



An Introduction to Sustainable Design for Buildings

An Online Continuing Education Course for Engineers

Course Number: BD-2017

Credit: 2 Hours / 2 PDH / 2 CPD

An Introduction To Sustainable Design for Buildings



J. Paul Guyer, P.E., R.A.

Paul Guyer is a registered civil engineer, mechanical engineer, fire protection engineer, and architect with over 35 years experience in the design of buildings and related infrastructure. For an additional 9 years he was a senior-level advisor to the California Legislature. He is a graduate of Stanford University and has held numerous national, state and local positions with the American Society of Civil Engineers and National Society of Professional Engineers.

PRINCIPLES OF SUSTAINABLE DESIGN FOR BUILDINGS

J. Paul Guyer, P.E., R.A., Fellow ASCE, Fellow AEI

1. THE SUSTAINABLE DESIGN CHALLENGE

Sustainable design seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments. Design and construction of buildings and related infrastructure create major direct and indirect impacts on the environment. For example, in the United States, buildings:

- Consume 39% of total energy use**
- Consume 12% of total water consumption**
- Consume 68% of total electricity consumption**
- Cause 38% of carbon dioxide emissions**

In recognition of this growing issue the concept of “sustainable design” has arisen in recent years. Unfortunately this approach is frequently described as “integrated” or “synergistic” or “holistic” or similar terms that are not particularly definitive.

Utilizing a sustainable design philosophy encourages decisions at each phase of the design process that will reduce negative impacts on the environment and the health of the occupants, without compromising the bottom line. It is an approach that encourages compromise and tradeoffs. Such an approach positively impacts all phases of a building's life-cycle, including design, construction, operation and decommissioning.

Government agencies at all levels as well as increasing numbers of private companies are committed to incorporating principles of sustainable design and energy efficiency into all of its building projects. The result is an optimal balance of cost, environmental, societal and human benefits while meeting the mission and function of the intended

facility. Sustainable design should ideally be incorporated as seamlessly as possible into the existing design and construction process.

This course is about an approach to sustainable design that is structured and lends itself to incorporation into the building design process. It consists of....

- ❑ **PRINCIPLES**
- ❑ **OPPORTUNITIES**
- ❑ **RESOURCES**

Principles are the road map of sustainable design. Opportunities are things that may be done to optimize a specific project in recognition of one of the Principles. Resources are published manuals, guides and data bases that are available to assist in optimizing implementation of an opportunity.

2. THE SIX PRINCIPLES OF SUSTAINABLE DESIGN

There are six **PRINCIPLES** of sustainable design....

- **OPTIMIZATION OF SITE POTENTIAL**
- **OPTIMIZING ENERGY USE**
- **PROTECTION AND CONSERVATION OF WATER**
- **SELECTION AND USE OF ENVIRONMENTALLY PREFERABLE PRODUCTS**
- **ENHANCEMENT OF INDOOR ENVIRONMENTAL QUALITY**
- **OPTIMIZATION OF OPERATIONS AND MAINTENANCE PRACTICES**

In this course we will be looking at the **OPPORTUNITIES** that may exist in the building design and construction process that will optimize a specific project in recognition of these **PRINCIPLES**, and **RESOURCES** that may be available to provide guidance in applying these **OPPORTUNITIES**.

3. PRINCIPLE: OPTIMIZATION OF SITE POTENTIAL

Creating sustainable buildings starts with proper site selection, including consideration of the reuse or rehabilitation of existing buildings. The location, orientation, and landscaping of a building affect the local ecosystems, transportation methods, and energy use. Siting for physical security has become a critical issue in optimizing site design. The location of access roads, parking, and perimeter lighting must be integrated into site design.

3.1

Sustainable site selection minimizes transportation issues. optimize

To view the remainder of the course material and to take the quiz for PDH credit, you must purchase the course.

Close this window and click "Add to cart" on the product page.

space by the
t islands;
ate
able site
sustainably



- and incorporate retention
- previous pavement in project design
- Reduce runoff of site using vegetated swales and depressions

- Consider Energy Implications in Site Selection and Building Orientation**