

Table of Contents

Overview	vii
-----------------------	-----

Course Schedule	xiii
------------------------------	------

SECTION 1

Part 1. Introduction to Green Buildings: Examples

Preview Part 1.....	1
Self-Assessment	2
1.1 Discussion Questions. Ice Breaker	3
1.2 Example—Hotel Property.....	4
1.3 Discussion Question.....	5
1.4 Example—Single-Unit Property.....	5
1.5 Discussion Question.....	6
Review Part 1.....	7

Part 2. Value, Cost, Competency, and Legislation

Preview Part 2.....	9
Market Value Definition.....	11
2.1 Discussion Question.....	13
Market Value and Cost	15
Appraisal Standards and Green Buildings.....	16
Legislative and Other Movements Affecting the Appraisal of Green Buildings	17
2.2 Discussion Questions.....	23
2.3 Discussion Questions	25
Review Part 2.....	27

Part 3. The Evolution of Green Buildings

Preview Part 3.....	29
Sustainability: Definition and Concepts	31
Green Building: Definition, Relationship to Sustainable Building, and History.....	33
What Do We Mean When We Say Green?	36
Green Building Timeline	37
3.4 Discussion Questions.....	38
Digging Deeper	39
Review Part 3.....	41
Digging Deeper. Eight Principles of Sustainability.....	42

Part 4. The Six Elements of Green Building

Preview Part 4..... 45
Two Key Concepts: Whole Building and Integrated Design Approaches47
Overview: The Six Elements of Green Building 48
Element 1. Site—Planning and Development..... 49
Element 2. Water 54
Element 3. Energy57
4.12 Review Quiz75
Element 4. Indoor Air Quality (IAQ).76
Element 5. Materials78
Element 6. Operations and Maintenance (O&M).....79
Green Building vs. Code Building81
Back to the Whole Building and Integrated Design Approaches 82
4.16 Discussion Question 83
4.17 Review Quiz. The Six Elements of Green Building 85
Review Part 4.....87

SECTION 2

Part 5. The Benefits and Costs of Green Building

Preview Part 5..... 89
The Benefits of Green Building91
5.2 Discussion Questions. Benefits of Green Building..... 92
The Costs of Green Building..... 93
Case Study. Office Building with Energy Efficient Improvements 94
5.3 Discussion Question..... 95
Retrofitting and Renovation 96
Digging Deeper. Life Cycle Cost.....97
Review Part 5..... 99

Part 6. Green Building Certification and Rating Programs

Preview Part 6.....101
The Purpose of the Programs103
6.1 Discussion Question. Green Building Program Outcomes.....104
How the Green Building Certification Programs Function104
The Green Building Certification Process105
Green Building Certification Programs Overview 106
ENERGY STAR® 106
Leadership in Energy and Environmental Design (LEED®).....109
ICC 700 National Green Building Standard™ (NGBS) 113

Part 6. Green Building Certification and Rating Programs, cont.

Passive House Institute U.S. (PHIUS)	114
Changes in Programs over Time	115
6.2 Discussion Questions. Green Building Certification	116
Digging Deeper. CALGreen Code Changes: How They May Affect Green Building Certification Programs.....	117
Review Part 6.....	119

Part 7. Reporting and the Secondary Market

Preview Part 7	121
Appraisal Standards and Reporting.....	123
Residential Appraisal Reporting.....	123
7.1 Discussion Question. For Residential Appraisers	124
Commercial Appraisal Reporting.....	125
7.2 Discussion Question. For Commercial Appraisers.....	126
Review Part 7.....	127

Part 8. Highest and Best Use Implications

Preview Part 8.....	129
Highest and Best Use (HBU) and Green Building.....	131
New Construction and Retrofitting.....	131
Useful Life and Obsolescence	132
8.1 Discussion Questions. Obsolescence	133
Review Part 8.....	135

Part 9. The Three Approaches to Value

Preview Part 9.....	137
Cost Approach	139
Sales Comparison Approach	140
Income Capitalization Approach.....	141
9.1 Discussion Questions. Residential and Commercial	143
Contribution and Reconciliation	145
Professional Opportunities for Appraisers.....	146
Conclusion.....	147
Review Part 9.....	149
9.2 Review Quiz Sections 1–2	151
Examination Reminders	153
Preparing for the Exam	153
Guidance on Taking the Final Exam.....	153
Test-Taking Strategies.....	154

APPENDIX

- AI Residential Green and Energy Efficient Addendum
- AI Commercial Green and Energy Efficient Addendum

SOLUTIONS

Overview

Course Description

Welcome to *Introduction to Green Buildings: Principles & Concepts*. This course is intended to give real property appraisers a firm foundation in green building principles and methods for this emerging building type. Green building concepts apply to commercial and residential property types.

According to Dodge Data & Analytics Smart Market Brief 2020¹:

- One-third or more of one-unit builders (33%) and multiunit builders/remodelers (35%) report doing 50% or more of their projects green.
- 42% of one-unit builders and 31% of multiunit builders/remodelers report doing no green building at all by the definition above.

The two facts above show that while there is some green construction in the new residential market, there is also still a notable opportunity to increase future engagement. Only 17% of one-unit remodelers do more than half of their projects green, and 50% of remodelers did not do any green projects in 2018. This low engagement may be in part due to the restrictions of the definition, which may require green activities beyond the scope of some renovation projects.

Top 10 States for LEED Green Building in 2019 ²		
Ranking	State	Gross Sq. Ft. per Capita, Certified
1	Colorado	4.76
2	Illinois	3.85
3	New York	3.76
4	Massachusetts	3.74
5	Hawaii	3.00
6	Maryland	2.64
7	Virginia	2.50
8	Minnesota	2.40
9	Oregon	2.30
10	California	2.17

If Washington, DC were a state, it would lead with 52.86 gross square feet per capita, certified.

1. <https://www.nahb.org/news-and-economics/industry-news/press-releases/2020/01/High-Performance-Building-Practices-Prevalent-in-the-Residential-Home-Building-Market/>
2. www.pyramidhomes.com/top-10-states-for-leed-green-building-in-2019/

As a result of growth in the industry, appraisers are being asked more often to appraise green buildings. But what is significant about these buildings, and how do they differ from conventional buildings? The answers to these questions form the basis of this course.

The class begins with a discussion of the principles of green building, which are covered in detail before moving into the particular construction methods and materials used in them. This course structure ensures that appraisers will be able to understand the underlying green building concepts as well as the construction methods and materials they may encounter in the field.

Next, the course provides an overview of green building certification programs and introduces the subject of reporting appraisals of green buildings. It then examines how the principles of green building apply to highest and best use analysis. The final portions of the course address the three approaches to value in the context of the principles and elements of green building. At the end of the course, participants should have a firm understanding of the elements of green buildings as well as how they differ from conventional buildings and should be able to identify the principal certification programs.

The field of green building is vast, and it is impossible to cover all of it in any one course. For this reason, the end of the course is the jumping off point for further coursework in residential and general (commercial) appraisal methods.

Note. *Introduction to Green Buildings: Principles & Concepts* is approved by GBCI for 7.5 CE hours.

Professional Development Program

This course is one of four courses that make up the Appraisal Institute's Valuation of Sustainable Buildings Professional Development Program. The other courses include *Case Studies in Appraising Green Residential Buildings*, *Residential and Commercial Valuation of Solar*, and *Case Studies in Appraising Green Commercial Buildings*. The Valuation of Sustainable Buildings Professional Development Program has a residential path and a commercial path. For more information, please see www.appraisalinstitute.org/education/your-career/professional-development-programs

Learning Enhancements

The course has been designed with a variety of elements to enhance your learning experience.

- **Preview.** To give you a taste of what is to come, each part begins with a preview page, which includes a brief overview of the content, learning objectives to consider as you move through the content, and learning tips that will assist you in understanding the information you're about to cover.

- **Learning Objectives.** Each learning objective covers information required for understanding the concepts in the course. Look them over before the part begins so that you have a frame of reference as you move through the material. At the end of each part, reread the objectives. Are you able to do what is stated? If not, this is the time to ask your instructor for help or review the concepts that you do not understand.
- **Examples & Discussion Questions.** To supplement the discussions, we've included examples and discussion questions to help you apply what you are learning.
- **Fill-in-the-Blanks.** When you write something down, you are more apt to remember it. The course handbook includes discussion questions that ask you to write down your responses before proceeding to an open discussion with others in the class.
- **Discussion.** This course provides opportunities to learn through discussion with other professionals. Green building is an emerging field, and we are not all at the same level of understanding, so please take this opportunity to engage with your peers in order to get the most out of the course.
- **Review.** Each part concludes with a review, which includes the learning objectives and key terms and concepts that have been covered.
- **Review Quizzes.** Quizzes are included at key points in the course. The multiple-choice questions are similar to the types of questions you might find on the exam. Answering the fill-in-the-blank and multiple-choice questions will help you assess whether or not you really know the information that was covered.
- **Green Resources.** Tap a variety of online green resources from our website at www.appraisalinstitute.org/education/education-resources/green-building-resources and click on *More Green Resources* under Downloads.

Topics are expanded regularly and include legislation, national and state government sites and programs, databases, design, and solar energy. This free benefit is available only to class participants: Appraisal Institute Designated members, Candidates for Designation, Practicing Affiliates, and Affiliates receive indefinite access; all other class participants are granted two-year admittance.

A Green Building Registry exists but has limited data in many markets. It is still worth visiting at <https://us.greenbuildingregistry.com/> to research certified homes in your market area.

Classroom Guidelines

To make the course a positive experience for everyone attending, we have some guidelines for your consideration:

- 100% attendance is required. No exceptions.
- Limit use of computers and wireless devices to classroom projects.

- Communicate with business associates during break time instead of class time.
- Put away reading materials such as newspapers and books that are not used in class.
- Please silence cell phones and other communication devices.
- Please do not record the lectures. Recordings are not permitted.
- Refrain from ongoing conversations with those seated near you and other distracting behavior.

General Information

- **Calculators.** A calculator is not required for the course or the exam. **Important note.** Cellular phones, tablets, iPads, and other devices that can store data or connect to the Internet are **NOT** permitted during the exam. In addition, all watches, wallets, bags, and purses must be removed and stored out of reach prior to taking the exam.
- **Breaks.** There will be two 10-minute breaks during each half-day session unless noted otherwise by the course sponsor. The lunch break is one hour.
- **Attendance sheets** will be distributed during each half-day session to verify your attendance during all sessions.
- **Certificates of completion** may be downloaded after completion of the course, and attendance during the entire course is required.

Recommended Texts

- *The Appraisal of Real Estate*, 15th ed. Chicago: Appraisal Institute, 2020.
- *The Dictionary of Real Estate Appraisal*, 7th ed. Chicago: Appraisal Institute, 2022.
- *Residential Property Appraisal*. Chicago: Appraisal Institute, 2020.
- The Appraiser’s Guide to Identifying Green Features in Homes—available for free download. Google the title or go to: www.kathyprice.typepad.com/greenguide/
- Simmons, Alan F., SRPA, LEED® AP, *An Introduction to Green Homes*. Chicago: Appraisal Institute, 2010.
- Adomatis, Sandra K., SRA, LEED® Green Associate, *Residential Green Valuation Tools*. Chicago: Appraisal Institute, 2014.
- Runde, Timothy P., MAI, LEED® AP, and Thoyre, Stacey L., WELL AP, *The Valuation of Green Commercial Real Estate*. Chicago: Appraisal Institute, 2017.

USPAP References in This Course

All references to the Uniform Standards of Professional Appraisal Practice (USPAP) are taken from the 2020–2021 edition, effective until December 31, 2023. (Washington, D.C.: The Appraisal Foundation).