standard site. Concrete car stops would be provided

FIGURE 4. A photo of the bioswale project completed in Nashville by HPI in the Gulch. This is similar to the proposed layout for the Clayton project. There was a concern by the hospital administration that the landscaping would have the appearance of unordered weeds. Hospitals need to portray an appearance of order to the community. As a result, the landscaping will include defined borders.



at the end of the parking areas where the front of the cars would protrude over the swale area. As a result there would be less pavement needed in the parking lot.

Signs were provided so visitors could learn about the bioswales and how stormwater is naturally absorbed back into the soil. The parking area would present a dramatic visual statement to the community that this is a different type of facility. The site would be connected to the natural world with walks and views of the landscaping and pond.

When applying for LEED certification or for Green Guide for Healthcare Construction (GGHC) the project will meet the requirements for a cluster of points. Each point is interwoven with others to provide a comprehensive whole building approach.

The green approach will help the Clayton facility achieve these GGHC credits:

- Site Selection 1
- Credit 5.1 Site Development: Protect or Restore Open Space or Habitat 1
- Credit 5.2 Site Development: Reduce Development Footprint 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 9.1 Connection to the Natural World: Outdoor Places of Respite 1
- Credit 1 Water Efficient Landscaping: No Potable Water Use or No Irrigation 1
- Credit 1.1 Optimize Energy Performance: 3.5%/10.5% 1

The end result is a dramatic site that makes a statement to the community, patients, and staff that this is a restful, healing place that cares for the environment and for people's health. It is an efficient design working with the natural space and not against it. When staff, patients, and visitors go to other nearby facilities they are sent to large sterile parking garages with natural gardens installed at hard-to-find remote areas of the hospital. At Clayton they would arrive in the middle of the natural garden area and experience its welcome natural environment there.

TEAM ORGANIZATION

Administrative Team

There are many teams that work together to see a building through from concept to a functional building. The Administration team consists of the CEO, engineers, managers, accounting, users, and maintenance. This team sets the tone for the approach and is the basic "blueprint" of a project. The sustainable goals must be set at this level. It is very hard for the other teams to follow a sustainable approach if there is not clear support at this early stage.

Project Team Leader. The next step for the administration team is to hire a consultant that can uphold the sustainable goals and help build a team of professionals to help the administrative team walk through the building and sustainable process. This consultant can be an architect, engineer, or other building professional that has experience with design and construction along with a shared sustainable approach. "The hospital wanted to meet with the city and develop a good budget early in the project to reduce the amount of 'surprises' during construction," stated David Howe of Johnston Memorial Hospital.

For the Clayton project the architect filled this role and was able to work with the administration to set up a process to work through the project. The following are some of the tasks for the administration that the project team leader can help direct.

- *Request For Proposals (RFP).* Build a design, construction, and operations team open to work with new approaches. There are a lot of good architects, engineers, landscapers, construction managers, and contractors to bring onto a team. It is very important to build a team open and supportive of sustainable approaches. A team member not supporting sustainability can make it difficult for the administration to reach its sustainable goals.
- *Schedule Consultants.* A sustainable project may need consultants brought on board early in the design process. Standard projects will bring the Landscape Architect on the team at the end of the project. On the Clayton project the civil engineer and landscape architect were on board early in the design process.
- *Design Budget.* To save money on construction and operations, more money will be spent on consulting fees to develop options for pricing operations. The owner decided to move ahead the fees to the civil and landscaping team to develop a schematic design to present to the hospital board, pricing, and city. Similar to the Clayton project the Vanderbilt project developed a budget to include time for the consultants to develop designs early in the project. "At the end of the first phase of the project we realized we spent more money on the design while the LEED elements did not cost that much. We have several meetings deciding which LEED elements worked for this project. We should not have to spend as much time on the next LEED project," observed Tony Fort of Vanderbilt University Campus Planning and Construction.
- *Design Schedule.* The design schedule should allow time in the schedule to present the green approach to board and users to achieve early "buy in." PowerPoint presentations with early images of the project were presented to the board and doctors.

Design Team

In the enterprise approach it is important to build a design team that is sensitive to the sustainable elements and will support the sustainable goals.

Interdisciplinary Coordination. Sustainable approaches will require the design team to step out of their traditional areas of responsibility. The traditional approach can be illustrated by the way each discipline handles stormwater. When rain hits a roof the architect designs a roof to move the water off the roof as soon as possible. The plumbing engineer designs pipe to move the water five feet outside of the building where the civil engineer moves the water in expensive pipes off the site. The landscape architect brings in water from the city water service to water the plants. The end result is the installation of expensive systems that may not be the best for the environment.

In the green approach the civil engineer, architect, landscape architect, and plumbing engineer worked together on one interdisciplinary design. It is important to build a team of designers that are open to working with this type of approach.

Work with Construction Management (CM) Team. When budgets are important, the design team will have to work closely with the CM team to develop pricing packages so the CM team can be clear on the scope of work.

Narratives, Drawings, and Specifications. Because these are new approaches the design team has to be able to develop different types of documents to present to boards, codes, and contractors. For Clayton PowerPoint presentations were used for the administrative team. Large drawings of the site layout were prepared to use for city meetings and community meetings.

Construction Management (CM) Team

Choosing the wrong CM team can make sustainable design a chore for the facility team and this can negate the sustainable elements in a project early in the design process. Because green sites are not common it would be easy for the CM team to inflate the budget cost to cover items they have no experience

in. This is why it is important to work with a local landscaping contractor to develop a realistic budget price.

Subcontractors. Joe Braden with American Constructors, Inc the General Contractor working with the Vanderbilt project said, “We thought LEED would add to the cost of the project. At the beginning of the project we had several meetings about LEED. Once we got into the details we realized it did not cost more. We would be willing to do more LEED projects with Vanderbilt.”

Codes Team

Regulations. Many municipalities have not yet adopted green regulations. In the Clayton project the design team and administrative team worked with the local city codes to work through the process to make sure their requirements were met. All stakeholders worked cooperatively on this green design project.

Schedule. Working with local codes will require time and input from the design team early in the design phase of the project. Early coordination can save many dollars later in a project. There were several town meetings where the design team and administration had to meet with local residents. Several detailed site plans and elevations of the facility were shown to the town and residents at the town meetings.

OFFICE OF SUSTAINABILITY

Both Vanderbilt and Clayton are making early steps into sustainability. These facilities have the potential to operate as environmental sustainable buildings. Sustainability is dynamic and moving and is not something that is done at one point in time. These buildings have the potential to run efficiently and save water and energy while providing a clean environment inside and outside the building. However, these benefits cannot be realized without an operational structure to keep the facility running efficiently.

The next step is to develop an Office of Sustainability that has the responsibility to help the organization run on a sustainable track. Like building de-

sign, the office has to be built using the enterprise approach. An office with no authority from the administration will not have the tools it needs to operate efficiently. With this authority the organization and the buildings can run efficiently.

Office of Sustainability Organization

There are many stakeholders in an organization and these stakeholders will need to be involved in the formation of this office. It is important to begin the office with a meeting of the stakeholders along with the administration to develop the tasks, budget, and the authority of the office.

For example: These LEED buildings are built with low VOC paints, furnishings and adhesives in the construction. The organization’s paint department may use old paint that has high VOC additives in the new facility and as a result undo all the effort of the design and construction team. The OS will need the authority to work with the paint department to set up policies for using paint in new LEED buildings.

An operational budget is important, and the added efficiencies to a facility will soon pay for the office. Energy, water, sewer, and staff prices will continue to rise. This office can help the organization run efficiently and reduce many of these costs.

There are many good consultants, including engineers and architects, that can help an organization develop this office. This will usually involve hiring a facilitator to work with the different stakeholders to create the office.

Office of Sustainability Responsibilities

Once the office is established there are many tasks it can initiate.

Sustainable Procedures. As discussed in the low VOC paint, the office can work with the paint department to set up procedures to order and apply paint. These tasks may involve bringing in a facilitator to work with the stakeholders to develop these procedures.

Green Master Plan. This can be done in many levels of the organization. Vanderbilt and Clayton can use the building specifications as a basis for the green master plan for new construction. Some engineers

and architects can also help the facility develop the green master plan.

The green master plan can also include the overall layout of the facility campus and how it relates to the community outside the campus. Pedestrian access, automotive access, and public transportation are a few; Working with local green energy or sustainable energy programs are others.

Sustainable Practices. Most every professional group and manufacturer has developed sustainable product standards or operational standards. For example, the lumber industry has certified lumber. This is typical for housekeeping, lawncare, and many other products. This also works for the different trades in an organization. The OS can monitor these efforts and incorporate these standards into the operation of the organization.

Environmental Regulations. The OS will usually find themselves helping the organization meet at least the minimal required standards on local hot issues. These can include many items such as grease trap upgrades for the kitchen or old fuel oil tanks. The OS can mediate between officials and administration and develop plans to solve existing environmental problems.

LEED for Existing Building (EB). LEED EB is an important program to begin on LEED certified

buildings to make sure the buildings operate at their designed efficiencies. Existing building commissioning is another task to make sure existing buildings are operating as designed. It is not uncommon for these teams to find valves closed or dampers closed that result in energy consumption, and that will cost very little to repair.

Monitor New Sustainable Trends. To positively react with the environment we live in, and the high cost of energy, organizations will need to constantly develop new sustainable methods. The OS can monitor these developments and apply the applicable trends to the organization.

Sustainable Investing. There is a trend for the public to know where organizations are investing their capital. Organizations can complement their sustainable goals by investing their assets in ventures that promote green building. The OS can advise and help direct these investments into sustainable-minded organizations to facilitate good investment as well as promote a healthy environment.

CONCLUSION

When organizations take the enterprise approach to sustainability it will help the earth sustain itself as a wonderful place to live. This approach will also help the organization sustain its future as a wonderful place to live, work, and invest into the future.