Sustainable Facility Solutions beyond LEED

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ABSTRACT

The tools provided by the USGBC LEED™ rating system and other green facility design benchmarks, can be useful toward performance-based goal setting; however, sometimes these objective tools can stifle imagination and obscure fundamental goals by hiding behind standards-based criteria.

What should the architectural and engineering response be when a client wants to build a new world-class renewable energy scientific laboratory in a developing tropical region with a minimum environmental footprint? In order to best address the challenge, client stakeholders, as well as the design team, must understand the demands and costs involved with a zero carbon, net zero energy, zero waste, and net zero water development project.

This presentation will examine the boundaries of traditional sustainable design methodologies and illustrate a case study on how an architectural team was able to align a lofty sustainable design initiative with a strategic business, community, and regional plan.

Keywords: sustainable, LEED, architecture, engineering, environmental, laboratory

1 THE CHALLENGE

Flad Architects was commissioned to design a 500,000-square-foot, state-of-the-art chemical and biological laboratory in the tropical environment of a developing country. Infrastructure for recycling, public transportation, and general sustainable education is limited or nonexistent in many developing nations. At the onset, the highest goals of minimizing the environmental footprint of a carbon-intensive project seemed all but impossible to achieve. After all, laboratories use 5-10 times the amount of energy than office buildings to maintain safe and controlled conditions inside the building.

2 SETTING SUSTAINABILITY GOALS

Many sustainable design strategies can be organized around four major goals:

1. Preserve and create a healthy environment
2. Protect natural resources
3. Educate and set a global example
4. Allow the goals to excel and evolve over the life of the building

A sustainable renewable research laboratory should not only be more efficient about its resource consumption, the design should respond to all aspects of a more responsible existence; an example for all of society, one which demonstrates the results for others to emulate and from which to learn.

What was clear at the outset of the project was the design team should reach as far as possible to achieve these goals without losing sight of the financial goals. Considering its unique location, the project should address both the predominant environmental concerns in that country and the climatic conditions specific to the region. The design should measurably improve sustainable design technologies and methodologies in the region.

The dominant global benchmarks like LEED, BREEAM or others should not limit the design strategies for the sake of achieving a certain certification level. Rather, the design should identify and use innovative, sustainable practices at this location for this type of research laboratory.

Design and construction can only address a small number of problems over the lifetime of a building. And, even this first step has become a complicated process with many involved parties and many decisions and strategies. They range from selecting an appropriate site, using appropriate construction materials, designing building

systems and providing a healthy, productive and attractive work environment.

3 DESIGN OBJECTIVES

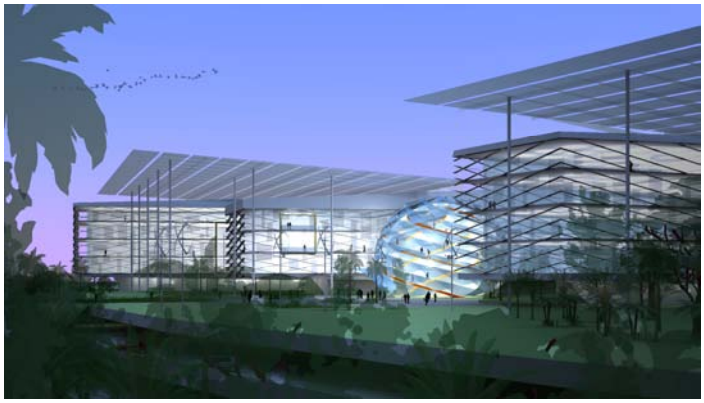
In order to set priorities, visioning sessions were conducted to identify the major opportunities the project presents for advancing the sustainability goals. These objectives should have the greatest impact on the technological, economical, ecological, aesthetic, operational, and societal challenges and should exceed what others have attempted. The objectives are summarized as follows:

- Design a workplace with connections to the outside and to nature
- Design systems that maintain a balanced budget of net energy neutrality
- Energize staff to participate in progressive, continual improvements
- Transform the company and the country toward a more sustainable way of life
- Produce zero waste both during construction and when in operation
- Maximize the use of public transportation to work or use zero-emission vehicles
- Achieve a zero carbon footprint
- Do not consume or discharge water from or to the city utilities
- Foster life on the site; create habitat exchange
- Provide a healthy and high quality facility

These are merely the most prevalent objectives. The project sustainability agenda includes many larger and smaller initiatives to holistically improve the ecological footprint.

4 CONCLUSION

Ultimately, the design will be measured against other established benchmarks to document, verify, and commission its sustainable qualities. This project will have an opportunity to set a new standard for buildings in the tropics. It will be closely observed within the country and beyond, and it is a project goal to set a new development of sustainable construction applications and methodologies in motion for the benefit of the region and others like it.



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