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Looking For Value in All The Wrong Places:

Toward Expanded Consideration of Green and High Performance Attributes in Non-residential Property Appraisals in the United States

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Energy Technologies Area

October, 2015

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LOOKING FOR VALUE IN ALL THE WRONG PLACES

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Disclaimer

Executive Summary

Large numbers of commercial buildings have sought to improve their energy and environmental performance, with half of all leasable U.S. offices now designated at some level of "green". All properties fall somewhere on the green/high-performance spectrum (above and below average) whether or not they bear a formal label or rating.[1] Variations in the level of performance can either positively or negatively influence value. This component of value can be shaped by many factors, from utility costs to tenant/owner preferences that translate into income (rent levels, vacancy rates, lease-up times, etc.). Occupant perceptions of indoor environmental quality are another potential influence on value.

While there has been little uptake of this thinking by practicing appraisers, the increased prevalence of green/HP practices combined with concerns about appraiser competency are compelling the industry to adapt their traditional techniques to this new driver of value. However, the overly narrow focus of policymakers on appraisal of labeled or rated exemplary buildings (e.g., LEED or ENERGY STAR Certified) represents a significant missed opportunity. Any level of green or energy performance can in fact influence value, including below-average performance (a.k.a. "brown discount"), irrespective of whether or not the building has been formally rated. Another surmountable challenge is the limitations to non-appraisers' understanding of the appraisal process (and constraints therein). A crucial byproduct of this is unrealistic expectations of what appraisers can and will do in the marketplace.

This report identifies opportunities for catalyzing improvement of the green/HP appraisal process, which apply to all involved actors—from owner, report-ordering client, the appraiser, and the appraisal reviewer—and fostering more demand for appraisals that recognize green/HP property attributes. The intended audience is primarily the public policy community and other stakeholders outside the formal appraisal community who can contribute to the broader effort to advance professional practices. The discussion begins with a description of the appraisal process and the points at which green/HP considerations can enter the analysis. A series of major barriers to better practices are identified along with approaches to reducing them.

Barriers

- Although industry standards of practice caution against bias of any sort, a skeptical predisposition towards "green" is reinforced by information deficiencies.
- Information deficiencies result from the lack or difficulty of obtaining usable data on green/HP features in subject properties as well as valid sales comparisons or cashflow analyses.
- Competency deficiencies, such as lack of conversancy in relevant technical topics, leads to oversights, and disjointed treatment of relevant information.

[1] This report adopts the terminology used by The Appraisal Foundation and others. "Green" refers to the entire panoply of green building strategies, including sustainable materials, improved indoor environmental quality, site-sensitive citing, water efficiency, and energy efficiency. High-performance refers primarily to energy and indoor environment. The building sector and appraisers alike have long struggled with ambiguity in these definitions.

- Time/cost pressure and process commoditization (e.g., template-based approaches) result from highly constrained budgets, quick turn-around times expected of appraisers, and standardized practices that were not developed with green/HP considerations in mind.
- Professional differences between appraisers and sustainability professionals include divergent objectives, the former being market observers and the latter market influencers.
- Risk aversion arises from multiple concerns including veracity, accuracy, and persistence of energy data, impacts of operational choices, new sources of appraiser liability associated with green/HP assessments, industry pressures not to over-value buildings or suggestion of bias, and concern about spending non-billable time on complex assignments.
- A public policy vacuum has been created by disjointed and uncoordinated efforts from public-sector stakeholders, insufficient efforts to discuss and understand the appraisal industry and process, and a perception by some valuation professionals that green/HP is oversold.

Opportunities

- Elevating the competency of appraisers can be achieved through a combination of improved industry standards of care and equal-access training and professional development offerings.
- Development of better information resources must focus on building-level information that provides robust documentation as well as aggregate sales-comparison data and other contextual information such as local codes, typical upgrade costs, energy prices, etc.
- Improved energy benchmarking and rating tools could provide appraisers with information more well-adapted to their particular needs, which differ from those of typical audiences such as energy managers.
- Better characterizing and managing risk will enable appraisers to cope with uncertainties in performance information, and help identify where risks may be introduced or mitigated by green/HP features, including higher costs or obsolescence of poorly-performing buildings.
- Integrating disaster resilience and sustainability in appraisals would recognize important synergisms among these features, including durability and ability of green/HP buildings to better withstand external hazards.
- Mitigating the problem of additional time/cost for performing assignments is an essential need that can be addressed by providing easier access to information and analytic procedures, perhaps coupled with new resources to defray the associated costs.
- Enhancing demand for improved appraisals is a fundamental need, and depends on owners, developers, lenders, and others soliciting competent appraisers to perform scopes that expressly call out green/HP considerations, and to critically review the work product for compliance before acceptance.
- Engaging new market participants, such as energy utilities and insurance companies can ensure fuller representation and participation of market stakeholders already engaged in green/HP activities and capable of furnishing valuable data and managing associated risks.

Cutting across these individual activities, there is a need for outside stakeholders to formulate and follow a roadmap instead of piecemeal initiatives, bridging the professional/cultural divide between appraisers and green/HP communities, and tracking progress in order to know what is working. A more coherent communication and training strategy is needed, as the appraisal industry is highly fragmented, with two-thirds of appraisers opting out of membership in trade associations.

In sum, while there is no silver bullet for advancing the practice of valuing green/HP features, there are concrete opportunities. Parties seeking solutions must identify barriers they wish to address and select from among potential initiatives that map to those barriers. Close collaboration with the appraisal community is critical, as non-appraisers have historically obtained limited traction with this industry due to lack of understanding of the nuances involved in the valuation profession. Large organizations and agencies should have a united approach; the perception or reality of a fragmented and uncoordinated strategy is unsettling for prospective partners in the appraisal industry. This requires improved communication and education within and among these communities.

The Emergence of "Green" Appraisals

In response to market demands and a range of policies and voluntary programs, buildings are increasingly incorporating green and high-performance ("green/HP") attributes with the overarching goals of achieving reduced operating costs (more efficient use of utilities and on-site power production), increased income, improved indoor environmental quality, and use of materials with a reduced environmental 'footprint' (Figure 1). These attributes are implemented along a wide continuum, ranging from modest individual upgrades to otherwise ordinary buildings to comprehensive strategies carrying buildings towards zero net energy and water purchases. Only a small subset of green/HP building stock by floor area bears any sort of third-party label or rating, yet all buildings have some level of green/HP features or operational practices. There a contrasting segment that performs poorly and is thus at increased risk of erosion in value as a result of incurring higher costs and being deemed obsolescent. The potentially greater importance of this latter issue versus the "green premium" (Runde and Thoyer 2010) has received little attention.

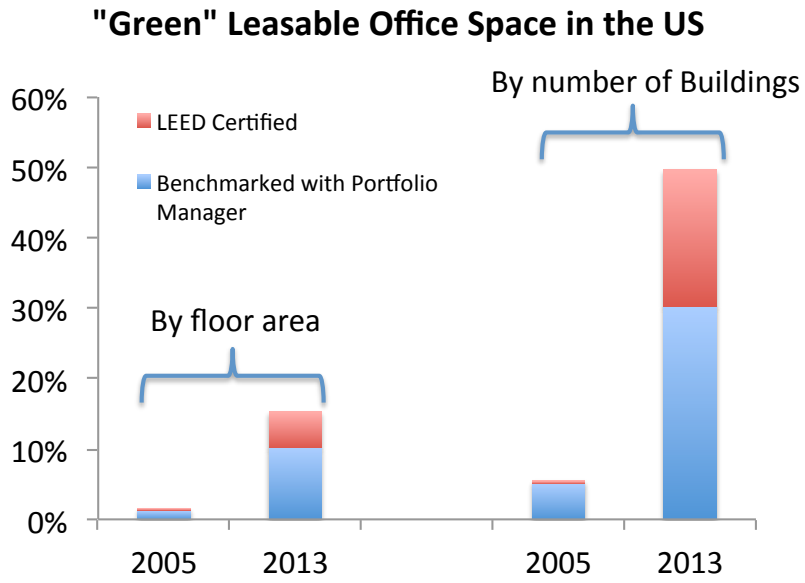

Figure 1. *Trends in green office building market penetration, for the subset of Class A-B-C properties deemed of interest to institutional investors (excludes government-owned-and-occupied, single-tenant owner-occupied, medical, and size minima that vary by market). To be included, ENERGY STAR property must have been certified within the past two years and LEED buildings within the past five years (Kok and Holtermans 2014). Many more buildings possess green/HP attributes but do not seek labels or ratings.*

Any potential incremental value provided by the presence of green/HP features (or discount if buildings are deemed to under-perform) ultimately manifests through the interaction of buyers and sellers, with close involvement of real-estate agents. The role of appraisers is to observe the outcomes of these transactions and help codify the values awarded and the influence of income, expenses, quality perception, etc. As the appraisal is often generated after the property is under contract, its value to any specific sale transaction is limited. Appraisers play a more

central role in other types of transactions such as valuations by owners who plan to hold the property (e.g., re-financing, taxes or partnership actions). The broader importance is in raising general market awareness for future transactions.

Attaining and maintaining competency in this rapidly evolving market environment requires that appraisers (and others related to the valuation process) obtain new knowledge, tap new sources of data directly or via third-party experts, and then be able to evaluate whether it influences asset value and the property's risk profile.

All buildings have some level of performance (above and below the average), representing a wide spectrum of costs of ownership and property quality. Today, few property appraisals are able to rigorously take this into account. Professional standards of care call for appraisers to assess the impact of utility expenses and other green amenities on value (Black *et al.,* 2015), but clear expectations and methodologies for doing so have been lacking. One such methodological challenge is establishing rigorous quantification of savings relative to a "normal" building. In this regard, assessing the impacts of energy efficiency is more challenging than on-site generation equipment.

Ideally, appraisers will identify and evaluate performance attributes that contribute to the productivity, competitiveness, and utility of a subject property in the context of the market value appraisal assignment. A large body of literature establishes that incremental value accrues to green and high-performance buildings, arising from a combination of reduced expenses and increased income. Finch (2014) identified 51 such studies by 44 organizations associating increased value with green-labeled buildings, with the following key findings:

- **Higher Rental Rates** – LEED buildings display a 15.2% to 17.3% premium and ENERGY STAR buildings display an 7.3% to 8.6% premium over similar* non-rated buildings.

- **Higher Stabilized Occupancy Rates** – LEED buildings have 16% to 18% higher occupancy than non-rated buildings, while ENERGY STAR buildings have 10% to 11% higher occupancy.

- **Faster Lease Up** – Both at initial construction/renovation and also at roll-over when a vacancy occurs.

- **Lower Utility Costs** – Electricity and gas expenses in ENERGY STAR buildings are more than 13% lower compared to similar (building class, location, etc.) non-rated buildings.

- **Increased Sales Prices** –LEED buildings exhibit a 10% to 31% premium and ENERGY STAR buildings exhibit an 6% to 10% premium over non-rated buildings.

- **Low Construction Cost Premiums** – Construction costs for LEED buildings are typically equal to or only slightly greater than the costs for non-rated buildings, primarily due to the costs of certification (approximately 0% to 2% for LEED Silver/Gold).

These types of findings are, however, not often sought after or deemed to be usable by the valuation profession. Usability is a concern because few studies correlate outcomes with the

exact level of performance or category of rating a building might possess. Granularity is also lacking in most areas, including geography, building type, surrounding, market conditions, tenant quality, and the perspectives of potential buyers. Moreover, there is little if any literature on certain components of value such as health/productivity differentials in green/HP buildings. While, in theory, capitalization rates may be lower for green/HP buildings (a reflection of lower perceived risk), only a few studies have documented this effect.

Industry organizations, particularly the the Appraisal Foundation and the Appraisal Institute have made concerted efforts to assemble practical knowledge, training, and tools into a form directly used by their constituencies.

A small number of appraisers and other analysts have demonstrated an ability to look holistically at the green and energy-efficient attributes of a property and incorporate the information in a considered valuation (for example, Majersik 2003; Chappell and Corps 2009; Runde 2015). However, these isolated examples are the exception to the rule, with few appraisers even aware of the extent of existing green/HP buildings.[2]

This report examines the traditional real-estate valuation process and how it can be utilized to better capture the value of high-performance buildings. It begins by identifying the key actors and proceeds to outline the appraisal process and to pinpoint where and how high-performance considerations can be accommodated. The report goes on to outline key barriers to improved practices and strategies for potentially overcoming them.

Market Actors

The appraisal approach and methods used depend on the type of valuation required. For example, an appraisal for a lender will focus on income and expenses while an assignment conducted for tax purposes will focus on land plus replacement value. Other appraisal applications include developers seeking to identify the ultimate value of a proposed project, tax and estate planning, portfolio valuation, insurance (premium-setting or claims handling), litigation under circumstances such as divorce, death, foreclosure, etc. Parties engaged in the broader process of how and why appraisals are commissioned, performed, and used, include:[3]

- Appraisers themselves (and appraisal reviewers)
- Those who order and use appraisals
  - Primary users such as property owners, lending professionals including mortgage brokers, loan underwriters, credit committees, risk and compliance, loan portfolio managers, acquisition due diligence professionals, and insurers
  - Secondary users of appraisals, including:

[2] See https://sites.google.com/site/appraisinghpbuildings/market-data

[3] As characterized in the non-residential Appraisal Foundation Valuation Advisory

    - Other professionals within the financial, legal, tax, realty, and accounting fields whose activities require an understanding of real estate valuation and/or economic attributes impacting financial collateral
    - Property developers, owners, managers, and institutional investors
    - Investment advisors, bond rating agencies, and other financial services professional
    - Senior lenders take a keen interest in appraisals of properties seeking subordinate debt, and must "consent" to those loans and associated valuations
    - Insurers who assume professional liability risks to which appraisers are exposed
- Intermediaries and service providers such as managers (e.g., Appraisal Management Companies, AMCs), and real estate agents
- Third-party experts such as architects, engineers, and resource analysts
- Policy makers and government officials evaluating the role and applicability of appraisals of high performance buildings, including:
    - Federal and state banking, insurance, securities, tax assessors, and tax regulatory commissioners
    - Utilities and utility regulators
    - Environmental, zoning and real estate authorities and regulators

As will be discussed below, some of these actors are highly peripheral to the current process and could be significantly more engaged in the context of green/HP considerations. Others are key to the valuation process, specifically owners providing building design information, certifications and operational history, professional energy engineers who certify savings estimates, the client ordering team who need to correctly set the assignment Scope of Work, the appraiser and finally the reviewer who approves the appraisal report analysis as correct/ acceptable for use in loan underwriting.

The demographics of the appraisal trade (residential and non-residential combined) indicate a shrinking and aging workforce (Appraisal Institute 2015; O'Rourke 2013). Nearly two-thirds of appraisers are over 50 years old, with 80% having a bachelor's degree or less education. Median income is under $53,000 per year (Bureau of Labor Statistics 2015). As of mid-2015, there were 78,500 active real estate appraisers[4] across the U.S. residential and non-residential buildings), about three-quarters of which were men. The actual number has fallen by about 8,000 from the year 2011, or at the rate of 3% per year. The advent of Appraisal Management Company clearinghouses (primarily managing residential appraisals) has resulted in appraiser fees reductions of up to 50%, leading to a less and less skilled and motivated workforce. Approximately 80% of appraisers report dropping fees in 2015 (Alltera Group 2015). Two thirds of these are sole proprietors, an important indication of the lack of support possessed by many appraisers. Only 4% of appraisers exclusively practice commercial appraising, 80% exclusively residential, and 15% both. Two-thirds of appraisers do not belong to any trade association. Trade organization membership is very fragmented, the top three being the Appraisal Institute, representing about 43% of those belonging to any association, followed by State Coalitions (~25%), NAR (~20%), and NAIFA (~15%). This complicates outreach efforts. Only 22% of appraisers are optimistic about the future of their profession.

[4] Another 20,000 or so are licensed or certified but not active.

Historical & Economic Considerations

Only in the past decade or so have professional societies engaged in defining the set of appraisal issues and practices that pertain to green and high-performance buildings. The preceding history provides important context as it affects expectations on competency, and the conduct and pricing of appraisals.

The move towards securitization of real-estate debt since the 1980s led to the involvement of many more parties in real-estate transactions and a proportionately significant increase in appraisal activity. Industry observers point out, to their chagrin, that in spite of higher stakes and increased complexity, the time allowed for performing appraisals has shortened as have the fees paid (down by 30% between the 1980s and mid-2000s), thanks in part to the institution of competitive bidding for these assignments (Hudgins 2007). Meanwhile, profits were subsequently divided among an increasingly diverse set of market players.

Following the Savings and Loan meltdown of the early 1990s, the governmental imposed reforms that included the passage of the Financial Institutions Reform Recovery and Enforcement Act (FIRREA) which called for state licensing all appraisers for assignments which include FDIC Insurance. The passage of FIRREA brought in a much needed rigorous set of appraisal standards, called the Uniform Standards of Professional Practice (USPAP)—published by the Appraisal Foundation—to which state appraiser licensing bodies bind licensed appraisers. Competency concerns had come to the fore.

Appraisal Management Companies (AMCs) are important players in the residential process—and to a lesser degree non-residential—serving to facilitate the selection of appraisers, ordering, tracking, quality control, and delivery of appraisal reports.[5] AMCs also have processes for addressing disputed appraisal findings. While having existed since the 1960s, AMCs became much more prevalent after New York Attorney General Andrew Cuomo, Fannie Mae and Freddie Mac, with support from the Federal Housing Finance Agency, developed a set of appraisal rules called the Home Valuation Code of Conduct (HVCC). As a response to the real estate bubble of the mid-2000s, the intent was to better isolate lending interests from the appraisal process, particularly the appraiser selection. This influenced rules now found in The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010[6] and its Truth in Lending and Interagency Guidelines. Dodd-Frank called for the use of "Automated Valuation Models" (primarily applied to residential properties), with the intention of reducing risk of tampering or undue subjectivity, but this also tied the hands of appraisers when confronted with atypical buildings. These models were not built with green/HP considerations in mind.

Non-residential appraisal fees vary widely, from just a few thousand dollars for a simple, free-standing property to far higher levels for more for complex or multi-tenant developments. Higher fees reflect more demanding data requirements, modeling, and documentation.

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[5] See http://www.realtor.org/appraisal/nar-issue-brief-appraisal-management-company-qa

[6] See https://en.wikipedia.org/wiki/Dodd%E2%80%93Frank_Wall_Street_Reform_and_Consumer_Protection_Act

Evaluating relatively complex green and high-performance buildings is one of many examples of potential assignment complexity. The industry is large. For example, CB Richard Ellis performed nearly 50,000 appraisals in the Americas in 2014, with $72M in quarterly revenues in late 2007, and employed 400 appraisers in 53 U.S. markets at that time.

Valuing the Environmental Performance of Non-residential Real Estate

As observed Hudgins (2007), “determining a commercial property's value is an inexact science, and often relies on the appraiser's experience and intuition as much as it does on recent sales data and property fundamentals.” This runs somewhat at odds with the commoditization and automation of the appraisal brought into force in response to past turmoil in the real estate markets.

The central panel of Figure 2 depicts the key steps of the traditional appraisal process, overlaid by considerations when evaluating a green/HP building. Note that the figure does not expressly call out the project inception or concluding reviews, but they are treated in the text below. The following discussion elaborates on these points. Best practices dictate that green/HP attributes merit consideration and inclusion within each aspect of the existing appraisal process. It is fortunate that fundamentally new methods are not required in order to achieve this; existing appraisal approaches can accommodate green/HP considerations.

Interpreting value based on asset attributes and market dynamics may vary by perspective and profession -- the appraiser must objectively analyze all relevant information that differentiate buildings with high performance features within the subject’s real estate market, then adjust financial and investment risk factors accordingly. Competency standards already require, in principle, that green/HP factors be considered, yet this rarely happens in practice.

In addition to the contributory value of green/HP features as, for example, reflected in utility costs or rent income, appraisers should also consider whether a property’s green/HP features merit adjustment to the risk factors traditionally considered in the valuation process. Primary risk considerations include tenant credit quality, tenant rollover rate, overall stabilized occupancy level, changes to building operating efficiency over time, exposure to future energy and water price volatility, obsolescence risk, financing risk stemming from future capital preferences and pricing, and liquidity risk due to evolving investor preferences. Secondary risk factors include grid reliance, water supply availability, and location-based factors including access to multiple transit options and natural disaster probability, severity and asset resiliency.

A web-based matrix[7] more finely maps the elements of the appraisal process pertinent to environmental performance within buildings. The Matrix also identifies key actors, barriers and risks, and solutions, followed by resources for more information.

[7] See https://docs.google.com/spreadsheets/d/1Og1dX4BuHPoUVF_z2n_DRED9UmTr_B3MPtnSu9SnVlM/edit#gid=0

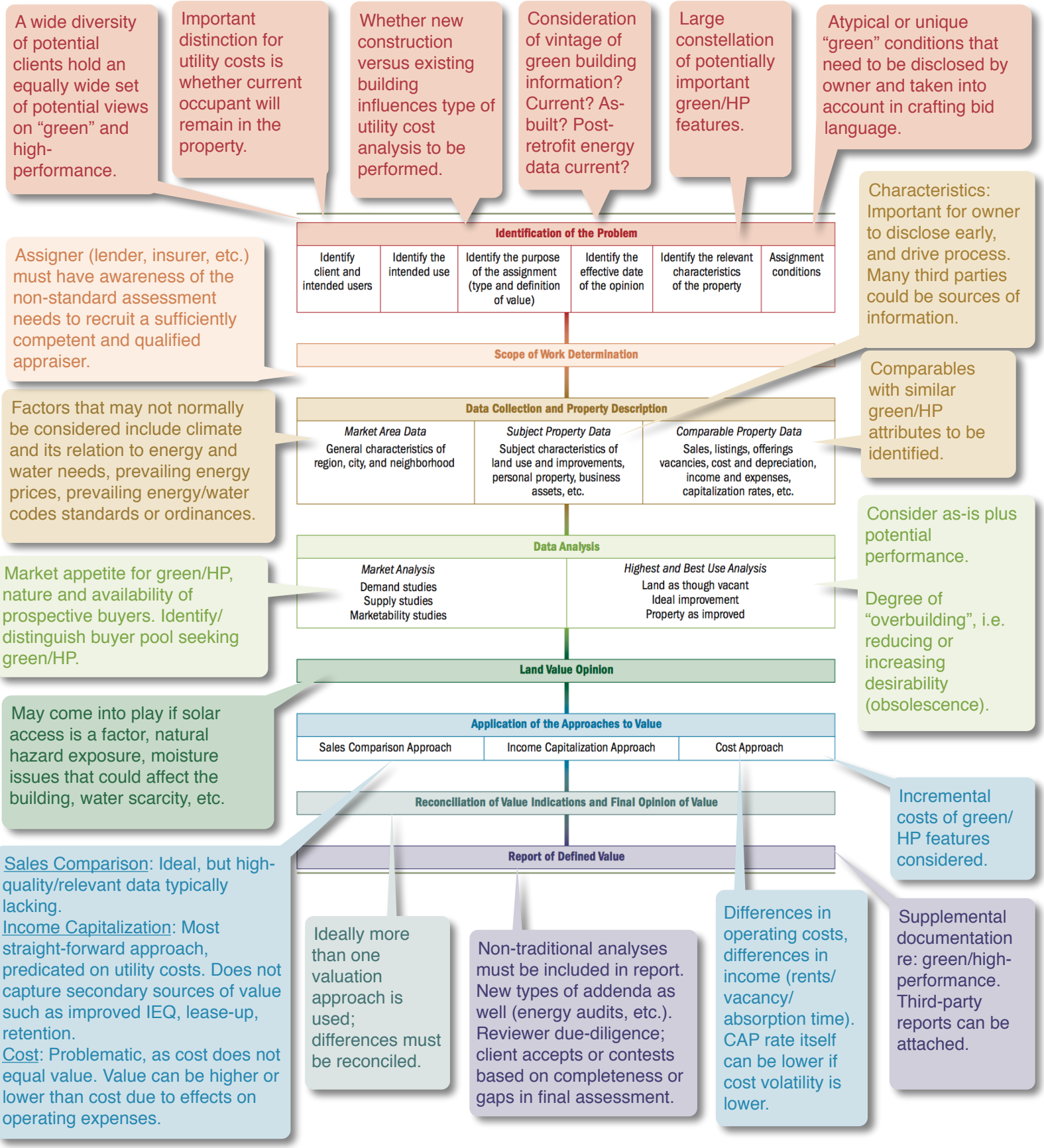

Figure 2. *Traditional non-residential real-estate valuation (inset) process and points at which high-performance property attributes may be considered. Inset does not include process-inception or review phases. (Source: Inset from The Appraisal of Real Estate, 14th Edition, Appraisal Institute, 2013, annotations by the author.)*

The salient stages of the process for valuing real estate (existing or proposed structures), including observations on where performance can be considered, proceeds as follows.[8]

Process Inception

As noted above, there are many potential clients for appraisals, and procurement and scope-of-work details will vary among them. By far the most common are lending institutions (triggered by purchase or refinance events), which will issue a bid or RFP by circulating a property address with a short description and request for bids (fees & timing). The loan officer or an administrator is typically the one who requests the appraisal, however in order to avoid conflicts of interest a third party within the lending institution, typically an administrative person within the bank or a separate Appraisal Management Company, actually orders and manages the process and conducts the appraisal review. Loan officers can communicate directly with the appraiser as long as value is not directly discussed. Bid requests are often highly cursory, and often have a 24- to 48-hour response time, leaving the appraiser with little time to assess the requirements of the assignment.

Information on anything 'unusual' about the property should be disclosed at this time. Appraisers may ask for more details before bidding. Where large numbers of appraisals are procured, a Request for Qualifications (RFQ) may be issued. Appraiser selection is often according to the lowest bid.

If thorough, loan application data provided by the owner can be a key determination of RFP quality. Green/HP considerations can and should be articulated in the bid documents or taken into account in determining assignment budget, assessing appraiser competency, and appraiser selection. This is rarely done with any rigor in the current market. Bid documents are usually very cursory. Including in the RFP a copy of the Appraisal Institute's Green Building Addendum (or similar building feature summary), LEED point list or Energy Star disclosures would be of significant assistance to an appraiser to generate an accurate fee and timing bid.

Scope of Work

Once the assignment is awarded, a more intensive round of fact-finding and confirmations begins. The initial scoping and information gathering process is essential to correctly matching appraiser competency to the assignment and achieving an accurate property valuation. Again, scopes of work rarely incorporate green/HP considerations, or, if they do so the treatment is perfunctory and expectations low. This missing material can set the appraisal assignment off in the wrong direction or might even result in the need to select a different appraiser whose competency better matches the property complexity. Re-appraisal is costly and best avoided.

Appraisers and their clients must concur on the assignment purpose and communicate the Scope of Work required to complete an assignment. It is important to engage early and often with the owner's representative so as to assemble a robust information packet that best characterizes the subject property. A third-party engineering report known as the Property

[8] Follows from Finlay *et al.,*(2015).

Condition Assessment is sometimes generated during the process, focusing primarily on condition and deferred maintenance issues. The PCA gives only cursory attention to energy issues. An even more comprehensive property description can enable appraisers to identify green/HP features that warrant inclusion within the Scope of Work, and to acquire market data that appropriately segments high performance buildings within the broader market. Owners are often not aware of their key roll in providing important building information at the start of the appraisal process, even prior to appraiser engagement.

Data Collection and Property Description

While an initial round of data collection must happen very early in the process in order to inform the Scope of Work, once the assignment has begun much more information must be gathered. Traditional data sources such as routine income and expense items, property description, and mainstream comparable sales include little information relevant to green/HP buildings.

Owners and their representatives are typically in the best position to provide the necessary documentation. It is equally important to gather performance metrics (e.g., energy use intensities) as it is to identify the underlying property characteristics and management processes. Examples of important third-party data sources include as-built plans and descriptions of relevant features, energy-use disclosures, ratings and their background documentation, and energy audits. Prediction or proof of annual cost savings via a bona fide energy report (e.g., per ASHRAE) and the ability to have real-time energy monitoring are key elements to the valuation process. Ideally, stand-alone systems (PV arrays) should be submetered. For proposed construction, modeling studies comparing typical to as-proposed energy use are needed. Leading lenders in the green/HP arena are concerned about the inability of most appraisers to analyze the role of resource costs and performance in their valuations (NEREJ 2015).

Existing contractual relationships such as solar leases, PPAs, utility contracts, or Energy Service Company agreements must all be identified and taken into account. Lenders and prospective buyers will be wary about any obligations that remain with the building upon ownership transfer, and thus the costs, benefits, and risks of these obligations need to be identified and disclosed.

Contextual factors that may not normally be considered include climate and its relation to energy or water needs, prevailing utility prices, and energy or water codes and standards.

Market data must also be collected to determine recent sales, if any, of comparable properties as well as a segmentation and profile of potential buyers and their level of interest and willingness to pay for green/HP features. Third-party services such as CoStar gather market data, although are not deemed to be of very high quality.

Filling in the many gaps requires the appraiser to obtain non-traditional documentation and third-party opinions. Third parties are critical in this regard. Examples of non-traditional third parties include utility customer representatives, energy auditors, commissioning providers,

project architects/engineers, sustainability consultants, indoor environmental quality experts, and local benchmarking/disclosure ordinance databases.

Data Analysis

Utility expenses are central to any valuation based on cashflow. Where information is lacking, appraisers are compelled to revert to "default" utility expense values (e.g., from BOMA). Where buildings perform better than average, the appraiser requires substantive documentation in order to supersede default values. This could involve quality-assured utility bill analysis, normalizing for weather and other factors, such as provided by third-party approved bill analysis Portfolio Manager or baseline benchmarking provided by a qualified energy auditor. For projected energy savings, validated computer energy models specified by qualified analysts must be obtained and the associated physical measures responsible for the energy savings clearly delineated. The latter may include characteristics identified by rigorous energy audits or tools such as the Building Asset Score.

The focus must be on owner/occupant benefits as distinct from community/global benefits not monetized by the owner. Monetary value can come from direct benefits (e.g., reduced operating costs) as well as indirect ones such as market positioning. While on the one hand, inefficient resource use corresponds to suboptimal net income (a key indicator of value), over-building such that prospective buyers/tenants will not value the full scope of features utilized represents a degree of "overbuilding" or "super-adequacy" (in appraisal parlance). In effect, a building can be obsolete to varying degrees if it is either under-performing or over-performing (from a resource-use standpoint). Performance with respect to prevailing energy or water codes and ordinances is an important benchmark.

In the case of proposed construction, the goals of the standard "highest and best use" analysis within the broader appraisal process are to determine whether the project is the physically possible, legally permissible, financially feasible, and maximally productive chose (or option) among the various building/use types that might be considered. These considerations generally transcend green/HP considerations but one important exception is the extent to which high performance attributes are consistent with applicable codes and ordinances.

Valuation

Three customary valuation approaches may be applied during the appraisal process, individually or in combination based on the type of valuation that is sought. Again, green/HP considerations are not commonly addressed rigorously in the valuation process. Land value may be a factor as well if attributes such as solar access, microclimate, influences on indoor environmental quality, or other impacts on energy use are present.

The ***Cost Approach*** considers property-specific investment versus value, and is analogous to replacement cost in insurance parlance or "reproduction costs" if an exact replica (original materials, codes, etc.) apply. Appraisers will want to consider the effect of any financial incentives, and the probability by which marginal investments made in pursuit of higher building performance can be recovered through operating cost reductions or additional net

income. Cost-based analyses by definition do not account for consequent effects on operating expenses (in this case utilities).

The ***Sales Comparison Approach*** identifies the sale prices of similar buildings, making adjustments for market conditions (sales date), differences in attributes, etc. Limits on available transaction data for green/HP properties in nearly all markets challenge appraisers when completing this approach to value. Availability of "comps" depends a lot on market size, with smaller population centers being most challenging. Large firms often maintain their own proprietary databases. In practice, the effort made can range from use of existing databases to primary data collection in the market of interest through interviews with realtors, manually correlating searches of green/HP buildings databases with sales databases, etc. Very specific data on the characteristics of comparable buildings are required in order to successfully apply the sales comparison approach. Fortunately, most primary markets have begun a notable shift, adopting a "new normal" of high-performance design and operating characteristics required for inclusion as a mainstream Class A property. In markets exhibiting above-average adoption rates, consideration of the high performance value premium will ultimately be overtaken by the inverse -- a discount for property characterized as under-performing.

Valuing high performance attributes and systems using the ***Income Approach*** is generally the primary methodology used in commercial property valuation by buyers and sellers. It requires identifying and quantifying collective financial impacts along each of the four *pro forma* subcategories - Income, Vacancy, Expenses and Risk. Appraisers can gather differentiated rental rate, vacancy, and operating expense information that supports mark-to-market modifications and capitalization rate adjustments. It may be deemed appropriate to apply lower capitalization ("CAP") rates if the green/HP building entails lower financial risks, e.g., due to reduced vulnerability to utility price volatility, superior tenant quality, reduced operational fault risk. In some cases the rationale for a CAP rate adjustment is easier to document than lower utility expenses, particularly if disclosure ordinances are not in place or the operational data are not otherwise available. On the other hand, volatility in utility expense data (including consumption as well as tariffs), lack of long-term baselines (or ability to reliably project retrofit savings), and confounding operational-vs-asset influences conspire to make appraisers apprehensive about deviating from stipulated "default" values. Age of systems or other indicators of superadequacy or obsolescence can require further depreciation of nominal benefits. For new construction or recently retrofitted properties, savings projections will need to be obtained, evaluated, and relied upon in estimating stabilized utility costs.

Report Preparation, Review, and Acceptance

The final report preparation and "reconciliation" steps are critical and include client review as well as external review. The report itself must rigorously substantiate any explicit treatment of green/HP features and performance. The appraiser's own analysis should be augmented by third-party technical appendices such as energy audits, benchmarking/rating reports, or solar lease documents. Buyers should obtain and review the final appraisal. The Appraisal Institute

has recently created a formal designation for appraisal reviewers who in some cases are the weak competency link in the valuation chain.[9]

Appraisal findings can be and are occasionally disputed. If relevant information was not provided in the initial documentation, it is much harder to successfully contest the appraisal. Clients can withhold payment while contesting. Owners believing that green/HP features have not been adequately evaluated have the option to dispute the findings, a much more difficult, expensive and time consuming option than doing the assessment correctly the first time.

Barriers to Valuing Green and High-Performance Attributes

As an indicator of how unestablished green/HP appraisal practices are, one highly motivated and competent appraiser who is well trained in the green/HP area has only been able to perform appraisals on three developed green/HP properties in the past seven years, representing only 4% of their total projects. This reflects lack of client awareness and demand for the service, willingness to pay the incremental cost, and other factors.

The leading barriers to advancing the practice of property valuation to better address green/HP considerations can all be addressed most effectively through interaction and multidirectional information exchange between between the owner, ordering client, appraisal, and green and high-performance buildings communities. Impeding this process are literal differences in how language is used and the meanings ascribed to terms. Table 1 provides a sampling of how some key appraisal terminology maps onto energy and buildings terminology. The energy and broader green-buildings communities are not yet very adept at communicating value in appraisal parlance. In some cases, a given term has different meanings in the respective fields, e.g., “good performance” means efficiency or lower resource intensity to the green/HP community while it means broad financial solidity in the valuation community.

Emblematic of an even deeper divide is the familiar use of the language and concept of cost-effective measures as determined through engineering analyses. This abstract form of economics has little bearing on “sub-optimal” values buyers actually place on building attributes.

Appraisers are the messengers of how markets function, whereas energy policymakers focused on these issues are projecting how markets will behave if they function according to idealized theory where costs and benefits are fully optimized and market frictions and failures are overcome.

[9] See http://www.appraisalinstitute.org/reviewdesignation/

Table 1. *Appraisal vs building energy efficiency terminology.*

Appraisal Terminology	Analogous Buildings Energy Terminology
Asset (property)	Asset (an energy-using feature that is integral to the building, such as windows, as distinct from features that are not, such as computers.
Competent management	Strong energy management culture
Contributory value	Portion of measure cost and or engineering-economic value of operating cost savings that is actually reflected in the valuation. Incremental value minus whatever discounting the "imperfect" market ascribes
Deferred capital expense	Retrofit candidate
Deferred maintenance	Building out of tune
Habitability	Thermal comfort, indoor environmental quality, disaster resilience
Highest and best use: new construction	Compliant with green/HP building codes and ordinances
Market value	Market failure to adequately value energy-efficiency
Obsolescence: External	Impeded solar access, energy price volatility; poor outdoor air quality (out of control of owner)
Obsolescence: Functional	Energy inefficient; overbuilt
Operational (expense)	Operational (behaviorally or decision-driven energy use, e.g., temperatures, schedules)
Risk management	Commissioning and performance tracking/persistence
Stabalized utility expenses	Post-retrofit energy costs
Superadequacy	Not cost effective (e.g., oversized PV)
Third-party documentation	Energy audits, commissioning reports, benchmarks and ratings

These issues notwithstanding, a reasonably finite number of barriers impede thel process of incorporating considerations of green/HP in real-estate appraisals. However, they are far-reaching and emerge repeatedly throughout the process, as follows:

1. Skeptical predisposition towards "green". An undercurrent of skepticism colors some appraisers' view of green/HP factors. For appraisers with a long history of practice, this is perhaps rooted in earlier times when the science and practice of sustainable building practices was less established. Information deficiency and lack of competency today reinforce knee-jerk reactions. The Appraisal Foundation's recent Valuation Advisory on core competency cautions against this sort of bias (Black *et al.,* 2015).

2. Competency deficiency. Many appraisers are not conversant in even the basic concepts and metrics of green/HP. One result is that the mistake can be easily made of viewing green/HP as a

single feature or reducing it to a single metric, thus implying the attribute to either be present or not present in a subject property, rather than manifest as a granular continuum such that each and every building's performance use becomes a consideration. One consequence of limited competency is that energy considerations may be appended, at best, to a traditional appraisal rather than treated in a more integral fashion. Another consequence is the inclination of some appraisers to pessimistically assume that entirely new methods will be required in order to address green/HP issues, when in fact the existing methods can fully accommodate these issues as long as appropriate data are gathered and considered at the right point in the process. Further hampering appraisers, key market factors applicable to green/HP are largely non-overlapping with those that appraisers traditionally track, and the sources of that information (e.g., buildings receiving performance labels or ratings, energy codes, energy incentives) are unfamiliar to appraisers.

3. Information deficiency. Timely availability, accessibility, and usability of green/HP information is a problem that vexes the entire domain of high-performance buildings. Appraisers, who must be able to substantiate and defend their analyses, are particularly adversely impacted. The problem manifests in two broad ways. Firstly, obtaining and making sense of often highly technical information produced by other professions is no small feat. However, the appraiser needs only to understand (not verify or certify) the findings of specialists. Certain transaction structures imply additional inertia, e.g., in the case of institutional owners who may not have access to building-specific information as readily as individual property owners. Secondly, information rarely assembled with the appraiser in mind, the information is often far more or less granular than the appraiser requires. For example, an energy audit, commissioning report, or indoor-environmental quality inspection can easily be daunting to the appraiser, and locating the "nuggets" therein is not easy. Foremost among the information needed by the appraiser is a quantitative estimate of energy savings that the subject building achieves over a standard building. Compounding the problem, much of the 'generic' information in the energy field (e.g., typical energy savings for particular measures) and many studies and claims about how this translates into asset value is either too highly generalized (perhaps using national averages) or is from a specific market not relevant to that where the user is practicing. In practice, the value of a green/HP building will vary widely depending on factors as diverse as prevailing energy prices and sentiments of prospective buyers. Traditional appraiser training has not emphasized these considerations, although that is now changing. Lack of information also impedes an owner's ability to compel an appraiser to consider a property's green/HP features and performance. Even with good information available, the highly fragmented appraisal industry and its professional organizations[10] provides no single turn-key pathway for reaching all practicing appraisers. The Appraisal Foundation and the Appraisal Institute are the only industry bodies with significant sustained interest and effort in this area. However, approximately two thirds of appraisers do not belong to any trade association (Alltera 2015).

4. Time/budget pressure & process commoditization. Appraisers are under considerable time/budget pressure to complete their assignments. Green/HP, particularly in the context of non-residential buildings, is a complex topic and enormous amounts of documentation can be

[10] Examples include the Appraisal Institute, The Appraisal Foundation, American Society of Appraisers, Royal Institute of Chartered Appraisers, and the American Society of Farm Managers and Rural Appraisers.

Table 2. *Barriers and opportunities.*

Barriers ==> **Strategies V**	**Skeptical predisposition towards "green"**	**Competency deficiency**	**Information deficiency**	**Time/budget pressure & process commoditization**	**Professional differences between appraisers and sustainability professionals**	**Risk aversion**	**Public policy vacuum**
Elevating the competency of appraisers							
~ Professional Standards of Care	x	x	x		x	x	
~ Enhancing training and professional development	x	x	x		x	x	x
Developing better information resources							
~ General information	x	x	x			x	x
~ Building-specific information	x	x	x	x	x	x	
~ Aggregate market information	x	x	x	x		x	
Improved energy benchmarking and rating tools		x	x	x		x	x
Better characterizing and managing risk		x	x	x		x	x
Integrating disaster resilience and sustainability		x	x			x	
Mitigating the problem of additional time/cost for performing assignments		x	x	x		x	
Enhancing demand for improved appraisals	x					x	
Engaging new market participants							
~ Utilities		x	x	x	x		
~ Insurers		x	x			x	

presented to the appraiser for assessment. The previously mentioned barriers associated with competency and information only serve to amplify the effort to process this additional layer of information. Meanwhile, the process of scoping, bidding, and performing appraisals has become more commoditized and standardized, which reduces flexibility and the ability to consider non-standard factors. The widespread use of valuation templates by all the major appraisal organizations is also a major problem as they don't typically include considerations of green features, etc.; adding these factors and discussions is an added burden. It is appropriate and typical for fee and timing adjustments to be made so as to permit the appraiser to provide an accurate report, but "lowest-bidder" pressures mitigate against quality assessments.

5. Professional differences between appraisers and sustainability professionals. Those who design, build, or otherwise promote the development of markets for green/HP buildings view themselves as agents of change and advocates of improved practices. They seek to change markets. The appraiser does not view themselves in this way. They do not drive value or actively shape markets, but, rather, observe market behavior and codify it.[11] Un other words, appraisers are the messengers of how markets function, whereas energy policymakers focused on these issues are projecting how markets will behave if they function according to idealized theory where costs and benefits are fully optimized. Lack of appreciation for these differences in posture towards this issue can thwart well-intended efforts to unify the two communities. Compounding the problem, as previously noted, the terminology used in the valuation industry differs, sometimes fundamentally, from that used in the green/HP community (Table 1).

6*. Risk aversion.* While a central goal of appraisals is to identify project-related risks and incorporate them in the valuation, risk abounds in the appraisal process itself. Appraisers are understandably adverse to this second type of risk, as their reputations and profits rest upon it. Undertaking an assignment for which the appraiser is not competent is a key risk. This, in turn, invites the risk of over- or under-valuing the property and being taken to task (in the review process or even in post-assignment litigation). Running afoul of appraisal standards, including any appearance of bias or undue influence, places appraisers at risk. A particularly important risk arises in appraising recently retrofitted properties, as utility expense inputs to cashflow models are typically substantiated by analyzing *past* experience. Very robust savings projections are needed order to defend stipulated "stabilized" post-retrofit utility expenses. Assumptions about often complex utility tariffs are yet another variable. This kind of energy engineering analysis is beyond even well-trained appraisal expertise, the third party report conclusions are best relied upon (as done with Phase 1 Environmental Site Assessments or a PCA). By using third-party reports, risk is thus transferred from the appraiser to the third-party expert. A more pragmatic risk is ending up with an insufficient fee as a result of underestimating the effort that may be entailed in performing an appraisal. Contrary to the stated desire for more information, some observers protest the trend toward increased disclosure as inviting new risks (Davis 2013), when analysis is beyond the appraiser's competency, conclusions can still be used. While these liabilities have not yet manifested in litigation (e.g., one long-standing appraisal law blog has no occurrences of the terms "green", "green buildings," or "energy-efficiency[12]) the risk is there.

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[11] "Market behavior" can include incorporating actual utility expenses into valuations.

[12] See http://www.appraiserlawblog.com/

7. Public policy vacuum. Efforts by environmental policymakers to foster collaboration between the appraisal and green/HP buildings communities have been highly fragmented, short-lived, and of limited effectiveness. A wide cognitive and technical void separates these policymakers and valuation professionals, resulting in lack of mutual understanding. Appraisers often feel "dictated to" and over-sold by policymakers, rather than engaged in two-way dialogue and joint problem solving process. Appraisers are also wary of the consistently glowing characterization of green/HP proffered by public agencies — they know there can be downsides, but see those being ignored or downplayed. While the policy community has great expectations for the use of labeling and rating programs (LEED, ENERGY STAR, etc.) in the valuation process, practicing appraisers express doubt about the applicability. Appraisers see the policymaking community as having a poor grasp of the appraisal process and standards of care, resulting in recommendations that are in-actionable. A common example are rules of thumb about applying standard capitalization rates to stipulated energy savings in order to estimate contributory value, when in reality the calculation has to be modified to reflect a myriad of factors including but not limited to local conditions, prospective buyer types, and a host of related risk factors such as energy savings volatility and persistence. Moreover, appraisers apply other methods in addition to cashflow-analyses prior to reaching a final determination of value. Moreover, some appraisers are deterred from engagement with federal initiatives by a perception of a siloed and uncoordinated approach towards green appraisals, and lack of staying power for problems that require patience and tenacity.

* * *

Each of the preceding broad categories of barriers presents opportunities, many of which are outlined below. Most opportunities address multiple barriers (Table 2).

Opportunities

This section explores how the various actors and processes can be better aligned to address the aforementioned gaps/disconnects/barriers.

1. Elevating the competency of appraisers

Professional standards of care

We are not aware of any surveys that have been conducted to characterize the level of green/HP knowledge and competency among commercial appraisers, or the obstacles they see to enhancing their practice. This would be a natural place to start in order to inform efforts to improve competency.

Recent public-domain work by the Appraisal Foundation (Black *et al.,* 2015; Finlay *et al.,* 2015) together with publications of The Appraisal Institute lay important groundwork for more systematically incorporating green/HP considerations in the standards of care for valuation professionals. There is room for more elaboration and training to build competency, particularly

in such a rapidly changing field. Emerging areas needing attention include the trend towards Net Zero Energy buildings (Runde 2015) and technologies enabling real-time demand response by "grid-aware" buildings.

While the Appraisal Foundation advisories are voluntary, state regulators may adopt elements of these guidelines and make them required for appraisers in local markets. Interested parties may seek to work with localities towards this end. The Foundation also manages the Uniform Standards of Professional Appraisal Practice (USPAP).[13] These currently allow for an appraiser to identify competency gaps and to obtain that competency during the course of the relevant assignment. Requiring competency before an assignment is accepted would be a more effective way to safeguard the process. By analogy, following concerns about competency and ethics in the over-valuation of conservation easements, some jurisdictions now require the appraiser sign an affidavit that they possess the education/experience required for these assignments.

As discussed more fully below, liability insurance companies that underwrite appraisers can also play a role here, as a key risk-management strategy is to equip appraisers with the ability and incentive to employ best practices in their assessments of green and high-performance buildings.

Training and professional development

Training and professional education address many barriers, and enable appraisers and other participants in the process to obtain sufficient competency. There is very limited appraiser training on basic building design and operations and no particular training on green/HP issues is currently required as part of an appraiser's education. Training could also be valuable for other parties such as appraisal reviewers, lenders, developers, property owners, etc. Of note, the administrative staff to whom appraisal requests are handed within lending institutions are typically less familiar with the project in question and also have less training than the presiding loan officer. Training focused on these individuals could be particularly value.

In a recent report, the U.S. Department of Energy (DOE) identified appraiser education as a leading policy goal. They noted that the states of Alabama and Colorado have subsidized appraiser education on green buildings (USDOE 2014). According to one report, only 14 residential and 7 non-residential appraisers in California had completed the Appraisal Institute's "Valuation of Sustainable Building Professional Development Program" (California Energy Commission 2015). This compares poorly with the 11,000 licensed appraisers in California as of January 2015, although perhaps not surprising due to the small number of green buildings there are in California as a percentage of the total. The Appraisal Institute is reported to have had 257 appraisers complete one or more courses in their sustainability program as of 2014; about 1% of membership (McGraw Hill 2014).

Training efforts have thus far been limited. Several courses are offered by the Appraisal institute (introduction to "green", case studies for residential and non-residential buildings, solar valuation, and residential green description). The U.S. Department of Energy is developing

[13] See https://netforum.avectra.com/eweb/DynamicPage.aspx?Site=taf&WebCode=USPAP

courses on rating and benchmarking tools and their Guidelines for Building Science Education are aimed at residential and non-residential appraisers.

Improved depth can no doubt be offered on topics such identifying third-party experts and how to vet them and incorporate their conclusions into the valuation process; codes and standards; market data; finding and judging various models and data sources; emerging technologies; how to read a solar lease, PPA, or Green Lease. DOE is currently developing appraiser training in benchmarking and rating tools.

Existing trainings tend to focus on the most common building types. Energy considerations in specialized facilities such as hospitals, data centers, laboratories, or energy-intensive industrial operations are generally not treated. The value of high performance arguably stands to be greatest in these facilities, as, for example, energy costs are far higher and the co-benefits of energy efficiency are often even more substantial than in conventional properties.

The use of case studies is a traditional teaching methodology. Few real-world case studies of appraising green/HP buildings have been published, however, and fewer still have been incorporated into trainings. While large numbers of case studies have been performed for individual residential buildings,[14] only a handful of examples for non-residential buildings are in the open literature. The same imbalance applies for regional or national statistical studies. Future case study work should also focus on whether under-performing buildings received below-average valuations (the so-called "brown discount").

Increased scale in training deployment is needed. For example, trainings offered by a given professional society are generally only available to its members. Reciprocal training is also needed for those in the green/HP (e.g., program designers; code officials) who seek to engage constructively with appraisers.

2. Developing better information resources

General information

New green/HP research is published on a regular basis, but seems to have little visibility or effect in mainstream appraisal circles. It is difficult for appraisers to access unfamiliar green/HP literature and databases. Policymakers may seek to mount an informational campaign to enhance access to the products of their own research and that of the broader "green/HP community". The U.S. Department of Energy has sponsored an initial effort along these lines in the form the Information Atlas for Appraising Green and High Performance Buildings.[15]

There is a need to for more case-studies demonstrating the application of green/HP considerations in the valuation process. These should illustrate different types of appraisal uses (sale, refinancing, asset management, insurance losses, etc.). More statistical work is also need

[14] A catalog can be found here: https://sites.google.com/site/appraisinghpbuildings/valuation

[15] See https://sites.google.com/site/appraisinghpbuildings/

to assess micro-level trends in valuation for large numbers of buildings. Groups could attempt to work with the Appraisal Foundation to help improve hedonic methods already utilized in the Uniform Standards of Professional Appraisal Practice (USPAP). Better methodologies (e.g., Bayesian probability approaches) are now available, and it has become easier to assemble large datasets with nuanced information about green/HP property characteristics. Care must be taken not to generalize findings into over-simplified rules of thumb. Of particular importance, studies should also test the hypothesis that sub-average performance ("brown discount") erodes property value.

Building-specific information

Existing competency standards require that appraisers substantiate their findings with data. The types of non-traditional third-party experts possessing substantial green/HP data are often unfamiliar to appraisers. Efforts to help appraisers identify and differentiate among the many types of third-party experts and apply the report conclusions to the property analysis would be of value. The increased use of sophisticated metering and data-acquisition systems is another resource largely untapped by appraisers.

In the case of a green/HP property, assertions of energy efficiency are not very defensible *in lieu* of robust utility data and detailed descriptions of the physical characteristics to which performance is being attributed. Appraiser reliance on stipulated or "default" values can understate value when the subject building is high-performing. The problem is far more difficult for less tangible factors such as indoor environmental quality (IEQ), which appraisers would characterize under the rubric of "Habitability". The Green and Efficient Addendum could be enhanced to capture more useful information of this sort, and appraisers could be empowered to extract more of this information from inspections and associated measurements and mitigations. Other information sources include the Green and Efficient Buildings Addendum, LEED point lists, energy engineering reports, etc. Certain IEQ attributes do not require expert assessment.[16]

Appraisal practice sometimes involves obtaining a Property Condition Assessment (PCA) report. The ASTM standards for these reports could be reviewed with an eye for opportunities to enhance the green/HP content, e.g., identification of O&M issues that could have adverse impacts on energy use.[17]

There may be scope to improve the energy analysis aspects of hedonic methods already utilized in the Uniform Standards of Professional Appraisal Practice (USPAP), promulgated by the Appraisal Foundation.

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[16] See https://sites.google.com/site/appraisinghpbuildings/key-topics/indoor-environmental-quality

[17] See ASTM E2018-08 Baseline Property Condition Report, http://www.astm.org/Standards/E2018.htm; ASTM E1527-13 Phase I Environmental Assessment Process, http://www.astm.org/Standards/E1527.htm; ASTM E2797 Building Energy Performance Assessment http://www.astm.org/Standards/E2797.htm

As previously noted, owners/developers are a key source of information and more efforts could be made to support them in conveying useful information about green/HP features to appraisers.

Aggregate market information

In an ideal world, existing databases of property sales would provide all the information necessary for appraisers to conduct sales comparisons. Some providers, e.g., CoStar[18]/Loopnet[19] and Xciligent report having done this, yet practicing appraisers note that there is little green information and concerns about quality control on the underlying data. Multidisciplinary efforts could improve the rigor and availability of these kinds of databases and associated analyses. However, most commercial property valuation is income based so even with an improved sale database, the primary methodology used by buyers and sellers (and appraisers) will be the Income Approach. The exception could be owner user buildings where both approaches might influence buyers.

The green/HP community has stood up various databases of high-performance buildings. Some are program specific (e.g., ENERGY STAR buildings), while others attempt to aggregate databases (e.g., GBIG, targeting primarily large commercial properties). For applications to the valuation process, these efforts are lacking in two respects. Firstly, the databases do not contain sales information and thus are not directly useful in sales-comparison studies. Secondly, these focus on ostensibly exemplary buildings, whereas best practice for appraisers is to consider the entire performance spectrum. The Building Performance Database (BPD) is an effort in this direction (including buildings irrespective of their level of energy use), but is not paired with real-estate sales data and is not intended to be representative of the overall building stock. Valid comparisons must encompass energy data, physical characteristics, and operational factors. Those who assemble these databases could consider combining this information with sales data as a resource for the appraisal industry.

Aside from individual building characteristics, appraisers require data on prevailing conditions and contextual factors such as weather, energy prices, building codes, policies, and public attitudes. Some elements of this were captured in the Green Building Opportunity Index combining general market conditions and investment outlook with green adoption and implementation, mandates and incentives, state energy initiatives, and "green culture." It is unfortunate that this service (Created by NEEA and Cushman Wakefield in 2010) is no longer maintained; it or something similar should be revived and regularly updated. The Green Building Barometer is another proposal along these lines.[20] CBRE's Green Building Adoption Index provides a potentially key element, capturing the penetration of ENERGY STAR and LEED buildings by market (offices only, and only leasable space), but going no further than that in

[18] Note that CoStar does not list buildings with sales prices under $250,000. http://www.costar.com/News/Article/Case-for-Green-Buildings-Grows-Stronger-for-Owners-Occupants/127092

[19] See http://www.loopnet.com/Green-Buildings/

[20] See https://sites.google.com/site/appraisinghpbuildings/market-data

terms of providing broader contextual information on the disposition of the surrounding market (Kok and Holtermans 2014).

3. Improved energy benchmarking and rating tools

The existing body of tools and software for green/HP buildings assessment is bewildering at best and unknown at worst to most appraisers. The language is foreign and the subject-matter knowledge required to use and interpret results is out of reach. The free *PV Value* tool for quantifying the contribution of a solar photovoltaic array is one of the few energy analysis tools that has proven useful to and usably by the appraisal community.

Leading rating and benchmarking tools have highly limited utility for appraisers, which is not surprising given that they were not developed with appraisers in mind. Some (e.g., BPD or the Building Asset Score) do not provide essential energy cost metrics. The vintage of the energy characteristics data within the tools is not always specified or filterable, leaving the appraiser uncertain as to whether it is representative of *current* conditions.

These tools, however, do have value in helping to obtain descriptive information on green/HP features, and to garner some metrics and ratings that may have contextual value. Moreover, third-party endorsed energy analyses generated by tools such as Portfolio Manager bolsters an appraiser's ability to credibly deviate from industry defaults in discounted cashflow analyses. Incremental improvements may be made to some of these tools to increase their value to appraisers, an illustration of which might be allowing the Building Performance Database data to be filtered by data vintage (as distinct from building vintage), thereby providing the appraiser with a clearer picture of market practices at a given point in time. Any tool that helps reduce the time/effort required to access disclosure data on energy bills would also be valuable to appraisers.

As many of these tools offer application programming interfaces (APIs), an effort could be made to collaborate with appraisal software vendors who may be interested in pulling relevant data fields into their tools and reporting them in a context and format more familiar to appraisers. Recent efforts to enable residential energy audit software to automatically populate the Appraisal Institute's Residential Green and Energy Efficient Addendum[21] provide an example, analogs of which could be achieved for non-residential buildings. The AI Addendum also includes pre-set links to the *PV Value* software for solar array analysis.

4. Better characterizing and managing risk

A key function of the appraisal process is assessing the risks and uncertainties associated with property valuation. Indeed, as noted in The Appraisal Foundation's advisory on competency, there is risk in insufficient knowledge or experience that results in "assigning value, or no value, to green components without market support" (emphasis added) (Black, *et al.,* 2015).

[21] See http://www.appraisalinstitute.org/assets/1/7/Interactive820.04-ResidentialGreenandEnergyEffecientAddendum.pdf

Green/HP buildings can mitigate certain risks, but can also bear their own unique risks, such as water damage from vegetated roofs, solar panels on rooftops posing a hazard and impediment to firefighters, etc. Energy savings persistence is likely foremost among these risks. Appraisers must understand the techniques used to reduce uncertainty, including sub-metering and savings tracking, regular O&M programs, commissioning, and application of well-validated simulation models to savings estimation.

On the up side, green/HP buildings are intrinsically subject to reduced utility price volatility, when properly executed, have significantly better indoor environmental quality, and are more durable and disaster resilient. These buildings are also argued to enhance income. A few surveys and many "proofs by vigorous assertion" suggest that some high-performance buildings will indeed have lower vacancy rates, better tenant retention, and faster lease-up times. More data, however are needed to demonstrate the strength of these effects and how they vary by market and other circumstances. Owner-occupants capture similar benefits of healthy interior conditions directly into their business workforce, plus reputation aids talent attraction and retention. This consideration has been cited by leading technology companies such as Microsoft, Apple, and Google (Mills *et al.,* 2015).

Another risk factor is that lenders will be wary about excessive leverage when green/HP features are financed. This can be particularly significant for small buildings in mid-markets, where green/HP features can represent a much higher fraction of appraised value than is the case for large projects. The Connecticut Green Bank discovered this in the case of their commercial PACE loans, but found that it could be managed. This suggests that a focus on small commercial properties could be particularly productive.

Engaging insurance companies and risk-management professionals in the appraisal process (described below) is one way to ensure that risks are better characterized and mitigated and that appraisers are adequately insured for applicable errors and omissions claims that may arise from green assignments. This is more of a prospective than current issue in the industry, but analogous litigation has been seen involving architects and engineers.[22]

5. Integrating disaster resilience and sustainability

Natural hazards are a contextual factor that appraisers are expected to consider in the valuation process. Appraisers are arguably more attuned to natural hazards and the vulnerability of properties than they are to green/HP issues. That green/HP properties can be more disaster resilient merits consideration as appraisers assess what is known as "functional utility". Some building professionals assert a high-performance building cannot be deemed truly green or sustainable if it is not durable in the face of extreme events or every-day factors that stand to degrade the facility.

Natural hazard events and associated economic costs continue to rise, impacting property value through proxies such as rising insurance premiums and fortification costs. The private insurance industry is engaging efforts to promote resilience, incentives for disaster-resilient practices, and

[22] See http://www.greenbuildinglawblog.com/

adjusting premiums to reflect building code quality and enforcement.[23] The Institute for Business and Home Safety (IBHS) offers guidelines on disaster-resilient buildings; some insurers assess lower premiums to these buildings. Conversely, insurance premiums may be adversely impacted by sub-par ratings within the Building Code Effectiveness Rating Scale.[24]

As recognized by IBHS, LEED, the U.S. Department of Energy and others, certain sustainability attributes enhance a property's every-day durability and ability to endure or adapt following natural disasters.[25] Examples include the water-damage resilience of closed-cell foam insulation or the fire-resistant properties of multi-pane windows. Sustainability attributes can shorten or even eliminate business disruptions following a power outage due to backup generators or on-site energy storage. The correction of discovered defects often translates into enhanced equipment life, improved tenant comfort, avoided premature equipment failure, and early detection of fire hazards.[26]

Efforts could be made to enhance the existing treatment of natural hazards and other durability considerations to include these linkages with green/HP considerations, and to consider these attributes in property valuations.

6. Mitigating the problem of additional time/cost for performing assignments

One barrier noted above is concern about the additional time and cost to gather information and evaluate green/HP features. The LEED building checklists provide convenient data on relevant building characteristics. New tools such as the Appraisal Institutes Green and Energy Efficiency Addendum[27] help structure the collection and presentation of relevant data, although a User Guide is needed for the Addendum. Mobilizing more and better data on sales and market characteristics (energy prices, building codes, etc.) in a form appraisers can use would also make the process more efficient. For each appraiser or firm to individually gather such data is time-consuming and creates significant redundant effort; a public-goods, open-access directory would be a welcome resource in the industry. Widespread existing efforts to compel disclosure and public access to utility data is an existing example of pooled data that is readily accessible by appraisers.[28] The U.S. Department of Energy has supported this work in the past.

Third-party incentives or financing of the incremental costs of information acquisition (e.g., by utilities, as mentioned below, or other stakeholders) may be feasible. Training is a second-order cost to appraisers, and incentives to defray training costs would also be of value.

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[23] See https://www.disastersafety.org/building_codes/rating-the-states_ibhs/

[24] See the Building Code Effectiveness Grading Scale: http://www.isomitigation.com/bcegs/0000/bcegs0001.html

[25] See "The Link Between Hazard Mitigation and Livability: Planning for a Sustainable Future" –FEMA Publication No. 364 September 2000http://www.fema.gov/media-library/assets/documents/2110

[26] See https://sites.google.com/site/appraisinghpbuildings/key-topics/quality-assurance

[27] See http://www.appraisalinstitute.org/assets/1/29/AI_821_Green_Commercial_Interactive.pdf

[28] See https://sites.google.com/site/appraisinghpbuildings/key-topics/disclosure-1

7. Enhancing demand for improved appraisals

In the absence of demand for green appraisals, the incentive for appraisers to make the added effort and investment in training will remain limited. Owners who have invested in improving their property clearly have an interest in recovering their investment both during the holding period and upon sale. Lenders need to fully understand collateral value and associated performance risks. Third-party stakeholders such as insurers have their own objectives, and policymakers seek to undue market failures resulting from non-valuation of green and high-performance elements of the building stock.

Owners of green and high-performance buildings should compile all information and communicate it to each prospective lender. Within the cover letter, owners are advised to identify the collateral as a high performance building, that specific features should be considered in the valuation assignment, and state the expectation that the appraiser have competency in line with the assignment complexity. It is critical that owners and those who order appraisals fully articulate expectations and disclose key factual information at this early, critical stage of the process. One approach would be to have owners complete a standardized disclosure of building features and identify available supporting documentation, analysis, and reports. This would be made available as part of the RFP so appraisers could determine if they are competent and submit reasonable fee and timing bids. This could be accompanied by model language for expected appraiser qualifications, due-diligence expectations, Bid/RFP documents, RFQs, Property History Summaries, Property Condition Assessments (PCAs). The Appraisal Institute has also promulgated model SOW language for residential appraisals, which calls for competency in green/HP as well as citing a national "Green Value Score" upon which appraisers can rely.[29] Appraisal Management Companies (AMCs) oversee many appraisal projects and could be an effective intermediary between banks/clients and appraisers for deploying improved methodologies, although their reputation is to oversimplify the process rather than to improve its quality.

In an example for residential real estate, a builder of high-efficiency homes introduced language into his guidance to lenders to help identify qualified appraisers.

> *"This home is being built/renovated/updated to nationally recognized standards above prevailing code. It is designed and constructed with unique features and materials and with high efficient equipment and in accordance with high efficiency standards. The Lender shall choose an Appraiser educated and knowledgeable in this type of valuation of these specialized Homes, preferably an appraiser who holds a professional appraisal designation that requires advanced education on such issues as the valuation of sustainable buildings (e.g., MAI or SRA designations from the Appraisal Institute). The appraiser shall provide verification of green valuation education of 14 hours or more from a qualified educational provider and knowledge to be permitted to conduct the appraisal for this project."*

[29] See http://mts.sustainableproducts.com/certified_products/Model%20Green%20Home%20Valuation%20Scope%20of%20Work%2010-27-12.pdf.

Another opportunity arises near the conclusion of the appraisal assignment, when the draft is reviewed. A new level of arms-length technical review could be created, e.g., by interested utilities, state energy offices, or universities. AMCs traditionally play a role in this process as well. Clients may elect to contest an appraisal that they feel has not adequately addressed the property's green/HP features.

Legislating better practices for these entities at the federal level or as augmentations to Federal minimum requirements at the State level could be explored. Recent efforts to do so indicate the need for further refinement.[30]

8. Engaging New Market Participants

While the real-estate valuation "ecosystem" is already a busy landscape, certain potentially valuable non-appraisal trades and professions with bearing on green/HP are absent or only peripherally engaged.

Energy Utilities and Other Energy Efficiency Program Agents

To the extent that utilities and other parties are compelled to support the improvement of energy efficiency within their customers' premises, they may align themselves with efforts to ensure that appraisals capture the value. To the extent that property owners understand the extent to which their investment will be recouped, they will be more likely to participate in utility programs.

While focused on residential appraisers, it is worth noting a relatively rare effort was made on the part of utilities to assess the role that real-estate appraisers could play in their programs (Roger Starch Worldwide 2003). Appraisers were found to have limited awareness of utility or federal energy efficiency activities, and few addressed it in their work. As this effort was nearly 15 years ago, utilities should be polled to determine whether other efforts have been made, lessons learned, remaining opportunities.

Many utilities have offered, sometimes free or discounted, energy education to appraisers. These include Georgia Power, Duke Energy, Arizona Public Service, The Salt River Project, and others. However, there is a much broader array of ways that utilities can engage.

New efforts could be made to engage utilities. In addition to an educational role, this could include a role in mitigating the "lowest-bidder" syndrome through provision of financial incentives to appraisers to defer the additional time spent incorporating green/HP analysis into the traditional appraisal, or, if this is problematic, utilities could underwrite the costs of third-party experts to facilitate data gathering, analysis, review, etc. Where utilities interoperate with lenders, they can insist on the careful application of competency criteria during the appraiser selection process. A key caution for any new form of third-party engagement is to avoid any real or perceived conflict of interest or potential to introduce bias into the process. Extreme care must be taken to manage any potential risk in this regard.

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[30] See http://www.usgbc.org/articles/senate-energy-committee-approves-comprehensive-energy-legislation

Insurance Industry

Insurers and appraisers have a variety of overlapping goals and interests, yet insurers have not been engaged in the green/HP appraisal discussion.

- Appraisers are sometimes commissioned to prepare an "insurance value" appraisal, which is a variant on full valuations insofar as certain items, e.g., land or excluded features are not included. Green/HP features should be part of such an assignment.
- Business interruption insurance claims are indexed to rents and vacancy rates, and thus any effect of green/HP characteristics on those metrics is of interest in the underwriting process.
- An increasing number of insurers are associating their in-house operations as well as corporate strategy and public posture with sustainability. They are investing in green buildings and will thus be as interested as any owner in seeing that the incremental value created is recognized during the appraisal process.
- Insurers engage in efforts to promote disaster resilience, in some cases adjusting premiums to reflect the quality and enforcement of local pertinent building codes. The Institute for Business and Home Safety offers guidelines on disaster-resilient buildings and some insurers reward compliant buildings with lower premiums, which, in turn, positively influence a property's cashflow.
- Insurers and appraisers alike are concerned about associated (inadvertent) downside technical risk, ranging from energy savings persistence to health and safety factors. Insurers, for example, have created energy-savings insurance products coupled with engineering oversight to help address performance risk (Mills 2003). Collaboration on identifying and managing these risks could be mutually advantageous.
- Lastly, appraisers carry Errors & Omissions liability insurance,[31] which has the potential of being triggered if there are disagreements around the handling of green/HP issues. Insurers have an interest in loss prevention. This is more of a prospective than current issue in the industry, but analogous litigation has been seen involving architects and engineers.[32]

Appraisers assume legal, reputational, and ethical risks by overlooking green features, utilizing unsupported or inappropriate adjustments to value, or having any real or perceived bias toward or against green/HP (Black *et al.,* 2015). Liability claims can arise, for example, if the appraisal is contested for inadequately treating green or high-performance features or overestimating value. Undervaluing green/HP features could result in an appraisal coming in below a contracted selling price, which could in turn scuttle a transaction and create disputes. Appraisers may turn to insurers to help them manage these risks. Insurers thus have an interest in proactively enhancing appraiser competency and quality assurance during the appraisal process and in tailoring their products and services to recognize these risks and reward best practices through policy terms an conditions. Insurers can be proponents of risk management, an illustration of which is the intended benefit of Green MLS in reducing liability associated with undocumented claims (NAR 2014).

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[31] A leading Errors & Omissions liability insurer for appraisers is LIA, http://www.liability.com/

[32] See http://www.greenbuildinglawblog.com/

Conclusion and Recommendations

Building on a review of the appraisal process and how green/HP considerations can fit into it, this report identifies major categories of barriers impeding more thorough consideration of green/HP factors in commercial real estate appraisals, and offers a series of broad categories of solutions for mitigating these barriers.

The wide domain of risk assessment and management is perhaps the most dominant and crosscutting barrier-opportunity nexus. Appraisers are ill-equipped to quantify uncertainties in the potential upside benefits of green/HP on expenses as well as income (differential rents, vacancies, etc.). It is also challenging for appraisers to determine whether a property will perform as advertised or whether it is under built ("obsolescent") or overbuilt ("superadequate") for a particular market in terms of green/HP. In wading into these new areas of analysis, appraisers themselves face competency risk and associated reputational risks. But they face equal risk in ignoring these emerging facets of buildings. Better data, understanding, tools, and perhaps even insurance products can help to manage downside concerns while better resolving the relationships between green/HP and investment risks.

Appraisers acutely lack information *and* the competency to use it. The lack of sales-comparison data is the most often cited example, but even information on the subject building (characteristics and operations) is often hard to obtain and verify. The Income Approach is most important for non-residential valuation and analysis is being aided by robust energy management system technology that tracks building performance and reduces operational risk. More broadly, green/HP information does not circulate widely within the valuation community. Third parties such as federal agencies may be able to play a role in helping relay more relevant information to appraisers, but a coherent strategy is needed, together with long-term commitment.

The importance and need for increased owner engagement is one of the foremost needs. Owners are seen to be generally uninformed (and arguably un-empowered) about their important role in gathering/sharing relevant information with the client and appraiser. Lack of this information contributes to an ineffective scope of work at project inception. Meanwhile, appraisal review is a final opportunity to affirm that best practices were employed and information properly considered. Model documents and procedures may help streamline this process.

One of the more significant sources of inertia is the vast amount of information to potentially be collected and considered, and the corresponding time requirements and cost. Thus, of key importance is designing and implementing more time-efficient systems for mobilizing and analyzing salient information. There may also be a role for financial incentives, e.g., from utilities, to help defray some of these transaction costs, particularly given the "lowest-bidder" syndrome that impinges on the appraiser selection process.

In addition to the topical opportunities, following are some cross-cutting activities through which interested stakeholders may be most effective:

- **Develop a roadmap for action.** A strategic process would be best initiated with an industry-wide survey to characterize the level of knowledge and competency among commercial appraisers, and the obstacles to enhancing their practice. Key needs and issues could then be identified, further vetted with stakeholders, and then mapped to likely facilitators.

- **Bridge the professional/cultural divide between appraisers and policymaker communities.** Appraisers have little interaction with the environmental policy stakeholder communities. Indeed there is indifference if not distrust. The history has been punctuated by dictates, without much insight into how the appraisal process works and how much time appraisers actually have to consider green/HP features. Concerted efforts are needed to build mutual respect and trust and clearer lines of two-way communication. Practicing appraisers have already called for this (Adomatis 2014). Past federally sponsored work with role-playing exercises around similar energy issues may yield better understanding of appraisal industry needs (Ruth *et al.,* 2007). Simple efforts to help appraisers understand terminology are a good starting point. DOE's "Building America Building Science Translator" is a resource that could be promulgated more widely in the appraisal community (USDOE 2015).

- **Track progress.** We have found no public-domain efforts to quantify and track the uptake of "green" appraisal practices. Existing information may be regarded as proprietary and, in any case, no one actor has market-wide experience. An entity is needed to objectively poll practitioners to obtain an ongoing progress report, which, among other things, would be useful in identifying barriers and prioritizing and targeting new initiatives.

There is no silver bullet for advancing the practice of valuing the green/HP features of buildings. Interested parties in the public policy community must identify barriers they wish to address and select from among the initiatives described above that map to those barriers. Close collaboration with appraisers is critical. Large organizations and agencies should have a united approach that includes all stakeholder perspectives; the perception or reality of a fragmented and uncoordinated strategy is unsettling for prospective partners in the appraisal industry. This requires improved communication and education within and between these communities.

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