About the Appraisal Institute

- 80 plus year old professional society of real estate valuers
- 22,000 members in 60 countries
- Largest publisher of real estate valuation textbooks
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- A leader in development of the body of knowledge
- Real estate valuation education curriculum
Residential Green Valuation Tools

by Sandra K. Adomatis, SRA, LEED Green Associate
Appraisers provide professionally developed opinions of value for:

- Mortgage Lending
- Collateral Management
- Eminent Domain
- Property Taxes
- Litigation
- Corporate Balance Sheets
- Foreclosure, and
- Real Estate Damages, among many others....

Appraisers also do consulting work for many types of clients.
Appraisers protect the public interest and the integrity of the financial system, court system, corporate balance sheets, etc. by providing their services in the following manner:

- Unbiased
- Objective
- Impartial

*Appraisers tell the truth, even if it hurts!*
Market Value

The most probable price that a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

- Buyer and seller are typically motivated;
- Both parties are well informed or well advised, and acting in what they consider their best interests;
- A reasonable time is allowed for exposure in the open market;
- Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and
- The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

(12 C.F.R. Part 34.42(g); 55 Federal Register 34696, August 24, 1990, as amended at 57 Federal Register 12202, April 9, 1992; 59 Federal Register 29499, June 7, 1994)
Value in Use

The value of a property assuming a specific use, which may or may not be the property’s highest and best use on the effective date of the appraisal. Value in use may or may not be equal to market value but is different conceptually.

Principle of Contribution

The concept that the value of a particular component is measured in terms of the amount it adds to the value of the whole property or as the amount that its absence would detract from the value of the whole.

Feasibility Analysis

A study of the cost-benefit relationship of an economic endeavor.

**Some Basic Concepts & Definitions**

**Payback Period**

The length of time required for the stream of cash flows produced by the investment to equal the original cash outlay.

Some Basic Concepts & Definitions

Cost Versus Value

Cost and Value are related,
BUT

Cost ≠ Value
Appraisers use 3 basic methodologies to estimate real property value, along with many sub-techniques:

- The Cost Approach
- The Sales Comparison Approach
- The Income Capitalization Approach
The Cost Approach

Based on the idea that a buyer would pay no more for a property than the cost to acquire a similar site and construct improvements of equivalent desirability and utility........

<table>
<thead>
<tr>
<th>Basic Cost Approach Procedure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost New</td>
<td>$2,100,000</td>
</tr>
<tr>
<td>Less Depreciation</td>
<td></td>
</tr>
<tr>
<td>Physical Depreciation</td>
<td>-$275,000</td>
</tr>
<tr>
<td>Functional Obsolescence</td>
<td>-$100,000</td>
</tr>
<tr>
<td>External Obsolescence</td>
<td>-$325,000</td>
</tr>
<tr>
<td>Total Depreciation:</td>
<td>-$700,000</td>
</tr>
<tr>
<td>Depreciated Value of the Improvements:</td>
<td>$1,400,000</td>
</tr>
<tr>
<td>Add: Depreciated Cost of the Site Improvements:</td>
<td>+$150,000</td>
</tr>
<tr>
<td>Add: Estimated Land Value:</td>
<td>+$450,000</td>
</tr>
<tr>
<td>Estimated Fee Simple Value:</td>
<td>$2,000,000</td>
</tr>
</tbody>
</table>
The Sales Comparison Approach

Based on the idea that a property is worth what buyers and sellers of similar properties are paying/selling.

1. Identify, research and analyze recent sales of similar properties (comparables)
2. Make *adjustments* to the comparables to make them similar to the subject.
3. Reconcile the value indicators into a value opinion.

*Adjustments* ...... An important concept in valuing green components
The Income Capitalization Approach

Based on the idea that a property’s value is based on the amount of income that it will generate for an investor.

1) Estimate rental income + income from other sources
2) Subtract vacancy and collection loss
3) Estimate and subtract operating expenses
4) Estimate property net operating income
5) Convert net operating income into value by:
   1. Multiplier
   2. Capitalization Rate
   3. Discounted Cash Flow Analysis
Reconciliation of the 3 Approaches

Each approach has strengths and weaknesses, depending on:

- Applicability/Appropriateness
- Perceived Accuracy
- Quantity of Evidence
The Issue of Competency

COMPETENCY RULE

An appraiser must: (1) be competent to perform the assignment; (2) acquire the necessary competency to perform the assignment; or (3) decline or withdraw from the assignment. In all cases, the appraiser must perform competently when completing the assignment.
http://www.appraisalinstitute.org/education/your-career/professional-development-programs/

## Valuation of Sustainable Buildings

<table>
<thead>
<tr>
<th>Title</th>
<th>Hours</th>
<th>State Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Green Buildings</td>
<td>8</td>
<td>State Approval</td>
</tr>
<tr>
<td>Case Studies in Appraising Green Residential Buildings</td>
<td>8</td>
<td>State Approval</td>
</tr>
<tr>
<td>Residential and Commercial Valuation of Solar</td>
<td>15</td>
<td>State Approval</td>
</tr>
<tr>
<td>Case Studies in Appraising Green Commercial Buildings</td>
<td>15</td>
<td>State Approval</td>
</tr>
</tbody>
</table>

**FAQs**

- Program Registry – Residential
- Program Registry – Commercial
What Do We Mean When We Say “Green?”

- Green
- Sustainable
- High performance
- Energy efficient
Green building

The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s lifecycle from siting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.
The Six Elements of Green Building

- Site
- Water
- Energy
- Materials
- Indoor Air Quality
- Operations and Maintenance
Biggest Energy Consumers

How Energy Is Used in Homes (2005)

- Space Heating: 41%
- Lighting and Other Appliances: 26%
- Water Heating: 20%
- Refrigeration: 5%
- Air Conditioning: 8%

Issues & Challenges in Valuing Green

- Green Certifications
- “Shades” of Green
- Searchable green fields in MLS databases
- Commercial databases
- Lack of marketing by sales agents
- Lack of training/education (underwriters, appraisers, regulators, sales agents, others)
- Insufficient appraisal fees for proper research & verification
## Issues in Reporting Green Features

### Single Family Residential - Form 1004

<table>
<thead>
<tr>
<th>Finished area</th>
<th>8 Rooms</th>
<th>3 Bedrooms</th>
<th>2.5 Bath(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances</td>
<td>Refrigerator</td>
<td>Range/Oven</td>
<td>Dishwasher</td>
</tr>
</tbody>
</table>

*Finished area above grade contains:*

*Additional features (special energy efficient items, etc.). See attached Supplemental Addendum.*

*Describe the condition of the property (including needed repairs, deterioration, renovations, remodeling, etc.).*
Residential Green and Energy Efficient Addendum

Client:
Subject Property:
City: State: Zip:

Additional resources to aid in the valuation of green properties and the completion of this form can be found at [http://www.appraisalinstitute.org/education/green_energy_addendum.aspx](http://www.appraisalinstitute.org/education/green_energy_addendum.aspx)

The appraiser hereby certifies that the information provided within this addendum:

- has been considered in the appraiser’s development of the appraisal of the subject property only for the client and intended user(s) identified in the appraisal report and only for the intended use stated in the report.
- is not provided by the appraiser for any other purpose and should not be relied upon by parties other than those identified by the appraiser as the client or intended user(s) in the report.
- is the result of the appraiser’s routine inspection of and inquiries about the subject property’s green and energy efficient features. Extraordinary assumption: Data provided herein is assumed to be accurate and if found to be in error could alter the appraiser’s opinions or conclusions.
- is not made as a representation or as a warranty as to the efficiency, quality, function, operability, reliability or cost savings of the reported items or of the subject property in general, and this addendum should not be relied upon for such assessments.

**Green Building:** The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s lifecycle from siting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classic building design concerns of economy, utility, durability, and comfort.\(^1\) High Performance building and green building are often used interchangeably.

**Six Elements of Green Building:** A green building has attributes that fall into the six elements of green building known as (1) site, (2) water, (3) energy, (4) materials, (5) indoor air quality, and (6) maintenance and operation. A Green Building will be energy efficient but an energy efficient building is not synonymous with Green Building.
<table>
<thead>
<tr>
<th>Green Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following items are considered within the appraised value of the subject property:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Certification</th>
<th>Year Certified:</th>
<th>Certifying Organization:</th>
<th>Verification</th>
<th>Certification attached to this report</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>USGBC (LEED)</td>
<td>NAHB (ICC-700)</td>
<td>Reviewed on site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rating</th>
<th>Score:</th>
<th>LEED Certified:</th>
<th>LEED Silver</th>
<th>LEED Gold</th>
<th>LEED Platinum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ICC-700 National Green Building Standard Certified:</td>
<td>Bronze</td>
<td>Silver</td>
<td>Gold</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additions</th>
<th>Explain any additions or changes made to the structure since it was certified:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Comments</th>
<th>If a property is built green but not formally certified, it still deserves proper description and analysis to value the features. The market analysis is of the structure’s physical, economic, and locational attributes and not an analysis of its label alone.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Additions</th>
<th>Explain any additions or changes made to the structure since it was certified:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Comments</th>
<th>Attach the rating worksheet that provides the ratings for each element to provide a better understanding of the features. The worksheet will assist</th>
</tr>
</thead>
</table>
## ENERGY EFFICIENT ITEMS

The following items are considered within the appraised value of the subject property:

### Insulation
- Fiberglass Blown-In
- Foam Insulation
- Cellulose
- Fiberglass Batt Insulation
- Other (Describe):
- Basement Insulation (Describe):
- HERS Insulation Installed Rating: 1, 2, 3 (See Glossary)

### Envelope
- Envelope Tightness:
- Envelope Tightness based on Blower Door Test

### Water Efficiency
- Reclaimed Water System (Explain):
- Greywater reuse system
- WaterSense® fixtures
- Rain Barrels Provide Irrigation

### Windows
- ENERGY STAR®
- Low E
- High Impact
- Storm
- Double Pane
- Triple Pane
- Tinted
- Solar Shades

### Day Lighting
- Skylights - #:
- Solar Tubes - #:
- Other (Explain):

### Appliances
- ENERGY STAR® Appliances:
- Dishwasher
- Refrigerator
- Other:

### HVAC
- High Efficiency HVAC SEER:

### Appliance Energy Source
- Propane
- Electric
- Natural Gas
- Other (Describe):

### Other
- Walls
- Ceiling
- Floor

### Unit
- CFM25
- CFM50
- ACH50
- ACHnatural

### Cistern - Size
- Gallons

### Location of cistern
- Solar Shades

### Energy STAR Light Fixtures

---

The table above includes various energy-efficient items considered in the appraisal of a property's value. Each item is listed with checkboxes for selection, and some have additional fields for specific details.
<table>
<thead>
<tr>
<th>HVAC (Describe in Comments Area)</th>
<th>Energy Rating</th>
<th>Energy Audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ High Efficiency HVAC SEER: Efficiency Rating: %</td>
<td>□ ENERGY STAR *Home - Version:</td>
<td>□ Infrared Photograph Attached</td>
</tr>
<tr>
<td>AFUE*: %</td>
<td>□ Other (Describe):</td>
<td>Has an energy audit/rating been performed on the subject property? □ Yes □ No □ Unknown</td>
</tr>
<tr>
<td>*Annual Fuel-Utilization Efficiency</td>
<td>Home Energy Score (HES) (Score range 1-10):</td>
<td>If yes, comment on work completed as result of audit.</td>
</tr>
<tr>
<td>□ Programmable Thermostat</td>
<td>□ Certification Attached</td>
<td></td>
</tr>
<tr>
<td>□ Thermostat/Controllers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Radiant Floor Heat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Geothermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Heat Pump Efficiency Rating: COP:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSPF: SEER: EER:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Passive Solar (Defined in Glossary)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indoor Air Quality</th>
<th>HERS Information</th>
<th>Utility Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Indoor Air PLUS Package</td>
<td>Rating:</td>
<td>Average Annual Utility Cost: $</td>
</tr>
<tr>
<td>□ Energy Recovery Ventilator Unit or Whole Building Ventilation System</td>
<td>Monthly Energy Savings on Rating: $</td>
<td>per month based on:</td>
</tr>
<tr>
<td>□ Non Toxic Pest Control</td>
<td>Date Rated:</td>
<td># of Occupants:</td>
</tr>
</tbody>
</table>

---

**AI Residential Green and Energy Efficient Addendum**

---

(continued on next slide)
## Solar Panels

The following items are considered within the appraised value of the subject property:

<table>
<thead>
<tr>
<th>Description</th>
<th>Array #1</th>
<th>Array #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>kWh (size)</td>
<td>Owned</td>
<td>Owned</td>
</tr>
<tr>
<td>Manufacturer of Panels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty on Panels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of Panels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Production kWh per Array</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source for Energy Production Estimate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location (Roof, Ground, Etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tilt/Slope for Array</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azimuth per Array</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of Inverter(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty Term</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Solar Thermal Water Heating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Active System - type</td>
<td>Direct, Indirect</td>
</tr>
<tr>
<td>If Passive System - type</td>
<td>Integral collector, Thermoosyphon</td>
</tr>
<tr>
<td>Storage Tank Size</td>
<td># Gallons:</td>
</tr>
<tr>
<td>Collector Type</td>
<td>Flat-Plate Collector, Integral Collector, Evacuated-Tube Solar</td>
</tr>
<tr>
<td>Back-Up System</td>
<td>Conventional Water Htr, Tankless On Demand, Tankless Heat Pump</td>
</tr>
<tr>
<td>Age of System</td>
<td>Warranty Term</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Solar Energy Factor (SEF)</td>
</tr>
<tr>
<td></td>
<td>(Rating range 1 to 11 - higher number is more efficient)</td>
</tr>
</tbody>
</table>
## Location - Site

The following items are considered within the appraised value of the subject property:

<table>
<thead>
<tr>
<th>Walk Score</th>
<th>Source: <a href="http://www.walkscore.com">http://www.walkscore.com</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Transportation</td>
<td>Bus - Distance: Blocks</td>
</tr>
<tr>
<td>Site</td>
<td>Orientation - front faces: East/West, North/South</td>
</tr>
</tbody>
</table>

Comments
### Incentives – Amount of Incentive and Terms

The following items are considered within the appraised value of the subject property:

<table>
<thead>
<tr>
<th>Federal</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td></td>
</tr>
<tr>
<td>Source</td>
<td></td>
</tr>
<tr>
<td>(For example <a href="http://www.dsiereusa.org">www.dsiereusa.org</a>)</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td>Incentives offset cost and should be</td>
</tr>
</tbody>
</table>
Areas to emphasize in reporting:

- Market analysis section (detailing the market for green properties in the area)
- Improvements description section
- Highest & best use section
- Comments section on the three approaches to value
How Green is Considered in the 3 Approaches

- What does it cost?
- Does cost equal value?
- Are buyers willing to pay for it?
- Are maintenance costs any lower?
- How are physical and useful lives affected?
- Is there an increase in rental income?
- Is any obsolescence created?
- How is financial feasibility affected?
## Extracting the Value of Green via The Cost Approach

<table>
<thead>
<tr>
<th></th>
<th>High Performance Sale A</th>
<th>Sale Price</th>
<th>Code-Built Sale B</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale Date</td>
<td>5/20xx</td>
<td>$185,000</td>
<td>4/20xx</td>
<td>$177,000</td>
</tr>
<tr>
<td>Sale Price</td>
<td></td>
<td>$185,000</td>
<td></td>
<td>$177,000</td>
</tr>
<tr>
<td>$/SF living area</td>
<td>$103</td>
<td>$98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seller Concessions</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lot Size</td>
<td>12,500</td>
<td>-$33,000</td>
<td>13,900</td>
<td>-$33,000</td>
</tr>
<tr>
<td>Style</td>
<td>Ranch</td>
<td>Ranch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>Good</td>
<td>Good</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>New</td>
<td>New</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living Area (SF)</td>
<td>1,800</td>
<td>1,812</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bedrooms</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baths</td>
<td>2.5</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porches</td>
<td>Entry/Screened</td>
<td>Entry/Screened</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Improvements</td>
<td>Landscaping, etc.</td>
<td>-$9,000</td>
<td>Landscaping, etc.</td>
<td>-$7,000</td>
</tr>
<tr>
<td>Net Price of Improvements</td>
<td>$143,000</td>
<td>$137,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price/SF</td>
<td>$79.44</td>
<td></td>
<td></td>
<td>$75.61</td>
</tr>
</tbody>
</table>
Gross Rent Multiplier

The relationship or ratio between the sale price or value of a property and its periodic gross rental income.

Example

Sale Price ÷ Gross Monthly Rent = GRM

$275,000 ÷ $2,292 = 120
## Estimating the Contributory Value of Energy Savings – GRM Method

<table>
<thead>
<tr>
<th>Description</th>
<th>Upgrades: Low-E Windows, Energy Efficient HVAC, R-41 Insulation</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Energy Savings</td>
<td>$100</td>
<td>Based on last 12 months of utility bills compared to average utility bill of similar houses in neighborhood</td>
</tr>
<tr>
<td>GRM</td>
<td>110</td>
<td>Sale of 406 East St. at $121,000/$1,100 rent per month. Same neighborhood.</td>
</tr>
</tbody>
</table>

Indicated Value of energy savings: $100 \times 110 = $11,000

Depreciated Cost of Upgrades: $18,000
Assume:

1. Depreciated Cost of Green Component = $2,500
2. Useful life of item: 7 years
3. Equity Loan Rate: 10.5%
4. Utility Savings: $35 per month, or $420 per year

Present Value Factor $\times$ $\text{Amount per Year} = \text{Contributory Value}$

Present Value of $1$ at 10.5% for 7 years $= 4.7893$

$420 \text{ per year} \times 4.7893 = \$2,011$
Case Study – The Nines Hotel

Starwood Luxury Collection Property, Portland, OR  LEED® Silver Target

**Indirect Costs**
- Incentive registration $3,000
- LEED® registration Fee $9,000
- Commissioning $56,660
- Energy model $30,720
- LEED® credit calculation $55,880
- LEED® process management $55,000
**Total Indirect Costs** $210,260

**Direct Cost Premiums**
(above typical to achieve sustainability goals)
- Sustainable sites $59,660
- Water efficiency $32,300
- Energy & atmosphere $291,750
- Materials & resources $100,000
- Indoor environmental quality $32,000
- Innovation & design $4,000
**Total Direct Cost Premiums** $519,710

**Incentives**
- State grant incentives $101,104
- State tax credit incentives (passthrough) $216,104
- Reduced city development charges $280,963
**Total Incentives** $598,171

**Cost Premium Less Incentives** $131,799
0.2% of construction

**Utility Cost Paybacks & Operating Expenses**
- Energy cost savings per year $101,924
- Water & sewage cost savings per year $7,854
- Additional ops. costs per year $3,200
- Green power & cost per year (2 yrs.) $11,646
- ROI per Years 1 & 2 $101,924
- ROI per Year 3 > $106,263
**Total ROI 10 years w/2% utility cost escalation** $992,880

**Payback Period to Cover Premium** 18 Months

Values specific to the Pacific NW
## Case Study - Residential

<table>
<thead>
<tr>
<th>Subject</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale price</td>
<td>$308,000</td>
</tr>
<tr>
<td>Price/sq. ft. GLA</td>
<td>$146.67</td>
</tr>
<tr>
<td>Financing</td>
<td>Conventional</td>
</tr>
<tr>
<td>Date of sale</td>
<td>Current</td>
</tr>
<tr>
<td>Site size/sq. ft.</td>
<td>14,275</td>
</tr>
<tr>
<td>Design</td>
<td>Ranch</td>
</tr>
<tr>
<td>Quality of construction</td>
<td>SIP/Metal roof/Green score 325</td>
</tr>
<tr>
<td>Actual age</td>
<td>Proposed</td>
</tr>
<tr>
<td>Condition</td>
<td>New</td>
</tr>
<tr>
<td>Room count Total/bedrooms/baths</td>
<td>7 total/4 bedrooms/2.5 baths</td>
</tr>
<tr>
<td>GLA</td>
<td>2100</td>
</tr>
<tr>
<td>Energy-efficient items</td>
<td>HERS 56 – Good</td>
</tr>
<tr>
<td>Heating/cooling</td>
<td>Hi eff. central</td>
</tr>
<tr>
<td>Garage</td>
<td>3-car detached</td>
</tr>
<tr>
<td>Landscaping</td>
<td>Zero impact landscape</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Data source</td>
<td>Builder</td>
</tr>
</tbody>
</table>
### Case Study – Residential, continued

Only one sale with energy efficient rating found

<table>
<thead>
<tr>
<th>Subject</th>
<th>Sale 1</th>
<th>Sale 2</th>
<th>Sale 3</th>
<th>Sale 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale price</td>
<td>$308,000</td>
<td>$290,000</td>
<td>$275,000</td>
<td>$285,000</td>
</tr>
<tr>
<td>HERS Index</td>
<td>56</td>
<td>100</td>
<td>105</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
<td>Proposed</td>
<td>2 Yrs</td>
<td>5 Yrs</td>
<td>3 Yrs</td>
</tr>
<tr>
<td>Rental</td>
<td>N/A</td>
<td>N/A</td>
<td>$2200/Mo</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Assume all other features are similar.
Case Study – Residential, continued

• Analysis Results

1. Can an appraiser develop a credible opinion of value for the subject property, a high-performance house, based on these code-built comparables?

2. What adjustments are necessary based on the data presented?
Case Study – Residential, continued

• Analysis Results

• List adjustments quantifiable and the support.

  ▪ Energy-efficient adjustment based on GRM
  ▪ 125 (GRM) x $69 monthly savings = $8,625 (2.8%)
  ▪ GRM result of $8,625 is similar to cost at $9,500
  ▪ Sale 1 versus Sale 3 supports a $5,000 adjustment for a one-year difference in age
  ▪ Comparing Sale 1 versus Sale 2 suggests no roof adjustment
  ▪ Site value assumed equal since unit of value is buildable site
Case Study – Residential, continued

Analysis Results

<table>
<thead>
<tr>
<th></th>
<th>Sale 4</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total costs</td>
<td>$308,000</td>
<td>Building costs $255,000</td>
</tr>
<tr>
<td>Site value</td>
<td>$−35,000</td>
<td>0</td>
</tr>
<tr>
<td>Site improv.</td>
<td>$−16,000</td>
<td>0</td>
</tr>
<tr>
<td>Building costs</td>
<td>$257,000</td>
<td>Building costs $255,000</td>
</tr>
<tr>
<td>GLA</td>
<td>2,200</td>
<td>2,100</td>
</tr>
<tr>
<td>$/GLA</td>
<td>$116.82</td>
<td>$121.42</td>
</tr>
</tbody>
</table>

Solution: $121.42 − $116.82 = $4.61 or 3.9% ($4.61/$116.82)
## Paired Sales Analysis

<table>
<thead>
<tr>
<th>Pair 1=</th>
<th>Sale 1</th>
<th>Sale 2</th>
<th>Pair 2 =</th>
<th>Sale 3</th>
<th>Sale 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale price</td>
<td>$290,000</td>
<td>$275,000</td>
<td></td>
<td>$285,000</td>
<td>$308,000</td>
</tr>
<tr>
<td>Date</td>
<td>Current</td>
<td>3 months</td>
<td></td>
<td>2 months</td>
<td>Current</td>
</tr>
<tr>
<td>HERS</td>
<td>100</td>
<td>105</td>
<td></td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>Age adjustment</td>
<td>$10,000</td>
<td>$25,000</td>
<td></td>
<td>$15,000</td>
<td>-$0-</td>
</tr>
<tr>
<td>Indication</td>
<td>$300,000</td>
<td>$300,000</td>
<td></td>
<td>$300,000</td>
<td>308,000</td>
</tr>
<tr>
<td>Difference</td>
<td>No adjustment for 5 points</td>
<td></td>
<td></td>
<td>$8,000 for 20 points or 2.6% more</td>
<td></td>
</tr>
</tbody>
</table>
### Reconcile Indications

<table>
<thead>
<tr>
<th>Methods providing support for energy efficient features</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Paired Sales</td>
<td>2.6%</td>
</tr>
<tr>
<td>Cost Difference</td>
<td>3.9%</td>
</tr>
<tr>
<td>GRM Analysis</td>
<td>2.6%</td>
</tr>
<tr>
<td>Studies</td>
<td>3% to 20%</td>
</tr>
<tr>
<td>Reconcile</td>
<td>The weight of the data supports 3%</td>
</tr>
</tbody>
</table>
Case Study – Residential, continued

Underwriting Requests

• Remove energy efficient or solar PV adjustment (even after you’ve proven adjustment).

• Appraiser must treat as a hypothetical condition and not an as is value conclusion.

• Results – Not acceptable to GSEs
• Case Studies in Appraising Green Commercial Buildings
Overall Course Objectives

- Identify and analyze the differences in green buildings and practices and traditional construction and how these differences may or may not impact asset value.
- Identify how the community, market, and highest and best use analysis of a green building may be conducted and reported.
- Identify how the property description and analysis portion of the appraisal assignment of a green building may be conducted and reported.
Overall Course Objectives

• Identify the life cycle cost analysis as a tool for the comparison of building performance standards and specifications. (Develop ways to assess potential contributory value of green or energy efficient or other related components, features or systems.)
• Apply the three approaches to value in context of green buildings.
• 14-Classroom Hours
• 1-Hour Exam
II. Rating Systems

A. LEED®

1. Most broadly accepted rating system in U.S.


b. Categories of LEED

- New Construction
- Existing Buildings: O&M
- Commercial Interiors
- Core & Shell
- Schools
- Retail
- Healthcare
- Homes
- Neighborhood Development
Green is the Color of Money

1.2 Case Study. Banner Bank Building – Boise, Idaho

- First speculative LEED Platinum Core & Shell office building certified in the U.S.
- Able to draw tenants from competing buildings
- Has a consistent program of upgrading & improvement
- Unanticipated benefits
  - Reduced TI costs & accelerated depreciation
  - Health benefits
1.2 Case Study. Banner Bank Building

Comparable Operating Expenses

• Fixed
  – Lower than 6 of the 7 comps

• Maintenance
  – Lower than all comps by more than $1/psf

• Utilities
  – Including “other” utilities
    ▪ Lower than 6 of the 7 comps
  
• Total Expenses
  – Lower than all comps by margins of $1.28–$2.81/psf
1.2 Case Study. BBB – Lessons Learned

Heating Water Setpoint

- Minor adjustment = major savings

Balance of Underfloor Air Systems

- Minor adjustment = savings & improved tenant comfort

Integration of Central System & Zone Controllers

- System integration = savings & decreased geothermal use

Building Pressure Control

- Additional input = reduced geothermal & greater comfort
1.2 Case Study. BBB – Lessons Learned

Condenser Water Heat Reclaim

– Waste heat reclaimed & geothermal use dropped

Continuing Efforts

– Real-time oversight leads to immediate corrections
1.2 Case Study Questions, cont.

Possible results of strategies taken at BBB:

1. Increase value

   *Reduction in operating costs, ability to garner top-of-the-market rents, reduced environmental risk, better tenant retention, & less downtime between leases have positive impacts on NOI (I₀) & value.*

2. Impact risk

   What types?

   *Environmental, construction (demountable walls, plug & play systems), lease-up risks*
Possible results of strategies taken at BBB:

3. Impact risk

How?

*Risks have been reduced by the strategies undertaken. The property has continued to operate more efficiently, with minimal construction & almost no deconstruction of tenant spaces being required.*

*Occupancy has been consistently high.*
Possible results of strategies taken at BBB:

4. How would you capture the potential benefits in a valuation analysis?

   The most logical way to capture the potential benefits is through the assumptions made in the discounted cash flow analysis.
Possible results of strategies taken at BBB:

5. What factors would most influence market value?

- **Lower levels of risk – lease-up, environmental, & construction, which could indicate lower discount & terminal cap rates**

- **Lower costs of TIs, less downtime between leases because of abbreviated fit-out times**

- **Increased tenant satisfaction because of healthier working environment (reduced sick time), which could increase tenant retention**
1.2 Case Study Questions, cont.

Possible results of strategies taken at BBB:

6. Which approaches would be most useful in valuing this building?

   *The most useful approach would be income cap, specifically a DCF analysis.*

Least useful?

   *The least useful would be the sales comparison approach, given the lack of any truly comparable properties in this market. The cost approach would be difficult given the unique characteristics of the building & difficulty of estimating obsolescence.*
1.2 Case Study Questions, cont.

Possible results of strategies taken at BBB:

7. Based on the manner in which this property was developed, what differences, if any, do you think there would be in market value?

   *It would be necessary to compare market demand for this property with demand for its peers. It has shown consistently high occupancy & top-of-the-market rents.*

8. What factors would be most relevant in a market value appraisal?

   *Those that can be quantified & monetized*
Questions

M. Lance Coyle, MAI, SRA, CCIM
2014 President-Elect of The Appraisal Institute