

## Research Guide to Sustainable Design

Sustainable design is an increasingly important consideration in real estate development, construction, and sales; both in the residential and commercial spheres. This guide will assist you in learning the key considerations of sustainable design--from site selection, to design, material, energy and water sourcing, regulatory and zoning analysis, and more. This guide is intended for use by students in REALTOR® University's Master of Real Estate class "LEED Design, Construction, and Sustainability." The tabs correspond with papers and assignments in that course. The resources derive from an assortment of government, academic, non-profit, for-profit, and non-governmental organizations. It is up to you to determine a resource's bias, veracity, authenticity, and date currency.

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."  
~from "Our Common Future," 1983.

View the full Our Common Future report [here](#).

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## Precedent-Setting Documents

Included below are precedent-setting documents in the development of sustainable design and lifestyle.

- [Declaration of Interdependence for a Sustainable Future](#)  
International Union of Architects (UIA), American Institute of Architects (AIA), World Congress of Architects, 1993
- [On Common Ground](#)  
The National Association of REALTORS® semi-annual magazine covering smart growth topics.
- [The Greening of the White House](#)  
A project in 1993 to renovate the White House and surrounding buildings resulting in significant energy savings and emissions reductions.

## Researching Your Air, Water, and Soil

The sources below assist with researching your local air, water and soil quality. The U.S. Environmental Protection Agency, at the federal and state level, is an excellent resource for this type of information. Additionally, your municipal, county, and state government websites frequently provide environmental reports and often conduct environmental studies.

- [U.S. Environmental Protection Agency \(EPA\)](#)  
Website of the U.S. Environmental Protection Agency
- [State and Territorial Environmental Agencies](#)  
The U.S. EPA provides a list of health and environmental agencies of U.S. states and territories.
- [Water Quality and Monitoring](#)  
The U.S. EPA provides numerous tools for learning about the drinking water in your area.
- [Air Quality and Monitoring](#)  
The U.S. EPA provides numerous tools for learning about the air quality in your area.
- [Where You Live: Brownfields Database](#)  
The U.S. EPA provides resources for identifying and reporting brownfields in your area.
- [Abandoned Mine Lands Database](#)  
The U.S. Dept. of the Interior provides a database of abandoned mines across the United States.
- [Fish Advisories Database](#)  
The U.S. EPA provides fish advisories to ensure safety of those fishing in the United States.
- [Thirst Short Film](#)  
PBS offers a short film titled "Thirst" that offers insight into the politics of water.

## Energy Rating System Analysis

In the United States there are currently three major energy rating systems, which are LEED, Energy Star, and HERS. Each system exhibits strengths and weaknesses. Learn more about each system below. Articles marked with an **E** [require a password](#).

- [LEED Certification](#)  
The U.S. Green Building Council offers an interactive tool for learning about LEED certification.
- [HERS Index](#)  
The Residential Energy Services Network offers resources on the Home Energy Rating System (HERS).
- [Energy Star](#)  
Learn more about the Energy Star rating system, a joint effort of the U.S. Department of Energy and the U.S. Environmental Protection Agency.
- Feist, T. (2019). [Frameworks for Simplifying Sustainability: Easily incorporate green initiatives with a few helpful tips and resources](#). *Journal of Property Management*, 84(3), 32–33. **E**
- Simons, R., Robinson, S., & Lee, E. (2019). [A market-driven green office building index](#). *Journal of Real Estate Portfolio Management*, 25(1), 77–98. **E**
- Sinha, S. (2019). [Enterprise management takes smart buildings to the next level](#). *Industrial Management*, 61(4), 24–27. **E**
- [EnergyStar Tools & Resources Library](#)

### Research on Your Own

To search for the most recent articles on this topic, login to RU's [EBSCO](#) account\* and enter subject terms such as:

- Find articles tagged with the subject "energy efficiency" and the subject "energy consumption" that contain the text *rating* within five words of *system*:

DE "ENERGY consumption" [explode] AND "rating system\*\*"

- Find articles tagged with the subject "energy efficiency" that contain the text *energy rating* within five words of *system*:

DE "ENERGY consumption" [explode] AND "energy rating\*\*"

\*EBSCO is a database subscription accessible only to REALTORS® and students in REALTOR® University's Master of Real Estate program ([password required](#)).

## Carbon Footprints

### Tools

Use the tools below to assess your carbon footprint and identify ways to reduce your consumption.

- [Ecological Footprint Calculator](#), Global Footprint Network
- [Ecological Footprint Quiz](#), Center for Sustainable Economy
- [Walk Score](#)  
A tool to ascertain the walk-ability of your neighborhood.
- [Water Footprint Calculator](#), Water Footprint Network
- [Ecological Footprint Quiz](#), Earth Day Network
- [Sustainable Living Resources](#)  
The U.S. EPA provides numerous tools and resources to assist you in your sustainable living journey.
- [Carbon Footprint Calculator](#)  
PG&E offers a calculator to assess your carbon footprint.
- [EcoConsumer Waster Calculator](#)  
King County, WA provides numerous waste calculators to determine your average consumption and identify ways to conserve.

### Data & Statistics

- [Climate Exchange Market Data](#), Chicago Climate Exchange
- [Emissions Trading System](#), European Union
- [Residential Energy Consumption Survey Data](#)  
The household characteristics section, find statistics on energy consumption from appliances, TVs, computers, heating, etc. in the home, and much more.
- [State of the Air](#)  
The American Lung Association's State of the Air data provides details about air quality across the United States. This tool is also available as a smartphone app.

### In the NAR Library

Below are a few popular items in our library catalog on this topic. To search for more items on this topic, visit our [Library Catalog](#) website.

- Dondero, J. (2017). [The Energy Wise Workplace : Practical and Cost-Effective Ideas for a Sustainable And Green Workplace.](#)
- Holladay, M. (2017). [Musings of an Energy Nerd : Toward an Energy-Efficient Home.](#)
- Duffy, A., Rogers, M., & Ayompe, L. (2015). [Renewable Energy and Energy Efficiency.](#)
- Bridgewater, A. & Bridgewater, G. (2009). [Renewable Energy for Your Home.](#)
- Fosket, J. & U Mamo, L. (2009). [Living Green.](#)
- DeGunther, R. (2008). [Energy Efficient Homes for Dummies.](#)
- Goldsmith, E.B. & Sheldon, B. (2008). [Green Cleaning for Dummies.](#)

## Identifying Eco-Consumers

Use the resources below to identify the various eco-consumer personas.

- [Green Consumer Behavior and Types](#)  
In this article, green consumer and green consumer types are investigated. In addition, information was given about the green marketing process (Oct. 14, 2018).
- [Identifying Eco-Consumer Demand](#)  
The University of Vermont Online provides brief articles with tips for identifying eco-consumer demand.
- [5 Types of Customers](#)  
This About.com Small Business Canada article identifies key types of consumers that can also translate into types of eco-consumer.

### Research on Your Own

To search for the most recent articles on this topic, login to RU's [EBSCO](#) account\* and enter subject terms such as:

- Find articles where either the word *green* or the word *eco* is within two words of consumer:  
  
(green OR eco) W2 consumer\*
- Find articles containing either the word *green* or the word *eco* where one of those words is within ten words of consumer, which is within five words of type:  
  
(green OR eco) W10 (consumer\* W5 type\*)

\*EBSCO is a database subscription accessible only to REALTORS® and students in REALTOR® University's Master of Real Estate program ([password required](#)).

### Journals

Below are journals on this topic that you can search or browse within in the EBSCO database.

- [BioCycle](#) **E**
- [Business Strategy and the Environment](#) **E**
- [Corporate Social - Responsibility and Environmental Management](#) **E**
- [Environmental Economics & Policy Studies](#) **E**
- [Environmental Quality Management](#) **E**
- [Journal of Environmental Sciences](#) **E**
- [Environmental Policy & Governance](#) **E**
- [Environmental Quality Management](#) **E**
- [Land Economics](#) **E**
- [Sustainable Development](#) **E**

## LEED Certification

### LEED Tools

- [A Citizen's Guide to LEED for Neighborhood Development: How to Tell if Development is Smart and Green](#)  
A report by the National Resources Defense Council, an environment action group.
- [University of Maryland School of Architecture, Planning, & Preservation Research Portal](#)  
National Center for Smart Growth Research & Education
- [Real Property Sustainable Development Guide](#)  
U.S. Government Services Administration
- [Rio Declaration on Environment and Development](#)  
From the United Nations Conference on Environment and Development in 1992.
- [Smart Growth Reports](#)  
Urban Land Institute
- [Sustainable Development Reports](#)  
Urban Land Institute
- [The Brundtland Report](#)  
Seminal work in the field of sustainable development and green building, this report is also known as "Our Common Future," published in 1987.
- [Report of the World Commission on Environment and Development: Our Common Future](#)  
United Nations, 2007
- [State of Green Business Report](#)  
GreenBiz.com offers an annual "State of Green Business" report.

### Life-Cycle Cost Analysis (LCCA)

Since green building, design, and lifestyle often sees higher up-front costs, selling the idea of green can sometimes prove a challenge. A Life-Cycle Cost Analysis (LCCA) can help your clients see the long-term value of this type of building. The resources below offer some examples and ideas as to how to conduct and present a LCCA.

- [Life-Cycle Cost Analysis \(LCCA\)](#)  
The National Institute of Building Sciences' Whole Building Design Guide
- [Life-Cycle Cost Analysis for buildings is easier than you think](#)  
Tools from the U.S. Forest Service
- [Life-Cycle Cost Analysis](#)  
Tools from U.S. Dept. of Transportation's Federal Highway Administration

## Databases

- [Energy Star Partner Locator](#)  
The U.S. Department of Energy offers this Energy Star Partner Locator to identify companies offering energy efficient mortgages.
- [FSC Certificate Database](#)  
The Forest Stewardship Council provides a list of certified wood providers and products to ensure you are not destroying old growth forests when sourcing materials for your project.
- [LEED Registered Project Directory](#)  
Database for registered LEED projects--search by project name, city, state, certification type, and organization.




## eBooks

Below are a few popular eBooks in our library on this topic. To search for more eBooks on this topic, visit our [eBooks website](#).


- McDonald, R. (2015). [Conservation for Cities](#).
- Bergman, D. (2013). [Sustainable Design](#).
- Melaver, M. & Mueller, P. (2009). [The Green Building Bottom Line](#).
- Yudelson, J. (2009). [Green Building Through Integrated Design](#).
- Moskow, K. (2008). [Sustainable Facilities](#).
- Yudelson, J. (2007). [Green Building A to Z](#).

## Standards & Best Practices





### Ethics & Standards

- [BREEAM Building Research Establishment Environmental Assessment Method](#)  
Operated by U.K.-based BRE Trust, BREEAM establishes energy and resource efficiency standards for sustainable building design, construction, and operation.
- [Components of Green Building](#)   
U.S. Environmental Protection Agency
- [Construction Criteria Base](#)  
Use the National Institute of Building Sciences' Construction Criteria Base to find up-to-date U.S. construction criteria--including guides, specifications, manuals, and standards from government agencies.
- [Energy Savings Performance Contracts](#)   
Use the U.S. Department of Energy's Energy Savings Performance Contracts when working with U.S. federal agency projects.
- [Energy Star Rating System](#)   
The U.S. Department of Energy's energy rating program.

## Library



- [Green Globes](#)  
Operated by the ECD Energy and Environment Canada, the Green Globes offer energy and resource efficiency standards for commercial interior design. The ECD is owned by Jones Lang LaSalle.
- [LEED Certification](#)  
U.S. Green Building Council, the accrediting organization for LEED certification; LEED stands for "Leadership in Energy and Environmental Design."
- [LEED-ND for Neighborhood Development](#)  
LEED-ND provides communities with a set of standards by which to develop an "environmentally superior neighborhood."
- [RESNET Rating System](#)   
The Residential Energy Services Network offers the Homes Energy Rating System (HERS) to help residential real estate evaluate energy performance.
- [Whole Building Design Guide](#)  
A program of the National Institute of Building Sciences.

## Best Practices

- [Environmentally Preferable Products](#)   
U.S. Environmental Protection Agency's list of preferred products and services for government agencies.
- [Evaluating and Selecting Green Products](#)  
The National Institute of Building Sciences provides guidance on sourcing green products for your building project.
- [Facility Performance Evaluation](#)  
Using the National Institute of Building Sciences' facility performance evaluation guidelines will help to analyze and identify areas in need of efficiency improvement and much more.
- [Find Endangered Species](#)   
The U.S. Fish and Wildlife Service provides a searchable database of national endangered species. Use this database when selecting a building site to determine if accommodations need to be made to protect a species. Also consult with your state government, should they have identified additional endangered species by statute.
- [Home Energy Information Guide](#)  
This guide helps real estate professionals and Multiple Listing Services make the value of efficiency investments visible to homeowners and buyers, even if the projects themselves are neatly hidden.
- [Greening the Government Through Efficient Energy Management](#)   
This seminal executive order (#13123), signed in 1999 by President Clinton, set a new standard for federal building architecture and design.
- [Habitat Conservation Plan](#)   
Detailed in the Endangered Species Act, a habitat conservation plan enables ecosystem preservation and recovery.  
U.S. Fish and Wildlife Service
- [Life-Cycle Cost Analysis](#)  
The National Institute of Building Sciences provides excellent background on conducting a life-cycle cost analysis for a building project.



## Library

- [National Register of Historic Places](#)   
When selecting a building site, consult with the National Parks Service's National Register of Historic Places.
- [National Wetlands Inventory List & Map](#)   
When selecting a building site, be sure to consult the U.S. Fish and Wildlife Service's National Wetlands Inventory list and map to identify endangered flora, fauna, and wetlands.

## People, Companies & More

### Companies & People

- [Center for Sustainable Economy](#)
- [Croxtton Collaborative](#)  
Another early pioneer of green building, Croxtton's early projects include the Natural Resources Defense Council's New York office in the late 1980s and the Audobon Society's Audobon House in New York in the early 1990s.
- [William McDonough](#)  
One of the pioneers of green building, his early work includes designing the Environmental Defense Fund's New York office in the 1980s.

### Websites

- [Conservation Reserve Program](#)  
Run by the U.S. Department of Agriculture, this unique program allows private agricultural land owners to receive rental payments in return for resource-conservation efforts.
- [Green Building Initiative](#)  
A consultant and service provider for green building certification.
- [Midwestern Regional Greenhouse Gas Reduction Accord](#)
- [Regional Greenhouse Gas Initiative](#)
- [Western Climate Initiative](#)

### Associations, Institutes, Councils, & Societies

- [Committee on the Environment](#)  
American Institute of Architects
- [Cool Cities Initiative](#)  
The Sierra Club launched the Cool Cities Initiative in 2005 with goals and targets for environmental stewardship.
- [Division for Sustainable Development](#)  
United Nations Dept. of Economic and Social Affairs
- [Forest Stewardship Council](#)
- [National Center for Smart Growth Research & Education](#)
- [National Institute of Building Sciences](#)
- [Natural Resources Defense Council](#)

## Library

- [Nature Conservancy](#)  
Non-profit environmental conservation organization working to "protect ecologically important lands and waters for nature and people."
- [The 2030 Challenge](#)  
A non-profit organization, Architecture 2030 mission is "to rapidly transform the U.S. and global Building Sector from the major contributor of greenhouse gas emissions to a central part of the solution to the climate change, energy consumption, and economic crises."
- [Trust for Public Land](#)  
Non-profit land conservation group that works to preserve parks, historic lands, and much more.
- [U.S. Conference of Mayors Climate Protection Agreement](#)  
In 2005 over 900 U.S. mayors signed on to the Mayors Climate Protection Agreement to meet rigorous environmental standards and goals.
- [U.S. Green Building Council](#)
- [Urban Land Institute](#)
- [World Business Council for Sustainable Design](#)
- [World Green Building Council](#)

**Government Agencies**

It is important to understand all the federal, state, and local government agencies that regulate the environment, and thus real estate development. Working in partnership with these agencies not only guarantees the success of your project, but also protects our limited resources. Below are the key federal government agencies that involve regulations of resources and real estate. Also check with your state and local governments for additional legal and regulatory requirements.

- [National Parks Service](#), U.S. Department of the Interior
- [National Renewable Energy Laboratory](#), U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy
- [U.S. Army Corps of Engineers](#)
- [U.S. Dept. of Energy](#)
- [U.S. Environmental Protection Agency](#)
- [U.S. Federal Energy Regulatory Commission](#)
- [U.S. Fish & Wildlife Service](#)
- [U.S. Forest Service](#)