THE APPRAISAL FOUNDATION
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APPRAISAL PRACTICES BOARD

TO: All Interested Parties

FROM: Rick O. Baumgardner, Chair
Appraisal Practices Board

RE: **First Exposure Draft – *Valuation of Green Buildings: Background and Core Competency***

DATE: July 15, 2013

The Appraisal Practices Board (APB) was officially formed by The Appraisal Foundation Board of Trustees on July 1, 2010. The APB has been charged with the responsibility of identifying and issuing voluntary guidance on recognized valuation methods and techniques, which may apply to all disciplines within the appraisal profession. The APB has prioritized topics to offer guidance in areas which appraisers and users of appraisal services feel are the most pressing.

The Board accomplishes its mission through the use of panels of Subject Matter Experts (SMEs), comprised of widely recognized individuals with expertise in the specific topic being considered, who research and identify all pertinent sources of existing information on the given topic. The APB then vets the issue through this public exposure process, with the goal of ultimately adopting guidance, which may include more than one recognized method or technique that addresses the specific topic.

From the APB's perspective, compliance with all guidance issued by the Board is voluntary. However, it is possible that state or federal government agencies, clients and/or user groups of appraisal services, professional appraisal societies, or others may opt on their own volition to mandate compliance with the guidance issued by the APB.

This is the First Exposure Draft representing guidance applicable to the *Valuation of Green Buildings: Background and Core Competency*. The Board is seeking public comment in response to this exposure draft and based on the comments received, may make revisions to the guidance and issue subsequent exposure drafts. Once the Board believes it has received all relevant comment on this topic, it may vote to adopt the material as official guidance from the APB.

The Board is also currently engaged in developing guidance on other topics. It is anticipated that exposure drafts will be forthcoming in the very near future that relate to these other topics. In

addition, subsequent exposure drafts may include multiple topics for consideration simultaneously.

All interested parties are encouraged to comment in writing to the APB before the deadline of September 20, 2013. Respondents should be assured that each member of the APB will thoroughly read and consider all comments.

Written comments on this exposure draft can be submitted by mail, email and facsimile.

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The Appraisal Foundation
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Washington, DC 20005

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IMPORTANT NOTE: All written comments will be posted for public viewing, exactly as submitted, on the website of The Appraisal Foundation. Names may be redacted upon request.

The Appraisal Foundation reserves the right not to post written comments that contain offensive or inappropriate statements.

If you have any questions regarding the attached exposure draft, please contact Staci Steward, Practices Administrator at The Appraisal Foundation, via e-mail at staci@appraisalfoundation.org or by calling (202) 624-3052.

First Exposure Draft
Valuation of Green Buildings: Background and Core Competency

Issued: July 15, 2013
Comment Deadline: September 20, 2013

When commenting on various aspects of this exposure draft, it is very helpful to reference the line numbers, fully explain the reasons for concern or support, provide examples or illustrations, and suggest any alternatives or additional issues that the APB should consider.

Appraisal Practices Board

Voluntary Guidance on Recognized Valuation Methods and Techniques:

Valuation of Green Buildings: Background and Core Competency

This communication is for the purpose of issuing guidance on recognized valuation methods and techniques. Compliance with such guidance is voluntary, unless mandated through applicable law, regulation, or policy.

Date Issued: To Be Determined

Application: Residential and Non-residential Real Property

Issue: As part of its ongoing responsibilities, the Appraisal Practices Board (APB) is tasked with identifying where appraisers and appraisal users believe additional guidance is required. Once such issue identified by the APB is *Valuation of Green Buildings – Background and Core Competency*. The APB established a Subject Matter Expert Panel on Green Building Background and Core Competency for appraisers to address the rapidly evolving influence of green and sustainable building practices in the property valuation profession.

The purpose of this document is to provide guidance to appraisers concerning the necessary background and core competency that is needed to value green, high-performance or sustainable commercial and residential buildings (henceforth referred to as green buildings) as well as existing building stock that is not green (henceforth referred to as brown buildings) yet may have green features or exist in a (local) market that values sustainability and/or green building. This Valuation Advisory is the first in a series of three to be issued by the APB on green buildings. The APB intends to issue additional advisories on the *Valuation of Green Buildings: Residential Properties* and the *Valuation of Green Buildings: Non-Residential Properties*.

In that context, this advisory is to provide guidance as to the background and core competency issues from which the next two advisories will build upon.

Valuation of Green Buildings: Background and Core Competency

Table of Contents

Executive Summary

As green building and sustainable building practices continue to re-shape the construction and operation of commercial and residential real estate, appraisers in all markets and of all skill and experience levels are increasingly likely to encounter valuation assignments dealing with these issues. The purpose of this Advisory is to provide the appraiser with pertinent background and core competency needed to more fully understand the skills and knowledge needed to adapt to changes in the marketplace, including the evolution of green and sustainable building practices in the commercial and residential property sector. The next set of Advisories will specifically address the *Valuation of Green Buildings-Residential* and *Valuation of Green Buildings-Commercial*.

Timely response by appraisers to changing market fundamentals is one of the most basic expectations of users of appraisal services. Appraiser competency in the valuation of green buildings is necessary to meet the expectations of the users of appraisal services and to ensure public trust. The Uniform Standards of Professional Appraisal Practice (USPAP) requires an appraiser to: (1) be competent to perform the assignment; (2) acquire the necessary competency to perform the assignment; or (3) decline or withdraw from the assignment.[1]

Green/Energy Efficiency Education

- Because of the growth in the green building industry in many markets, appraisers are advised to familiarize themselves with at least the most common features in property types they appraise. In such cases, appraisers should expand their knowledge base and skill set to include familiarity with green building, sustainability, and energy efficiency. The specific educational path will vary depending on the appraiser's prior experience and expertise in this area, as well as the market expectations and client requirements.
- In order to keep up with this rapidly-changing field and changes in the market, appraisers should endeavor to incorporate green building and energy efficiency into their education regimen. Paths to competency include, but are not limited to, coursework and self-study, as well as attendance at professional seminars and presentations (live and online), offered both by appraisal organizations, as well as organizations like the U.S. Green Building Council (USGBC) and others that specialize in green building and energy efficiency.
- Suggested guidelines for competency thresholds can be found in Section Two of this document under the heading *Expectations for Appraisers/r Core Competency.*

Ensure Appropriate Scope of Work Parameters:

- Under USPAP an appraiser must properly identify the assignment elements in order to determine an appropriate scope of work. This could include identifying relevant property characteristics such as the following features: energy efficiency, green, sustainable, high-performance, and on-site energy generation.

[End of **Executive Summary]**

[1] Uniform Standards of Professional Appraisal Practice (USPAP) – 2012-2013 edition, (Washington, D.C.: The Appraisal Foundation, 2012), U-11.

Section I: Background

Green building awareness, knowledge and expertise is quickly becoming an area where appraisers may need a higher level of sensitivity to their impact on the market. In some markets, what was once an esoteric niche is becoming engrained in mainstream building practices, building codes, and market behaviors. As market participants increasingly express green and sustainable practices and expectations in their buy/lease decisions, appraisers should consider the perspective of the relevant market participants, in markets where such change impacts value. This Valuation Advisory is intended to provide guidance to appraisers and users of valuation services seeking to determine the necessary knowledge and skills required to competently value green buildings and existing building stock affected by green building.

The growing market adoption of sustainability principles and the changing regulatory environment are creating a new normal against which buildings are to be judged in some markets. Building performance and obsolescence potential are emerging as concerns. Performance is now being measured across a variety of metrics that include resource use efficiency (energy and materials), water use, indoor environmental quality (air quality, daylight), worker productivity, and proximity to transit, community services and housing. Class A office in certain urban area may require LEED certification. New home buyers can choose among multiple homes with ENERGY STAR or various green labels in a growing number of areas across the U.S.

This evolution in some real estate markets may present new challenges that appraisers must research and analyze as part of their assignment, such as:

1. ***Market share of green buildings***: Landlord response to tenant demand, in addition to code requirements, and how it impact new construction and major renovations to incorporate green features and pursue green certifications in the commercial sector.

2. ***Green building codes and mandates for green space***: With more and more municipalities instituting or expanding green building codes, and entities such as the GSA requiring that their buildings conform to green standards, competent valuation requires an understanding of new building technologies and value implications of the new building code standards. These new standards affect not only new buildings and retrofits but also brown buildings that do not comply with current building codes.

3. ***Prevalence of brown buildings upgrading with green features such as energy-efficient HVAC systems, solar photovoltaic systems, or water-efficient fixtures:*** These types of upgrades, even in conventional buildings, could yield value impacts. Appraisers doing this type work must identify and value such features with market-supported adjustments.

4. ***Potential for obsolescence, also known as the brown discount, for existing buildings that don't "green up":*** *Just as green buildings that outperform the market may sho*w a value premium, brown buildings that underperform relative to their market may show a discount.

Section II: Core Competency

The transition toward green buildings, green building codes and technologies, and the growing awareness of the relevance of sustainability to the marketplace discussed in the previous section can be viewed as part of the natural evolution of the real estate industry as it adapts to environmental, societal, and economic changes. Just as the building sector evolves, so too, must the skill set of the appraiser in order to accurately see the property through the eyes of the market, and thus render a competent valuation, based on market-supported conclusions.

Key Terms and Concepts

This list of key terms and concepts is meant to be representative of the minimum knowledge base required of appraisers to meet baseline competency requirements, and is not intended to be exhaustive.

- Sustainability
- Green Building
- Integration
- Green Building and Energy-Efficiency Rating Systems
- Energy Modeling and Auditing
- Policy Initiatives and Regulations
- Financing Incentives

Sustainability

Sustainability is a very broad concept that lacks a single definition. It is most often defined with reference to the 1987 United Nations Brundtland Commission Report which defines sustainability as economic development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs.

When considering the application of this concept to a business setting, Elkington's "triple bottom line" (TBL) is commonly cited, which states that one must balance the economic, social and environmental objectives across current and future generations.[2] The TBL concept is also sometimes framed as "People, Planet, Profit."

While neither of these definitions speak specifically to the built environment, the RICS Global Property Sustainability Survey strongly echoes the TBL concept by ''...equat[ing] sustainability with the goal of balancing economic, environmental and social objectives at global, national and local levels in order to meet the needs of today without compromising the ability of future generations to meet their needs.''[3]

As RREEF's Sustainability Report notes, a definition that pertains to achieving sustainability within the built environment is still evolving, but that, "Today, the focus is on operating

[2] Elkington, J, *Cannibals with Forks: The Triple Bottom Line of 21st Century Business* (Stony Creek, CT: New Society Publishers, 1998), 20.

[3] Royal Institution of Chartered Surveyors (RICS) Global Property Sustainability Survey (Q4 2009).

efficiency and risk mitigation with a growing emphasis on the environmental impact of buildings."[4]

Relevance to Appraisers

Sustainability's influence on real estate purchase and lease decisions is clear and growing as evidenced by a recent survey by CoreNet Global/JLL survey indicating that 92% of real estate executives consider sustainability criteria in their location decisions.[5] Most notably, sustainability has been the driving force behind green building and, as will be discussed further in a subsequent section, the key aspects of the major green building rating systems derive from the principles of sustainability.

In addition, the concept of sustainability presents a set of risks to the market value of real estate. These risks can be categorized as follows:[6]

- Resource Use: Operational and Construction/Renovation
- Obsolescence
- Transparency & Stakeholder Influence
- Externalities

The exhibit below illustrates examples of each of the above risks and the potential for impacts to market value.

[4] RREEF Real Estate 2012 Sustainability Report (2012).
[5] CoreNet Global and Jones Lang LaSalle, "Perspectives on Sustainability: Results of the 2010 CoreNet Global and Jones Lang Lasalle Global Survey on Corporate Real Estate and Sustainability," Jones Lang LaSalle (March 2011).
[6] Runde, T.P. and S. Thoyre, "Integrating Sustainability and Green Building into the Appraisal Process," Journal of Sustainable Real Estate (2010, 2): 221–48.

RISK CATEGORY	EXAMPLES OF SUSTAINABILITY RISKS	POTENTIAL PROPERTY VALUE IMPACTS	
		Direct	Indirect
RESOURCE USE	▪ ↑ global demand for materials vs. fixed supply ▪ ↑ energy cost, volatility; ↑ water cost, rationing	▪ ↑ replacement cost; ↑ TI & future renovation costs ▪ ↑ operating expenses, ↓ NOI; Energy efficiency becomes paramount	▪ ↑ replacement cost may ↑ market barriers to entry; Renovate preferred over new construction; Life cycle costing
OBSOLESCENCE	▪ Consumption rate ↓, or patterns shift ▪ ↑ need for properties to adapt to future uses and users (not yet identified) ▪ Increased rate of change expected in future	▪ ↓ demand for retail; change in type/location ▪ ↑ rate of depreciation; ↑ TI, cap ex cost for less adaptable properties	▪ ↓ economic growth due to ripple effect of consumer (70% GDP) ▪ ↑ risk for special-purpose improvements
TRANSPARENCY & STAKEHOLDER INFLUENCE	▪ ↑disclosure of energy efficiency ▪ Non-financial stakeholders influence investor decisions	▪ GRI reporting that triggers green-up of REIT portfolio; carbon reporting	▪ Stigma for poor performers ▪ Supply chain reporting requirements
EXTERNALITIES	▪ Greenhouse gas (GHG) and climate change legislation ▪ Community charges back project externalities ▪ Poor indoor air quality	▪ Carbon taxes, cap & trade; Project GHG emissions used as reason not to allow development ▪ Impact fees; assessments ▪ Health risk liability	▪ Stigma: ↓ marketability

Source: Runde, T.P. and S. Thoyre. Integrating Sustainability and Green Building into the Appraisal Process. *Journal of Sustainable Real Estate*, 2010, 2.

As a means of achieving a level of core competency, an appraiser should understand the concept of sustainability as it relates to real estate, and should also be able to both determine the degree to which the local market has incorporated sustainability principles into the buy/lease decision-making matrix, and objectively determine the degree to which the subject is affected by sustainability-related risks.

Green Building

The term, green building, can be used to mean both a noun (a structure with sustainability-related features) and a verb (constructing or remodeling a structure with sustainability-related features).

There are wide-ranging definitions for the term and to date, no single agreed-upon definition. The Green Act, introduced by the U.S. House of Representative as HR 2336 in 2010, defined "…green building standards [to mean] standards to require use of sustainable design principles to reduce the use of nonrenewable resources, encourage energy-efficient construction and rehabilitation and the use of renewable energy resources, minimize the impact of development on the environment, and improve indoor air quality." This definition aligns closely with the leading green building rating systems, such as LEED and most of the major residential green labels, and

may be a useful description of the essential attributes of a green building and the goals of green building design.

An important feature of green buildings is that the essential attributes described above are based in the principles of sustainability, and therefore, encompass more than just energy-efficiency features. This distinction proves salient to the appraiser and, despite the fact that the terms "green" and "energy-efficient" are often incorrectly used as synonyms, they reflect different building attributes. In practice, a green building will have features that address more than just energy use such as water efficiency, sustainable site selection, indoor environmental quality, and material selection, use and waste disposal. A building that is said to be "energy-efficient" may not be a green building if the only distinguishing characteristic of the building is that it uses less energy than a comparable building. Likewise, one cannot assume that a green building will necessarily be more energy efficient than a conventional building.

Relevance to Appraisers

Green buildings, or brown buildings with green features, can contain special materials or equipment, can have design advantages and can be less (or more) expensive to operate. Such buildings may have unique technologies (solar panels, high-efficiency HVAC, BMS/BAS system) or qualities (siting, passive heating and cooling, a green certification) that may have additional value in the market. These features may affect the value of the property due to the initial cost as well as the potential impact on operating costs, lower risk, improved marketability or higher rental income.

As green building codes continue to proliferate, and as existing (brown) buildings incorporate green technologies, the distinction between what is a green building and what is not will likely become more difficult to pinpoint. This is not to say that a given market may not value a green label, but the overriding concern to the appraiser should be to accurate identify the specific features and attributes of a given property and properly gauge the effect on market value. By focusing too much on the potential value impacts of green building labels/certifications, appraisers may miss the value impacts of green building design concepts that have been incorporated into existing brown buildings, such as the case where a conventional building upgrades its HVAC system with energy-efficient equipment or makes water-efficiency upgrades to its plumbing systems. The upgraded property may lack a certification or label, and may not technically be considered a "green building" but the green upgrades likely have a discernible effect on market value and as such, need to be noted and appropriately valued. As with any property characteristic, knowledgeable appraisers would be expected to remain focused on the characteristics, performance and risk profile of a given property, and the degree to which the market values those characteristics, when analyzing the effect on market value.

Appraisers should also be aware that green and energy efficient are not synonymous. Energy-efficient buildings are not necessarily green. While green buildings are typically expected to be more energy efficient than their conventional counterparts, it is incumbent upon the appraiser to verify whether or not a green building is in fact more energy efficient than its peers, and appropriately consider the implications of modeled versus actual energy performance.

Integration

The concept of integration is central to green building and encompasses both a new approach to building design and construction, referred to as the integrated design process (IDP), as well as the concept of creating synergies that improve the function of a building on a variety of levels.

IDP is a departure from the conventional "Design-Bid-Build" model. IDP incorporates key stakeholders from various disciplines working collaboratively from the outset of the design process through the completion phase. Rather than thinking about a building as discrete parts, an integrated design approach encourages the view of a building as a whole system; hence, it is sometimes referred to as "whole building design" or "whole house approach" for residential buildings.

The table below, produced for the British Columbia (Canada) Green Building Roundtable, summarizes the key differences between IDP and the conventional Design-Bid-Build model.[7]

Integrated Design Process		Conventional Design Process
Inclusive from the outset	vs	Involves team members only when essential
Front-loaded — time and energy invested early	vs	Less time, energy, and collaboration exhibited in early stages
Decisions influenced by broad team	vs	More decisions made by fewer people
Iterative process	vs	Linear process
Whole-systems thinking	vs	Systems often considered in isolation
Allows for full optimization	vs	Limited to constrained optimization
Seeks synergies	vs	Diminished opportunity for synergies
Life-cycle costing	vs	Emphasis on up-front costs
Process continues through post-occupancy	vs	Typically finished when construction is complete

Source: Developed for the BC Green Building Roundtable 2007 by Busby, Perkins & Will.

By viewing the building as a system and by involving a wide range of viewpoints and skills on the design team, integrated design can achieve synergies between the building components. For example, installing water-efficient plumbing fixtures not only saves water, but saves energy because as less water is used, less energy is used to heat and move the water throughout the building. A vegetative (green) roof can both reduce storm water runoff and decrease the heat island effect of a building which can affect heating/cooling requirements of a building. In a commercial building, different window design utilizing overhang or specialty glazing can be used to take full advantage of passive solar heating while also reducing unwanted solar heat gain, and possibly reducing artificial lighting requirements. Done properly, this design element can reduce energy used for heating, cooling and lighting. Further, reduced lighting, or changing to a light source that generates less heat, can further reduce cooling needs. These elements have measurable initial (first) cost impacts, as well as ongoing operational cost impacts due to reduced energy use and maintenance.

[7] Busby, Perkins + Will, "Roadmap for the Integrated Design Process," developed for the BC (Canada) Green Building Roundtable (2007).

Relevance to Appraisers

These types of design and operational synergies may generate measurable construction and/or operating cost savings, yet may be virtually invisible, even to those familiar with sustainable building practices. Appraisers may need assistance from the design team in identifying and describing integrated design strategies and the resulting synergies. In some cases, the cost savings can be substantial. For example, in the proposed renovation of a 45,000 square foot office/flex building to net-zero status, the integration of a ground-source heat pump system with passive ventilation and BMS-controlled mechanical windows eliminated the need for $600,000 of duct work. Additional operational savings will likely accrue by eliminating the need for fans to move the air through the building for heating, cooling and ventilation. In this case, the integrated design had implications in the Cost, Sales Comparison, and Income Approaches.

Green Building and Energy-Efficiency Rating Systems

Green building rating systems are intended to both set a baseline for meeting new construction, retrofitting and operational requirements and also serve as a means of distinguishing buildings that have received certification from those that have not. Green building rating systems are distinguished from energy-efficiency scores and labels (such as ENERGY STAR or HERS) in that the latter focus solely on energy efficiency, while green building ratings systems are intended to rate a building's design and/or performance across the full spectrum of sustainability criteria (i.e., the triple bottom line).

There are several widely acknowledged green building rating standards for commercial buildings in the U.S., and a larger number for residential properties. The residential standards are more plentiful and with few exceptions, tend to be more regionally specific.

Virtually all of the sustainability-based rating systems (i.e., excluding ENERGY STAR and HERS/HERS II) award cumulative points across a range of common sustainability metrics that include five core categories:

- Energy Efficiency
- Materials and Resource
- Water Efficiency
- Indoor Environmental Quality (IEQ/IAQ)
- Site Efficiency/Community

Some green building rating systems include additional categories as well. Points are typically awarded in a cumulative fashion across all categories. Most green building rating systems incorporate energy efficiency at a minimum threshold for certification. For example, in some green building programs, the energy efficiency category may provide performance thresholds such as ENERGY STAR Benchmarking or a obtaining a minimum HERS Rating for homes.

The following discussions summarize some of the characteristics of the various standards and how these may or may not impact market value analyses and conclusions.

Commercial Green Building Rating Systems

There are numerous green building rating systems in use worldwide. The two leading rating systems used in the United States are discussed below.

LEED

The Leadership in Energy and Environmental Design (LEED) rating system is currently the most widely utilized comprehensive green building rating system in the U.S. It is a voluntary rating system that requires third-party verification for certification, which sign-off is provided by the Green Building Certification Institute (GBCI). Version 1.0 of the standard was launched by the U.S. Green Building Council (USGBC) at its Membership Summit in August of 1998. After extensive modifications, Version 2.0 was released in 2000. LEED Version 3.0 was released in 2009 and is set to be replaced by Version 4.0 in 2013. The rigor required to achieve certification increases with each version, as does the focus on energy efficiency and by extension, carbon pollution.

Certification for the standard is based on a point system and is awarded for basic LEED certification, as well as LEED Silver, LEED Gold and LEED Platinum, with each ascending level of certification requiring a higher number of points. Points can be earned in the following five core categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, plus two additional categories: Innovation and Design Process and Regional Priority Credits. LEED offers a variety of tracks for certification of various property types, including New Construction (NC), Core and Shell (CS), Healthcare, homes, and Existing Buildings Operations & Maintenance (EBOM), among others. Only the Existing Building track (EBOM) measures actual performance of the building. All the other tracks rate design, not actual performance. Each track has both common and unique credit categories, making direct comparisons between tracks difficult. Further, since each track offers alternate paths to achieve credits, and the credit totals are cumulative, properties that achieve similar points and certification levels cannot be directly compared in a meaningful way for valuation purposes.

Green Globes

Green Globes is the second most recognized comprehensive green rating system for commercial buildings in the U.S. and has gained momentum in recent years due to its adoption by several federal agencies, including Veterans Affairs and the State Department. Growth in the rating's level of adoption has been credited to the fact that Green Globes became the first green building program to achieve accreditation as a standards developer by the American National Standards Institute (ANSI).

It was originally designed as a self-certifying standard, but moved to third-party certification to enhance credibility and gain wider market acceptance. Green Globes awards cumulative points in categories including Energy, Water, Resources, Indoor Environment, Emissions, Project/Environmental Management, and Site. Green Globes offers only two tracks: New Construction and Existing Buildings.

Energy-Efficiency Rating Systems

These systems are designed to rate buildings solely on energy efficiency as opposed to green building rating systems which rate a building across multiple aspects of sustainability-related criteria. The two most well-known systems are ENERGY STAR and HERS.

ENERGY STAR is the Environmental Protection Agency's (EPA's) voluntary rating system created to promote energy efficiency and reduce greenhouse gas emissions (GHGs). Unlike LEED and Green Globes, which focus on multiple aspects of building construction and

performance, the ENERGY STAR program focuses solely on the energy performance characteristics of a property and how efficiency can be improved and maximized.

ENERGY STAR has been widely adopted across both the commercial and residential sectors in the U.S. and extends well beyond real estate into a variety of other products (residential and office equipment, heating and cooling systems and others). LEED utilizes the Energy Star rating and the portfolio manager software to award points in the Existing Building Operation and Maintenance track.

There are some important differences between ENERGY STAR for commercial properties and ENERGY STAR for homes. An ENERGY STAR score for a commercial building differs from an ENERGY STAR rating of a home. ENERGY STAR for commercial properties rates actual energy usage relative to a building's peers, adjusted for climate and occupancy use. ENERGY STAR for homes uses an energy modeling program that produces a HERS Index Rating and estimates projected energy use. ENERGY STAR for commercial properties is only available for existing buildings whereas ENERGY STAR for homes is only available for new construction.

Residential Green Building Rating Systems

The rating systems for residential development are more numerous than those for commercial properties, making consistent comparisons across systems challenging. Residential green building rating systems tend to be more geographically diverse, though there are several national programs, such as the one developed by the National Association of Homebuilders. The table below includes a number of the better known residential green building and energy-efficiency rating systems. It is intended to be illustrative rather than comprehensive.

Program	Sponsor	What it Rates	Where Prevalent
ENERGY STAR	U.S. EPA	Energy Efficiency	Nationwide
HERS / HERS II	RESNET	Energy Efficiency	Nationwide/ (CA –HERS II)
National Green Building Standard (NGBS)	NAHB	Sustainability	Nationwide
LEED- Homes	USGBC	Sustainability	Nationwide
GreenPoint Rated	BuildItGreen	Sustainability	CA (primarily)
Earth Advantage	Earth Advantage Institute	Sustainability	Portland, OR
Built Green	Master Builders Association	Sustainability	Seattle Area
Earthcraft	Greater Atlanta Builders & Southface	Sustainability	Southeast
GreenBuilt Texas	Home Builder Ass'n of Greater Dallas	Sustainability	Texas

Each program varies in its minimum category requirements, rigor, requirements for performance testing, pre-drywall inspection, third-party or self-certification, and whether the program applies to new or existing houses.

Relevance to Appraisers

Green building rating systems are designed to offer market participants an easy to understand label that purports to convey a building's sustainability attributes. In simple terms, these rating systems seek to answer the question: is this a green building or not? The appraiser should attempt to determine if the local market in fact recognizes a particular label, score, or rating in this way, and if, in fact, there may be value added by a particular label. In many cases, the green-label sensitivity of market participants may be uncertain and/or difficult to substantiate. In such cases, the various rating systems are best used as a framework to assist the appraiser in understanding how the green or energy efficient building is different from the comparables.

In most cases, appraisers will not be able to make direct comparisons between buildings that are rated or not, nor between similar buildings rated at different levels (LEED Silver versus LEED Gold, for example). Indeed, due to the cumulative nature of the point system, two buildings at the same rating level (LEED Silver, for example) may have different value-impacting characteristics from an appraisal standpoint.

Each strategy should be assessed on the basis of whether or not it could create a differential to the operational, overall performance and/or risk characteristics of the property being analyzed and whether this differential constitutes a market advantage/disadvantage for a building incorporating more sustainable design, systems and protocols. This analysis should include analysis of the design intent of the various strategies, and the degree to which these goals are in line with the needs and desires of relevant market participants.

Properties rated by market-recognized, third-party certified standards have generally been subjected to a more rigorous level of scrutiny, and are therefore, likely to reflect a higher overall asset quality than unrated buildings. For example, properties certified under LEED typically require at least a basic third-party commissioning of the mechanical systems, meaning that an outside engineer verifies that the mechanical systems are operating as designed. Likewise, residential rating systems that mandate a pre-drywall inspection for thermal bridging and quality insulation installation reflect an added level of third-party review of the construction, over and above basic code-compliance building inspections.

Given the wide variety of residential standards, the appraiser's responsibility is to familiarize him/herself with the specifics of the relevant standards in their respective markets and to objectively analyze whether, or not, these factors create potential differentials in market value for higher performing properties. This analysis would consider market factors and trends regarding these standards and whether, or not, a particular market recognizes the standards (and strategies incorporated) as creating a benefit for properties adopting them. Key differences among the programs that might impact value include the sponsor (the home building industry vs. an independent organization for example), whether third-party certification is mandatory, and whether third-party pre-drywall inspection and/or performance testing is mandatory.

These examples demonstrate the potential impact that various green strategies and practices might have on the market value analysis. If the valuation professional completing an assignment on a green building does not make the effort to understand and analyze the various green strategies employed, then they very likely have not performed an accurate or competent analysis of the property.

Energy Modeling and Auditing

Energy Modeling

Energy modeling is similar to cash flow modeling used in appraisal, but instead of modeling cash flows, engineers, designers, and energy auditors use a computer program to model energy flows within and throughout a structure. Energy models consist of a computer program that requires a variety of inputs pertaining to the building envelope, construction materials, climate, occupancy and use. The output of an energy model is a prediction of the energy use of a building, and the reliability of the output is highly dependent on the quality of the inputs, the sophistication of the software, and the skill of the operator. Therefore, energy models typically require some level of specialized training in order to use and understand properly. The more advanced models such as those used in the commercial sector may require more advanced training and/or degrees in engineering or similar disciplines.

Energy models are widely used in new construction for code compliance with energy codes and to comply with energy ratings like ENERGY STAR and voluntary green building rating systems such as LEED. Energy models are also used in existing homes and commercial buildings to

identify opportunities for energy-efficiency upgrades and to estimate potential energy savings from a proposed retrofit or energy-efficiency upgrades. In residential homes this is sometimes called an asset rating, as it predicts the performance of the building with limited input on occupant behavior. Examples of asset rating in residential buildings include the HERS Index Rating and the Dept. of Energy's Home Energy Score. Energy modeling can be performed on any type of building, including both green and non-green buildings.

Relevance to Appraisers

Use of energy modeling data in the valuation process requires the appraiser to be aware of the predictive limitations of energy modeling, as well as how an energy model differs from an energy audit. Just as with car mileage, actual results rarely match modeled predictions, and in the built environment, occupant behavior can significantly impact actual energy use. Further, as the sophistication of the energy model increases, so do the required inputs, inputs which may or may not be reliably known or supportable. The skill level and experience of the energy modeler also must be consistent with the sophistication of the software and the complexity of the building. While most appraisers lack the specialized training necessary to perform energy modeling, appraisers may be expected to review and understand reports that result from energy modeling, which will typically require an understanding of basic energy modeling concepts and terminology such as energy use intensity (EUI) as well as what kWh and kBTU measure, and how to convert between the two measures. Basic knowledge of energy modeling concepts, practices and terminology by the appraiser is required in order to effectively interact with the professionals responsible for creating the energy model and/or the report, and to incorporate the results, as appropriate, into the appraisal. Appraisers should further be aware of the USPAP requirements relating to relying on the work of others when contemplating the use of energy modeling analysis in valuation settings. (See Lines 908-915 in the Comment to Standards Rule 2-3)[8]

Energy Audits

An energy audit, also sometimes referred to as a building performance assessment, can include a variety of activities as well as define the report that specifies the results of those activities. An energy audit differs from energy modeling because it measures how a building is actually performing, not how it is intended to perform. Typically, an energy audit involves, at a minimum, a walk-through inspection of the building by a trained inspector, or rater, a basic equipment assessment, and the report will include an analysis of utility usage and energy-efficiency upgrade recommendations. More advanced audits may include building envelope testing (blower door test) and/ or energy modeling. Examples of energy audits in the residential sector include a Building Performance Assessment (BPA), or a compressive audit combined with a HERS rating. In the commercial sector, the typical standard is an ASHRAE Level, 1, 2 or 3 energy audit, progressing form a Level 1 walk-through inspection with upgrade recommendations, to an "investment grade" Level 3 report that may include advanced energy modeling and analysis of systems interactions. Energy audits are routinely performed on all types of properties, including both green and non-green buildings.

Relevance to Appraisers

Potential applications of energy audits by appraisers and underwriters include comparing similar properties based on their predicted energy use as well as for ranking or assessing proposed

[8] Uniform Standards of Professional Appraisal Practice (USPAP) – 2012-2013 edition, (Washington, D.C.: The Appraisal Foundation, 2012), U-29.

energy efficiency upgrades or retrofits. HERS ratings may be used to adjust residential comparables for predicted energy use. Energy audits in the commercial sector may point the user to areas of potential cost-effective upgrades as well as identify areas where the subject property differs, positively or negatively, from the comparables. In both residential and commercial settings, the basic equipment assessment can provide meaningful insight to the appraiser as to the anticipated performance and remaining useful life of the components.

As with energy modeling, most appraisers lack the specialized training required to perform an energy audit. However, appraisers should review and understand energy audit reports, such as a HERS report, or a Building Performance Assessment. A basic understanding of energy audit concepts, practices and terminology is also required in order to effectively interact with the professionals responsible for creating the energy audit report. For example, a residential appraiser should be able to discern whether a lower HERS score correlates with lower or higher energy use, and should be able to understand what a blower door test is measuring. Commercial appraisers would be expected to understand whether an ENERGY STAR rating is positively or negatively correlated with energy use, and know whether the rating is based on actual or predicted (modeled) energy use. Clients may also require the appraiser to review and understand a basic ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) audit. As with energy modeling, appraisers should be aware of the USPAP requirements relating to relying on the work of others when contemplating the use of energy audits/performance assessments in valuation settings.

Policy Initiatives & Regulation

Government policy and regulations concerning green building have proliferated in recent years. Policy is generally broad in nature while regulations target specific market segments and behaviors. Both serve to shape market behaviors in ways the market would not otherwise address.

Policy and regulations concerning green building can come from the local, state and federal levels. Local green building codes and state-mandated renewal portfolio standards (RPS) that specify how much of a state's electricity must be derived from renewable sources, are examples of regulations at the local and state levels. The federal Government has a variety of policies relating to sustainability, including the 2009 Executive Order (EO13423 "Strengthening federal Environmental, Energy, and Transportation Management"), requiring that agencies must buy products that contain low or no toxic or hazardous constituents, contain the highest percentage of recovered materials practicable, use energy-efficient products, and reduce indoor and outdoor water use, among other requirements.

Another example of federal policy is the 2010 Green Act. Although it died in committee, this legislation would have amended FIRREA to require appraisals to include energy-efficient features and renewable energy sources.

Appraisers should be aware of and familiar with green building policies and regulations, so that they can differentiate between market-driven demand and policy-driven demand. For example, for an appraiser unfamiliar with local green building codes, the widespread use of energy efficiency technologies might be interpreted as market-driven green building demand, due to the market participants' embrace of sustainability principles. While this market-driven demand may be a factor, the appraiser also should consider the possible role of increasingly stringent energy portions of local or state building codes in generating demand for energy efficient technologies.

Changing policies and regulations concerning the energy use and performance of buildings can also have implications in the adjustment process of older comparables constructed to less rigorous code standards. Energy codes might also affect the level at which energy costs are stabilized for purposes of direct capitalization.

Financing Incentives

While mandates like building codes and regulations are the "stick" used to implement policy, incentives are the "carrot" meant to motivate behaviors consistent with policy. Incentives are available at the federal, state and local level, primarily from government entities, but also from regional and local utilities. The incentives include preferential tax treatment such as credits and deductions, financing products, and direct rebates. Each of these incentives is targeted to encourage a particular policy, and/or incorporation of specific building practices, protocols and/or characteristics. The program funding availability and qualifications may change over time, and the state and local incentives vary widely in their availability and nature based on the particular location.

Some of the various incentives at the federal state and local level are summarized below:

- The federal government offers a 30 percent investment tax credit for installation of renewable energy generation systems such as solar, geothermal and wind.
- Mortgage financing products tailored to energy efficiency and/or renewable energy, such as Energy Efficiency Mortgages or EEM offered by FHA, and the HUD Powersaver.
- At the state level, direct rebates for energy efficiency renovations and/or solar and renewable energy generating installations are available.
- Local and regional utility companies, charged with increasing the proportion of energy from renewable sources, may offer direct rebates to customers who install solar PV or solar thermal systems. In many cases, these incentives decline over time, in an effort to offset the higher initial cost to early adopters, and mirror the typical price declines in new technology as it increases in scale.
- Some counties (Los Angeles, San Francisco and Sonoma Counties in California, to name a few) are experimenting with financing solar PV and other distributed renewable energy sources with PACE (Property Assessed Clean Energy) programs. These programs function much like a bond assessment where the property owner pays the cost of the renewable energy improvements over time, as a special assessment added to the property tax bill.

Relevance to Appraisers

For appraisers engaged in typical lender appraisals, tax benefits may have limited relevance. Rebates and incentives will affect initial cost, and therefore should be considered for new construction and renovations. Appraisers who work with specialized financing products like EEMs or Powersavers will need to be familiar with these programs and the scope of work should detail how the assignment differs from an appraisal for conventional financing. PACE program characteristics vary by the local jurisdiction, and how they affect the appraisal process will be determined by the scope of work. Rebates and incentives are expended at the time of the installation of the system, so they are typically not value-affecting after completion, whether installed new or as part of an energy-efficiency upgrade. However, they may be relevant to appraisers when estimating replacement cost new in the valuation process.

Tax benefits typically are outside the consideration of a typical market value appraisal as well, since they accrue to the property owner, not the real estate, and their value is dependent on the tax situation of the owner. However, for appraisers providing consulting services including feasibility analysis for renewable energy or payback/ROI analysis for upgrades and retrofits, tax benefits and rebates may be relevant depending on the particular assignment. Appraisers engaging in this area of work should seek the advice of outside professionals when needed, particularly with respect to tax implications that might be outside the appraiser's expertise.

Current USPAP Rules and Standards

All sections of the Uniform Standards of Professional Appraisal Practice (USPAP) that are relevant to the valuation of green and/or energy-efficient buildings should be considered.

The relevance of the concepts emphasized in the COMPETENCY RULE is looked at in the context of the appraisal of green building in the following bullet points:

- ***Properly identify the problem to be addressed***: Appraisers should be able to recognize green buildings and green features in brown buildings in order to determine and perform the appropriate scope of work, conduct relevant market research, and use appropriate valuation methodologies. Green buildings and features are sometimes difficult to distinguish from conventional buildings. Appraisers must have enough basic competency to know whether or not the property being appraised requires specialized knowledge of green buildings.

- ***Knowledge and experience to complete the assignment competently:*** When appraising green buildings, appraisers must possess or take steps to gain the necessary knowledge and experience required to competently value green buildings and brown buildings with green and/or energy-efficient features.

- ***Competency may apply to factors such as…familiarity with a specific type of property or asset,…special laws and regulations or an analytical method***: Like any other property type or property characteristic, competence mandates that the appraiser be adequately familiar with the asset type/features, as well as the appropriate and most widely-used valuation techniques for the particular property/features.

Potential scenarios where appraisers may encounter difficulty can be broken down into these major categories:

- Insufficient knowledge and experience leading to value conclusions that is not credible. Influence of bias (green and brown), unintentional or otherwise, on the value conclusion.

- Having adequate knowledge and experience but not applying them correctly.

Insufficient knowledge and experience

USPAP addresses the development and communication of the appraisal; if the development process is performed according to Standards, the results should be credible. The following are examples of potential issues in the valuation of green buildings:

- *Assigning value, or no value, to green components without market support.*

- *Impacts on value must be market-supported.* Appraisers unfamiliar with green building concepts, features and practices may incorrectly assume that value impacts will be obvious in the comparable data, when, in fact, most data service providers do not specifically cull out green features or labels. For example, most data service providers do not specifically identify green labels, or features, such as solar photovoltaic systems (solar PV), and if they do, it may not be reported consistently.

  Value impacting green characteristics, including physical features, as well as less obvious characteristics such as integrated design may also require different metrics of comparison, such as HERS Index Rating for homes or ENERGY STAR score for commercial buildings, or energy use intensity (EUI). Such metrics may not only be unfamiliar to most appraisers, but may also require accessing alternate data sources like the EPA ENERGY STAR database, or utilizing alternative analytical approaches. Single-family residential appraisers, who normally do not use income-based valuation models such as a DCF in their regular practice, may need to do so in order to competently value a solar PV installation.

- *Overlooking green features*. Appraisers may fail to note green features in the appraisal because they either do not know how to address them, or simply fail to note their existence, potentially resulting in an error of omission. Many green characteristics are virtually invisible on a typical inspection, such as high-performance glazing, above-standard insulation, energy efficient lighting, motion- and daylight-responsive lighting controls, or an advanced building automation/management system (BAS/BMS). Competent appraisers can be expected to know what to look for and what questions to ask to avoid missing relevant features.

  If the market places a greater emphasis on green characteristics like energy efficiency, or quality of the interior environment, the potential impact on the existing, non-green buildings is obsolescence – the brown discount. Further, green features like solar PV, low-flow fixtures, and energy efficient lighting are often incorporated, by choice or by code, into major retrofit projects. Unless appraisers have a fundamental understanding of green building concepts and practices, and study market behavior relating to these features, appraisers risk missing or misapplying important adjustments to the comparables and the subject that may result in potentially providing inaccurate, and/or misleading results.

  Given the degree to which green building features and sustainable building practices have been adopted by the building and design industry, and incorporated into building codes and government policy, in some markets, some level of green building knowledge and facility could be needed by real property appraisers, both commercial and residential, that appraise green or brown buildings in their practice.

- *Unsupported or Inappropriate Adjustments.* As with any other building feature, green building features, labels, certifications require market support, which may be derived from conventional paired-sales/rent analysis, or from other sources including market interviews and/or applicable secondary data sources such as studies and third-party research. However, appraisers applying an across-the-board adjustment to the comparable properties based on a dollar amount not market-derived, or random/unsupported percentage adjustments for green features and characteristics face the same competency risk as do appraisers who apply unsupported or inappropriate adjustments for other, non-green features.

When considering adjustments to the comparables in the valuation process, appraisers must subject green feature adjustments to the same rigor of analysis as any other adjustment. Adjustments must remain consistent with appraisal theory, and must be supportable by observations of market behavior including, but not limited to, sale and lease comparable data. The following are examples of unsupported or inappropriate adjustments:

- Using a multiplier for energy efficiency savings without adequate market research and support;
- Applying a fixed percent premium for green certification, based solely on the industry-reported cost premium over a code-built structure, without independently investigating if the cost premium is accurate and relevant to the specific market, and whether or not market participants are using this as a basis of comparison/adjustment;
- Assuming the market reaction, if any, to green or energy efficiency features is the same for different geographic areas (e.g., Northeast vs. West Coast, Central California vs. Coastal, urban versus suburban) or different market segments (e.g., commercial versus residential, high-end residential versus entry level, Class A office vs. Class B office);
- Using methods and/or analytical approaches that are inconsistent with established appraisal theory and practice would raise competency concerns, just as they would if applied to non-green features; and
- Assuming that the market will react the same way it did the last time the appraiser worked in that market. Market reactions to green building can evolve more rapidly than appraisers may be accustomed to, and competent valuation requires the appraiser to stay informed and aware of all relevant market trends.

Influence of Bias

Good ethical business practice and an appraiser's professional reputation are centered on the assumption of objectivity: i.e., that the appraiser will render an objective value opinion free of bias. Further, performing an assignment with bias is a clear violation of the USPAP ETHICS RULE,[9] which states, in part:

> "An appraiser must not perform an assignment with bias." USPAP defines bias as: "a preference or inclination that precludes an appraiser's impartiality, independence, or objectivity in an assignment."[10]

"Green" bias is evident when an appraiser assumes green buildings or properties with green features are inherently worth more than non-green properties, without conducting adequate research to support that opinion.

"Brown" bias is evident where an appraiser dismisses any potential value impact of green buildings or properties with green features without first conducting the necessary research to support the contention that the market does not attribute value to those features.

Some level of skepticism and resistance to new concepts and market influences is normal and a healthy part of the valuation process when dealing with new property types and market

[9] Uniform Standards of Professional Appraisal Practice (USPAP) – 2012-2013 edition, (Washington, D.C.: The Appraisal Foundation, 2012), U-7.
[10] Ibid, U-2.

influences. However, when resistance to new ideas or approaches persists, the appraiser's objectivity may become compromised, resulting in an unacceptable bias. Examples of bias include:

- *Assuming the market doesn't care, so why should the appraiser (brown bias)?* Appraisers may misjudge, intentionally, or because they have not conducted necessary market research to render an appropriate judgment, the degree to which the market has incorporated sustainability into its market value decision matrix, and therefore, miss the value the market may assign to green labels, energy-efficiency ratings, green features and sustainable building practices. Ignoring the green certification because the appraiser was "waiting for the green sales job" from the borrower is a clear example of not completing adequate due diligence that is expected of a competent appraiser.
- *Assuming that all green building benefits accrue to the public or environment, and therefore, the only potential impact to the subject property's market value is an economic cost (brown bias).* Green buildings and green features often have positive non-economic impacts, but they also often have positive economic impacts as well. Energy savings, water savings, and the potential for higher rents are examples of direct impacts that may positively impact the economic bottom line. Indirect impacts on the property might include improvement to the quality of the interior environment (air quality, daylight) that can improve productivity and tenant satisfaction, which can lead to improved tenant retention and therefore, lower turnover costs. Green-certified houses are often subjected to added inspections and performance testing, with greater attention to durability and resistance to pests and decay.
- *Assuming green characteristics and/or certifications always add value (green bias).* Appraisers may alternately adopt a bias, unintentional or otherwise, that all green buildings and green building features add value, without adequately analyzing the full spectrum of value impacts or conducting adequate market research to support that contention.

Expectations for appraisers/thresholds for competence

This topic is of prime relevance to appraisers because subject-matter and geographic competency are fundamental requirements of any appraisal assignment. Determining the minimum threshold for core competency will depend to some degree on property type, geography, time, and the intended use of the appraisal opinions and conclusions.

However, while the level of rigor expected of an appraiser may vary, the basic criteria to judge competency for a green property follow the same steps that apply to any appraisal assignment: problem definition and identification, research and analysis, and development and reporting of the value.

For example, in an assignment to appraise a residential or commercial green building, an energy-efficient property or a brown property with green/energy-efficient features, the appraiser's competency for the particular assignment may be determined based on the appraiser's ability to accurately:

- identify the subject property's characteristics that would cause it to be classified as green or energy-efficient (applies to both green buildings and brown buildings with green features);
- verify these characteristics through documentation and information available for the type of characteristic with an emphasis on third-party verification;
- analyze the market to determine if these characteristics contribute to market value; and

- develop and report an opinion of market value of the subject property.

The following section provides specific examples of suggested minimum thresholds of competence for both residential and commercial appraisers performing assignments that include valuing green buildings, energy-efficient buildings, brown buildings with green or energy-efficient features and brown buildings in predominantly green markets. This list is not meant to be exhaustive but rather illustrative of the specific types of knowledge and skills required of today's appraiser.

- Recognize, capture, and analyze relevant green and energy-efficient characteristics from data services (such as MLS, CoStar, Loopnet) related to the subject property and comparable sales while recognizing that such data services may not specifically note green features, certifications, labels, and energy scores. Appraisers will likely be required to move beyond traditional data sources like MLS for information on certifications, labels, third-party verifications, and specific green/energy efficient features.
- Understand the difference between an energy-efficiency score (ENERGY STAR for commercial buildings or HERS for homes) and a sustainability-based green building certification/label (such as LEED, NAHB (National Association of Home Builders) National Green Building Standard), and the implications for valuation.
- Understand the dominant green building rating system for the market and property type being appraised. Be aware of the differences between the various green building rating systems in terms of metrics (what it measures), rigor (how it measures), whether it is self- or third-party certified, and whether it is performance/operations-based (such as LEED Existing Buildings Operations and Maintenance, or EBOM) or design/asset based (LEED Core & Shell, LEED New Construction, etc.).
- Recognize that green building certifications and energy scores are time sensitive, and the relevance/reliability of a rating or certification may diminish as time passes. Properties may need to be re-certified or re-rated due to changes in: 1) the rating system, 2) the structure, and/or 3) the occupancy or manner in which it is used or operated.
- Explain, describe and cite the relevance, if any, to market value of any green labels/certifications and/or energy efficiency score/labels as well as energy-efficient or green building features in the appraisal report.
- Appropriately analyze, discuss and report the degree of value impact, if any, of the label, certification or green and energy-efficient characteristics of the property (includes green or energy-efficient features in brown buildings).
- Read, analyze and appropriately consider in the valuation the impact, if any, of any building performance assessments, audits, or energy-efficiency reports available for the property.
- Have access to and appropriately employ the "green section" of popular building costs estimator services. Understand that in areas with green building codes, the marginal cost of green and energy-efficient buildings should already be embedded in the manuals' standard cost estimates for new construction, but may not be included for component costs.
- Be aware of the cost/value implications of integrated design and integrated systems. Integrated design and systems integration (synergies) can result in cost savings that may offset added costs of green features. These cost interactions are typically not embedded in the published cost manuals.

- Possess baseline knowledge of energy efficiency, green building and sustainability concepts, technologies, and building features sufficient to differentiate between properties that are considered green, and/or energy efficient and those that are not.
- Be aware of, and monitor, market behaviors and attitudes relating to sustainability, green building and energy efficiency, which may include primary research (observation, interviews, surveys) as well as secondary research (publications, studies, published research).
- Conduct an appropriate level of market research and analysis to support the market's willingness to pay for energy efficiency and other green building features.
- Develop an appropriate scope of work to address the green, energy efficient, or sustainable features in the subject property, in the context of the market attitudes, client requirements, and intended use/user of the report.
- In addition, residential appraisers would also be expected to:
    - Understand the HERS Index Rating or similar energy efficiency scoring metric that is dominant in the market and know where to obtain this data for the subject and comparable properties.
    - Report any energy efficient or green features and the methods used to analyze value in that particular market, within the appraisal report.
    - Appropriately consider energy savings from energy-efficiency upgrades in the valuation process. Conduct adequate market research to support the use of gross rent multiplier (GRM), discounted cash flow (DCF) or similar income-based valuation techniques.

In order to meet the above criteria, appraisers who accept these types of assignments may need to more fully understand the meaning and implications of selected key terms and concepts, outlined in the following section, "Key Terms and Concepts." Where there are differences between residential and commercial appraisers, those distinctions are noted within the specific topic. In addition to these terms and concepts, appraisers are expected to understand the meaning and implications of green building terms and concepts used by the typical local market participant in the decision-making process. For example, if an appraiser is working in an area where solar panel installations are not uncommon, it is incumbent upon the appraiser to have a firm understanding of the various types of solar panel systems (such as solar PV vs. solar thermal) and how to determine the value impact of a solar array. Likewise, a commercial appraiser appraising commercial office buildings may be required to understand and value additional new building technologies such as building automation/management systems (BAS/BMS), among others.

Addendum: Selected Resources

Internet Resources

Energy Efficiency Scores, Ratings Labels & Tools

- EPA Energy Star (Energy Star for Homes and EPA Portfolio Manager for Commercial): http://www.energystar.gov/
- Energy Information Administration (EIA): http://www.eia.gov/consumption/commercial/
- Office of Energy Efficiency and Renewable Energy (DOE): http://www.eere.energy.gov/

Residential Green Ratings, Labels and Tools

- Appraisal Institute Residential Green and Energy Efficient tax credit (Form 820.03): http://www.appraisalinstitute.org/education/downloads/ai_82003_reslgreenenergyeffaddendum.pdf
- National Association of Homebuilders (NAHBGreen aka National Green Building Standard): http://www.nahbgreen.org/
- RESNET/Home Energy Rating System (HERS): http://resnet.us/ and http://www.energy.ca.gov/HERS/
- Home Energy Score (HES): http://www1.eere.energy.gov/buildings/residential/hes_index.html
- Build it Green (GreenPoint Rated): http://www.builditgreen.org/greenpoint-rated/ Fannie Mae Green Initiative (especially Green Initiatives Resources): https://www.fanniemae.com/multifamily/green-initiative

Commercial Green Ratings, Labels & Tools

- U.S. Green Building Council(LEED): http://usgbc.org (especially Resources), also http://gbig.org
- Green Building Institute (Green Globes): http://www.greenbuildinginstitute.org/
- New Buildings Institute: http://newbuildings.org/

Building Codes

- International Green Construction Code(IgCC): http://www.iccsafe.org/cs/igcc/pages/default.aspx
- ASHRAE Green Standard 189.1 (Standard for the Design of High-Performance, Green Buildings): https://www.ashrae.org/resources--publications/bookstore/standard-189-1

Publications

- Journal of Sustainable Real Estate (JOSRE)www.costar.com/josre/
- Journal of Green Building http://www.collegepublishing.us/journal.htm
- Green Builder magazine (residential) http://www.greenbuildermag.com/
- Hoen, B., R. Wiser, P. Cappers and Mark Thayer, An Analysis of the Effects of Residential Photovoltaic Energy Systems on Home Sales Prices in California, Lawrence Berkeley National Laboratory Environmental Energy Technologies Division, April 2011 http://eetd.lbl.gov/ea/emp/reports/lbnl-4476e.pdf
- Muldaven, Scott, Value Beyond Cost Savings, Green Building Finance Consortium: http://www.greenbuildingfc.com/

- Pivo, G. and J. Fisher. Investment Returns form Responsible Property Investments: Energy Efficient, Transit-oriented and Urban Regeneration Office Properties in the U.S. from 1998– 2008. Working Paper, Responsible Property Investing Center, Boston College, University of Arizona Benecki Center for Real Estate Studies, Indiana University, October 11, 2008, revised March 3, 2009 www.uic.edu/cba/mare/CureEvents/InvestmentReturns.pdf
- Runde, Timothy and Thoyre, Stacey, Integrating Sustainability and Green Building into the Appraisal Process, Journal of Sustainable Real Estate (JOSRE) Vol 2, No. 1, 2010. http://www.costar.com/uploadedFiles/JOSRE/JournalPdfs/11.221_248.pdf
- Wright-Chappell, T. and B. Smith. High Performance Green Building: What's it Worth? Cascadia Region Green Building Council, May 2009. http://living-future.org/sites/default/files/HighPerfGB_ValuationStudy.pdf

Educational Resources

- Appraisal Institute Courses: http://www.appraisalinstitute.org/education/green/
  - Introduction to Green Buildings: Principles & Concepts
  - Case Studies in Appraising Green Residential Buildings
  - Case Studies in Appraising Green Commercial Buildings
  - Residential and Commercial Valuation of Solar
- Appraisal Institute's *Valuation of Sustainable Buildings* Professional Development Program: http://www.appraisalinstitute.org/education/green/downloads/green-faqs.pdf
- Webinar*: Is Green the New Brown for Appraisers? 5 Lessons from the Field.* Appraisal Institute Northern California Chapter, December 2010: https://dl.dropbox.com/u/14128443/Webinar.wmv