project approach

Integrated Design

A successful sustainable, or green, project is a solution that is greater than the sum of its parts. By intentionally building connections and cross-linked support between the engineered, cultural and natural systems present in all building projects, significant efficiencies, as well as natural system regeneration, can be achieved. Project and operating costs can also be reduced. Simply adding or overlaying individual "environmental" systems in isolation will not allow buildings and communities to benefit from the available connections and interdependencies that can be identified in an integrated, or whole system, design approach. This is the fundamental challenge of sustainable design and building cost-effective LEED projects.

"Optimizing components in isolation tends to pessimize the whole system – and hence the bottom line. You can actually make a system less efficient, simply by not properly linking up those components. If they're not designed to work with one another, they'll tend to work against one another."

P. Hawken, A. Lovins, H. Lovins, Natural Capitalism

In short, 7group's goal is to help project teams design high performance LEED buildings that cost no more to construct than conventional buildings, but cost much less to operate. We accomplish this by rigorously employing integrated design, a design methodology that constantly examines the tradeoffs between up-front costs for pursuing these goals and the benefits that are derived from achieving them. Design decisions are based upon analyzing, quantifying, and evaluating the synergistic interactions between building systems.

The core concept of integrated design is simple - most everything in a building project affects everything else. Consequently, we will examine how to integrate site parameters, solar orientation, water, stormwater systems, thermal envelope, lighting, window performance, heating and cooling supply systems, ventilation, and air distribution in a way that all of these systems are working together, much like those within an organism.

For example: by enhancing insulation levels, improving lighting, increasing air distribution efficiency, and installing high-performance glazing that keeps out the summer heat and the winter cold, we can downsize a building's mechanical systems (equipment such as furnaces, air conditioners, heat pumps, fans, etc.). In many climates, entire perimeter heating systems can be eliminated. The cost savings achieved through such mechanical equipment reductions pay for the provisions that allowed for such downsizing in the first place (the better insulation, lighting, air distribution, and windows listed above). The resulting building will cost the same, but energy consumption and utility bills will be reduced dramatically.

Dozens more examples could be described here, but the point being made is that when all design decisions are based on similar notions of integrating the building's systems, certain conventional components can be reduced in size or even eliminated altogether. The result can be dramatic in terms of energy efficiency, performance, cost savings, and environmental impacts. Via such integration, the size and cost of HVAC systems typically can be reduced by 40-50% - or even more depending upon project parameters and goals. Consequently, over the life of the building, operational cost savings will easily exceed the building's initial construction cost.

Unlike conventional design, though, integrated design mandates closer interaction among the owner's representatives, architects, engineers, and operations staff while they work together from the earliest pre-design phase to evaluate measures that can produce overall project savings, higher performance, and environmental benefits. We will initiate this interaction at the very beginning of this project by convening a goal-setting session with all stakeholders, followed by a focused and collaborative design charrette with all team members.

In conclusion, many projects have great potential for incorporating the most advanced green building design techniques and systems. However, there can a cost to pay in terms of budget as well as untested techniques; technically feasible solutions may not be right for operational simplicity and budget. Part of our job is to help find an optimal balance between the economic, cultural, and ecological areas of sustainability that will meet the objectives of our clients, yet allow for future adaptation of new technologies and interactions with the community.

Our approach is one of common sense application of thoughtful and integrated solutions. We know the development process and understand what is necessary to create a realizable LEED projects.

partner profile

Marcus B. Sheffer

Energy & Environmental Consultant

LEED Accredited Professional

Selected Experience

Energy/environmental consultant with over 20 years of professional experience

Formed Energy Opportunities, Inc. in 1993 to provide technical consulting services on projects relating to energy management, efficiency and conservation; renewable energy systems, and the environmental impacts of human enterprises

Operates the York County Community Foundation Energy Program providing technical assistance to nonprofit organizations since 1993

Consultant on over 50 green building projects

Consultant on 12 LEED® Certified projects

Areas of experience include:

- Green buildings
- LEED Green Building Rating System
- GBTool – International Green Building Assessment Tool
- Energy efficiency and conservation
- Renewable energy systems
- Water conservation and efficiency
- Measurement and Verification
- Energy efficient lighting design
- Daylighting analysis and evaluation
- Environmental issues related to the built environment

Presentations at over 100 regional, national and international workshops and conferences

Advisor to the Pennsylvania Governor's Green Government Council on energy and environmental issues

Authored the Pennsylvania Solar Manual. Articles in national publications Solar Today and Energy User News

Served 12 years with the Pennsylvania Energy Office, 1981 to 1993

Education

Bachelor of Arts degree in Environmental Studies, Shippensburg University, 1981

Master of Science degree in Public Administration, Shippensburg University, 1986

Awards and Affiliations

LEED Accredited Professional, April 2001 and November 2004

Founding Board Chair, Green Building Association of Central Pennsylvania, affiliate of U.S. Green Building Council

U.S. Green Building Council LEED Energy & Atmosphere Technical Advisory Group (EA TAG) Vice-Chair

U.S. Green Building Council LEED Training Faculty

U.S. Green Building Council workshop development (Advanced Training and Energy Modeling Module)

U.S. Green Building Council LEED Technical Reviewer for Certifications

U.S. Team participant in two International Green Building Challenge; 2000 Maastricht, Netherlands – Pennsylvania Department of Environmental Protection (PA DEP) Southcentral Regional Office Building and PA DEP Cambria Office Building; 2002 Oslo, Norway – Clearview Elementary School

Founding Board Member, Sustainable Energy Fund, which promotes energy efficiency and renewable energy

Certified Energy Manager by the Association of Energy Engineers

Professional memberships include American Solar Energy Society, ASHRAE, IESNA and U.S. Green Building Council

Judge for the 2000 Pennsylvania Governor's Awards for Environmental Excellence

Pennsylvania Governor's Award for Environmental Excellence – 1998 York Foundation Energy Program; 2001 PA DEP Cambria Office Building; 2003 Clearview Elementary School

American Institute of Architects (AIA) Top Ten Green Building – 2000 PA DEP Cambria Office Building

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10. What assurances can the developer of the Greenbridge site give that proposed green technologies (e.g. geothermal heating, green roofs, etc.), being used as justifications for higher intensity zoning and modifications to regulations will actually be built? What stipulations would the developer agree to? Why should the developer be granted the higher intensity zoning and modifications without providing assurances?

Applicant response: LEED does not operate in a manner that is consistent with the Chapel Hill regulatory process. LEED only certifies buildings about 24 months AFTER they are completed. We cannot guarantee LEED certification for any specific item. No applicant can.

GREENBRIDGE----------GREENTECHNOLOGY MATRIX

ATTRIBUTE	BENEFIT	EST. COST	PROBABILITY
Green Roofs	Creates habitat, reduces storm water runoff, generates oxygen, reduces heat island effect	$1,000,000	90%
Solar PV	Reduces energy demand & the burning of fossil fuels, reduces the release of greenhouse gases into the atmosphere	$1,000,000	90%
Green Materials	Promotes responsible use of natural resources, improves indoor air quality and health, promotes local materials sourcing.	$850,000	100%
Geothermal (Heating and Cooling)	Reduces energy demand & the burning of fossil fuels, reduces the release of greenhouse gases into the atmosphere.	$650,000	60%
Rainwater catchment and reuse	Conserves water. reduces stormwater runoff, provides on-site irrigation source.	$200,000	50%
Green lighting/ fixtures & Bulbs/light controls	Warm lighting which can be dimmed vs. fluorescent lights, lamps last twice as long and use less than %energy.	$ 530,000	100%
Indoor Fresh Air System	Improves indoor air quality, reduces energy demand and the release of greenhouse gases into the atmosphere	$900,000	50%
Energy Star Appliances	Reduces energy demand & burning of fossil fuels, reduces the release of greenhouse gases into the atmosphere	$0	100%
Low E Window glass, window wall system	Reduces solar heat gain, increases energy efficiency, increases natural daylighting	$950,000	100%
Automated shade system	Reduces additional solar heat gain and reduces energy demand	$ 190,000	50%
Daylighting and Views	Increases natural daylighting from 50% to 90%, reduces the demand for artificial lighting, provides sunlight to plaza and neighborhood	$7,500,000	100%
Construction Waste Recycling	Reduces waste golng to construction land fill, increases the use of off-site recycling materials	$ 100,000	100%
Microturbine	Approximately twice as energy efficient as grid generated power. Produces hot water and electricity as a by-product.	$ 250,000	80%
Underground Parking	Reduces heat island effect, storm water runoff, increases sidewalk amenity and allows for optimal use of town center areas.	$3,200,000	100%
Bicycle storage/ lockers/Showers	Encourages alternate transportation, excersize, storage both for residents and retaillcommercial employees	$100,000	100%
Water Conserving fixtures	Conserves water, reduces waste volumes flowing to wastewater treatment, reduces treatment demand	$0	100%
Building Commissioning	Promotes high performance building by certifying quality design, construction and operation	$ 161,000	100%
LEED Certification	Provides framework for greenbuilding, provides third party documentation of greenbuilding	$ 100,000	100%
Integrated Green Design	Assures best of class sustainability elements in the project	$1,200,000	100%