

**The Engineering
Guide to LEED—
New Construction**

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The Engineering Guide to LEED— New Construction

Sustainable Construction for Engineers

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Preface

The *Engineering Guide to LEED–New Construction* is intended as a reference or a textbook to aid in the understanding and application of green building design concepts for the engineering and development community. It focuses on the U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design® (LEED) rating system as an example format for sustainable vertical construction.

Sustainability has many definitions. The definition that has been generally accepted in the context of human beings building and living in a more “sustainable” world was initially developed at the World Commission on Environment and Development (WCED) in 1987. It is simply this: “Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Sustainable Construction is a subset of sustainability, which focuses more on the built environment, both during the construction phase and during the operational life cycle of the facility. However, both sustainability and sustainable construction are subject to interpretation and are very difficult to define. What may seem sustainable in one culture or per one set of values, may not appear sustainable to another. Likewise, the concepts that may be viewed as more important for sustainability by some people, may not be as important to others.

A very common term used for a major focus area in sustainable construction is *Green Building*. Green Building may not really represent true sustainable construction in some people’s opinion, but it is an attempt to approach sustainability in a format that fits readily into our current culture. It is a movement that tries to put some of the concepts of sustainability into the construction or renovation of our buildings and facilities.

In like manner, even though this book has sustainable construction in its title, it by no means represents a fully comprehensive method to construct sustainably. This book is intended to be an introduction to some of the major concepts that are being accepted in methodologies to introduce sustainability into construction practices in the United States. It specifically covers the concepts that are currently being promoted by a rating system developed by the USGBC. The system is entitled LEED and has grown out of energy-saving efforts in the United States.

This book focuses more on the “Environmental” aspects of LEED. The “Energy” aspects have been fairly well developed and might require another volume or two to adequately explain in greater detail. In addition, this book expands on some of the environmental issues that are focused on in LEED and gives some direction into means to accomplish the goals, or gives more detailed background information on the

environmental systems and impacts that many of the LEED subcategories are based on. In this way, an engineer or other professional may better grasp the intent of the proposed sustainability methods. A better understanding may result in better and more comprehensive, or perhaps alternative designs to obtain the goals. This book is meant to be a guide for all professionals working on sustainable construction in the United States.

The book is divided into three different types of sections. The first section, which consists of Chap. 1, gives an introduction to both sustainable construction and the USGBC LEED–New Construction rating system. The second section, Chaps. 2 through 7, goes into detail on many of the prerequisites and credits used by the USGBC for certification through its rating system for new construction and major renovations. The last section, Chaps. 8, 9, and 10, consists of several distinct parts broadening out from the specific rating system items with emphasis on application to various sectors of particular interest to many groups, management, the military, and low-impact development (LID). Chapter 8 gives some overviews of construction management and organization for helping a *green* professional make a sustainable construction project successful. Chapter 9 gives a view of how the Federal Government and one of its largest departments, the Department of Defense (DoD), have evolved as major contributors to the sustainable development movement in the United States. This chapter starts with a broad overview of how the DoD is involved in the movement and gradually details it down to the example of how the DoD is starting to address the improving of indoor air quality. Chapter 10 gives a broad overview of how this rating system may effectively intersect with another growing movement in the sustainable construction arena in the United States, LID, which focuses on the outdoor impacts of construction, particularly with respect to stormwater.

The Engineering Guide to LEED–New Construction can be used either as a textbook, or a reference. The exercises in the chapters help to develop sustainable skills and understanding for the students, while also allowing them to research the new principles and guidances that may evolve after publication of the book. I hope that others find as great a satisfaction and enjoyment in becoming more *green* as I have over the past few years.

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