Appraising Energy Efficient Residential Properties

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Presented by: Calypso Continuing Education

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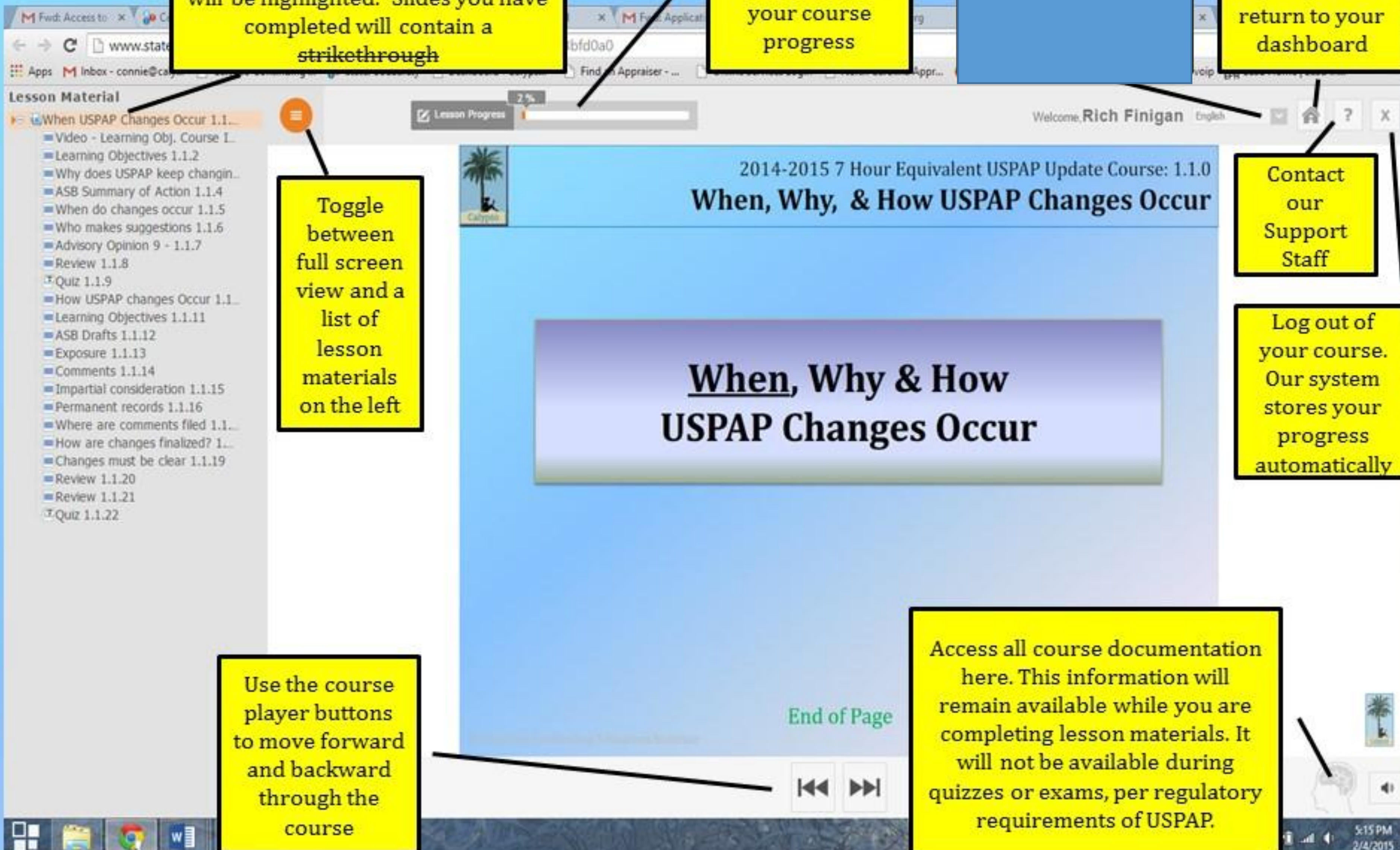
Screen Layout

Overview



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COURSE OUTLINE

Introduction: Identify an Energy Efficient Property and understanding the difference between Energy Efficiency versus Sustainability.

Section 1: Identify the seven elements of energy efficiency.

Section 2: Identify the systems of energy efficiency and identify the basic components of solar power and how to use a simple PV tool.

Section 3: Identify Energy Efficient Programs:

- National Programs
- State Programs
- Local Programs and Building Codes (The importance of knowing what exists in your market)
- Where does your state stand in national rankings

Section 4: Identify the secondary mortgage market and Scope of Work Considerations:

- What are secondary mortgage market requirements?
- What is an energy efficient loan?
- What is required in an appraisal of energy efficient homes where an adequate number of paired sales are not available?
- Is there value in energy efficiency?

Section 5: Site Inspection Issues and Considerations:

- Available forms
- Form for Appraiser to fill out property owner (to be developed)
- Data Collection Issues and Considerations

Section 6: Valuation

Cost Approach:

- How to accurately obtain cost
- Physical and functional (super adequacies) depreciation considerations
- Examples

Income Approach:

- How to gather accurate data to determine cost savings
- What methods are there to develop an adjustment from calculated savings
- How to develop a residential cap rate
- Examples

Sales Approach:

- How to find comparable sales
- How to calculate paired sales
- Regression Analysis
- Interviews with market participants (consumers and providers)
- How to proceed when paired sales are not available
- Examples

Reconciliation:

- Comments, explanations and rationale
- Support
- Assumptions

Section 7: Case Study

- Case study that demonstrates how to use both the income and cost approach in supporting the value opinion

Section 8: Competency:

- Core competencies requisite to become a real estate appraiser, i.e. ability to perform income approach, cost approach, and market approach to value
- Geographic competency, all that can be overcome by working with another appraiser in that region
- Adherence to USPAP STANDARDS 1 and 2
- Using the tools identified in the seminar
- Obtaining more knowledge and information from Calypso or other education providers

ACRONYMS

ADA - Airtight drywall approach
AI – The Appraisal Institute
ANSI – American National Standards Institute
COG – Center of Glass
DCF – Discounted Cash Flow Analysis
DOE - Department of Energy
EEM – Energy Efficient Mortgage
EMS – Environmental Management Systems
EPA – Environmental Protection Agency
Fannie Mae - Federal National Mortgage Association
FDIC – Federal Deposit Insurance Corporation
FHA - Federal Housing Administration
FHFA - Federal Housing Finance Agency
Freddie Mac – Federal Home Loan Mortgage Corporation (FHLMC)
GLA – Gross Living Area
GRM – Gross Rent Multiplier
GSE - Government-Sponsored Enterprise
HERS – Home Energy Rating System
HES – Home Energy Score
HUD - Department of Housing and Urban Development

ACRONYMS CONT.

ICC – International Code Council
IECC - The International Energy Conservation Code
IGCC –International Green Construction Code
Kw - Kilowatt
LEED - Leadership in Energy & Environmental Design
Low-e – Low Emissivity
LID - Low Impact Development
MOU – Memorandum of Understanding
NAHB – National Association of Home Builders
NGBS – National Green Building Standard
MLS – Multiple Listing System
MBS – Mortgage Backed Security
PV - Photovoltaics
PV Valuetool ®
RESNET – Residential Energy Services Network
SHGC – Solar Heat Gain Coefficient
USDOE – United States Department of Energy
USPAP – Uniform Standards of Professional Appraisal Practice
VA - Veterans Administration
VOC -Volatile Organic Compounds

COURSE LEARNING OBJECTIVES

- Describe an Energy Efficient Residential Property
- Describe the difference between Energy Efficiency and Sustainability
- Identify and Define the Elements of Energy Efficiency
- Identify the systems of Energy Efficiency, the basic components of solar power and how to use a simple Present Value for photovoltaics (PV) tool
- Be able to identify and define National Energy Efficient Programs and Certifications and know how to find relevant state and local programs in your marketplace
- Identify and define the secondary mortgage market and know what their requirements are regarding appraising an energy efficient property and identify and define Scope of Work Considerations

COURSE LEARNING OBJECTIVES CONT.

- Identify Site Inspection Issues and Considerations along with possible forms, how to use such forms, and identify Data Collection Issues and Considerations

- Identify how to accurately use the Cost Approach for Energy Efficient Properties along with learning Secondary Market Requirements

- Identify how to accurately use the Income Approach for Energy Efficient Properties along with learning Secondary Market Requirements

- Identify how to accurately use the Sales Comparison Approach for Energy Efficient Properties along with learning Secondary Market Requirements.

COURSE LEARNING OBJECTIVES CONT.:

- Learn how to reconcile your analysis and describe it accurately in the appraisal report along with identifying common defects in the reconciliation.

- Go through a case study to demonstrate competency and to identify a step by step method for appraising an energy efficient property.

- Understand competency Issues appraisers face when appraising energy efficient properties and identify common defects and effectively describe them in an appraisal report.

- Identify the definitions relating to energy efficiency.

Introduction

Identifying an Energy Efficient Property

Introduction Learning Objectives

- Define what an energy efficient property is.
- Describe how an energy efficient building must be considered in its entirety, not just as individual parts.
- Describe the difference between energy efficiency and sustainability.

Introduction
What is an Energy Efficient Building and is it a “Green” Building?:

We all think of the typical energy efficient features: solar, wind towers, insulation, windows etc.… Even pellet and wood furnaces come to mind, however, an energy efficient building can be much more……

Not all energy-efficient buildings are green

- Green buildings possess all the characteristics of sustainable housing
- Energy-efficient housing possesses energy efficient characteristics like those found in a net zero building or high-performance housing, but not all the sustainability characteristics.

Building Features	Green Building	Net Zero Energy Building	High Performance Building	Code-Built Building
Energy Efficient	X	X	X	Indeterminate
Resource Efficient	X	X	X	No
Environmentally responsible	X	No	No	No
Seven Elements Site Water Efficiency Energy Efficiency Waste Indoor Air Quality Materials Operations & Maintenance	X	X	May contain some of these elements, but not all	May contain some of these elements, but not all

The Banner Bank Building:

The following video is an example of a commercial energy efficient building and this seminar is for residential appraising, however, the video captures the essence of energy efficiency while dispelling the myth that energy efficiency is so expensive that it is not realistic.

https://www.youtube.com/watch?v=mEVesaZFgzY

Green Building – What does that really mean?

According to Wikipedia: "Green Building is the practice of increasing the efficiency of buildings and their use of energy, water and materials, and reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance and removal – the complete building life cycle." The EPA & Green Building

"A family of 4, each showering 5 min. per day will use 700 gallons of water per week – a 3 year drinking supply for 1 person in the US. Using a high performance showerhead uses 1-1.5 gallons of water per minute – up to 60% less than a traditional showerhead."

"The EPA tells us that in the US today, residential buildings account for:

21.5% of total energy use.
With the average home in the US spending $1,900 a year on energy, you can achieve significant savings while positively affecting your environment by following green building techniques.

9.1% of total water consumption
For most of us, the majority of our water usage is inside the home. Following some basic principles, you can enjoy great savings in water consumption and the energy required to heat it." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

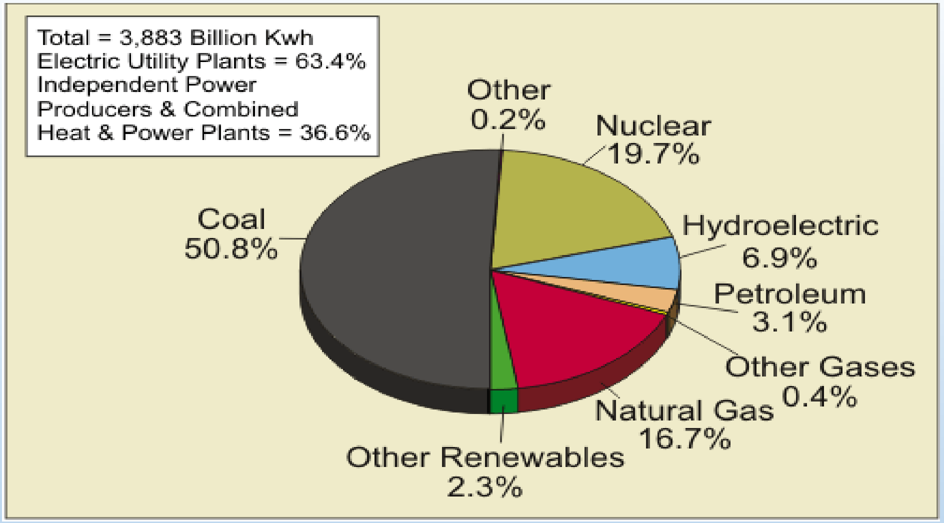
“34.8% of total electricity consumption

Homes today accounting for 34.8% of total US electricity consumption of electricity. The use of energy efficient appliances and building practices can make a significant impact on the amount of electricity your home uses and provide cost savings to you for years to come.

7.8% of the carbon dioxide emissions.

Many of the sources of the energy we use in our homes produce carbon dioxide emissions. For every gallon of water or kilowatt-hour of electricity you save, you reduce the amount of carbon dioxide entering the atmosphere. Reduction of those emissions benefit you, your family and the community around you.” (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.



U. S. Department of Energy

"By using green building principles, you can decrease the impact you and your family has on the environment and our natural resources. Green building represents a commitment to the environment, a contribution to a healthier community and a better world while achieving ongoing cost savings, and health and comfort benefits for you and your family."

"The electricity generated by fossil fuels for a single home puts more carbon dioxide into the atmosphere than 2 average cars." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Introduction Summary

This Banner Bank video clearly shows us that planning an energy efficient building matters. Cost does not equal value and if costs are incurred due to lack of up front planning they may be an over improvement (super adequacy), functional depreciation, not value. Unnecessary costs can be avoided with proper planning prior to construction. Without planning, heating systems can be over built and other duplications can occur that end up causing an energy efficient building to cost more than it needs to.

In this Chapter we have learned to:

- Identify what an energy efficient property is.
- Describe and understand how an energy efficient building must be looked at in its entirety, not just as individual parts.
- Define energy efficiency versus sustainability

Section 1:
The Components of Energy Efficiency

Section 1: The components of energy efficiency:

The seven elements of green building are: 1) Site, 2) Water, 3) Energy, 4) Waste, 5) Indoor Air Quality, 6) Materials, and 7) Operations and Management.

There are many sources that show four elements of green: 1) Energy, 2) Materials, 3) Water and 4) Air Quality. Some show six elements of green: 1) Site, 2) Water, 3) Energy, 4) Indoor air quality, 5) Materials, 6) Operations and Management. While the six elements is comprehensive, waste is additional elements shown above are also considered elements of green building and should be considered as well. There are many sites that can be found online and in books explaining the elements of green buildings. We have used several in this class. Footnotes are included showing where the information has been obtained. (EPA, Green Building)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

The U.S. Environmental Protection Agency lists: "1) Sustainable sites, 2) Energy efficiency, 3) Water efficiency, 4) Materials and resource use, 5) Indoor environmental quality, 6) Emissions and 7) Operations and maintenance." It does not list waste as an element and it adds emissions.

A building can have one or more of these components and therefore would have some degree of sustainability/energy efficiency. However, unless all seven items are considered during the planning of the building and implemented during building/renovation, the home is not a green building. There are many "shades of green." (EPA, Green Building)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Section 1 Learning Objectives:

- Identify the seven elements of a green building
- Describe when a building has all or some of these components and how these elements affect the value, i.e. describe “shades of green”
- Describe what constitutes a green building; i.e. possesses all of the seven elements and describe how they are addressed.

Much of the information in Section 1 is extracted from organization that have directed their narrative to builders and/or existing property owners. This information is immediately transferable and relevant to the appraisal process. In most cases it has been quoted to ensure that nuance of language and meaning is not in misinterpreted.

In order to quantify and value the elements of green building appraisers and other real estate professionals must be able to identify and understand the elements of green building.

Each chapter contains material that may be new to the appraiser, and should be reviewed carefully and thoroughly.

We strongly recommend visiting the sources cited by name or links if more information about the specific topic under review is needed.

For more information see link in the bibliography document corresponding to the page located in your learning extras.

Chapter 1 - Site

Section 1 Chapter 1 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe the site consideration established by the Leed's program.
- Describe site considerations identified by the US Department of Energy (USDOE).

Site

“The basic intent of LEED (Leadership in Energy & Environmental Design) for Homes is to use the entire property so as to minimize the project’s impact on the site. There are six-point earning segments within LEED for Homes:

• Site Stewardship – minimize long-term environmental damage to the property during the construction process. Accomplish this by pre-planning for the construction to: minimize areas disturbed on the site, provide erosion protection, and preserve existing plantings.

• Design landscaping features to avoid invasive species and minimize the demand for water and the need for synthetic chemicals, limit the use of conventional turf, and use drought resistant plants.”

Zigenfus, Richard, "Element analysis of the green building process" (2008). Thesis. Rochester Institute of Technology.

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Site

"• Design landscaping to reduce the local heat island effect. Accomplish this by placing plantings to provide shading and install light-colored materials over at least 50% of the sidewalks, patios, and driveways within 50 feet of the house. (For example, light concrete or light tile, not dark asphalt.)

• Design site features to minimize erosion and runoff from the site. For example; design the lot such that 70% of the build environment (not including the roof area), is permeable to capture water runoff.

• Design the home features to minimize the need for poisons for insects, rodents and other pests. For example: keep all wood (i.e. siding, trim, and structure) 12 inches above the soil, seal external cracks, joints, etc., no wood-to-concrete connections, install landscaping so that mature plants are at least 24 inches from the home, and implement termite control measures that meet specific LEED criteria."

Zigenfus, Richard, "Element analysis of the green building process" (2008). Thesis. Rochester Institute of Technology.

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Site

"• Make use of compact development patterns to conserve land and promote community livability, transportation efficiency, and allow for good pedestrian access. Another way to phrase this requirement is to build in areas where homes are already located to minimize impact on unused land."

"The basic intent of LEED for New Construction is to reduce pollution from construction activity, avoid development of inappropriate sites and reduce the environmental impacts on the building site. LEED for New Construction is similar to LEED for Homes, with a few differences. For example, limit site disturbance to within 40 feet of the building perimeter. Specific to New Construction are:

• Provide a high ratio of open space to the development footprint to promote biodiversity."

Zigenfus, Richard, "Element analysis of the green building process" (2008). Thesis. Rochester Institute of Technology.

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Site

"• Limit disruption and pollution of natural water flows by managing storm water runoff.

• "Minimize light trespass from the building and site, reduce sky-glow to increase access, improve nighttime visibility through glare reduction, and reduce development impact on nocturnal environments. 42"

"The US Department of Energy (USDOE) under its recommendation for Site Planning and Land Development states that consideration to the entire community and existing infrastructure in addition to the individual building can amplify the benefits of green home building. For example, by the improvement of a subdivision's storm water management plan and preserving the available natural surroundings through careful design and construction, can impact the entire community and reduce infrastructure costs. 43"

"Site planning should also consider solar gain, shade, wind and proximity to services (can you walk or take public transportation to services)."

Zigenfus, Richard, "Element analysis of the green building process" (2008). Thesis. Rochester Institute of Technology.

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Section 1 Chapter 1 Summary

In this chapter you learned the following:

- What site considerations have been established by the Leed's program.
- What site considerations have been identified by the US Department of Energy (USDOE).

Chapter 2 - Water

Section 1 Chapter 2 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe an example of non point-source pollution that can negatively impact on the site.
- Identify different methods of water conservation both at the site and within the home.

Chapter 2

Water:

Porous Paving Schemes – "Watertight, or "impervious," surfaces such as paved driveways, walkways, and patios don't allow storm water runoff to infiltrate into the ground's aquatic systems. Using uncompacted gravel, crushed stone and open or porous paving blocks for walkways and other light traffic areas minimizes the number of impervious surfaces on your property, allowing storm water runoff."

Rainwater Collection – "Rainwater collected from the roof is a free source of landscape irrigation water. This type of collection system consists of a suitable roof and guttering system, a storage tank and a simple filtration unit." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Low Impact Development (LID) – "This innovative approach mimics the land's original method of water run-off instead of disposing and treating storm water in large, costly, end-of-pipe facilities. This can come in the form of open spaces, vegetated rooftops, reduced street widths and curbs, pervious parking lots and sidewalks, medians and other buffer zones using more vegetation."

Plumbing – "Design your home to use recycled water for toilet flushing. Use ultra-low-flush toilets and low-flow shower heads."

(Note: "Some older toilets use 3-7 gallons per flush while an ultra-low-flow toilet uses less than 1.6 gallons per flush. A family of 4, each showering for 5 minutes per day will use 700 gallons of water per week – a 3 year drinking supply for 1 person in the US. Using a high performance shower head uses 1 – 1.5 gallons of water per minute – up to 60% less than a traditional shower head.") (UBuildIt.com)

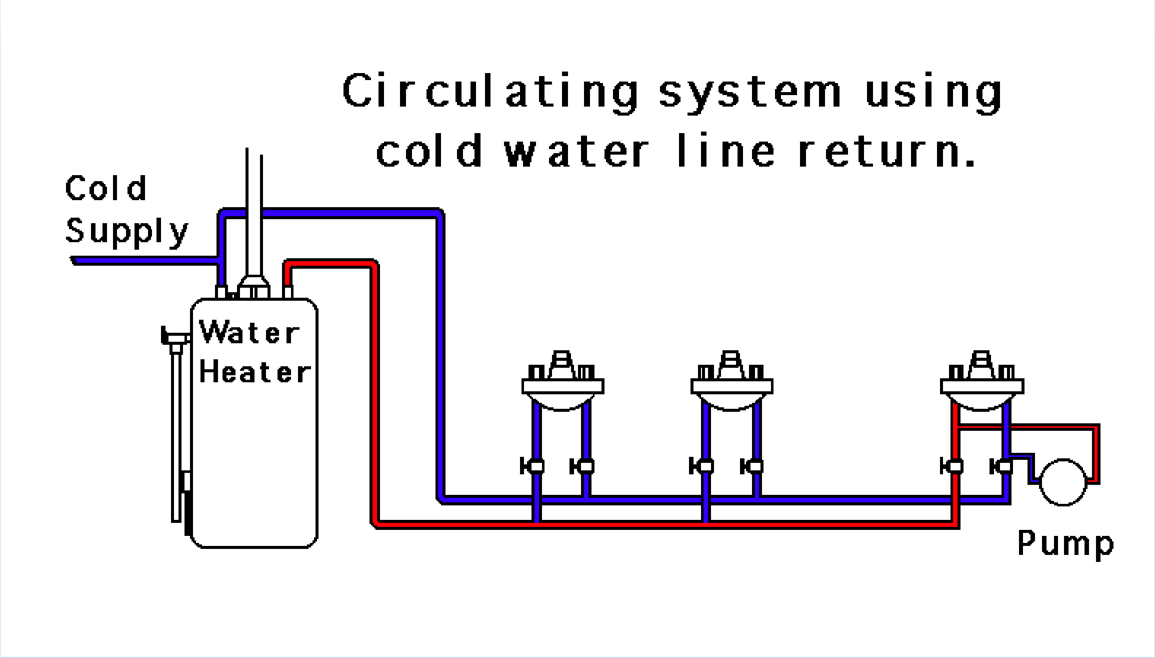
For more information see link in the bibliography document corresponding to this page located in your learning extras.

The Yard – "Mulch exposed soils in garden beds and improve that soil with compost to a depth of 8-13 inches to increase the ability to hold water. Select plants that have low water and pesticide needs. Planting trees not only beautifies a yard, but will also increase the value of a home while decreasing your impact on the environment. A single mature tree can provide nearly $300 in energy and resource values in terms of cooling, erosion and pollution control and they reduce the "carbon foot print. Putting the right plants in the right place and developing quality, healthy soil means less watering in the summer, less need for chemicals and less waste"

Chemicals – Nonpoint source pollution,"Avoid outdoor chemicals and fix oil and other fluid leaks to prevent contamination of the water runoff. According to the New York States Attorney General's Office, 95% of pesticides used on residential lawns are considered possible carcinogens by the EPA." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Hot Water – "Use recirculating systems for centralized hot water distribution or utilize "on demand" systems vs. traditional hot water tanks."



(UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Section 1 Chapter 2 Summary

In this chapter you learned the following:

- How nonpoint source pollution can contaminate groundwater.
- What considerations have been identified to conserve water both in in and around a home.

Chapter 3 - Energy

Section 1 Chapter 3 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe examples of energy conservation measures that can be employed in a residential setting.
- Identify an energy conservation rating program.

Chapter 3

Energy:

Energy savings can be measured which gives the appraiser some ability to quantify the energy savings contribution **provided adequate data is available to determine the actual energy savings.**

Advanced Framing – "Talk with the consultant and the framing contractor about using the advanced framing technique during the construction of your home. This creates a structurally sound home with improved energy efficiency, and lowers material and labor costs. This technique replaces lumber with insulation material and maximizes the wall that is insulated, improving the R-value of the home. On average, advanced framing uses 30% less lumber, which reduces the building costs and saves 2% to 4% of the total energy use." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Hot Water Heater – "Water heating can account for 14% to 25% of the energy consumed in a home. To increase the efficiency of a hot water heater, locate it near the highest point of usage. This is typically near the shower followed closely by the clothes washer."

Pipes – "Insulate the hot and cold water pipes within 3 feet of the hot water heater. This reduces standby heat loss. The hot water heater is continuously heating the piping and water in it, even when no water is being used."

(UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Household Appliances - "A green built home features appliances that are as energy efficient as possible. The U. S. Department of Energy and the U.S. Environmental Protection Agency have developed a program called **Energy Star** which labels those appliances meeting strict energy efficient criteria. The typical household spends $1,900 a year on energy bills. When comparing different appliance brands for a new home, be sure to look at their estimated energy consumption. This will impact the operating cost of the home for years to come."

(UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Air Sealing – "This is advanced caulking which is a part of the airtight drywall approach (ADA). Specifically, caulk or gasket drywall is installed on exterior walls at the top and bottom plates, windows and door frames; on interior walls at the intersections with exterior ceilings; and at electrical, plumbing or mechanical penetrations in the drywall. This approach minimizes heat loss in your home. Work with a consultant and drywall contractor to see if he/she uses this method."

Radiant Barrier – "Reflect heat away from a home by installing a radiant barrier (a sheet of aluminum foil with paper backing) on the underside of the roof. This significantly lowers cooling costs by reducing heat gains through your ceiling by 95%."

Insulation – "Add insulation to your attic to keep the heat in your house. There are some environmentally friendly insulation products made from recycled blue jeans, soybeans, cotton or newspapers." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Solar Power – "If the sun shines on a home for most of the day in the winter, there is the potential for solar power to reduce energy costs. A good solar design allows the winter sun to reach a thermal mass like a tile floor which holds heat and radiates it into the home for a period of time." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Lighting – “Install high-efficiency lighting systems with advanced lighting controls. This allows only the use the light when needed. Replace traditional incandescent lights with energy-efficient compact fluorescent bulbs. These bulbs will use 75% less electricity and last up to 10 times longer. When designing a home or remodeling project, introduce natural daylight into as many places as possible.”

Thermostat – “Use a programmable thermostat to provide the comfort needed day and night while minimizing heating use when not needed.” (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Ducts – “Seal the ducts with mastic and insulate them to R-11. This minimizes the heat loss from the home.”

Paints – “Mix non-toxic ceramic powder into interior paint to insulate walls and reduce the amount of heat passing through to the outside. These ceramic particles create a radiant barrier that reflects the heat back into the room.”

Redirect the Heat – “Use ceiling fans to redirect the heat back into a room by reversing the direction of the blades to counterclockwise. This brings the heat back down into the room.” (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Section 1 Chapter 3 Summary

In this chapter you learned the following:

- Examples of energy conservation measures that can be employed in a residential setting.
- The name of an energy conservation rating program.

Chapter 4 - Waste

Section 1 Chapter 4 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe methods that reduce waste production.
- Identify organizations and programs to promote recycling.

Chapter 4

Waste:

Waste is often not listed as a separate element of a Green Building however, the need to minimize waste is a critical element of a Green Building and needs to be listed and considered as its own element.

The EPA does note:

Waste Reduction:

EPA's Office of Solid Waste supports projects to reduce, reuse, and recycle waste generated from building construction, renovation, deconstruction, and demolition.

EPA's Green Scapes program provides cost-efficient and environmentally friendly solutions for large-scale landscaping projects that are designed to help preserve natural resources and prevent waste and pollution. (EPA: Components of Green Building)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

EPA's Industrial Materials Recycling Program provides information on how industrial materials, such as coal combustion products, foundry sand, and construction and demolition debris, can be recycled to meet the material needs of our construction industry. Industrial materials can be recycled in construction applications because they have many of the same chemical and physical properties as the virgin materials they replace. In some cases, they can even improve the quality of a product.

The Lifecycle Building Challenge is a competition soliciting projects, designs and ideas that facilitate building disassembly and material reuse to minimize waste, energy consumption, and associated greenhouse gas emissions. (EPA: Components of Green building)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Section 1 Chapter 4 Summary

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe methods that reduce +.
- Identify organizations and programs to promote recycling.

Chapter 5 - Indoor Air and Light Quality

Section 1 Chapter 5 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe methods that reduce the potential for indoor air quality contamination.
- Identify materials that can help reduce the potential for indoor air quality contamination.

Chapter 5

Indoor air quality and light:

Note: “The EPA ranks indoor pollution among the top 5 environmental risks. Unhealthy air is found in up to 30% of new and renovated buildings. The electricity generated by fossil fuels for a single home puts more carbon dioxide into the atmosphere than 2 average cars.”

Carpet – “Using a low pile or less allergen attracting carpet and pad greatly improves air quality. Wool or PET carpet (made from recycled pop bottles) are good choices. In addition, at installation, the carpet should be tacked down, not glued, to reduce pollutants. Many Green Built designs minimize the use of carpeted surfaces, replacing them with hard surfaces which don’t have these pollutants and are easier to keep free of dust, mold and mildew.” (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Paints – "Use low-VOC (Volatile Organic Compounds, such as formaldehyde) paints."

Ventilation – "While you want to seal a home to prevent heat loss, this creates a need for mechanical ventilation. Ventilation can be provided by quiet fans with automatic controls or by heat recovery ventilators (HRV). Talk to an HVAC contractor for the best system for your home's design."

Construction Materials – "To prevent microbial contamination, select materials that are resistant to microbial growth."

Drainage – "Provide effective drainage from the roof and surrounding landscape, as well as allow proper drainage of air conditioning coils."

Window Treatments – "Avoid synthetic window coverings or those that cannot be cleaned easily." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Section 1 Chapter 5 Summary

In this chapter you learned the following:

- Methods that reduce indoor air quality pollution.
- To identify materials that can help reduce the potential for indoor air quality contamination.

Chapter 6 - Materials

Section 1 Chapter 6 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe types of building materials that would be considered in a green building.
- Identify the reasons some materials are considered "green" or "responsibly sourced" building materials.

Chapter 6

Materials:

Many things should be considered when deciding what materials to use in a new home or for a renovation. Considerations include, is the material locally sourced? Is the material to be used coming from within 500 miles of the site? How is the material manufactured, what is it made of etc.…? Look for sustainability labels.

Plastic Lumber – "Plastic Lumber is weather and insect resistant, and will not crack, splinter or chip. It does not need painting and will not leach chemicals into the ground or surface water. By using plastic lumber, you minimize the amount of lumber used in your home, reduce your ongoing maintenance costs, and you won't harm your local habitat." ("Note: The US is home to 4.5% of the population, but is responsible for 15% of the worlds wood consumption.") (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Engineered Wood – "Engineered Wood combines the raw materials of wood veneer and fiber with adhesives to produce such laminated lumber as wood veneers, I-beams, roof and floor trusses. The manufacturing process uses fast growing, small diameter trees, allowing more than 80% of the log to be used in the end product. This produces a product which is very consistent and stable while decreasing the impact on a natural resource." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Fiber Cement Siding – "Fiber Cement Siding is a composite of cement and wood fiber reclaimed from wood processing waste or small diameter, fast growing trees. It produces a siding which is durable and low maintenance. Many fiber-cement composites offer a 50-year warranty, which increases the value of your home and decreases the maintenance costs." (Hardy Plank is an example.)

Brick – "The process of extracting clay for brick results in limited wasted material. Brick has a limitless lifespan and can be recycled or salvaged after demolition." (UBuildIt.com)

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Recycling – "The efficient use of materials when building Green comes in two forms. First, recycle construction waste and use reclaimed building materials during construction when appropriate. Once your home is finished, practice responsible recycling of the materials you use every day."

Design – "When working with your architect or designer, use standard dimensions, engineered wood and stacked floor plans to reduce the overall volume of lumber used as well as the volume of waste." (UBuildIt.com)

Additional materials considerations: Flooring, wall and ceiling coverings and furnishings.

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Flooring:

The following are examples of "green" flooring, however, flooring adhesives can be a huge problem and can contribute to indoor air pollution. Adhesives need to have low VOC or zero VOC content.

- Cork
- Bamboo
- Recycled Carpet
- FSC Certified Wood Flooring
- Recycled Glass Tile
- Reclaimed Wood flooring
- Linoleum

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Section 1 Chapter 6 Summary

In this chapter you learned the following:

- Some types of building materials that would be considered in a green building.
- Some of the reasons some materials are considered “green” or “responsibly sourced” building materials.

Chapter 7 – Operations and Management

Section 1 Chapter 7 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe the difference between a green building and an energy efficient building.
- Identify some of the sustainable characteristics found in a green building that provide superior operations and management.

Chapter 7

Operations and Management

Operations and management looks at the building systems to see if they are performing as they were intended to perform. It is also important to make sure systems are being managed and maintained to allow them to continue to function as they were designed too.

When an energy efficient building is maintained properly, the costs of running it will be lower and there will be savings for the owner that could help pay for a higher mortgage. Minimizing maintenance costs saves energy!

OTHER CONSIDERATIONS

Overall Sustainability:

How does the building function as a whole? Remember from the introduction, overall sustainability looks at the entire building, not just at the individual components.

Energy Efficiency versus Sustainability:

A building is not "green" just because it is energy efficient, there are many shades of green. Although the individual elements of energy efficiency can be analyzed separately and some can be quantified, overall sustainability looks at the entire building and site whereas an energy efficient property may have one or more of the components but not all.

Section 1 Chapter 7 Summary

In this chapter you learned the following:

- Some types of building materials that would be considered in a green building.
- Some of the reasons some materials are considered “green” or “responsibly sourced” building materials.

Section 1 Summary

The seven elements of green building are: 1) Site, 2) Water, 3) Energy, 4) Waste, 5) Indoor Air Quality, 6) Materials and 7) Operations and Management.

In this Section we learned to:

- Identify and define the seven elements of a green building.
- Identify that a building may have all or a few of these components and that what it has and does not have will affect the value. Think of this as “shades of green.”
- Identify that to be a green building all of the seven elements must be addressed.

Section 2

The Systems of Energy Efficiency

Section 2

The Systems of Energy Efficiency

“Heating and cooling accounts for more than half of the energy use in a typical U.S. home, making it the largest energy expense for most homes? Energy Saver shares tips and advice on ways you can reduce your heating and cooling costs, putting more money in your wallet.”

For more information see link in the bibliography document corresponding to this page located in your learning extras.

Section 2 Learning Objectives:

- Identify and define the energy efficient heating systems.
- Identify and define the energy efficient cooling systems.
- Identify and define the energy efficient electric systems.
- Describe insulation.
- Identify and define energy efficient windows and doors.
- Identify and define the Components of Solar.
- Demonstrate how to use a the PV Valuetool®.

Much of the information in Section 2 is taken from sources that are directed to builders and/or property owners, but are imminently relevant to real estate professionals in understanding the concepts surrounding green and energy-efficient buildings.

Appraisers and other real estate professionals must be able to identify and understand the systems of energy efficiency in order to quantify and value the elements of green building.

These chapters should be read slowly.

Visit the cited source if more information is needed.

For more information see corresponding links in the bibliography document located in your learning extras.

Chapter 1 – Heating Systems

Section 2 Chapter 1 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe different types of heating system.
- Identify the different types of energy sources used to generate heat or cooling.
- Describe how to determine whether or not a heating system represents an energy efficient system.

Chapter 1
Heat Distribution Systems:

"Heat is distributed through your home in a variety of ways. Forced-air systems use ducts that can also be used for central air conditioning and heat pump systems. (See "Minimizing Energy Losses in Ducts" in your learning extras)

Radiant heating (See "Radiant Heating" in learning extras) systems also have unique heat distribution systems. That leaves two heat distribution systems -- steam radiators and hot water radiators."

STEAM RADIATORS

"Steam heating is one of the oldest heating technologies, but the process of boiling and condensing water is inherently less efficient than more modern systems, plus it typically suffers from significant lag times between the boiler turning on and the heat arriving in the radiators. As a result, steam systems make it difficult to implement control strategies such as a night setback system." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

HOT WATER RADIATORS

“Hot-water radiators are one of the most common heat distribution systems in newer homes, second only to forced-air systems. They are typically a baseboard-type radiator or an upright design that resembles steam radiators.

The most common problem in hot-water systems is unwanted air in the system. At the start of each heating season, while the system is running, go from radiator to radiator and open each bleed valve slightly, then close it when water starts to escape through the valve.

For multi-level homes, start at the top floor and work your way down. One way to save energy in hot-water systems is to retrofit them to provide separate zone control for different areas of large homes.

(Continued on next slide)

HOT WATER RADIATORS

Zone control is most effective when large areas of the home are not used often or are used on a different schedule than other parts of the home.

A heating professional can install automatic valves on the hot-water radiators, controlled by thermostats in each zone of the house. Using programmable thermostats (See learning extras, "Thermostats") will allow you to automatically heat and cool off portions of your home to match your usage patterns." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Active Solar Heating:

"Active solar heating systems use solar energy to heat a fluid -- either liquid or air -- and then transfer the solar heat directly to the interior space or to a storage system for later use. If the solar system cannot provide adequate space heating, an auxiliary or back-up system provides the additional heat. Liquid systems are more often used when storage is included, and are well suited for radiant heating systems, (See learning extras) boilers with hot water radiators, and even absorption heat pumps (See learning Extras) and coolers. Both liquid and air systems can supplement forced air systems. Active solar heating systems use solar energy to heat a fluid -- either liquid or air -- and then transfer the solar heat directly to the interior space or to a storage system for later use." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

LIQUID-BASED ACTIVE SOLAR HEATING

"Solar liquid collectors are most appropriate for central heating. They are the same as those used in solar domestic water heating systems. Flat-plate collectors are the most common, but evacuated tube and concentrating collectors are also available. In the collector, a heat transfer or 'working' fluid such as water, antifreeze (usually non-toxic propylene glycol), or other type of liquid absorbs the solar heat. At the appropriate time, a controller operates a circulating pump to move the fluid through the collector. The liquid flows rapidly, so its temperature only increases 10° to 20°F (5.6° to 11°C) as it moves through the collector. Heating a smaller volume of liquid to a higher temperature increases heat loss from the collector and decreases the efficiency of the system. The liquid flows to either a storage tank or a heat exchanger for immediate use. Other system components include piping, pumps, valves, an expansion tank, a heat exchanger, a storage tank, and controls. The flow rate depends on the heat transfer fluid." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

STORING HEAT IN LIQUID SYSTEMS

"Liquid systems store solar heat in tanks of water or in the masonry mass of a radiant slab system. In tank type storage systems, heat from the working fluid transfers to a distribution fluid in a heat exchanger exterior to or within the tank."

DISTRIBUTING HEAT FOR LIQUID SYSTEMS

"You can use a radiant floor, hot water baseboards or radiators, or a central forced-air system to distribute the solar heat. In a radiant floor system, solar-heated liquid circulates through pipes embedded in a thin concrete slab floor, which then radiates heat to the room. Radiant floor heating is ideal for liquid solar systems because it performs well at relatively low temperatures. A carefully designed system may not need a separate heat storage tank, although most systems include them for temperature control. A conventional boiler or even a standard domestic water heater can supply back-up heat. The slab is typically finished with tile. Radiant slab systems take longer to heat the home from a "cold start" than other types of heat distribution systems. Once they are operating, however, they provide a consistent level of heat. Carpeting and rugs will reduce the system's effectiveness." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

VENTILATION PREHEATING

"Solar air heating systems use air as the working fluid for absorbing and transferring solar energy. Solar air collectors can directly heat individual rooms or can potentially pre-heat the air passing into a heat recovery ventilator or through the air coil of an air-source heat pump. Air collectors produce heat earlier and later in the day than liquid systems, so they may produce more usable energy over a heating season than a liquid system of the same size. Also, unlike liquid systems, air systems do not freeze, and minor leaks in the collector or distribution ducts will not cause significant problems, although they will degrade performance. However, air is a less efficient heat transfer medium than liquid, so solar air collectors operate at lower efficiencies than solar liquid collectors."

ROOM AIR HEATERS

"Air collectors can be installed on a roof or an exterior (south-facing) wall for heating one or more rooms. Although factory-built collectors for on-site installation are available, do-it-yourselfers may choose to build and install their own air collector. A simple window air heater collector can be made for a few hundred dollars." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

TRANSPIRED AIR COLLECTORS

"Transpired air collectors use a simple technology to capture the sun's heat to warm buildings. The collectors consist of dark, perforated metal plates installed over a building's south-facing wall. An air space is created between the old wall and the new facade. The dark outer facade absorbs solar energy and rapidly heats up on sunny days—even when the outside air is cold. A fan or blower draws ventilation air into the building through tiny holes in the collectors and up through the air space between the collectors and the south wall. The solar energy absorbed by the collectors warms the air flowing through them by as much as 40°F. Unlike other space heating technologies, transpired air collectors require no expensive glazing. Transpired air collectors are most suitable for large buildings with high ventilation loads, a fact which makes them generally unsuitable for today's tightly sealed homes. However, small transpired air collectors could be used to pre-heat the air passing into a heat recovery ventilator or could warm the air coil on an air source heat pump, improving its efficiency and comfort level on cold days. No information is currently available on the cost effectiveness of using a transpired air collector in this way, however." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ECONOMICS AND OTHER BENEFITS OF ACTIVE SOLAR HEATING SYSTEMS

“Active solar heating systems are most cost-effective in cold climates with good solar resources when they are displacing the more expensive heating fuels, such as electricity, propane, and oil. Some states offer sales tax exemptions, income tax credits or deductions, and property tax exemptions or deductions for solar energy systems. The cost of an active solar heating system will vary.

Commercially available collectors come with warranties of 10 years or more, and should easily last decades longer. The economics of an active space heating system improve if it also heats domestic water, because an otherwise idle collector can heat water in the summer. Heating your home with an active solar energy system can significantly reduce your fuel bills in the winter. A solar heating system will also reduce the amount of air pollution and greenhouse gases that result from your use of fossil fuels for heating or generating the electricity.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Electric Resistance Heating:

“Electric resistance heating is 100% energy efficient in the sense that all the incoming electric energy is converted to heat. However, most electricity is produced from coal, gas, or oil generators that convert only about 30% of the fuel's energy into electricity.

Because of electricity generation and transmission losses, electric heat is often more expensive than heat produced in homes or businesses that use combustion appliances, such as natural gas, propane, and oil furnaces. If electricity is the only choice, heat pumps (See “Heat Pump Systems” in your learning extras) are preferable in most climates, as they easily cut electricity use by 50% when compared with electric resistance heating.

The exception is in dry climates with either hot or mixed (hot and cold) temperatures (these climates are found in the non-coastal, non-mountainous part of California; the southern tip of Nevada; the southwest corner of Utah; southern and western Arizona; southern and eastern New Mexico; the southeast corner of Colorado; and western Texas). For these dry climates, there are so few heating days that the high cost of heating is not economically significant. Electric resistance heating may also make sense for a home addition if it is not practical to extend the existing heating system to supply heat to the new addition.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

TYPES OF ELECTRIC RESISTANCE HEATERS

“Electric resistance heat can be supplied by centralized forced-air electric furnaces or by heaters in each room. Room heaters can consist of electric baseboard heaters, electric wall heaters, electric radiant heat, or electric space heaters. (see learning extras, “Radiant Heating” and “Portable Heaters”) It is also possible to use electric thermal storage systems to avoid heating during times of peak power demand. “ (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ELECTRIC FURNACES

“Electric furnaces are more expensive to operate than other electric resistance systems because of their duct heat losses and the extra energy required to distribute the heated air throughout your home (which is common for any heating system that uses ducts for distribution).

Heated air is delivered throughout the home through supply ducts and returned to the furnace through return ducts. If these ducts run through unheated areas, they lose some of their heat through air leakage as well as heat radiation and convection from the duct's surface. Blowers (large fans) in electric furnaces move air over a group of three to seven electric resistance coils, called elements, each of which are typically rated at five kilowatts.

The furnace's heating elements activate in stages to avoid overloading the home's electrical system. A built-in thermostat called a limit controller prevents overheating. This limit controller may shut the furnace off if the blower fails or if a dirty filter is blocking the airflow. As with any furnace, it's important to clean or replace the furnace filters as recommended by the manufacturer, in order to keep the system operating at top efficiency.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ELECTRIC BASEBOARD HEATERS

“Electric baseboard heaters are zonal heaters controlled by thermostats located within each room. Baseboard heaters contain electric heating elements encased in metal pipes. The pipes, surrounded by aluminum fins to aid heat transfer, run the length of the baseboard heater's housing, or cabinet. As air within the heater is warmed, it rises into the room, and cooler air is drawn into the bottom of the heater. Some heat is also radiated from the pipe, fins, and housing.

Baseboard heaters are usually installed underneath windows. There, the heater's rising warm air counteracts falling cool air from the cold window glass. Baseboard heaters are seldom located on interior walls because standard heating practice is to supply heat at the home's perimeter, where the greatest heat loss occurs. “ (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ELECTRIC BASEBOARD HEATERS

"Baseboard heaters should sit at least three-quarters of an inch (1.9 centimeters) above the floor or carpet. This is to allow the cooler air on the floor to flow under and through the radiator fins so it can be heated. The heater should also fit tightly to the wall to prevent the warm air from convecting behind it and streaking the wall with dust particles.

The quality of baseboard heaters varies considerably. Cheaper models can be noisy and often give poor temperature control. Look for labels from Underwriter's Laboratories (UL) and the National Electrical Manufacturer's Association (NEMA). Compare warranties of the different models you are considering." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ELECTRIC WALL HEATERS

"Electric wall heaters consist of an electric element with a reflector behind it to reflect heat into the room and usually a fan to move air through the heater. They are usually installed on interior walls because installing them in an exterior wall makes that wall difficult to insulate." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ELECTRIC THERMAL STORAGE

“Some electric utilities structure their rates in a way similar to telephone companies and charge more for electricity during the day and less at night. They do this in an attempt to reduce their "peak" demand. If you are a customer of such a utility, you may be able to benefit from a heating system that stores electric heat during nighttime hours when rates are lower. This is called an electric thermal storage heater, and while it does not save energy, it can save you money because you can take advantage of these lower rates.

The most common type of electric thermal storage heater is a resistance heater with elements encased in heat-storing ceramic. Central furnaces incorporating ceramic block are also available, although they are not as common as room heaters. Storing electrically heated hot water in an insulated storage tank is another thermal storage option. Some storage systems attempt to use the ground underneath homes for thermal storage of heat from electric resistance cables. However, this requires painstaking installation of insulation underneath concrete slabs and all around the heating elements to minimize major heat losses to the earth. “ (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

"Ground storage also makes it difficult for thermostats to control indoor temperatures. Any type of energy storage systems suffers some energy loss. If you intend to pursue an electric thermal storage system, it would be best for the system to be located within the conditioned space of your home, so that any heat lost from the system actually heats your home, rather than escaping to the outdoors. It would also be best to know how quickly heat will escape from the system. A system that leaks too much heat could cause control problems, such as the accidental overheating of your home." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

CONTROL SYSTEMS

“All types of electric resistance heating are controlled through some type of thermostat. Baseboard heaters often use a line-voltage thermostat (the thermostat directly controls the power supplied to the heating device), while other devices use low-voltage thermostats (the thermostat uses a relay to turn the device on and off).

Line-voltage thermostats can be built into the baseboard heater, but then they often don't sense the room temperature accurately. It's best to instead use a remote line-voltage or low-voltage thermostat installed on an interior wall.

Both line-voltage and low-voltage thermostats are available as programmable thermostats (See ‘Thermostats” in learning extras) for automatically setting back the temperature at night or while you're away.

Baseboard heaters supply heat to each room individually, so they are ideally suited to zone heating, which involves heating the occupied rooms in your home while allowing unoccupied area (such as empty guest rooms or seldom-used rooms) to remain cooler. (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

CONTROL SYSTEMS

Zone heating can produce energy savings of more than 20% compared to heating both occupied and unoccupied areas of your house.

Zone heating is most effective when the cooler portions of your home are insulated from the heated portions, allowing the different zones to truly operate independently. Note that the cooler parts of your home still need to be heated to well above freezing to avoid freezing pipes." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Radiant Heating:

"Radiant heating systems supply heat directly to the floor or to panels in the wall or ceiling of a house. The systems depend largely on radiant heat transfer -- the delivery of heat directly from the hot surface to the people and objects in the room via infrared radiation. Radiant heating is the effect you feel when you can feel the warmth of a hot stovetop element from across the room. When radiant heating is located in the floor, it is often called radiant floor heating or simply floor heating. Radiant heating has a number of advantages. It is more efficient than baseboard heating and usually more efficient than forced-air heating because it eliminates duct losses. People with allergies often prefer radiant heat because it doesn't distribute allergens like forced air systems can. Hydronic (liquid-based) systems use little electricity, a benefit for homes off the power grid or in areas with high electricity prices. Hydronic systems can use a wide variety of energy sources to heat the liquid, including standard gas- or oil-fired boilers, wood-fired boilers, solar water heaters, or a combination of these sources." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Radiant Heating

“For more on the different types of energy sources and heat distribution systems for home heating, explore our ”Energy Saver 101 infographic on home heating”(located in the learning extras.) Despite its name, radiant floor heating depends heavily on convection, the natural circulation of heat within a room as air warmed by the floor rises. Radiant floor heating systems are significantly different from the radiant panels used in walls and ceilings. For this reason, the following sections discuss radiant floor heat and radiant panels separately.”

RADIANT FLOOR HEAT

“There are three types of radiant floor heat -- radiant air floors (air is the heat-carrying medium), electric radiant floors, and hot water (hydronic) radiant floors. You can further categorize these types by installation. Those that make use of the large thermal mass of a concrete slab floor or lightweight concrete over a wooden subfloor are called ‘wet installations,’ and those in which the installer ‘sandwiches’ the radiant floor tubing between two layers of plywood or attaches the tubing under the finished floor or subfloor are called "dry installations.“(Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

TYPES OF RADIANT FLOOR HEAT

AIR-HEATED RADIANT FLOORS

"Air cannot hold large amounts of heat, so radiant air floors are not cost-effective in residential applications, and are seldom installed. Although they can be combined with solar air heating systems, those systems suffer from the obvious drawback of only producing heat in the daytime, when heating loads are generally lower. The inefficiency of trying to heat a home with a conventional furnace by pumping air through the floors at night outweighs the benefits of using solar heat during the day. Although some early solar air heating systems used rocks as a heat-storage medium, this approach is not recommended." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ELECTRIC RADIANT FLOORS

“Electric radiant floors typically consist of electric cables built into the floor. Systems that feature mats of electrically conductive plastic mounted on the subfloor below a floor covering such as tile are also available.

Because of the relatively high cost of electricity, electric radiant floors are usually only cost-effective if they include a significant thermal mass such as a thick concrete floor and your electric utility company offers time-of-use rates. Time-of-use rates allow you to "charge" the concrete floor with heat during off-peak hours (approximately 9 p.m. to 6 a.m.). (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ELECTRIC RADIANT FLOORS

If the floor's thermal mass is large enough, the heat stored in it will keep the house comfortable for eight to ten hours without any further electrical input, particularly when daytime temperatures are significantly warmer than nighttime temperatures. This saves a considerable number of energy dollars compared to heating at peak electric rates during the day.

Electric radiant floors may also make sense for home additions if it would be impractical to extend the heating system into the new space. However, homeowners should examine other options, such as mini-split heat pumps, (see learning extras, “Ductless, Mini-Split Heat Pumps”) which operate more efficiently and have the added advantage of providing cooling.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

HYDRONIC RADIANT FLOORS

"Hydronic (liquid) systems are the most popular and cost-effective radiant heating systems for heating-dominated climates. Hydronic radiant floor systems pump heated water from a boiler through tubing laid in a pattern under the floor. In some systems, controlling the flow of hot water through each tubing loop by using zoning valves or pumps and thermostats regulates room temperatures. The cost of installing a hydronic radiant floor varies by location and depends on the size of the home, the type of installation, the floor covering, remoteness of the site, and the cost of labor floor is greatly improved compared with more traditional dry or wet floors." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

TYPES OF FLOOR INSTALLATIONS

“Whether you use cables or tubing, the methods of installing electric and hydronic radiant systems in floors are similar. So-called "wet" installations embed the cables or tubing in a solid floor and are the oldest form of modern radiant floor systems.

The tubing or cable can be embedded in a thick concrete foundation slab (commonly used in "slab" ranch houses that don't have basements) or in a thin layer of concrete, gypsum, or other material installed on top of a subfloor. If concrete is used and the new floor is not on solid earth, additional floor support may be necessary because of the added weight.

You should consult a professional engineer to determine the floor's carrying capacity. Thick concrete slabs are ideal for storing heat from solar energy systems, which have a fluctuating heat output. The downside of thick slabs is their slow thermal response time, which makes strategies such as night or daytime setbacks difficult if not impossible. (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

TYPES OF FLOOR INSTALLATIONS

Most experts recommend maintaining a constant temperature in homes with these heating systems. Due to recent innovations in floor technology, so-called "dry" floors, in which the cables or tubing run in an air space beneath the floor, have been gaining in popularity, mainly because a dry floor is faster and less expensive to build

Because dry floors involve heating an air space, the radiant heating system needs to operate at a higher temperature. Some dry installations involve suspending the tubing or cables under the subfloor between the joists.

This method usually requires drilling through the floor joists to install the tubing. Reflective insulation must also be installed under the tubes to direct the heat upward. (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

TYPES OF FLOOR INSTALLATIONS

Tubing or cables may also be installed from above the floor, between two layers of subfloor. In these instances, liquid tubing is often fitted into aluminum diffusers that spread the water's heat across the floor in order to heat the floor more evenly. The tubing and heat diffusers are secured between furring strips (sleepers), which carry the weight of the new subfloor and finished floor surface.

At least one company has improved on this idea by making a plywood subfloor material manufactured with tubing grooves and aluminum heat diffuser plates built into them. The manufacturer claims that this product makes a radiant floor system (for new construction) considerably less expensive to install and faster to react to room temperature changes.

Such products also allow for the use of half as much tubing or cabling, because the heat transfer of the floor is greatly improved compared with more traditional dry or wet floors." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

FLOOR COVERINGS

"Ceramic tile is the most common and effective floor covering for radiant floor heating, because it conducts heat well and adds thermal storage.

Common floor coverings like vinyl and linoleum sheet goods, carpeting, or wood can also be used, but any covering that insulates the floor from the room will decrease the efficiency of the system.

If you want carpeting, use a thin carpet with dense padding and install as little carpeting as possible.

If some rooms, but not all, will have a floor covering, then those rooms should have a separate tubing loop to make the system heat these spaces more efficiently. This is because the water flowing under the covered floor will need to be hotter to compensate for the floor covering.

Wood flooring should be laminated wood flooring instead of solid wood to reduce the possibility of the wood shrinking and cracking from the drying effects of the heat." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

RADIANT PANELS

“Wall- and ceiling-mounted radiant panels are usually made of aluminum and can be heated with either electricity or with tubing that carries hot water, although the latter creates concerns about leakage in wall- or ceiling-mounted systems.

Most commercially available radiant panels for homes are electrically heated. Like any type of electric heat, radiant panels can be expensive to operate, but they can provide supplemental heating in some rooms or can provide heat to a home addition when extending the conventional heating system is impractical.

Radiant panels have the quickest response time of any heating technology and -- because the panels can be individually controlled for each room—the quick response feature can result in cost and energy savings compared with other systems when rooms are infrequently occupied. (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

RADIANT PANELS

When entering a room, the occupant can increase the temperature setting and be comfortable within minutes.

As with any heating system, set the thermostat to a minimum temperature that will prevent pipes from freezing. Radiant heating panels operate on a line-of-sight basis -- you'll be most comfortable if you're close to the panel. Some people find ceiling-mounted systems uncomfortable because the panels heat the top of their heads and shoulders more effectively than the rest of their bodies." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Portable Heaters:

"Small space heaters are typically used when the main heating system is inadequate or when central heating is too costly to install or operate.

In some cases, small space heaters can be less expensive to use if you only want to heat one room or supplement inadequate heating in one room. They can also boost the temperature of rooms used by individuals who are sensitive to cold, especially elderly persons, without overheating your entire home.

Space heater capacities generally range between 10,000 Btu and 40,000 Btu per hour, and commonly run on electricity, propane, natural gas, and kerosene (see "Wood and Pellet Heating" in the learning extras for information on wood and pellet stoves)." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Portable Heaters

"Although most space heaters work by convection (the circulation of air in a room), some rely on radiant heating. Radiant heaters emit infrared radiation that directly heats objects and people within their line of sight, and are a more efficient choice when you will be in a room for only a few hours and can stay within the line of sight of the heater. They can also be more efficient when you will be using a room for a short period because they save energy by directly heating the occupant of the room and the occupant's immediate surroundings rather than the whole room. Safety is a top consideration when using space heaters.

The U.S. Consumer Product Safety Commission estimates that more than 25,000 residential fires every year are associated with the use of space heaters, resulting in more than 300 deaths. In addition, an estimated 6,000 people receive hospital emergency room care for burn injuries associated with contacting the hot surfaces of room heaters, mostly in non-fire situations." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Portable Heaters

"When buying and installing a small space heater, follow these guidelines:

- Only purchase newer model heaters that have all of the current safety features. Make sure the heater carries the Underwriter's Laboratory (UL) label.
- Choose a thermostatically controlled heater, because they avoid the energy waste of overheating a room.
- Select a heater of the proper size for the room you wish to heat. Do not purchase oversized heaters. Most heaters come with a general sizing table.
- Locate the heater on a level surface away from foot traffic. Be especially careful to keep children and pets away from the heater." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

VENTED AND UNVENTED COMBUSTION SPACE HEATERS

“Space heaters are classified as vented and unvented or "vent-free.“

Unvented combustion units are not recommended for use inside your home, because they introduce unwanted combustion products into the living space—including nitrogen oxides, carbon monoxide, and water vapor—and deplete air in the space.

Most states have banned unvented kerosene heaters for use in the home and at least five have banned the use of unvented natural gas heaters.

Vented units are designed to be permanently located next to an outside wall, so that the flue gas vent can be installed through a ceiling or directly through the wall to the outside. Look for sealed combustion or "100% outdoor air" units, which have a duct to bring outside into the combustion chamber.

Sealed combustion heaters are much safer to operate than other types of space heaters, and operate more efficiently because they do not draw in the heated air from the room and exhaust it to the outdoors. They are also less likely to backdraft and adversely affect indoor air quality. (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

VENTED AND UNVENTED COMBUSTION SPACE HEATERS

Less expensive (and less efficient) units use the room air for combustion. They do not have a sealed glass front to keep room air away from the fire and should not be confused with a sealed combustion heater.

In addition to the manufacturer's installation and operating instructions, you should follow these general safety guidelines for operating any combustion space heater:

- For liquid-fueled heaters, use only the approved fuel. Never use gasoline! Follow the manufacturer's fueling instructions. Never fill a heater that is still hot. Do not overfill the heater -- you must allow for the expansion of the liquid. Only use approved containers clearly marked for that particular fuel, and store them outdoors.

- Have vented space heaters professionally inspected every year. If the heater is not vented properly, not vented at all, or if the vent is blocked, separated, rusted, or corroded, dangerous levels of carbon monoxide (CO) can enter the home causing sickness and death. CO also can be produced if the heater is not properly set up and adjusted for the type of gas used and the altitude at which it is installed." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ELECTRIC SPACE HEATERS

"Electric space heaters are generally more expensive to operate than combustion space heaters, but they are the only unvented space heaters that are safe to operate inside your home. Although electric space heaters avoid indoor air quality concerns, they still pose burn and fire hazards and should be used with caution. For convection (non-radiant) space heaters, the best types incorporate a heat transfer liquid, such as oil, that is heated by the electric element. The heat transfer fluid provides some heat storage, allowing the heater to cycle less and to provide a more constant heat source. When buying and installing an electric space heater, you should follow these general safety guidelines:

- Electric heaters should be plugged directly into the wall outlet. If an extension cord is necessary, use the shortest possible heavy-duty cord of 14-gauge wire or larger. Always check and follow any manufacturer's instructions pertaining to the use of extension cords.

- Buy a unit with a tip-over safety switch, which automatically shuts off the heater if the unit is tipped over." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Heat Pump Systems

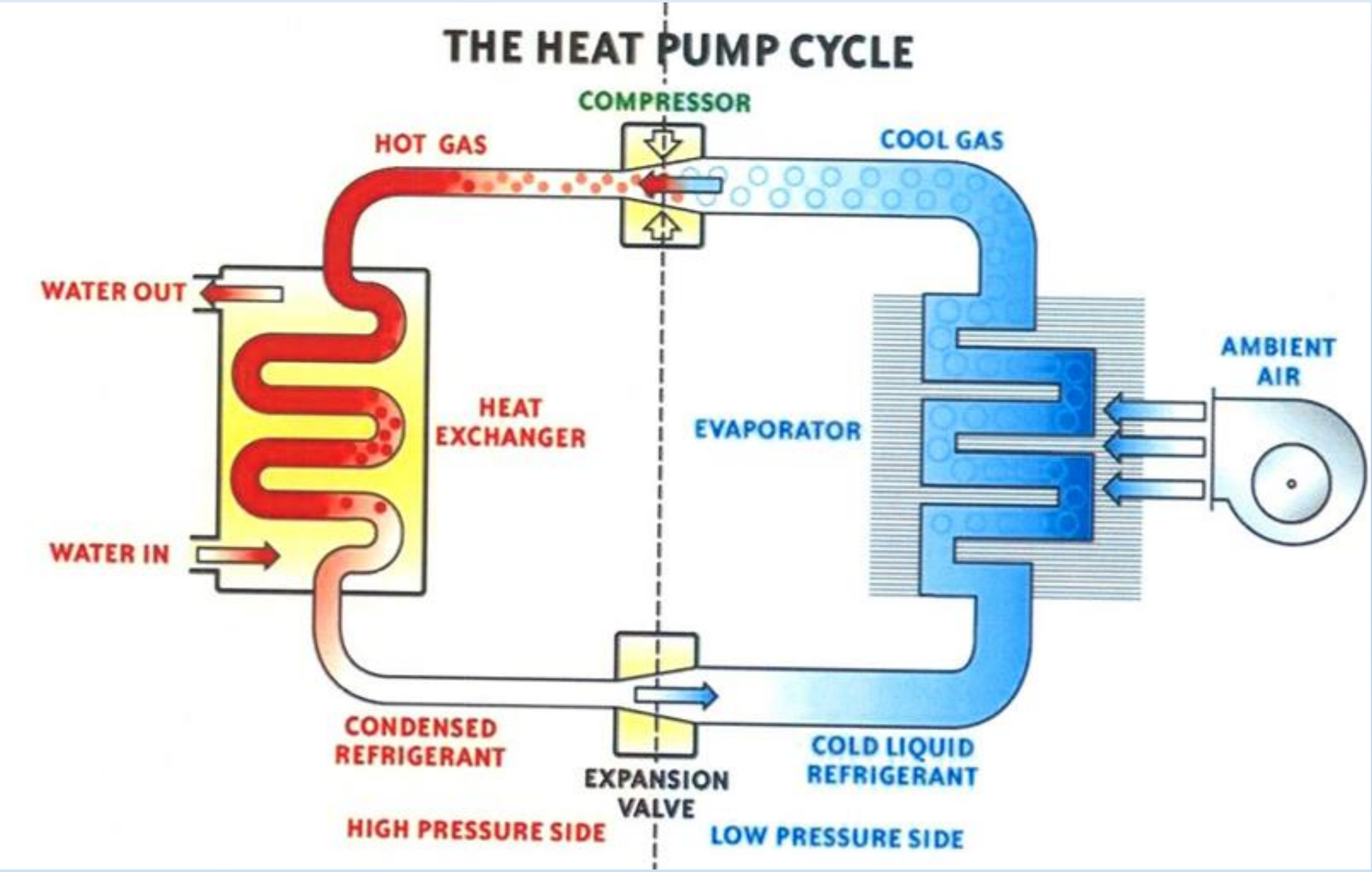
"For climates with moderate heating and cooling needs, heat pumps offer an energy-efficient alternative to furnaces and air conditioners. Like your refrigerator, heat pumps use electricity to move heat from a cool space to a warm space, making the cool space cooler and the warm space warmer.

During the heating season, heat pumps move heat from the cool outdoors into your warm house and during the cooling season, heat pumps move heat from your cool house into the warm outdoors. Because they move heat rather than generate heat, heat pumps can provide equivalent space conditioning at as little as one quarter of the cost of operating conventional heating or cooling appliances.

There are three types of heat pumps: air-to-air, water source, and geothermal. They collect heat from the air, water, or ground outside your home and concentrate it for use inside." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Heat Pump Systems



Air Source Heat Pump Systems

"The most common type of heat pump is the air-source heat pump, which transfers heat between your house and the outside air. Today's heat pump can reduce your electricity use for heating by approximately 50% compared to electric resistance heating such as furnaces and baseboard heaters.

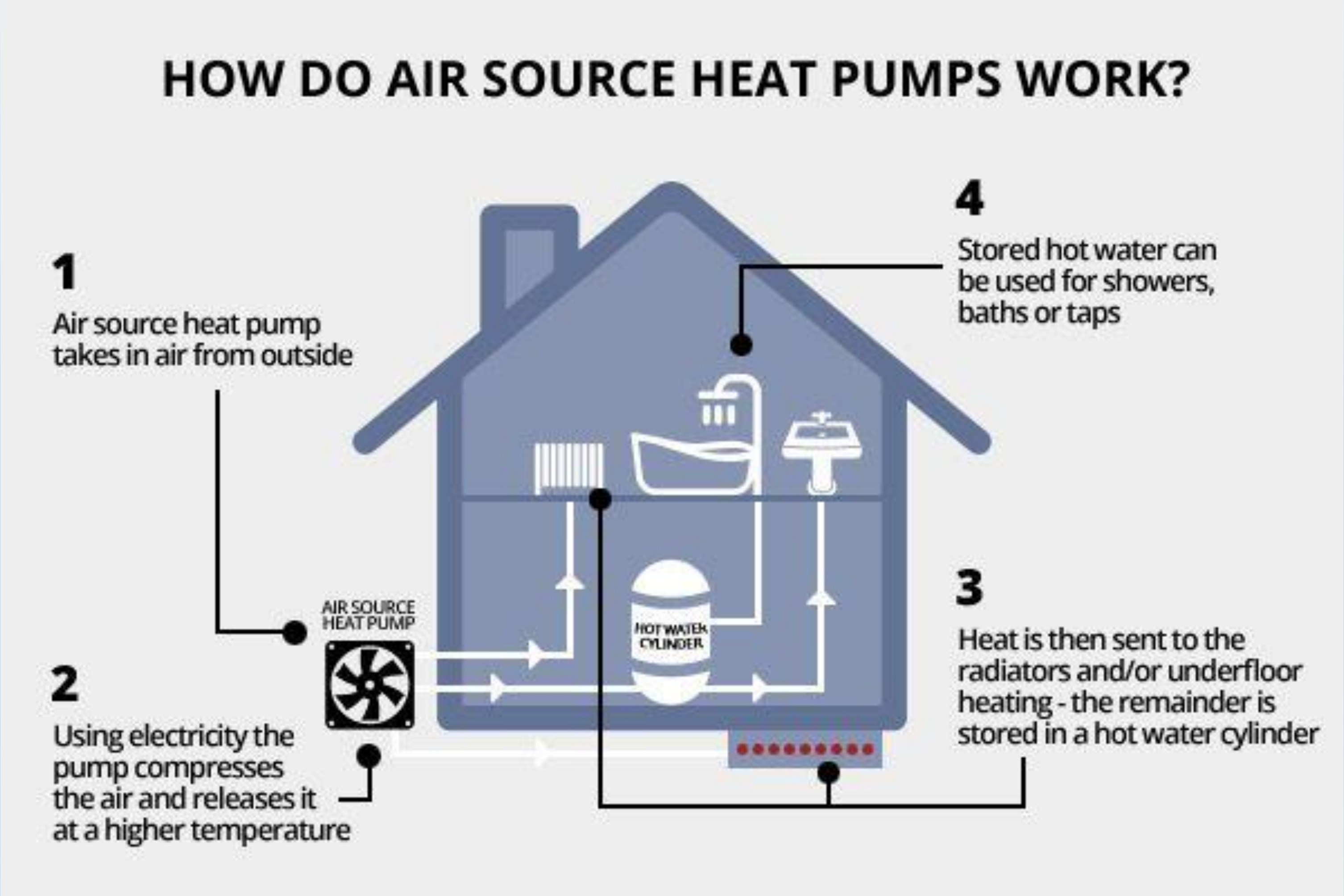
High-efficiency heat pumps also dehumidify better than standard central air conditioners, resulting in less energy usage and more cooling comfort in summer months.

Air-source heat pumps have been used for many years in nearly all parts of the United States, but until recently they have not been used in areas that experienced extended periods of subfreezing temperatures. However, in recent years, air-source heat pump technology has advanced so that it now offers a legitimate space heating alternative in colder regions.

For homes without ducts, air-source heat pumps are also available in a ductless version called a mini-split heat pump (Learning extras, "Ductless, Mini-split Heat Pumps"). In addition, a special type of air-source heat pump called a "reverse cycle chiller" generates hot and cold water rather than air, allowing it to be used with radiant floor heating systems (Learning extras, "Radiant Heating") in heating mode." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Air Source Heat Pump Systems



Geothermal Heat Pump Systems

"Geothermal (ground-source or water-source) heat pumps achieve higher efficiencies by transferring heat between your house and the ground or a nearby water source.

Although they cost more to install, geothermal heat pumps have low operating costs because they take advantage of relatively constant ground or water temperatures. Geothermal (or ground source) heat pumps have some major advantages. They can reduce energy use by 30%-60%, control humidity, are sturdy and reliable, and fit in a wide variety of homes.

Whether a geothermal heat pump is appropriate for you will depend on the size of your lot, the subsoil, and the landscape. Ground-source or water-source heat pumps can be used in more extreme climates than air-source heat pumps, and customer satisfaction with the systems is very high."

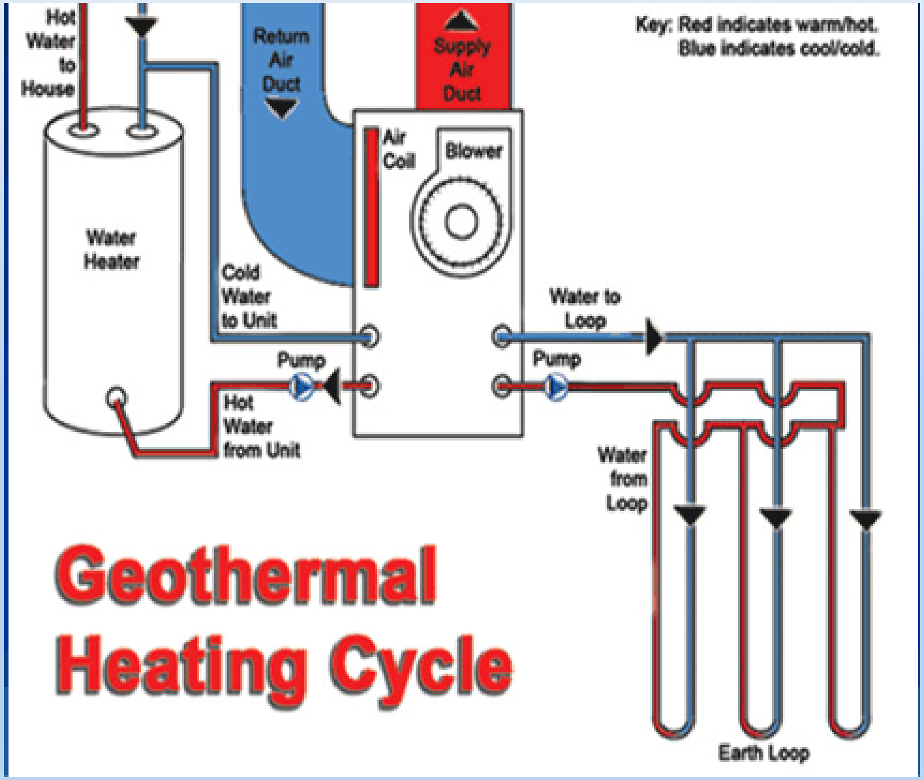
"A new type of heat pump for residential systems is the absorption heat pump, also called a gas-fired heat pump. Absorption heat pumps use heat as their energy source, and can be driven with a wide variety of heat sources." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Geothermal Heat Pump Systems

TYPES OF GEOTHERMAL HEAT PUMP SYSTEMS

- There are four basic types of ground loop systems.
- Three of these -- horizontal, vertical, and pond/lake -- are closed-loop systems.
- The fourth type of system is the open-loop option.
- Which one of these is best depends on the climate, soil conditions, available land, and local installation costs at the site.
- All of these approaches can be used for residential and commercial building applications.
- Geo Thermal Heat Pumps

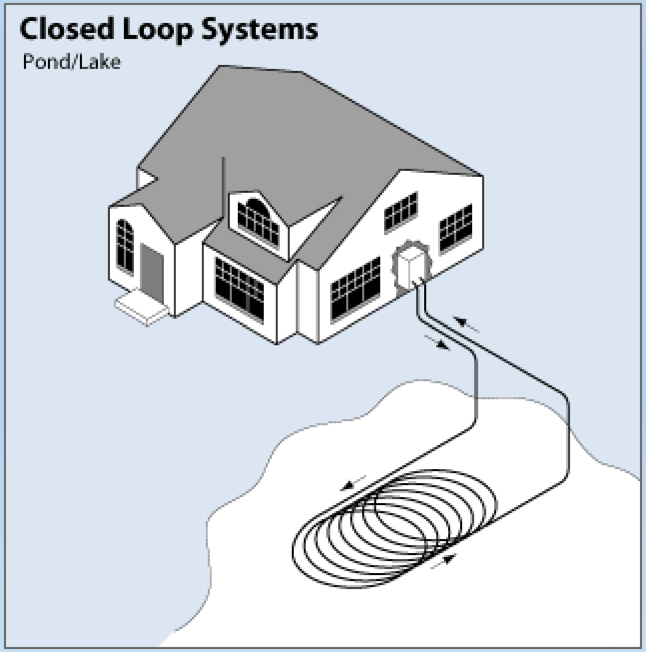


For more information see corresponding links in the bibliography document located in your learning extras.

Geothermal Heat Pump Systems

POND/LAKE

If the site has an adequate water body, this may be the lowest cost option. A supply line pipe is run underground from the building to the water and coiled into circles at least eight feet under the surface to prevent freezing. The coils should only be placed in a water source that meets minimum volume, depth, and quality criteria.

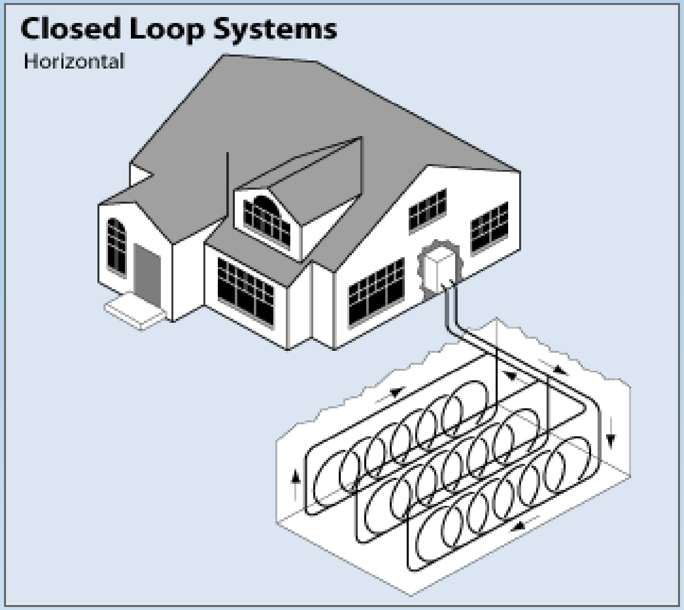


For more information see corresponding links in the bibliography document located in your learning extras.

Geothermal Heat Pump Systems

HORIZONTAL

This type of installation is generally most cost-effective for residential installations, particularly for new construction where sufficient land is available. It requires trenches at least four feet deep. The most common layouts either use two pipes, one buried at six feet, and the other at four feet, or two pipes placed side-by-side at five feet in the ground in a two-foot wide trench. The Slinky™ method of looping pipe allows more pipe in a shorter trench, which cuts down on installation costs and makes horizontal installation possible in areas it would not be with conventional horizontal applications.

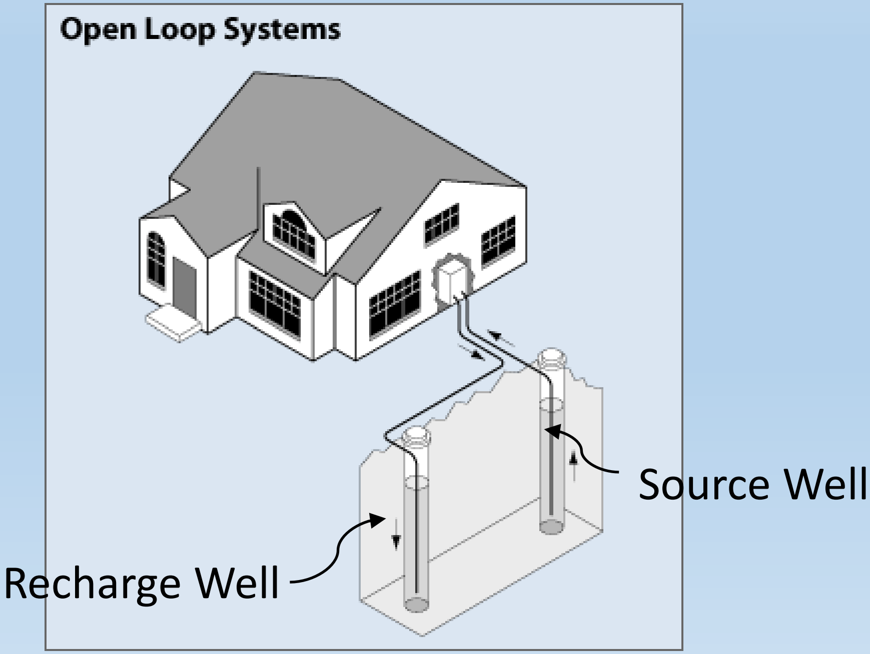


For more information see corresponding links in the bibliography document located in your learning extras.

Geothermal Heat Pump Systems

OPEN-LOOP SYSTEM

This type of system uses well or surface body water as the heat exchange fluid that circulates directly through the GHP system. Once it has circulated through the system, the water returns to the ground through the well, a recharge well, or surface discharge. This option is obviously practical only where there is an adequate supply of relatively clean water, and all local codes and regulations regarding groundwater discharge are met.



For more information see corresponding links in the bibliography document located in your learning extras.

"For more information on these specific types of heat pumps, see the following documents in the learning extras:

- Air-source heat pumps
- Ductless mini-split heat pumps
- Geothermal heat pumps
- Absorption heat pumps."

(Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

ADVANCED FEATURES TO LOOK FOR IN A HEAT PUMP

"A number of innovations are improving the performance of heat pumps.

Unlike standard compressors that can only operate at full capacity, *two-speed compressors* allow heat pumps to operate close to the heating or cooling capacity needed at any particular moment. This saves large amounts of electrical energy and reduces compressor wear.

Two-speed heat pumps also work well with zone control systems. Zone control systems, often found in larger homes, use automatic dampers to allow the heat pump to keep different rooms at different temperatures.

Some models of heat pumps are equipped with *variable-speed or dual-speed motors* on their indoor fans (blowers), outdoor fans, or both. The variable-speed controls for these fans attempt to keep the air moving at a comfortable velocity, minimizing cool drafts and maximizing electrical savings. It also minimizes the noise from the blower running at full speed.

Many high-efficiency heat pumps are equipped with a *desuperheater*, which recovers waste heat from the heat pump's cooling mode and uses it to heat water. A desuperheater-equipped heat pump can heat water 2 to 3 times more efficiently than an ordinary electric water heater. (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Another advance in heat pump technology is the *scroll compressor*, which consists of two spiral-shaped scrolls. One remains stationary, while the other orbits around it, compressing the refrigerant by forcing it into increasingly smaller areas.

Compared to the typical piston compressors, scroll compressors have a longer operating life and are quieter. According to some reports, heat pumps with scroll compressors provide 10° to 15°F (5.6° to 8.3°C) warmer air when in the heating mode, compared to existing heat pumps with piston compressors.

Although most heat pumps use electric resistance heaters as a backup for cold weather, heat pumps can also be equipped with burners to supplement the heat pump. *Back-up burners* help solve the problem of the heat pump delivering relatively cool air during cold weather and reduces its use of electricity.

There are few heat pump manufacturers that incorporate both types of heat supply in one box, so these configurations are often two smaller, side-by-side, standard systems sharing the same ductwork. The combustion fuel half of the system could be propane, natural gas, oil, or even coal and wood. In comparison with a combustion fuel-fired furnace or standard heat pump alone, this type of system is also economical. Actual energy savings depend on the relative costs of the combustion fuel relative to electricity." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Cooling systems:

"Although your first thought for cooling may be air conditioning, there are many alternatives that provide cooling with less energy use. A combination of proper insulation, energy-efficient windows and doors, daylighting, shading, and ventilation will usually keep homes cool with a minimum of energy use in all but the hottest climates. Although ventilation should be avoided in hot, humid climates, other approaches can significantly reduce the need to use air conditioning. Before choosing a cooling system, you may want to familiarize yourself with the 'Principles of Heating and Cooling' located in the learning extras." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

COOLING TIPS

- “Set your programmable thermostat as high as is comfortable in the summer, and raise the set point when you're sleeping or away from home.
- Clean or replace filters on air conditioners once a month or as recommended.
- Turn off kitchen, bath, and other exhaust fans within 20 minutes after you are done cooking or bathing; when replacing exhaust fans, consider installing high-efficiency, low-noise models.
- During summer, keep the window coverings closed during the day to block the sun's heat.
- Select energy-efficient products when you buy new cooling equipment. Your contractor should be able to give you energy fact sheets for different types, models, and designs to help you compare energy usage. See the efficiency standards for information on minimum ratings, and look for the ENERGY STAR when purchasing new products.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

COOLING SYSTEMS

VENTILATION FOR COOLING (see learning extras)

"Whether relying on 'Natural Ventilation' (see learning extras) or forcing air through your home with fans, ventilation is the most energy-efficient way to cool your house."

FANS FOR COOLING (see learning extras)

"Well-placed fans are sufficient to maintain comfort during the cooling season in many parts of the country."

WHOLE-HOUSE FANS (see learning extras)

"In many climates, you can use a whole-house fan to meet all or most of your home cooling needs." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

EVAPORATIVE COOLING

“For homes in dry climates, evaporative cooling or ‘swamp cooling’ provides an experience like air conditioning, but with much lower energy use.”

AIR CONDITIONING

“Air conditioner options include **room air conditioners**, **ductless mini-split air conditioners**, and **central air conditioning**. (See learning extras)Most air conditioners operate at less than their maximum efficiency, presenting energy-saving opportunities. New air conditioning units are far more efficient than earlier models. **Dehumidifying heat pipes** (see learning extras) can help an air conditioner remove humidity and more efficiently cool the air.”

RADIANT COOLING

“Radiant cooling cools a floor or ceiling by absorbing the heat radiated from the rest of the room and can be appropriate in arid climates but problematic elsewhere.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 2 Chapter 1 Summary

In this chapter you learned the following:

- How to describe different types of heating system.
- How to identify the different types of energy sources used to generate heat or Cooling.
- How to describe whether or not a heating system represents an energy efficient system.

Chapter 2 – Electrical

Section 2 Chapter 2 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe different types of insulation.
- Identify the different applications for insulation.
- Describe the relative energy savings that can be achieved with energy-efficient lighting.

Chapter 2

Electrical Use:

"How to be more efficient:

- **Find better ways to heat and cool your house**
- **Install a tankless water heater**
- **Replace incandescent lights"**
- **Find better ways to heat and cool your house."**

"The average household dedicates 11% of its energy budget to lighting. Traditional incandescent lights convert approximately only 10% of the energy they consume into light, while the rest becomes heat. The use of new lighting technologies, such as light-emitting diodes (LEDs) and compact fluorescent lamps (CFLs), can reduce the energy use required by lighting by 50% to 75%. Advances in lighting controls offer further energy savings by reducing the amount of time that lights are on but not being used. Here are some facts about CFLs and LEDs:" (IACHI)

For more information see corresponding links in the bibliography document located in your learning extras.

Electrical Use

- CFLs use 75% less energy and last about 10 times longer than traditional incandescent bulbs.
- LEDs last even longer than CFLs and consume less energy.
- LEDs have no moving parts and, unlike CFLs, they contain no mercury.

- **Use appliances and electronics responsibly**
- **Install daylighting as an alternative to electrical lighting.**
- **Cook smart**
- **Change the way you do laundry.”** (IACHI)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 2 Chapter 2 Summary

In this chapter you learned the following:

- How to describe different types of energy efficient lighting.
- How to identify the different types of energy saving electrical components.
- How to describe the relative energy savings that can be achieved with energy-efficient lighting.

Chapter 3 - Insulation

Section 2 Chapter 3 Learning Objectives

In this chapter you learned the following:

- How to describe different types of insulation.
- How to identify the different applications for insulation.
- How to describe whether or not and insulation type represents an energy efficient system.

Chapter 3

Insulation

(Videos provided by Efficiency Vermont)

Wall Insulation:

https://www.youtube.com/watch?v=sgXlNeZ8DDE&feature=youtu.be

Chapter 3

Insulation

(Videos provided by Efficiency Vermont)

Ceiling Insulation:

https://www.youtube.com/watch?v=rcS1Q48i67I&feature=youtu.be

Chapter 3

Insulation

(Videos provided by Efficiency Vermont)

Foundation Insulation:

https://www.youtube.com/watch?v=5XFVdUC5upM&feature=youtu.be

Chapter 3

Insulation (Photos provided by Efficiency Vermont)

Batts:

Fiberglass

Rock wool

Cotton

Chapter 3

Insulation: (Photos provided by Efficiency Vermont)

Loose Fill:

Cellulose

Fiberglass

Vermiculite

End of Page

Chapter 3

Insulation: (Photos provided by Efficiency Vermont)

Spray Applied:
Fiberglass

Cellouse:
Dense Pack

Moist-spray

Chapter 3

Insulation: (Photos provided by Efficiency Vermont)

Spray Foam:

Open-cell

Close-cell

Chapter 3

Insulation: (Photos provided by Efficiency Vermont)

Rigid Board:

Rock Wool

Expanded Polystyrene (EPS)

Chapter 3

Insulation: (Photos provided by Efficiency Vermont)

Rigid Board:

Extruded Polystyrene (XPS)

Polyisocyanurate

Section 2 Chapter 3 Summary

In this chapter you learned the following:

- How to describe different types of insulation.
- How to identify the different applications for insulation.
- How to describe whether or not insulation type represents an energy efficient system.

Chapter 4 - Windows

Section 2 Chapter 4 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe different types of windows.
-
- Identify the different applications for energy-efficient windows.
- Describe whether or not a window type represents an energy efficient system.

Chapter 4

Windows:

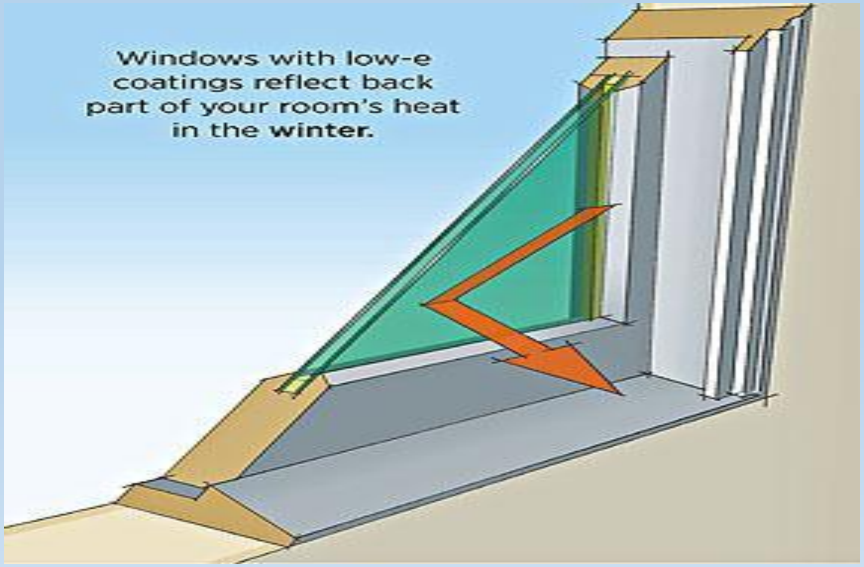
“Energy-efficient windows, doors, and skylights—also known as fenestration—can help lower a home's heating, cooling, and lighting costs. Learn about the ’Energy Performance Ratings’ in your learning extras to consider when selecting windows, doors, and skylights, and how to maximize their energy efficiency in your home.”

“Windows provide our homes with light, warmth, and ventilation, but they can also negatively impact a home's energy efficiency. You can reduce energy costs by installing energy-efficient windows in your home. If your budget is tight, energy efficiency improvements to existing windows can also help.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

IMPROVING THE ENERGY EFFICIENCY OF EXISTING WINDOWS

"You can improve the energy efficiency of existing windows by adding storm windows, caulking and weather-stripping, and using window treatments or coverings. Adding **storm windows** can reduce air leakage and improve comfort. **Caulking** and **weather-stripping** can reduce air leakage around windows. Use caulk for stationary cracks, gaps, or joints less than one-quarter-inch wide, and weather-stripping for building components that move, such as doors and operable windows. **Window treatments or coverings** can reduce heat loss in the winter and heat gain in the summer. Most window treatments, however, aren't effective at reducing air leakage or infiltration." (Energy.gov)



See learning extras for more information on subjects in bold

For more information see corresponding links in the bibliography document located in your learning extras.

COLD WEATHER WINDOW TIPS

- "Use a heavy-duty, clear plastic sheet on a frame or tape clear plastic film to the inside of your window frames to reduce drafts.
- Install tight-fitting, insulating window shades on windows that feel drafty after weatherizing.
- Close your curtains and shades at night to protect against cold drafts; open them during the day to let in warming sunlight.
- Install exterior or interior storm windows, which can reduce heat loss through the windows by approximately 10%-20%, depending on the type of window already installed in the home. They should have weather-stripping at all movable joints; be made of strong, durable materials; and have interlocking or overlapping joints.
- Repair and weatherize your current storm windows, if necessary." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

WARM WEATHER WINDOW TIPS

- "Install white window shades, drapes, or blinds to reflect heat away from the house.
- Close curtains on south- and west-facing windows during the day.
- Install awnings on south- and west-facing windows.
- Apply sun-control or other reflective films on south-facing windows to reduce solar heat gain." (energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

SELECTING NEW ENERGY-EFFICIENT WINDOWS

"If your home has very old and/or inefficient windows, it might be more cost-effective to replace them than to try to improve their energy efficiency. New, energy-efficient windows eventually pay for themselves through lower heating and cooling costs, and sometimes even lighting costs. When properly selected and installed, energy-efficient windows can help minimize your heating, cooling, and lighting costs. Improving window performance in your home involves design, selection, and installation."

DESIGN

"Before selecting new windows for your home, determine what types of windows will work best and where to improve your home's energy efficiency. It's a good idea to understand the "Energy Performance Ratings of Windows" (see learning extras) so you'll know what energy performance ratings you need for your windows based on your climate and the home's design. For labeling energy-efficient windows, ENERGY STAR® has established minimum energy performance rating criteria by climate. However, these criteria don't account for a home's design, such as window orientation." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

"Windows are an important element in "Passive Solar Home Design" (see learning extras), which uses solar energy at the site to provide heating, cooling, and lighting for a house. Passive solar design strategies vary by building location and regional climate, but the basic window guidelines remain the same—select, orient, and size glass to maximize solar heat gain in winter and minimize it in summer.

In heating-dominated climates, major glazing areas should generally face south to collect solar heat during the winter when the sun is low in the sky. In the summer, when the sun is high overhead, overhangs or other shading devices prevent excessive heat gain. To be effective, south-facing windows should have a solar heat gain coefficient (SHGC) of greater than 0.6 to maximize solar heat gain during the winter, a U-factor of 0.35 or less to reduce conductive heat transfer, and a high visible transmittance (VT) for good visible light transfer." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

"See **Energy Performance Ratings** (learning extras) to learn more about these ratings. Windows on east-, west-, and north-facing walls should be minimized while still allowing for adequate daylight. It is difficult to control heat and light through east- and west-facing windows when the sun is low in the sky, and these windows should have a low SHGC and/or be shaded.

North-facing windows collect little solar heat, so they are used only for lighting. **Low-emissivity (low-e) window glazing** (see learning extras) can help control solar heat gain and loss in heating climates. In cooling climates, particularly effective strategies include preferential use of north-facing windows and generously shaded south-facing windows.

Windows with low SHGCs are more effective at reducing cooling loads. Some types of glazing help reduce solar heat gain, lowering a window's SHGC. Low-e coatings—microscopically thin, virtually invisible metal or metallic oxide layers deposited directly on the surface of glass—control heat transfer through windows with insulated glazing." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

"Tinted glass absorbs a large fraction of incoming solar radiation through a window, reflective coatings reduce the transmission of solar radiation, and spectrally selective coatings filter out 40% to 70% of the heat normally transmitted through insulated window glass or glazing, while allowing the full amount of light to be transmitted.

Except for spectrally selective, these types of glazing also lower a window's VT.
See **Window Types** to learn more about glazing, coatings, tints, and other options when selecting efficient windows.

If you're constructing a new home or doing some major remodeling, you should also take advantage of the opportunity to incorporate your window design and selection as an integral part of your **whole-house design**—an approach for building an energy-efficient home." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

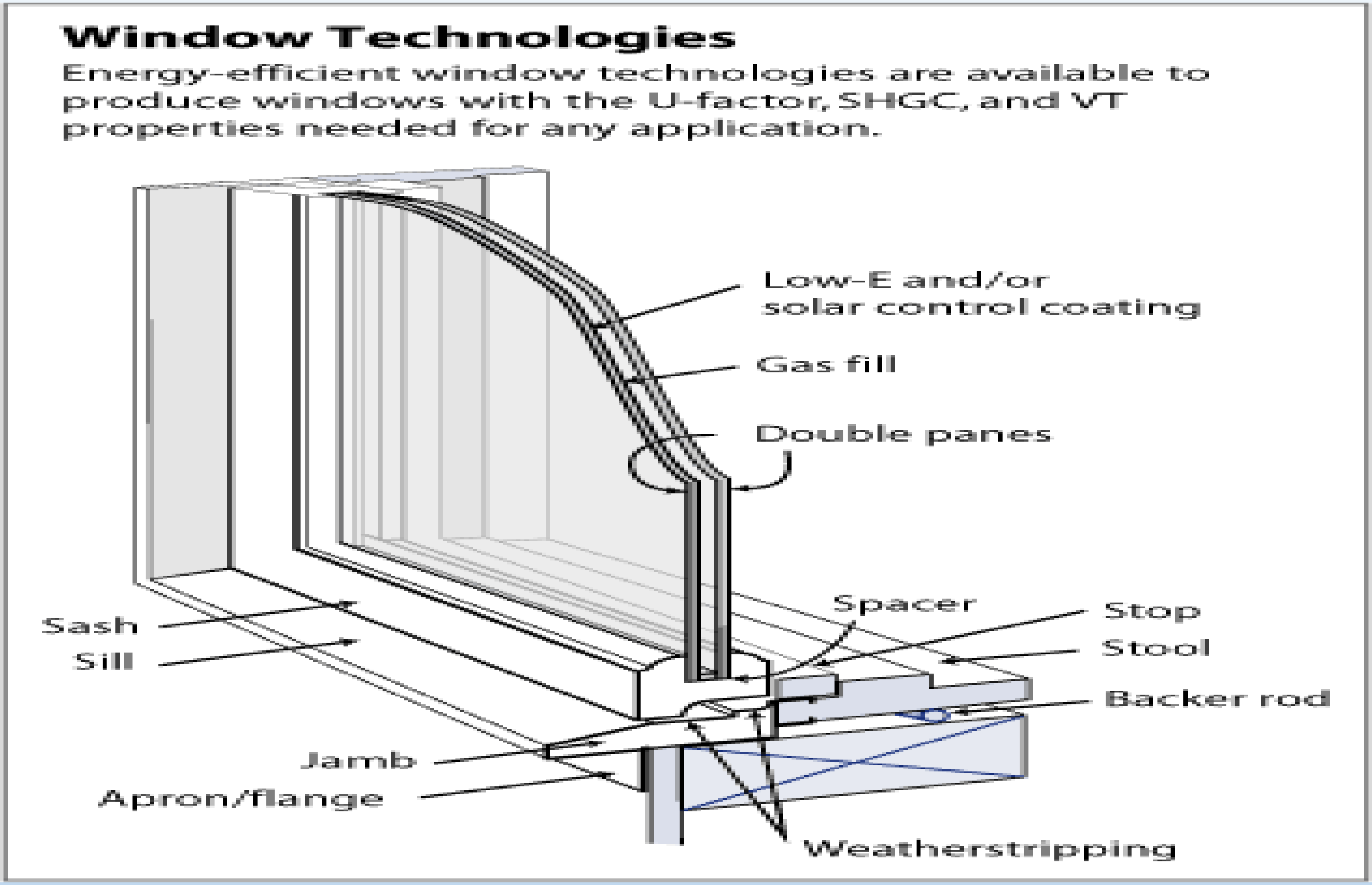
SELECTION

“You'll find that you have several options to consider when selecting what type of windows, you should use in your home.

When selecting windows for energy efficiency, it's important to first consider their **energy performance ratings** in relation to your climate and your home's design. This will help narrow your selection.

Select windows with both low U-factors and low SHGCs to maximize energy savings in temperate climates with both cold and hot seasons. Look for whole-unit U-factors and SHGCs, rather than center-of-glass (COG) U-factors and SHGCs. Whole-unit numbers more accurately reflect the energy performance of the entire product.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.



(Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

"A window's energy efficiency is dependent upon all of its components. Window frames conduct heat, contributing to a window's overall energy efficiency, particularly its U-factor. Glazing or glass technologies have become very sophisticated, and designers often specify different types of glazing or glass for different windows, based on orientation, climate, building design, etc. Another important consideration is how the windows operate, because some operating types have lower air leakage rates than others, which will improve your home's energy efficiency. Traditional operating types include:

- **Awning.** Hinged at the top and open outward. Because the sash closes by pressing against the frame, they generally have lower air leakage rates than sliding windows.
- **Casement.** Hinged at the sides. Like awning windows, they generally have lower air leakage rates than sliding windows because the sash closes by pressing against the frame.
- **Fixed.** Fixed panes that don't open. When installed properly they're airtight, but are not suitable in places where window ventilation is desired." (Energy.gov)

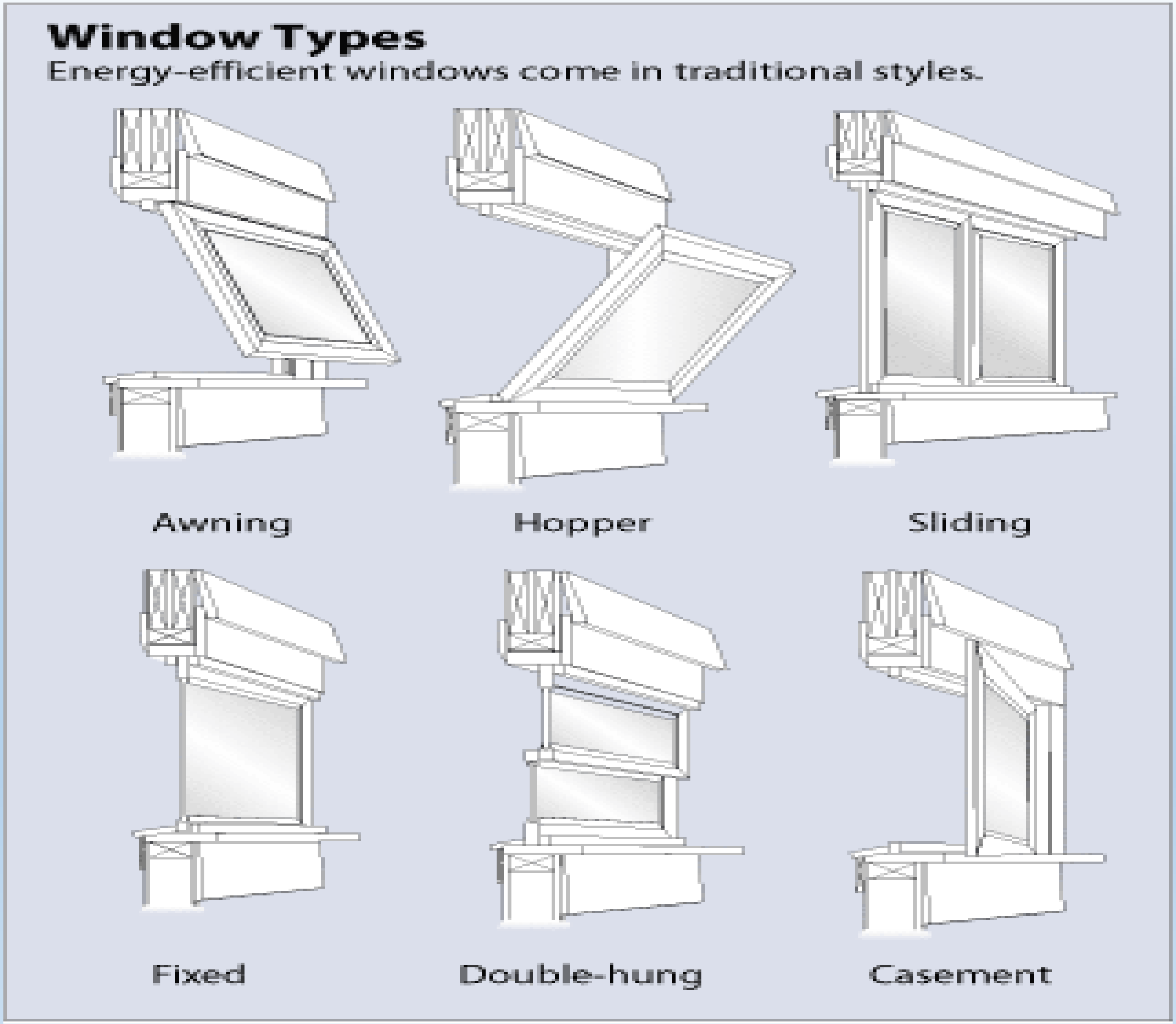
For more information see corresponding links in the bibliography document located in your learning extras.

- “**Hopper.** Hinged at the bottom and open inward. Like both awning and casement, they generally have lower air leakage rates because the sash closes by pressing against the frame.

- **Single- and double-hung.** Both sashes slide vertically in a double-hung window. Only the bottom sash slides upward in a single-hung window. These sliding windows generally have higher air leakage rates than projecting or hinged windows.

- **Single- and double-sliding.** Both sashes slide horizontally in a double-sliding window. Only one sash slides in a single-sliding window. Like single- and double-hung windows, they generally have higher air leakage rates than projecting or hinged windows.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.



(Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

INSTALLATION

“Even the most energy-efficient window must be properly installed to ensure energy efficiency. Therefore, it's best to have a professional install your windows.

Window installation varies depending on the type of window, the construction of the house (wood, masonry, etc.), the exterior cladding (wood siding, stucco, brick, etc.), and the type (if any) of weather-restrictive barrier.

Windows should be installed according to the manufacturer’s recommendations and be properly **air sealed** during installation to perform correctly. To air seal the window, caulk the frame and weather-strip the operable components.” (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 2 Chapter 4 Summary

In this chapter you learned the following:

- How to describe different types of windows.
- How to identify the different applications for energy-efficient windows.
- How to describe whether or not a window type represents an energy efficient system.

Chapter 5 -Doors

Section 2 Chapter 5 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Describe different types of doors.
- Identify the different applications for energy-efficient doors.
- Describe whether or not a door type represents an energy efficient system.

Doors:

“Your home’s exterior doors can contribute significantly to air leakage, and can also waste energy through conduction, especially if it's old, uninsulated, improperly installed, and/or improperly air sealed. **Weather-stripping** can reduce the energy losses due to air leakage.”

SELECTING NEW EXTERIOR DOORS

“New exterior doors often fit and insulate better than older types. If you have older doors in your home, replacing them might be a good investment, resulting in lower heating and cooling costs. If you're building a new home, you should consider buying the most energy-efficient doors possible. When selecting doors for energy efficiency, it's important to first consider their **energy performance ratings** in relation to the local climate and your home's design. This will help narrow your selection.”

For more information see corresponding links in the bibliography document located in your learning extras.

TYPES OF DOORS

"One common type of exterior door has a steel skin with a polyurethane foam insulation (see learning extras "Types of Insulation.") core. It usually includes a magnetic strip (similar to a refrigerator door magnetic seal) weather-stripping. If installed correctly and not bent, this type of door needs no further weather-stripping.

The R-values of most steel and fiberglass-clad entry doors range from R-5 to R-6, not including the effects of a window. For example, a 1-1/2 inch (3.81 cm) thick door without a window offers more than five times the insulating value of a solid wood door of the same size.

Glass or "patio" doors, especially sliding glass doors, lose much more heat than other types of doors because glass is a very poor insulator. Most modern glass doors with metal frames have a *thermal break,* which is a plastic insulator between inner and outer parts of the frame.

Models with several layers of glass, low-emissivity coatings, and/or low-conductivity gases between the glass panes are a good investment, especially in extreme climates. When buying or replacing patio doors, keep in mind that swinging doors offer a much tighter seal than sliding types." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

"It's impossible to stop all the air leakage around the weather-stripping on a sliding glass door and still be able to use the door. In addition, after years of use the weather-stripping wears down, so air leakage increases as the door ages. If the manufacturer has made it possible to do so, you can replace worn weather-stripping on sliding glass door."

INSTALLATION

"When you buy a door, it will probably be pre-hung. Pre-hung doors usually come with wood or steel frames. You will need to remove an existing doorframe from the rough opening before you install a pre-hung door. The doorframe must be as square as possible, so that the door seals tightly to the jamb and swings properly."
"Before adding the interior trim, apply expanding foam **caulking** to seal the new doorframe to the rough opening and threshold. This will help prevent air from getting around the door seals and into the house. Apply carefully, especially if the frame is wood, to avoid having the foam force the frame out of square. If needed, you'll also want to add weather-stripping. Check the weather-stripping on your exterior doors annually to see if it needs replacement." (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

STORM DOORS

“Adding a storm door can be a good investment if your existing door is old but still in good condition. However, adding a storm door to a newer, insulated door is not generally worth the expense, because you won't save much more energy.

Storm door frames are usually made of aluminum, steel, fiberglass, or wood (painted or not). Wooden storm doors require more maintenance than the other types.

Metal-framed storm doors might have **foam insulation** inside their frames. High-quality storm doors use low-emissivity (low-e) glass or glazing. “ (Energy.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

STORM DOORS

“Some doors have self-storing pockets for the glass in summer and an insect screen in winter. Some have fixed, full length screens and glass panels that slide out of the way for ventilation. Others are half screen and half glass, which slide past each other. Some are removable for cleaning, but others are not. All of these features add convenience and cost.

Never add a glass storm door if the exterior door gets more than a few hours of direct sun each day. The glass will trap heat against the entry door and could damage it.

Storm doors for patio doors are hard to find, but they are available. Adding one to a new, multi-glazed low-e door is seldom economic. Insulated drapes, when closed for the night in winter or on sunny days in summer, are also a good idea.”

For more information see corresponding links in the bibliography document located in your learning extras.

Section 2 Chapter 5 Summary

In this chapter you learned the following:

- How to describe different types of doors.
- How to identify the different applications for energy-efficient doors.
- How to describe whether or not a door type represents an energy efficient system.

Chapter 6
The Components of Solar and how to use a simple PV Solar tool

Section 2 Chapter 6 Learning Objectives

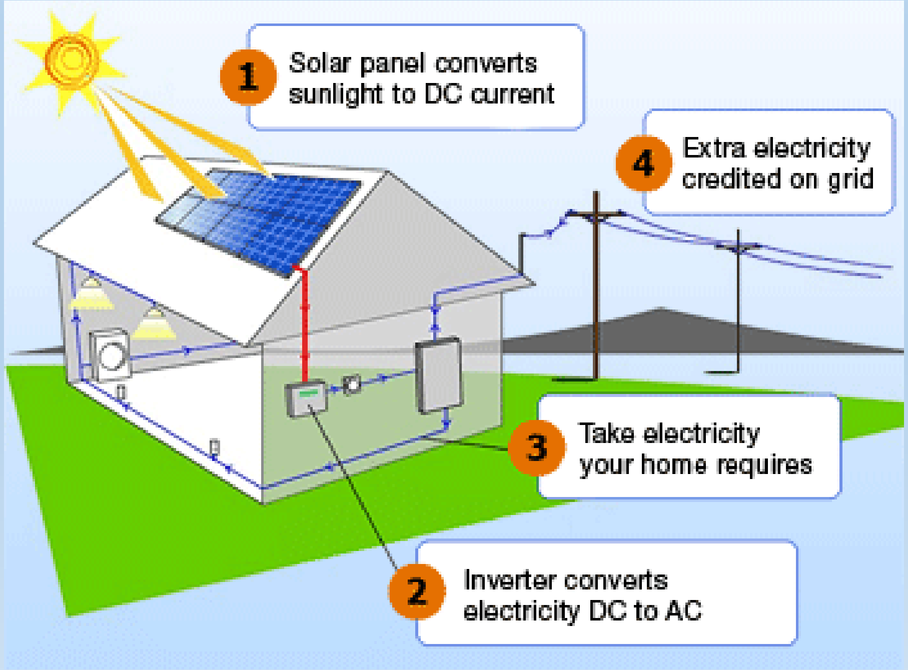
After successful completion of this chapter the real estate professional will be able to do the following:

- Describe different types of solar photovoltaic systems.
- Identify the different applications for energy-efficient solar photovoltaic systems.
- Describe tools to calculate energy savings from a photovoltaic solar system.

Chapter 6

What is Solar:

“Photovoltaic technology directly converts sunlight into electricity. Solar thermal technology harnesses its heat. Like water and air, the Sun is one of the Earth’s life support systems, providing heat and light. Solar energy, which is renewable, widely available and clean, provides enough energy to meet the world’s annual consumption needs every 50 minutes. The challenge is to collect a share —however small — of this heat and radiant energy.” (Planete Energies.com)



For more information see corresponding links in the bibliography document located in your learning extras.

What are the systems and their components

"Two major technologies have been developed to harness it:

1. Photovoltaic solar technology, which directly converts sunlight into electricity using panels made of semiconductor cells.
2. Solar thermal technology, which captures the sun's heat. This heat is used directly or converted into mechanical energy and in turn electricity, known as concentrated solar power.

Two different types of installations are used:

1. Individual systems for homes or small communities. Photovoltaic panels can power electrical devices, while solar thermal collectors can heat homes or hot water (See Close-Up: "Solar, a Boundless, Universally Accessible Energy Source" in learning extras).
2. Photovoltaic or concentrated solar plants that cover hundreds of acres produce electricity on a large scale, which can be fed into power grids." (Planete Energy.com)

For more information see corresponding links in the bibliography document located in your learning extras.

(Photos provided by Efficiency Vermont)

Evacuated tube collector (for heating water or space)

Flat plate collector (for heating water or space)

- Photovoltaic collector (for generating electricity)

- Roof mount (generates electricity)

Tracker (generates electricity)

"Solar energy is one of the most attractive renewable energies because of its flexibility — its capacity to power cities and industry using large solar plants while at the same time offering a stand-alone capability in the most isolated rural regions." (Planete Energy.com)

PV Tool and Calculations:

In order to use the PV Valuetool ® below you need to have information about the solar system you are trying to value. It is important that you get as much information as possible which should not be hard with a new system.

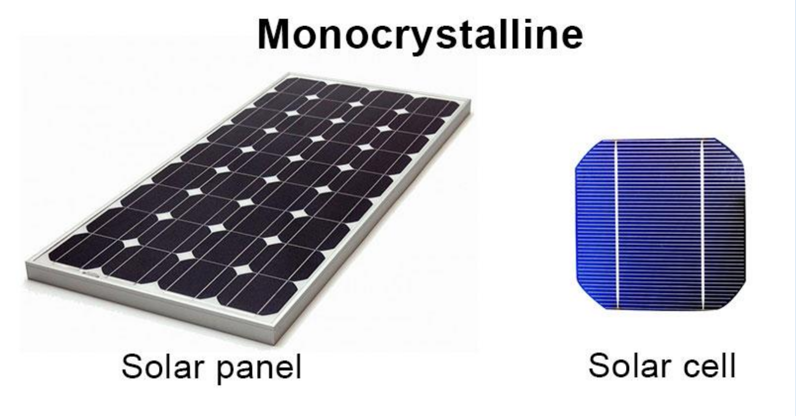
You enter the property address. You will need have the system size in watts (6kW = 6,000 watts), system age, the module warranty which you can use as the economic life (unless you feel it is different), whether the system is fixed or has a tracker, the inverter size in watts (again, 6kW =6,000 watts), the inverter warranty (unless you feel the economic life differs from the warranty life), the inverter age, and the borrowers interest rate to calculate the value of the solar panel with the PV Valuetool ®. (PV Value)

For more information see corresponding links in the bibliography document located in your learning extras.

Types of Solar Panels

Monocrystalline Silicon (Single Silicon)

“Right now, these are the most efficient types of solar panels. In other words, when sunlight hits these panels, more of it turns into electricity than the other types below. As a result of their high silicon content, they’re also more expensive, but you need fewer of them. That’s why they’re ideal for roofs. You can tell if you have a monocrystalline solar panel by its square-ish cells.” (Solar Photovoltaic.blogspot.com)

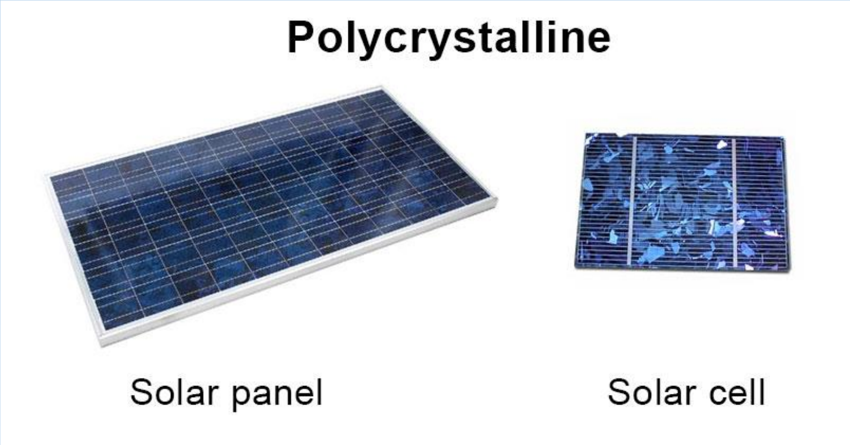


For more information see corresponding links in the bibliography document located in your learning extras.

Types of Solar Panels

Polycrystalline Silicon (Multi-silicon):

"'Poly' panels have lower silicon levels than 'mono' panels. In general, that makes them less expensive to produce, but they're also slightly less efficient. The good news is that their overall construction design can often make up for the efficiency loss, so they're also good for roofs. You can tell poly-silicon panels by their groovy mélange of silicon woven through thin rectangular conduit wires. Thin film (amorphous silicon, cadmium telluride, copper indium gallium (di)selenide). Everyone talks about 'thin film' because they're really inexpensive to make and they don't mind the heat, which is all cool. Except right now, they're very inefficient, which means you'll see them in big solar farm projects with a lot of land, but not on your roof." (Solar Photovoltaic.blogspot.com)



For more information see corresponding links in the bibliography document located in your learning extras.

Types of Solar Panels

BIPV (Building Integrated Photovoltaics)

"BIPV's can look like real roofing tiles (solar shingles are an example). That's nice, but good looks do cost a lot more. Second, they're way less efficient than conventional PV, which means you need a sunny spacious roof to make a dent in your electric bill. Finally, they may not last as long as regular panels. Right now, Pure Energies doesn't contract for BIPV systems."

Solar Thermal Panels

"Finally, there's another type of solar panel that has nothing to do with electricity. Instead of paying the gas company to heat your hot water tank, solar thermal panels produce hot water for your home and/or your pool. Some systems can even provide heat and air conditioning. Pure Energies currently doesn't offer solar thermal deals. More information: Solar Hot Water vs Solar PV." (NRGhomesolar.com)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 2 Chapter 6 Summary

In this chapter you learned the following:

- How to describe different types of solar photovoltaic systems.
- How to identify the different applications for energy-efficient solar photovoltaic systems.
- How to calculate energy savings from a photovoltaic solar system.

Section 2 Summary:

In this Section we learned to:

- Identify and define the energy efficient heating systems.
- Identify and define the energy efficient cooling systems.
- Identify and define the energy efficient electric systems.
- Identify and define insulation.
- Identify and define energy efficient windows and doors.
- Identify and define the components of solar and how to use a simple PV Valuetool®.

Section 3
Energy Efficient Programs

Section 3 Learning Objectives

- Identify Mandates and Bills Associated with Energy Efficiency.
- Identify and define National Energy Efficient Programs.
- Identify and define National Rating Programs for Energy Efficient Buildings.
- Know that State Programs often exist.
- Know that local programs often exist.
- Identify that there are savings with energy efficient homes and products, and these savings can be quantified and used in the appraisal process.

Chapter 1
Mandates and Bills

Section 3 Chapter 1 Learning Objectives

After successful completion of this chapter the real estate professional will be able to do the following:

- Identify different organizations and agencies that promote energy efficiency.

Executive Order 13423

(Federal Register online)

Requirements of the new Executive Order 13423 raises the standard for federal leadership and performance in several areas. The Executive Order requires agencies to:

- reduce energy intensity of 3% a year or 30% by the end of fiscal year 2015
- acquire goods and services that use sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy efficient, water-efficient, and recycled-content products
- comply with the Guiding Principles in 2006 Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (MOU) on new construction/major renovation.
- reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency, increase the diversion of solid waste as appropriate, and maintain cost-effective waste prevention and recycling programs in facilities
- implement within the agency environmental management systems (EMS) at all appropriate organizational levels

For more information see corresponding links in the bibliography document located in your learning extras.

Legislation that was proposed but did not pass:

H.R. 2454: American Clean Energy and Security Act of 2009
https://www.govtrack.us/congress/bills/111/hr2454

The SAVE Act – Sensible Accounting to Value Energy
http://www.imt.org/finance-and-real-estate/save-act

National Energy Efficient Programs

- Energy Star & Energy Star Homes
- NAHB Model Green Home Building Guidelines
- NAHB National Green Building Standard
- RESNET
- LEED for Homes

Section 3 Chapter 1 Summary

In this chapter you learned how the following organizations and agencies interact around energy efficient and green buildings:

- Energy Star & Energy Star Homes provides ratings
- NAHB Model Green Home Building Guidelines
- NAHB National Green Building Standard
- RESNET
- LEED for Homes

Chapter 2
Energy Star

Section 3 Chapter 2 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Describe what the Energy Star program provides.
- Identify funding organization that created the Energy Star program.
- Describe tools that would be useful to a real estate appraiser, appraising and energy efficient home.

Chapter 2

Energy Star:

“EPA's ENERGY STAR program stands alone as the most successful voluntary energy conservation movement in history. To save energy and protect the climate, the simple choice is ENERGY STAR.”

“Over the last 22 years, the little blue label has helped save more than $362 billion on utility bills and reduced greenhouse gas emissions by more than 2.4 billion metric tons. Fact is, ENERGY STAR is the most successful voluntary energy conservation movement in history.”

“EPA's ENERGY STAR Program was created to help identify the best ways to save energy. The little blue label says this product, this home, this building or factory is doing the right things to save. And energystar.gov offers the most comprehensive resource available for energy efficiency advice and information.” (Energystar.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

For more information see corresponding links in the bibliography document located in your learning extras.

History & Accomplishments:

“ENERGY STAR is a U.S. Environmental Protection Agency voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency.

In 1992, the US Environmental Protection Agency (EPA) introduced ENERGY STAR as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions.

Computers and monitors were the first labeled products. Through 1995, EPA expanded the label to additional office equipment products and residential heating and cooling equipment.

In 1996, EPA partnered with the US Department of Energy for particular product categories.” (Energystar.gov)

For more information see corresponding links in the bibliography document located in your learning extras.

History & Accomplishments

The ENERGY STAR label is now on major appliances, office equipment, lighting, home electronics, new homes and commercial and industrial buildings and plants. Through its partnerships with 18,000 private and public sector organizations, ENERGY STAR delivers the technical information and tools that organizations and consumers need to choose energy-efficient solutions and best management practices.

ENERGY STAR has successfully delivered energy and cost savings across the country, saving businesses, organizations, and consumers $24 billion in 2012 alone. Over the past two decades, ENERGY STAR has been a driving force behind the more widespread use of such technological innovations as efficient fluorescent lighting, power management systems for office equipment, and low standby energy use."

Major Milestones – The link below shows Energy Star Major Milestones by Year (Energystar.gov)

While there are 1,700,000 energy star houses in the U.S today, there is no national web site to find where the houses are located!

For more information see corresponding links in the bibliography document located in your learning extras.

Energy Star Homes:

“ENERGY STAR CERTIFIED NEW HOMES ARE:

1. More energy efficient than typical new homes.

2. Designed and built to high standards

3. Inspected, tested and verified

4. Built better from the ground up” (Energystar.gov)

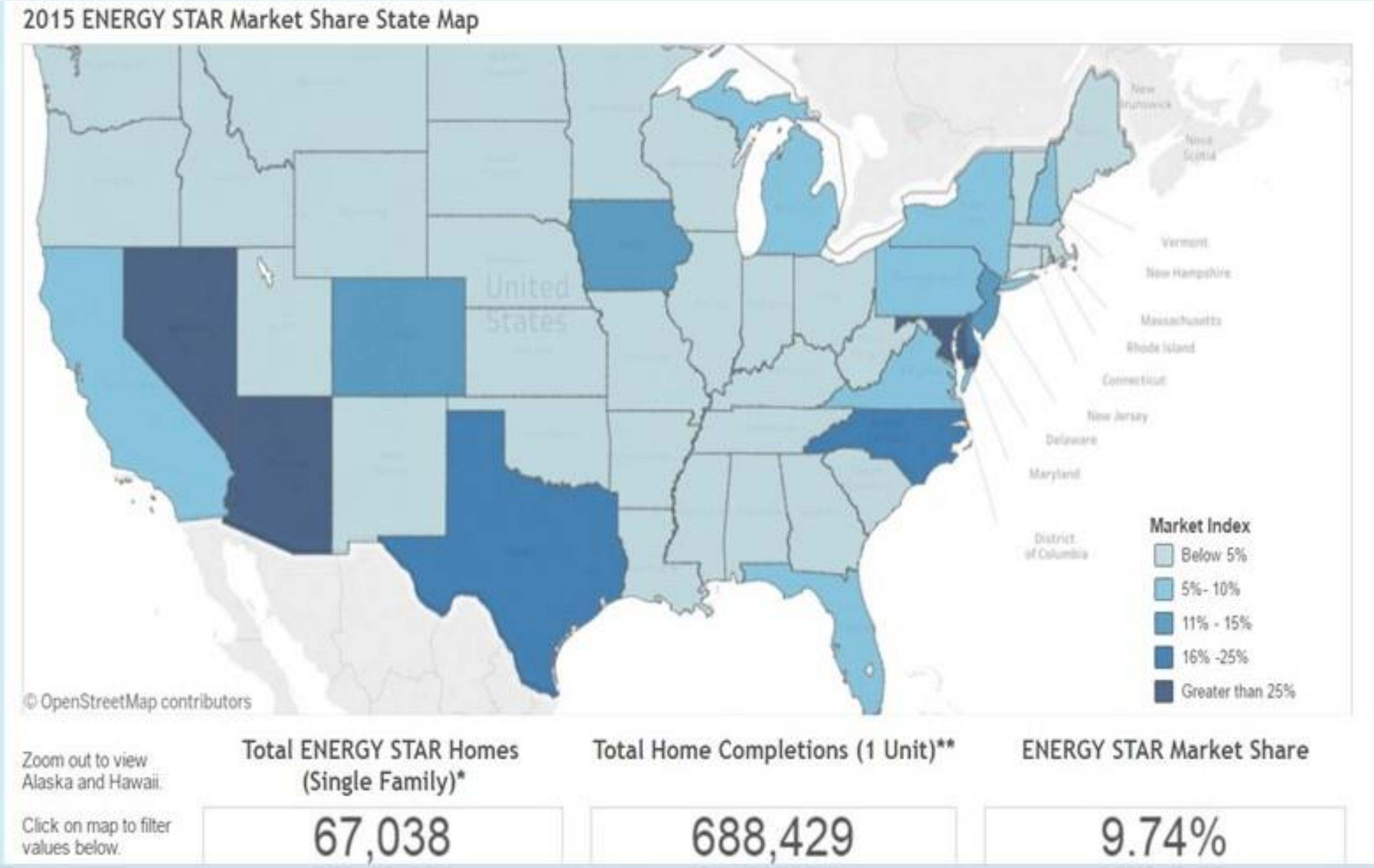
Watch the video on the next slide

For more information see corresponding links in the bibliography document located in your learning extras.

Energy Star Homes:

https://www.energystar.gov/newhomes/?s=mega

For more information see corresponding links in the bibliography document located in your learning extras.



For more information see corresponding links in the bibliography document located in your learning extras.

States with ENERGY STAR Certified Homes Market Share Greater Than National Average:

State	ENERGY STAR Certified Homes*	Market Share	Home Completions**
Arizona	10,801	48.94%	22,068
Maryland	3,929	35.76%	10,987
Nevada	3,633	35.24%	10,309
District of Columbia	69	27.36%	252
Delaware	776	18.51%	4,193
Texas	19,063	18.28%	104,301
North Carolina	5,911	15.35%	38,514
Colorado	2,666	13.46%	19,807
Iowa	921	12.54%	7,343
New Jersey	1,263	12.14%	10,404

States with ENERGY STAR Certified Homes Market Share Less Than National Average:

State	ENERGY STAR Certified Homes*
Florida	4,061
California	3,303
Virginia	1,291
Georgia	1,054
Pennsylvania	925
South Carolina	910
Michigan	857
New York	788
Washington	713
Ohio	656
Tennessee	609
Illinois	608
Indiana	523
Utah	452
Oregon	160
Idaho	158
New Hampshire	152

Savings from Selected Homes Are Equivalent To:

Category	Savings***
Annual Electric Savings (kWh)	115,372,398
Annual Gas Savings (Therms)	6,234,534
Annual Total Utility Bill Savings ($)	20,915,856
CO2 emission reduction (metric tons)	113,428

The Annual GHG Emissions from:

Passenger Vehicles	23,866

The Carbon Sequestered By:

Equivalent to growing tree seedlings for 10 years	2,882,634

The CO2 Emissions From:

Barrels of Oil	263,795

* Based on single-family ENERGY STAR Certified Homes as reported to EPA by Partners. Does not include manufactured homes or multifamily homes.
** Based on one unit housing permit data, adjusted for housing starts and housing completions, as provided by the U.S. Census (http://www.census.gov/construction/nrc/index.html).
*** Savings data based on EPA estimates. Emissions equivalency data calculated by EPA's Greenhouse Gas Equivalencies Calculator (http://www.epa.gov/cleanenergy/energy-resources/calculator.html).

Energystar.gov

For more information see corresponding links in the bibliography document located in your learning extras.

Section 3 Chapter 2 Summary

In this chapter you learned the following:

- How to describe what the Energy Star program provides.
- Who the founding organization that created the Energy Star program is.
- What tools the Energy Star program has for real estate appraiser, appraising and energy efficient home.

Chapter 3
NAHB Model Green Home Building Guidelines

Section 3 Chapter 3 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Describe what ICC 700 National Green Building Standard is.
- Identify the founding organization that created the ICC 700 National Green Building Standard.
- Describe the importance of The ICC 700 National Green Building Standard.

Chapter 3

NAHB Model Green Home Building Guidelines:

Policy Statement:

"NAHB supports sustainable, high performance new home construction and remodeling, encourages its members to build green, and works pro-actively to facilitate their efforts."

"Specifically, NAHB actively promotes viable, credible, market-driven, and voluntary green building initiatives at the federal level in both the legislative and regulatory arenas. It also assists state and local home building associations with such advocacy efforts upon request."

"In all of these endeavors, NAHB emphasizes that green building efforts must be voluntary rather than mandatory and that they must be both affordable and cost effective. In particular, NAHB supports the ANSI-approved, consensus-based ICC 700 National Green Building Standard, which was developed by the Home Innovation Research Laboratories, NAHB and industry experts with a broad range of expertise." (NAHB)

For more information see corresponding links in the bibliography document located in your learning extras.

In November, NAHB will partner with the U.S. Green Building Council at the Green build International Conference and Expo to bring the association's residential construction expertise to attendees."

Why It Matters:

"Green building/high performance building is important to the home building industry, consumers and the nation because it promotes lower total ownership costs through utility savings and increased durability as well as an improved indoor living environment. It also encourages environmental awareness and stewardship and more efficient use of increasingly scarce resources and helps to conserve them for future generations."

"Voluntary, non-prescriptive green programs provide builders and consumers with the flexibility that they need to construct homes that are sustainable, affordable, cost-effective and appropriate to the home's geographic location."

For more information see corresponding links in the bibliography document located in your learning extras.

Section 3 Chapter 3 Summary

In this chapter you learned the following:

- How to describe what the ICC 700 National Green Building Standard is.
- Who created the ICC 700 National Green Building Standard.
- What the importance of The ICC 700 National Green Building Standard.

Chapter 4

ICC 700 National Green Building Standard

Section 3 Chapter 4 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- describe the environmental significance of developing green homes.
- Identify the value proposition presented by green homes.

Chapter 4

ICC 700 National Green Building Standard

"The ICC/ASHRAE 700-2015 National Green Building Standard™ (NGBS) is the first residential green building standard to undergo the full consensus process and receive approval from the American National Standards Institute (ANSI)."

"First developed in 2008, NAHB, the International Code Council (ICC) and ASHRAE have partnered to develop the third edition of the nationally recognized standard, which is expected to be approved and published in early 2016."

"To date, the standard has been widely implemented throughout the industry. The Home Innovation Research Lab has certified the compliance of more than 50,000 dwelling units. Dozens of regional and local green initiatives refer to the standard within their program criteria and the International Green Construction Code (IgCC) allows compliance with ICC 700 NGBS as an alternate compliance path for residential buildings more than four stories in height." (NAHB)

For more information see corresponding links in the bibliography document located in your learning extras.

"Read more about Home Innovation Research Labs' NGBS Green Certification program for new homes (both single-family and multifamily), remodeling and renovation projects and residential developments."

Green Homes Show Growth in a Recovering Market According to New Report from McGraw Hill Construction:

June 05, 2014

"Residential construction is a key engine behind economic growth in the United States. According to McGraw Hill Construction's Dodge Construction Market Forecast, single and multifamily housing projects account for about 45% of the value of all construction projects started in the United States in 2014. With that market forecasted to grow rapidly in coming years, the green activity and drivers in the market are critical. (NAHB)

For more information see corresponding links in the bibliography document located in your learning extras.

The new Smart Market Report of the single and multifamily builder and remodeler community released today by McGraw Hill Construction (http://www.construction.com/) contains this critical intelligence. The report, "Green Multifamily & Single Family Homes: Growth in a Recovering Market," surveys builder and remodeler members of the National Association of Home Builders and reveals the evolution of green building for single family homes from boom to bust to recovery through comparisons with previous studies from 2006 to 2011, and includes new data on multifamily housing to provide a comprehensive review of the sector." (NAHB)

For more information see corresponding links in the bibliography document located in your learning extras.

"According to the latest study:

- 62% of firms building new single family homes report that they are doing more than 15% of their projects green. By 2018, 84% of them expect this level of green activity.
- 54% of firms building new multifamily projects report that they are doing more than 15% of their projects green. There is also growth expected—with 79% reporting the same level of activity anticipated by 2018.
- In the single family market, the most striking shift is in those firms dedicated to green building (doing more than 90% of their projects green). That percentage is already at 19%, and by 2018, it is expected to double (to 38%)" (NAHB)

For more information see corresponding links in the bibliography document located in your learning extras.

"The study finds that builders and remodelers in both the single family and multifamily sectors report that the market is recognizing the value of green: 73% of single family builders (up from 61% since the last report) and 68% of multifamily builders say consumers will pay more for green homes."

For more information see corresponding links in the bibliography document located in your learning extras.

"Greater consumer interest in green homes has contributed to the ongoing growth, leading us to anticipate that by 2016, the green single family housing market alone will represent approximately 26% to 33% of the market, translating to an $80 billion to $101 billion opportunity based on current forecasts. The findings also suggest that lenders and appraisers may be starting to recognize the value of green homes, making it a factor that could help encourage the market to grow if there is more widespread awareness across the U.S.," said Harvey Bernstein, vice president, Industry Insights and Alliances for McGraw Hill Construction." (NAHB)

For more information see corresponding links in the bibliography document located in your learning extras.

"The study also examines the triggers for green building activity. "This new study demonstrates phenomenal growth in green building, with more builders engaging in sustainable building practices than ever before," said NAHB Chairman Kevin Kelly, a home builder and developer from Wilmington, Del. "While growth in green in the single family market is driven more by high quality and customer demand, the multifamily market is more driven by cost factors such as the availability of government or utility incentives, as well as enhancing their competitive position and corporate image. All are compelling reasons for the industry to engage with this continuously growing market." (NAHB)

For more information see corresponding links in the bibliography document located in your learning extras.

"The Smart Market Report also reveals a vigorous and growing renewables market in the residential sector. 65% of the respondents – both single family and multifamily – currently use renewables on at least some of their projects, and the percentage that incorporate them in all of their projects is expected to grow from 8% in 2013 to 20% by 2016."

"Green Multifamily &Single Family Homes: Growth in a Recovering Market" was produced by McGraw Hill Construction in partnership with the National Association of Home Builders, with the support of Waste Management and Menck Windows. View the full report in your learning extras." (NAHB)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 3 Chapter 4 Summary

In this chapter you learned the following:

- How to describe the environmental significance of developing green homes.
- How to identify the value proposition presented by green homes.

Chapter 5
RESNET

RESNET®

RESIDENTIAL ENERGY SERVICES NETWORK

Section 3 Chapter 5 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Describe who RESNET (Residential Energy Services Network).
- Identify the programs offered by RESNET.
- Describe the tools developed by RESNET that an appraiser can use when developing an appraisal for an energy-efficient home.

Chapter 5

RESNET:

What Is the Residential Energy Services Network?

"The Residential Energy Services Network or RESNET is a not-for-profit, membership corporation that is governed by a board of 20 (who are elected by membership)."

"RESNET is a recognized national standards-making body for building energy efficiency rating and certification systems in the United States involving:

- A consensus based standard development and amendment process
- Transparent review and adoption process
- Formal public review and comment process" (RESNET)

For more information see corresponding links in the bibliography document located in your learning extras.

RESNET

"Who Recognizes RESNET's Standards?

RESNET's standards are recognized by a number of industry organizations and government bodies including:

- Builders for marketing the energy performance of their homes
- Contractors to tap the emerging retrofit market
- Federal government agencies:
    - IRS for tax credit qualification
    - U.S. Environmental Protection Agency for ENERGY STAR labeled homes
    - U.S. Department of Energy for Building America and National Builders Challenge programs" (RESNET)

For more information see corresponding links in the bibliography document located in your learning extras.

RESNET

How Are RESNET Standards Developed?

Any interested party can submit proposals for new or revised standards provisions. These will be reviewed by the appropriate RESNET Standing Committee, which will then forward a recommendation to the RESNET Board of Directors to:

- Accept the proposals as is
- Accept with modification
- Deny" (RESNET)

For more information see corresponding links in the bibliography document located in your learning extras.

RESNET

“Proposed standards provisions are posted on the RESNET website for public comment for a minimum of 30 days, where public comments will be reconciled by the appropriate RESNET Standing Committee, with a recommendation to the RESNET Board of Directors.”

“The Board of Directors votes on the Standing Committee's recommendation and the proposed standards provisions are then put before the RESNET Standards revision committee for approval or denial.”
“How Are Home Energy Raters Certified?

The knowledge base and skill sets for Home Energy Raters are defined by RESNET standards and the training providers are all accredited by RESNET, including:

- Curricula approval
- Instructors that are certified by RESNET (must pass examination)” (RESNET)

For more information see corresponding links in the bibliography document located in your learning extras.

RESNET

"All Home Energy Rater candidates must pass a national online test and perform 5 ratings under the supervision of certified RESNET Home Energy Rater. Only then can the Home Energy Rater candidate be certified by a RESNET accredited Rating Provider."

"How Does RESNET Provide for Quality Assurance within the Rating Industry?"

"RESNET has certain procedures in place that ensure quality standards are being maintained, such as:

- Each Rating Provider must employ a certified Quality Assurance Designee
- The Quality Assurance Designee must independently verify internal consistency of a minimum 10% of all building input files
- The Quality Assurance Designee must independently field verify the accuracy of a minimum of 1% of each certified Raters' homes
- RESNET monitors the Rating Providers compliance with quality assurance requirements" (RESNET)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 3 Chapter 5 Summary

In this chapter you learned the following:

- Who RESNET (Residential Energy Services Network) is.
- Clearly identify the programs offered by RESNET.
- Able to describe the tools developed by RESNET that an appraiser can use when developing an appraisal for an energy-efficient home.

Chapter 6 - LEED

Section 3 Chapter 6 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Describe what the LEED (Leadership in Energy and Environmental Design) organization is.
- Identify the different certifications offered by LEED.
- Describe the tools developed by LEED that an appraiser can use when developing an appraisal for an energy-efficient home.

Chapter 6

LEED for Homes:

"A home is more than just shelter: homes are the most important buildings in our lives. We think that every building should be a green building – but especially homes. Why? LEED homes are built to be healthy, providing clean indoor air and incorporating safe building materials to ensure a comfortable home. Using less energy and water means lower utility bills each month. And in many markets, certified green homes are now selling quicker and for more money than comparable non-green homes. Some of the most important buildings in the world use LEED. Shouldn't the most important building in everyone's world use LEED, too?" (LEED)

For more information see corresponding links in the bibliography document located in your learning extras.

Chapter 6

LEED for Homes:

Who it's for

"LEED for Homes is available for building design and construction projects for single family homes and multifamily projects up to eight stories.

- **Homes and Multifamily Low-rise**: Designed for single family homes and multifamily buildings between one and three stories.
- **Multifamily Midrise:** Designed for midrise multifamily buildings between four and eight stories." (LEED)

For more information see corresponding links in the bibliography document located in your learning extras.

LEED for Homes

“LEED, or Leadership in Energy and Environmental Design, is changing the way we think about how buildings and communities are planned, constructed, maintained and operated. Leaders around the world have made LEED the most widely used third-party verification for green buildings, with around 1.85 million square feet being certified daily.”

“LEED works for all buildings—from homes to corporate headquarters—at all phases of development. Projects pursuing LEED certification earn points across several areas that address sustainability issues. Based on the number of points achieved, a project then receives one of four LEED rating levels: Certified, Silver, Gold and Platinum. LEED-certified buildings are resource efficient. They use less water and energy and reduce greenhouse gas emissions. As an added bonus, they save money.” (LEED)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 3 Chapter 6 Summary

In this chapter you learned the following:

- How to describe who LEED (Leadership in Energy and Environmental Design).
- To identify the programs offered by LEED.
- Who created the LEED's certification program.
- The importance of the LEED's third-party certifications.

Chapter 7

National Rating Systems:

Section 3 Chapter 7 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Describe what a HERS (Home Energy Rating System) score is.
- Identify who created the HERS score.
- Describe what a HES (Home Energy Score) score is.
- Identify who created the HES score.
- Identify the different certifications offered by LEED.
- Describe the tools developed by DOE and RESNET that an appraiser can use when developing an appraisal for an energy-efficient home.

Chapter 7

National Rating Systems:

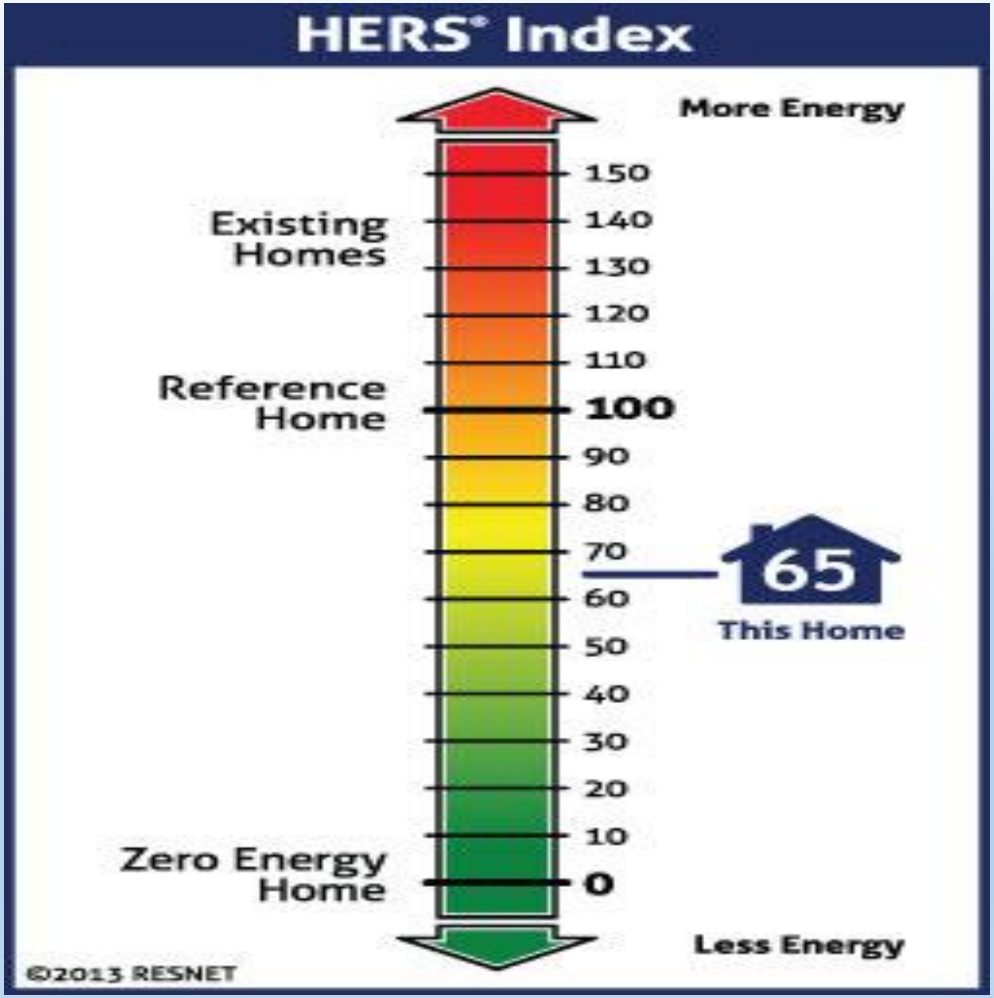
HERS – RESNET

(Home Energy Rating System) The Lower the HERS score, the more efficient the house.

HES – U.S. DEPARTMENT OF ENERGY

(Home Energy Score)

HERS: - RESNET https://www.youtube.com/watch?v=YjX8RKuKy3s



HERS Index

For more information see corresponding links in the bibliography document located in your learning extras.

"The HERS Index is a measurement of a home's energy efficiency and there are a lot of great reasons why you should have a home energy rating performed on your house."

"A HERS Index Score can tell you so much about a home you are thinking of buying. Heating, cooling and water heating constitute the largest cost of homeownership outside of the mortgage loan. The HERS Index Score will tell you how well the home performs energy-wise. The HERS Report will outline the energy features of the home and the expected cost of utility bills."
"It will also provide you with invaluable information about the existing home you live in, like how efficiently it's operating and where you can make modifications for greater energy savings. When you're selling your home, a low HERS Index Score can command a higher resale price. And when you're buying a home, you can anticipate the costs of energy bills and efficiency upgrades." (HERSIndex)

If your subject property was built after July 2012 you can look the HERS rating up on line at HERSindex.com.

For more information see corresponding links in the bibliography document located in your learning extras.

How does the HERS Index work?

“A certified RESNET Home Energy Rater assesses the energy efficiency of a home, assigning it a relative performance score (the HERS Index Score). The lower the number, the more energy efficient the home. The U.S. Department of Energy has determined that a typical resale home scores 130 on the HERS Index while a home built to the 2004 International Energy Conservation Code is awarded a rating of 100.

- **A home with a HERS Index Score of 70 is 30% more energy efficient than the RESNET Reference Home.**
- **A home with a HERS Index Score of 130 is 30% less energy efficient than the RESNET Reference Home.”**

“To calculate a home’s HERS Index Score, a certified RESNET HERS Rater does an energy rating on your home and compares the data against a 'reference home'– a designed-model home of the same size and shape as the actual home, so your score is always relative to the size, shape and type of house you live in.” (HERSIndex)

For more information see corresponding links in the bibliography document located in your learning extras.

"Some variables included in an energy rating are:

- All exterior walls (both above and below grade)
- Floors over unconditioned spaces (like garages or cellars)
- Ceilings and roofs
- Attics, foundations and crawlspaces
- Windows and doors, vents and ductwork
- HVAC system, water heating system, and your thermostat.
- Air leakage of the home
- Leakage in the heating and cooling distribution system" (HERSIndex)

For more information see corresponding links in the bibliography document located in your learning extras.

HERS EXPLANTION EXAMPLE:

"The subject property has a HERS rating of 54. A HERS rating measures a home's energy efficiency. A certified Home Energy Rater will assess the energy efficiency of a home, assigning it a specific score relative to its performance. The lower the score the more energy efficient the home is. The US Department of Energy has determined that a typical resale home scores 130 on the HERS index, while a standard new home is awarded a rating of 100. A home with a HERS Index Score of 50 is 50% more energy efficient than a typical code built home. The subjects HERS score of 54 means it is 46% more energy efficient than a typical code built home. To calculate a home's, HERS Index Score, a certified RESNET HERS Rater does an energy rating on your home and compares the data against a 'reference home'– a designed-model home of the same size and shape as the actual home, so your score is always relative to the size, shape and type of house you live in. Some of the variables included in an energy rating are: amount of exterior wall space, floors in unconditioned areas, ceilings & roof, attics and foundations, windows & doors, HVAC systems."

See the MLS sheet for the property described above on the next slide:

NON-PUBLIC DISPLAY, display to your client allowed

Residential
4408540 Closed

120 Lafayette Rd
Sugar Hill, New Hampshire 03586

L $545,000
C$470,000

Zoning: Res04
Year Built: 2008
Color: beige
Gross Taxes: $ 10,443.00
Taxes TBD: No
Tax Year: 2014
Monthly Assoc.$: $
Lot Acre: 5.20
Lot SqFt: 226,512
Common Land Acres:
Road Frontage: Yes/ 635
Water Frontage:
Water Acc Type:
# of Stories: 2 1/2
Basement: Yes / Walkout

Rooms: 11
Bedrooms: 3
Total Baths: 5
Full: 2
3/4 Baths: 2
1/2 Baths: 1
Garage Capacity 0
Garage Type: None
Total Fin SqFt: 2,799
Apx Fin Above Grd: 2,519
Apx Fin Below Grd: 280
Apx Ttl Below Grd: 1,468
Foot Print:
Flood Zone: No
Style: Contemporary , Modern Architecture

Water Body Type: **Water Body Restr.:** **Surveyed:** Unknown **Seasonal:** No
Water Body Name: **Current/Land Use:** No **Land Gains:** No **Owned Land:**
Parcel Access ROW: **ROW for other Parcel:** **ROW Width:** **ROW Length:**

Public Rems: Some properties make it difficult to find just the right adjectives to describe the beauty and uniqueness of the home, land, location and views; and this is one of them. This quality-built, Energy Star rated home incorporates several southern facing large windows to enjoy passive solar benefits; as well as the expansive mountain views with ever-changing colors throughout the seasons. Who wouldn't enjoy the wildlife which abound; and the raised garden beds are all in place for your green thumb to play. Open concept main level with an amazing fireplace as a focal point to enjoy your evening reading. The beautiful kitchen offers wonderful work space and plenty of storage.The house is all set up with a full-house gas generator, fire-sprinkler system and security system. There is also an area pre-planned and ready to put in an in-law suite; or keep it as a workshop space. Lots of options. Come view and you will agree; describing it in words doesn't compare to viewing it in person!

Directions: I93 to Exit 38, to Rte 116, right onto Lafayette

ROOM	DIMS	LEVEL	ROOM	DIMS	LEVEL	FLOOR	BR	FB	3/4	1/2	1/4
Living Rm	17x21	1	Master BR	11x16	2	1st	0			1	
Kitchen	19x20	1	2nd BR	12x15	2	2nd	2	1	1		
Dining Rm	11x11	1	3rd BR	12x13	3	3rd	1		1		
Family Rm	11x12	1	4th BR			4th					
Office/Study	7x10	1	5th BR			Bsmt			1		
Utility Rm		0	Den		0						
workshop	21x15	0	Other Rm 3								
Extra Room		0									

Assoc Amenities:
Possession: At Closing
Interior Feat.: Alternative Heat Stove , Cathedral Ceilings , Ceiling Fan , Den/Office , Dining Area , Family Room , Fireplace-Gas , Island , Master BR with BA , Sec Sys/Alarms , Skylight , Sprinkler System , Walk-in Closet , 1 Fireplace
Exterior Feat.: Deck , Porch , Porch-Covered
Basement: Full , Interior Stairs , Partially Finished , Concrete
Equip./Appl.: Air Conditioner , Dishwasher , Disposal , Freezer , Kitchen Island , Range-Gas , Refrigerator , Smoke Detector , Window Treatment
Driveway: Crushed/Stone
Electric: 200 Amp
Construction: Existing
Exterior: Cement
Financing: Energy Rated
Foundation: Concrete
Floors: Hardwood , Tile
Heating/Cool: Hot Water , Radiant
Garage/Park: None
Lot Desc: Country Setting , Fields , Mountain View , Sloping , View
Heat Fuel: Gas-LP/Bottle , Oil
Occ. Restrictions:
Roads: Public
Roof: Shingle-Asphalt
Sewer: Concrete , Leach Field , Private , Septic , Other
Water: Drilled Well
Suitable Land Use:
Fee Includes:
Water Heater: Off Boiler
Disability:
Building Certs: Energy Star Cert. Home
Negotiable:
Docs Available: Deed , Home Energy Rating Cert. , Property Disclosure
Excl Sale: washer and dryer not included

Tax Rate:
Assmt:
Assmt Yr: 2013
Tax Class:
Covenant: Yes
Source SqFt: Municipal
County: Grafton
Recorded Deed: Warranty
Book/Pg: 3219/ 0198
Plan/Survey:
Map/Blck/Lot: / /
Property ID:
Tax ID No. (SPAN# VT): SUGR-000219-000000-000038
Devel/Subdiv:
Const. Status: Existing
Home Energy Rated Index Score: 54
District:
High Sch: Profile Sr. High School
Jr./Mid Sch: Profile Junior High School
Elem Sch: Lafayette Regional School
Cable: Hughes/Direct TV
Electric Co: PSNH Eversource
Fuel Co: Irving
Phone Co:
Resort: No
Timeshare/Fract. Ownrshp: No
 # Weeks:
Timeshare %:
Foreclosed Bank-Owned REO: No
Short Sale: No

List Off: Peabody and Smith Realty **List Agt:** Andy Smith

End of Page

NOTE:

All properties built with a HERS rating after July 2012 can be located by property address through RESNET by searching using the link below

http://www.resnet.us/public-access-to-resnet-national-registry

TRENDS MATTER:

Demand for energy ratings in the U.S have been increasing. (RESNET-Energy Ratings)

For more information see corresponding links in the bibliography document located in your learning extras.

HES: - US Department of Energy

(Home Energy Score) – Only for Existing Houses

"The Home Energy Score is similar to a vehicle's miles-per-gallon rating. It helps homeowners and homebuyers understand how much energy a home is expected to use and provides suggestions for improving its energy efficiency. It also allows homeowners to compare the energy performance of their homes to other homes nationwide. The Home Energy Score includes: 1) the Score itself, 2) facts about the home including data collected and energy use breakdown, and 3) recommendations to improve the Score and the energy efficiency of the home."

"The process starts with a Home Energy Score Assessor collecting energy information during a brief home walk-through. Using the Home Energy Scoring Tool, developed by Lawrence Berkeley National Laboratory, the Assessor scores the home on a scale of 1 to 10. A score of 10 indicates that the home has excellent energy performance. A score of 1 indicates the home needs extensive energy improvements." (US Dpt. Energy)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 3 Chapter 7 Summary

In this chapter you learned the following:

- How to describe what a HERS (Home Energy Rating System) score is and identify who created the HERS score.
- How to Describe what a HES (Home Energy Score) score is and identify who created the HES score.
- How to describe the tools developed by DOE and RESNET that an appraiser can use when developing an appraisal for an energy-efficient home.

Chapter 8 - Local and State Programs:

Section 3 Chapter 8 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Identify the different types of governmental agencies and/or private organizations where guidance regarding energy-efficient programs may be found.

- Describe where to locate information regarding energy-efficient programs.

Chapter 8

Local and State Programs:

Know what programs are in your area.

- Affiliated with home-building organizations
- Affiliated with the public sector
- Affiliated with nonprofit organizations

These programs can be voluntary and are often market driven

VT/NH Programs/Resources:

NNEREN green fields

NNEREN HERS tutorial

NNEREN HERS Appraiser Database

Efficiency VT – Provides Support in VT

Vermont Residential Building Energy Standards (RBES)

GDS Associates – Provides Support in NH

VT Uses Four Green Rating Organizations

1. LEED (U.S. Green Building Council)
2. NGBS (ICC 700 National Green Building Standard)
3. VT Builds Greener
4. Green Building and Design Standards

Local Programs and Building Codes:

- Need to know what exists in your market

Where does your state fall in U.S. energy efficiency?

You can look it up using the link below. See what states are placing a higher value on energy efficiency, how does this affect your market analysis? Does energy efficiency matter in your market? (ACEEE)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 3 Chapter 8 Summary

In this chapter you learned the following:

- How to describe where to locate information regarding energy-efficient programs.

- To identify the different types of governmental agencies and/or private organizations where guidance regarding energy-efficient programs may be found.

Section 3 Summary

In this Section 3 we have learned to:

- Identify Mandates and Bills.
- Identify and define National Energy Efficient Programs.
- Identify and define National Rating Programs for Energy Efficient Buildings.
- Know that state programs often exist.
- Know that local programs often exist.
- Identify that there are savings with energy efficient homes and products, and theses savings can be quantified and used in the appraisal process.

Section 4

Who is the secondary market?

Is there value in energy efficient buildings?

Section 4 Learning Objectives

In this Section we will learn how to:

- Identify and define secondary market lenders.
- Identify and define secondary market lenders requirements.
- Describe the value in energy efficient buildings.
- Identify and define the scope of work considerations.

Chapter 1
Fannie Mae and Freddie Mac

Section 4 Chapter 1 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Identify two major GSEs (Government-Sponsored Entities) involved in secondary mortgage market.
- Describe who Freddie Mac and Fannie Mae are.
- Describe who FDIC is.
- Describe generally the responsibilities of a real estate appraiser when he or she encounters energy-efficient elements in the subject property when conducting an appraisal that will be sold on the secondary mortgage market.

End of Page

Chapter 1

Fannie Mae and Freddie Mac:

“Fannie Mae and Freddie Mac were created by Congress. They perform an important role in the nation’s housing finance system – to provide liquidity, stability and affordability to the mortgage market. They provide liquidity (ready access to funds on reasonable terms) to the thousands of banks, savings and loans, and mortgage companies that make loans to finance housing.”

“Fannie Mae and Freddie Mac buy mortgages from lenders and either hold these mortgages in their portfolios or package the loans into mortgage-backed securities (MBS) that may be sold. Lenders use the cash raised by selling mortgages to the Enterprises to engage in further lending. The Enterprises’ purchases help ensure that individuals and families that buy homes and investors that purchase apartment buildings and other multifamily dwellings have a continuous, stable supply of mortgage money.” (FHFA)

For more information see corresponding links in the bibliography document located in your learning extras.

Fannie Mae and Freddie Mac

"By packaging mortgages into MBS and guaranteeing the timely payment of principal and interest on the underlying mortgages, Fannie Mae and Freddie Mac attract to the secondary mortgage market investors who might not otherwise invest in mortgages, thereby expanding the pool of funds available for housing. That makes the secondary mortgage market more liquid and helps lower the interest rates paid by homeowners and other mortgage borrowers."

"Fannie Mae and Freddie Mac also can help stabilize mortgage markets and protect housing during extraordinary periods when stress or turmoil in the broader financial system threaten the economy. The Enterprises' support for mortgage lending that finances affordable housing reduces the cost of such borrowing."

"**Fannie Mae** was first chartered by the U.S. government in 1938 to help ensure a reliable and affordable supply of mortgage funds throughout the country. Today it is a shareholder-owned company that operates under a congressional charter." (FHFA)

For more information see corresponding links in the bibliography document located in your learning extras.

Fannie Mae Web Site
Fannie Mae Charter Act

"**Freddie Mac** was chartered by Congress in 1970 as a private company to likewise help ensure a reliable and affordable supply of mortgage funds throughout the country. Today is a shareholder-owned company that operates under a congressional charter."

Freddie Mac Web Site

Freddie Mac Charter Act

For more information see corresponding links in the bibliography document located in your learning extras.

Lending Institutions can look to Appraisers E+O for losses:

Lending institutions have faced sizeable losses over the past several years and can look to an appraiser's errors and omissions insurance in an attempt to recover the losses.

Retro reviews are still ongoing and have created a more diligent atmosphere in the appraisal profession. These events directly impact the sale of real property and actions of the sales professional.

FDIC:

The Federal Deposit Insurance Corporation (FDIC) preserves and promotes public confidence in the U.S. financial system by insuring deposits in banks and thrift institutions for at least $250,000; by identifying, monitoring and addressing risks to the deposit insurance funds; and by limiting the effect on the economy and the financial system when a bank or thrift institution fails.

An independent agency of the federal government, the FDIC was created in 1933 in response to the thousands of bank failures that occurred in the 1920s and early 1930s. Since the start of FDIC insurance on January 1, 1934, no depositor has lost a single cent of insured funds as a result of a failure.

The FDIC receives no congressional appropriations - it is funded by premiums that banks and thrift institutions pay for deposit insurance coverage and from earnings on investments in U.S. Treasury securities. The FDIC insures approximately $9 trillion of deposits in U.S. banks and thrifts - deposits in virtually every bank and thrift in the country.

FDIC

The standard insurance amount is $250,000 per depositor, per insured bank, for each account ownership category. The FDIC's Electronic Deposit Insurance Estimator can help you determine if you have adequate deposit insurance for your accounts.

The FDIC insures deposits only. It does not insure securities, mutual funds or similar types of investments that banks and thrift institutions may offer. (**Deposit Insurance: What's Covered** distinguishes between what is and is not protected by FDIC insurance.) See learning extras for more information.

Secondary Mortgage Market Lenders

The Secondary Mortgage Market is the market where mortgage loans and servicing rights are bought and sold between mortgage originators, mortgage aggregators (securitizers) and investors. The secondary mortgage market is extremely large and liquid.

A large percentage of newly originated mortgages are sold by their originators into the secondary market, where they are packaged into mortgage-backed securities and sold to investors such as pension funds, insurance companies and hedge funds.

The secondary mortgage market helps to make credit equally available to all borrowers across geographical locations.

Freddie Mac:

The **Federal Home Loan Mortgage Corporation** (**FHLMC**), known as **Freddie Mac**;

Surrogate regulator?

About Freddie Mac:

Freddie Mac Single Family Seller/Servicer Guide

Freddie Mac was chartered by Congress in 1970 with a public mission to stabilize the nation's residential mortgage markets and expand opportunities for homeownership and affordable rental housing. Their statutory mission is to provide liquidity, stability and affordability to the U.S. housing market.

Freddie Mac participates in the secondary mortgage market by purchasing mortgage loans and mortgage-related securities for investment and by issuing guaranteed mortgage-related securities, principally those we call PCs. The secondary mortgage market consists of institutions engaged in buying and selling mortgages in the form of whole loans (i.e., mortgages that have not been securitized) and mortgage-related securities.

About Freddie Mac

On September 7, 2008, Federal Housing Finance Agency (FHFA) put Fannie Mae and Freddie Mac under the conservatorship of the FHFA (see Federal takeover of Fannie Mae and Freddie Mac) because of financial losses.

Freddie Mac's three core business lines provide a constant source of mortgage funding for the nation's housing markets – helping to make homeownership and rental housing more affordable for America's families:

1. Single-Family Credit Guarantee Business
2. Multifamily Business
3. Investment Business

Although Freddie Mac does not do business directly with consumers, they do require that lenders that sell loans to them abide by their guidance documentation. **The principle guidance document is called the Freddie Mac Single Family Seller/Servicer Guide.**

Fannie Mae:

Federal National Mortgage Association

Was founded in 1938 during the Depression as part of the "New Deal".

Commonly referred to as Fannie Mae

About Fannie Mae:

Federal National Mortgage Association aka Fannie Mae is a Government-Sponsored Enterprise (GSE), though it has been a publicly traded company since 1968.

The corporation's purpose is to expand the secondary mortgage market securitizing mortgages in the form of Mortgage-Backed Securities (MBS).

The idea was, and is, to make more loans available in order that more people can realize the American Dream.

This allows lenders to reinvest their assets into more loans and, in effect, increases the number of lenders in the mortgage market by reducing the reliance on Savings and Loan type Banks.

Fannie Mae and Freddie Mac Requirements for an Energy Efficient Property:

Both Fannie Mae and Freddie Mac require that an appraiser obtain competency to complete an appraisal PRIOR to accepting an appraisal assignment. They require "requisite knowledge."

Fannie Mae's Definition of an Energy Efficient Property:

An energy-efficient property is one that uses resource-effective design, materials, building systems, and site orientation to conserve nonrenewable fuels.

Energy Efficient Improvements

"An energy-efficient property is one that uses resource-effective design, materials, building systems, and site orientation to conserve nonrenewable fuels." (Fannie Mae Selling Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

"Special energy-saving items must be recognized in the appraisal process and noted on the appraisal report form. For example, when completing the appraisal report (Form 1004), special energy-efficient items are to be addressed in the Improvements section in the Additional features field. The nature of these items and their contribution to value will vary throughout the country because of climactic conditions, differences in utility costs, and overall market reaction to the cost of the feature. Some examples of special energy-efficient features may include, but are not limited to, energy efficient ratings or certifications, programmable thermostats, solar photovoltaic systems, low-e windows, insulated ducts, and tank-less water heaters."

"Appraisers must compare energy-efficient features of the subject property to those of comparable properties in the Sales Comparison Approach adjustment grid. If the appraiser's analysis determines that an adjustment is warranted based on the market reaction to such item(s), the adjustment must be included in the adjustment grid." (Fannie Mae Selling Guide)

Note – If an appraiser determines that NO adjustment is necessary, this must also be explained and analysis shown why no adjustment is warranted.

For more information see corresponding links in the bibliography document located in your learning extras.

"Solar panels that are leased from or owned by a third party under a power purchase agreement or other similar arrangement are to be considered personal property items and are not included in the appraised value of the property. See B2-3-04, Special Property Eligibility Considerations, for additional eligibility requirements for properties with solar panels." (Fannie Mae Selling Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 4 Chapter 1 Summary

In this chapter you learned the following:

- How to identify two major GSEs involved in secondary mortgage market.
- How to describe who Freddie Mac and Fannie Mae are.
- How to describe who FDIC is.
- How to describe generally the responsibilities of a real estate appraiser when he or she encounters energy-efficient elements in the subject property when conducting an appraisal that will be sold on the secondary mortgage market.

Chapter 2
FHA

Section 4 Chapter 2 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Identify what the acronyms FHA and HUD represent.
- Identify the HUD document that every appraiser must comply with when completing an FHA appraisal assignment.
- Describe what FHA does.
- Describe generally the responsibilities of a real estate appraiser when he or she encounters energy-efficient elements in the subject property when conducting and a FHA appraisal assignment.

Chapter 2

FHA:

"The FHA, or Federal Housing Administration, provides mortgage insurance on loans made by FHA-approved lenders. FHA insures these loans on single family and multi-family homes in the United States and its territories. It is the largest insurer of residential mortgages in the world, insuring tens of millions of properties since 1934 when it was created. Learn more about FHA loan requirements and guidelines."

FHA appraisers must follow the HUD Handbook 4000.1 when completing an appraisal. FHA requires that an appraiser obtain competency to complete an appraisal PRIOR to accepting an appraisal assignment. (FHA.com)

See the Energy Efficient Homeowners Guide online by visiting the link in your learning extras. Also look for the Single Family Housing Policy Handbook, 4000.1.

For more information see corresponding links in the bibliography document located in your learning extras.

WHAT IS FHA:

The Federal Housing Administration (FHA) is a United States government agency created as part of the **National Housing Act of 1934**. The FHA insures loans made by banks and other private lenders for home building and home buying. The goals of this organization are to improve housing standards and conditions, provide an adequate home financing system through insurance of mortgage loans, and to stabilize the mortgage market.

YOUR TAX DOLLARS HARD AT WORK:

FHA is the only government agency that operates entirely from its self-generated income and costs the taxpayers nothing. The proceeds from the mortgage insurance paid by the homeowners are captured in an account that is used to operate the program entirely. FHA provides a huge economic stimulation to the country in the form of home and community development, which trickles down to local communities in the form of jobs, building suppliers, tax bases, schools, and other forms of revenue.

FHA HISTORY:

- Congress created the Federal Housing Administration (FHA) in 1934. The FHA became a part of the Department of Housing and Urban Development's (HUD) Office of Housing in 1965.

- When the FHA was created, the housing industry was flat on
- its back.

- Two million construction workers had lost their jobs.

- Terms were difficult to meet for homebuyers seeking mortgages

.
- Mortgage loan terms were limited to 50 percent of the property's market value, with a repayment schedule spread over three to five years and ending with a balloon payment.

- America was primarily a nation of renters. Only 4 out of 10 households owned homes.

FHA HISTORY

During the 1940s, FHA programs helped finance military housing and homes for returning veterans and their families after the war.

In the 1950s, 1960s and 1970s, the FHA helped to spark the production of millions of units of privately-owned apartments for elderly, handicapped and lower income Americans. When soaring inflation and energy costs threatened the survival of thousands of private apartment buildings in the 1970s, FHA's emergency financing kept cash-strapped properties afloat.

The FHA moved in to steady falling home prices and made it possible for potential homebuyers to get the financing they needed when recession prompted private mortgage insurers to pull out of oil producing states in the 1980s.

By 2001, the nation's homeownership rate had soared to an all time high of 68.1 percent as of the third quarter that year.

FHA HISTORY

The FHA and HUD have insured over 34 million home mortgages and 47,205 multifamily project mortgages since 1934. FHA currently has 4.8 million insured single-family mortgages and 13,000 insured multifamily projects in its portfolio.

In the more than 70 years since the FHA was created, much has changed and Americans are now arguably the best housed people in the world. HUD and FHA have helped greatly with that success.

THE RELATIONSHIP BETWEEH FHA AND HUD

In 1965, the Federal Housing Administration became part of the Department of Housing and Urban Development (HUD).

WHAT IS HUD:

The department was established on September 9, 1965, when President Lyndon B. Johnson signed the Department of Housing and Urban Development Act into law. The implementation took place January 13, 1966, following the completion of a special study group report on the federal role in solving urban problems.

HUD's mission is to create strong, sustainable, inclusive communities and quality affordable homes for all. HUD is working to strengthen the housing market to bolster the economy and protect consumers; meet the need for quality affordable rental homes; utilize housing as a platform for improving quality of life; build inclusive and sustainable communities free from discrimination; and transform the way HUD does business.

In 1968 riots in major cities follow assassination of Dr. Martin Luther King Jr.

Civil Rights Act of 1968 (also known as the Fair Housing Act) outlaws most housing discrimination, and gives HUD enforcement responsibility.

Housing Act of 1968 establishes Government National Mortgage Association (Ginnie Mae) to expand availability of mortgage funds for moderate income families using government guaranteed mortgage-backed securities.

WHAT DOES FHA DO?

FHA loans have been helping people become homeowners since 1934. **How do they do it?**

The Federal Housing Administration (FHA), which is part of HUD, insures the loan, so lenders can offer better rates and lower down payments, while reducing lender's risk.

Since 1934, the FHA and HUD have insured over 34 million home mortgages and 47,205 multifamily project mortgages.

HUD's Resource Center can be reached at 800-224-4342 or on the Web at www.HUD.gov

1999 -HUD Secretary Andrew Cuomo released the HUD "Home Buyer Protection Plan"

Cuomo said, "We believe this protection plan is going to make so much sense it will set a new standard for the industry."

He also described the plan as, "…one of the most important consumer protection measures in years."

FHA offers an Energy Efficient Mortgage:

“**THE ENERGY EFFICIENT MORTGAGE** means comfort and savings. Whether you are buying, selling, refinancing, or remodeling your home, you can increase your comfort and actually save money by using the **Energy Efficient Mortgage (EEM).** It is easy to use, federally recognized, and can be applied to most home mortgages. EEMs provide the borrower with special benefits when purchasing a home that is energy efficient, or can be made efficient through the installation of energy-saving improvements.”

“Homeowners with lower utility bills have more money in their pocket each month. They can afford to allocate a larger portion of their income to housing expenses. If you have more cash, why not buy a better, more comfortable home? There are two options with the Energy Efficient Mortgage.” (FHA.com)

For more information see corresponding links in the bibliography document located in your learning extras.

“Finance Energy-Saving Improvements!

- Cost-effective energy-saving measures may be financed as part of the mortgage!
- Make an older, less efficient home more comfortable and affordable!”

“WHO BENEFITS from the ENERGY EFFICIENT MORTGAGE?

Buyers:

- Qualify for a larger loan on a better home!
- Get a more comfortable home NOW.
- Save money every month from Day One.
- Increase the potential resale value of your home.

Sellers:

- Sell your home more quickly.
- Make your house affordable to more people.
- Attract attention in a competitive market.

Remodelers/Refinancers:

- Get all the EEM benefits without moving.
- Make improvements which will actually save you money.
- Increase the potential resale value of your home.”

(Energy Efficient Mortgage Homeowner Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

“Pay for energy improvements easily, through your mortgage. Your lender can increase your loan to cover energy improvement costs. Monthly mortgage payments increase slightly, but you can actually save money because your energy bills will be lower!”

Home Energy Assessment

“The Borrower will need to obtain a home energy assessment. The energy assessment will provide:

- Recommendations of energy-saving improvements for the Borrower’s consideration,
- Estimate of the money each improvement will save in energy costs, and
- Estimate of the cost to make each improvement.”

“The Mortgage Lender must use information from the home energy assessment report to determine the amount of money homeowners will save in energy costs with each improvement. Improvements are “cost-effective” when they save the homeowner as much or more than the cost of improvements.”
(Energy Efficient Mortgage Homeowner Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

Qualified Energy Assessors

"Qualified home energy raters/assessors must be trained and certified as one of the following:

- Building Performance Institute Building Analyst Professional
- Building Performance Institute Home Energy Professional Energy Auditor
- Residential Energy Services Network Home Energy Rater"

"The home energy report must reflect one of the above professional credentials by the assessor."

THIS IS WHY the EEM WORKS

"Energy-efficient homes cost less to own than non-efficient homes, though they may start off with higher price tags."

(Energy Efficient Mortgage Homeowner Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

SAMPLE COMPARISON of HOMEOWNER COSTS *		
	Older Existing Home	Same Home with $10,000 Energy Improvements
Home Price	$200,000	$210,000
Mortgage Amount (96% of Price)	$192,000	$201,600
Monthly Payment ** (30-year mortgage at 5.5%, rounded)	$1,090	$1,145
Monthly Energy Bills (Electric, Gas)	$186	$110
Monthly Cost of Homeownership	$1,276	$1,255
Monthly Savings	n/a	$21
Home Comfort During Hot or Cold Weather	- - -	+++

"*Values shown are for comparison only, and will vary from home to home."
"**Monthly payments are for principle and interest only, and do not include taxes, hazard insurance, homeowner's association fees, etc." (Energy Efficient Mortgage Homeowners Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

"Lenders recognize the savings that energy upgrades will bring to homeowners. Borrowers may use these potential savings like extra cash, and add the cost of upgrades into the mortgage, paying them off as part of the monthly mortgage payment."

FHA's Energy Efficient Mortgage Program

"The FHA Energy Efficient Mortgage covers upgrades for new and existing homes and is now available in all 50 states. Key features include:

- Loan limits may be exceeded
- No re-qualifying
- No additional down payment
- Improvements are made after closing- Appraised value is based on home prior to upgrades (appraisal does not need to reflect value with improvements)"

(Energy Efficient Mortgage Homeowners Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

CASE STUDY 1:

“Customer Quote: "The EEM was the second best thing that ever happened to me. The first best was actually being able to buy a home. This is our first home, and the EEM saved us a lot of headaches because we knew what we needed to do to the house. It's nice and comfortable now. Even my dogs are happy. I am very impressed." -Pat Theard

First-time home buyers Patricia and Mynette Theard purchased their home in California. It was built in 1940, and sold for $150,000. They got an FHA loan for 95% of the value of the property. The lender saw an opportunity for them to improve on their investment and recommended an Energy Efficient Mortgage.
A home energy assessment on the home recommended $2,300 in energy improvements including ceiling, floor and furnace duct insulation, plus a setback thermostat. The lender set aside an extra $2,300 for the improvements, bringing the total loan amount from $142,500 to $144,800. The loan closed, the Theards moved in, and the improvements were installed. The monthly mortgage payments increased by $17, but the Theards are saving $45 each month through lower utility bills.

Ask your lender about an Energy Efficient Mortgage. If they are not knowledgeable about the EEM, encourage them to learn about it, or find another lender.” (Energy Efficient Mortgage Homeowners Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

CASE STUDY 2:

“Adding Energy Improvements through a Home Refinance
"It's wonderful. We're just amazed at the difference. We've hardly used the furnace all winter. The house is much quieter too. It makes sense for everyone to do it." -Caroline Chang

In the fall of 1995, Caroline and Tommy Chang decided to refinance their 35-year-old home to take advantage of lower interest rates. Their lender suggested they get an energy assessment on the home so they could finance energy improvements through their new mortgage deal as well.
The lender increased the loan by $8,760 to cover the cost of energy improvements. Their final loan amount was $176,400, which is higher than they could have gotten without the EEM. The loan closed and the improvements were installed. These included double-paned windows, wall insulation, ceiling insulation, furnace duct repairs and insulation, and a few smaller items. These improvements, combined with their lower mortgage interest rate, mean the Chang’s will be saving about $230 per month. They will be more comfortable too!” (Energy Efficient Mortgage Homeowners Guide)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 4 Chapter 2 Summary

In this chapter you learned the following:

- How to identify what the acronyms FHA and HUD represent.
- What HUD document that every appraiser must comply with when completing an FHA appraisal assignment.
- What FHA does.
- Generally the responsibilities of a real estate appraiser when he or she encounters energy-efficient elements in the subject property when conducting and a FHA appraisal assignment.
- Who is qualified to perform a home’s energy rating or certification.

Chapter 3
Veterans Administration (VA)

Section 4 Chapter 3 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Identify what the acronym VA represent.
- Identify the VA document where appraisers and other individuals can learn about Energy Efficient Mortgages (EEMs).
- Describe what the VA does relating to home loans.
- Describe generally the responsibilities of a real estate appraiser when he or she encounters energy-efficient elements in the subject property when conducting and a VA appraisal assignment.
- Identify some of the energy-efficient items that qualify for VA funding.

Chapter 3

VA (Veterans Administration):

“VA helps Service members, Veterans, and eligible surviving spouses become homeowners. As part of our mission to serve you, we provide a home loan guaranty benefit and other housing-related programs to help you buy, build, repair, retain, or adapt a home for your own personal occupancy.
VA Home Loans are provided by private lenders, such as banks and mortgage companies. VA guarantees a portion of the loan, enabling the lender to provide you with more favorable terms.” US Dept. Veterans Affairs)

VA does not require that an appraiser obtain competency prior to accepting an assignment, but does require that the appraiser obtain competency before completing the assignment.

For more information see corresponding links in the bibliography document located in your learning extras.

VA Energy Efficient Mortgages:

"VA Pamphlet 26-7, Revised Chapter 7-Loans Requiring Special Underwriting, Guaranty and Other Considerations 7-16"

"3. Energy Efficient Mortgages (EEMs) Change Date November 8, 2012, Change 21 • This section has been updated to make minor grammatical edits."

"a. What are EEMs? EEMs are loans to cover the cost of making energy efficiency improvements to a dwelling. They can be made in conjunction with:
- a VA loan for the purchase of an existing dwelling, or
- a VA refinancing loan secured by the dwelling."

(VA Pamphlet 26-7)

For more information see corresponding links in the bibliography document located in your learning extras.

"Acceptable energy efficiency improvements include, but are not limited to:

- solar heating systems, including solar systems for heating water for domestic use,
- solar heating and cooling systems,
- caulking and weather-stripping,
- furnace efficiency modifications limited to replacement burners, boilers, or furnaces designed to reduce the firing rate or to achieve a reduction in the amount of fuel consumed as a result of increased combustion efficiency, devices for modifying flue openings which will increase the efficiency of the heating system, and electrical or mechanical furnace ignition systems which replace standing gas pilot lights,
- clock thermostats,
- new or additional ceiling, attic, wall and floor insulation,
- water heater insulation,
- storm windows and/or doors, including thermal windows and/or doors,
- heat pumps, and
- vapor barriers."

(VA Pamphlet 26-7)

For more information see corresponding links in the bibliography document located in your learning extras.

"b. Requirements Funds for energy efficiency improvements are considered part of the total loan, which must be secured by a first lien. If the labor is to be performed by the veteran, the loan increase will be limited to the amount necessary to pay for materials."

b. Requirements (continued)

"A loan for an existing property may be increased by up to $6,000 for energy efficiency improvements at the option of the lender and veteran at any time up to loan closing without VA's prior approval."

"The lender must determine that the proposed weatherization and/or energy conservation improvements are reasonable for the particular property. The lender must evaluate the veteran's ability to pay the increased loan payments caused by the addition of energy efficiency improvements."

"For energy efficiency improvements that will increase a loan amount by more than $6,000, the amount of the increase must be supported by an increased valuation in an equal amount."

(VA Pamphlet 26-7)

For more information see corresponding links in the bibliography document located in your learning extras.

“c. Borrower Notice on the Notice of Value (NOV)”

“Information on EEMs is provided to a veteran who applies for a loan which requires an NOV (a loan for a home purchase or cash-out refinance). The NOV includes the following notice to the veteran:

“The buyer may wish to contact a qualified person/firm for a home energy audit to identify needed energy efficiency improvements to the property. In some localities, the utility company may perform this service. The mortgage amount may be increased as a result of making energy efficiency improvements such as: Solar or conventional heating/cooling systems, water heaters, insulation, weather-stripping/caulking, and storm windows/doors. Other energy related improvements may also be considered.”

“The mortgage may be increased by:

• up to $3,000 based solely on the documented costs,
• up to $6,000 provided the increase in monthly mortgage payment does not exceed the likely reduction in monthly utility costs, or
• more than $6,000 subject to a value determination by VA.”
(VA Pamphlet 26-7)

For more information see corresponding links in the bibliography document located in your learning extras.

Section 4 Chapter 3 Summary

In this chapter you learned the following:

- What the acronym VA represent.
-
- Which VA document provides appraisers and other individuals information regarding Energy Efficient Mortgages (EEMs).
-
- What the VA does relating to home loans.
-
- Generally the responsibilities of a real estate appraiser when he or she encounters energy-efficient elements in the subject property when conducting and a VA appraisal assignment.
-
- Some of the energy-efficient items that qualify for VA funding.

Chapter 4
Secondary Market Lender Requirements

Section 4 Chapter 4 Learning Objectives

- While all chapters within this seminar are important, this chapter is the one that contains a concise list of everything any appraiser must do when performing an appraisal on an energy-efficient home.
- Use the list found within this chapter as a checklist to ensure that your appraisal could be used by the lender for the secondary mortgage market and comply with USPAP.

Chapter 4
Secondary Market Lender Requirements:

Fannie Mae, Freddie Mac and FHA require that an appraiser obtain competency prior to accepting an appraisal assignment.

VA requires an appraiser obtain competency before completing an appraisal assignment, but does not require that the appraiser have competency prior to accepting the appraisal assignment.

Appraisal Requirements:

- The appraisal must be in compliance with USPAP
- The appraisal must meet all secondary market guidelines.
- The value must be supported with market data.
- Market data must be available.
- Support for adjustments must be demonstrated not just stated.
- Cost alone is not adequate to support an adjustment.
- Per secondary market guidelines, without sales to support adjustments, two methods must be developed. Cost or Income alone is not adequate. Both must be used.
- Adjustments must be explained and supported.
- Approaches to value must be reconciled.
- Provide support in the appraisal report so that you do not have to provide it later. (AI Energy Efficient Addendum or other worksheet, energy report or energy ratings.)
- There are many terms for energy efficient items and your client may not understand things the same way you do. Explain, explain explain and cite sources.
- USPAP requires that you write the appraisal report for the intended user, this can take up to 3 times longer to do when writing an appraisal for an energy efficient property.

Section 4 Chapter 4 Summary

In this chapter you learned the following:

- What USPAP responsibilities are when performing an appraisal on energy-efficient home.
-
- What responsibilities you may have to secondary mortgage market GSEs.
-
- Some of the energy-efficient forms or certifications that you will need to complete when performing an appraisal on energy-efficient home.

Chapter 5
What is the value in energy efficient buildings

Section 4 Chapter 5 Learning Objectives

After Completing This Chapter The Real Estate Professional Will Be Able To Do The Following:

- Identify What Might Be Considered Nonfinancial Value Of Doing What Is Right For The Environment With Energy-efficient Housing.
- Describe How In Some Cases Additional Cost Does Not Equal Value(super Adequacy).
- Identify Some Of The National Trends Showing Potential Greater Value For Energy-efficient Homes.
- Describe How Lower Energy Costs Can Affect The Mortgage.

Chapter 5

What is the value in energy efficient buildings?

- The cost savings of energy.
- Lower operating costs allow for a higher mortgage.
- Potential higher property value.
- Non-financial value of doing what is right for the environment.
- Remember that cost does not equal value! (Super adequacy).
- National trends are showing that there is value in energy efficient buildings.

Studies showing trends:

View these articles in your learning extras.

National Association of Realtors study:

“Homebuyers Value Environmentally Friendly Features”

Other Studies:

“Going Green can Add Value to Your Home”

“New Report finds Green Homes Sell for a Premium”

“Studies find Solar Increases Home Value”

Section 4 Chapter 5 Summary

In this chapter you learned the following:

- What might be considered nonfinancial value of doing what is right for the environment with energy-efficient housing.
- How in some cases additional cost does not equal value(super adequacy).
- About national trends showing potential greater value for energy-efficient homes.
- How lower energy costs can effectuate higher mortgage amounts.

Chapter 6
Scope of Work Issues

Section 4 Chapter 6 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Identify what business considerations you must consider when appraising energy-efficient housing.
- Describe how much additional time might be spent conducting an appraisal on energy-efficient home.
- Identify one of the areas of USPAP that will play a significant role when developing an appraisal for an energy-efficient home.

Chapter 6

Scope of Work Issues:

It is important to note that an appraisal of an energy efficient property will take more time due to the need to have a longer property inspection, increased research and data collection above and beyond what is typically used, the time to analyze the data and develop the approaches to value and to report and reconcile what is found. An appraiser with the credentials and competency to appraiser energy efficient buildings will have taken classes to gain competency and may have also spent significant time and resources educating him/herself.

There will be increased Scope of Work and the appraiser needs to consider the additional time and education required when quoting his/her fees for energy efficient buildings. The additional Scope of Work should be discussed with the client before the appraisal assignment is accepted, if possible.

Scope of Work Issues

It can take up to 3 times as long to complete a USPAP compliant appraisal for an energy efficient property as compared to a code built property.

Each assignment needs to be carefully considered and discussed with the client before beginning with the appraisal. Many times information provided by the lender in the initial order will not address the energy efficient items. If you receive as assignment and realize at the time of inspection that the property is an energy efficient property

STOP

Call the lender and discuss the expanded Scope of Work BEFORE you begin!

USPAP and Scope of Work:

Under Competency USPAP states:

Problem Identification

An appraiser must gather and analyze information about those assignment elements that are necessary to properly identify the appraisal review problems to be solved.

Scope of Work Acceptability

The scope of work must include the research and analysis that are necessary to develop
credible assignment results.

An appraiser must not allow assignment conditions to limit the scope of work to such a degree that the assignment results are not credible in the context of the intended use.

An appraiser must not allow the intended use of an assignment or a client's objectives to cause the assignment results to be biased.

Disclosure Obligations

The report must contain sufficient information to allow the intended users to understand the scope of work performed.

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Section 4 Chapter 6 Summary

What business considerations you must consider when appraising energy-efficient housing

- How much additional time might be spent conducting an appraisal on energy-efficient home.

- One of the areas of USPAP that will play a significant role when developing an appraisal for an energy-efficient home.

Section 4 Summary

In this Section we learned to:

- Identify and define Secondary Market Lenders.
- Identify and define Secondary Market Lenders Requirements.
- Describe the value in energy efficient buildings.
- Identify and define the Scope of Work Considerations.

Section 5
Site Inspections Issues and Considerations

Section 5 Learning Objectives

- Identify data that needs to be collected during the site inspection and where to find it.
- Identify additional data that may need to be collected that would not be available at the time of the site inspection.
- Identify the forms that are available to use for data collection.

Chapter 1
Site Inspection Issues

Section 5 Chapter 1 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Identify what components and design features you must consider and identify during the site visit when appraising energy-efficient housing.
- Describe what certifications or addenda you might consider utilizing in your report to support your opinions and conclusions.
- Describe what data is critical to be analyzed and supported in your appraisal of an energy-efficient home.

Chapter 1

Site Inspection Issues:

- As the appraiser you must obtain enough information to know what systems and components the property has. Go back to the list of components of energy efficiency, water, energy, waste, and indoor air quality. You can create your own list this way.
- Look for features in the property that are not typical in a code built house
- Analyze the placement of the building on the lot
- Note and report landscaping
- Note and report building materials
- Analyze plans and specs if available
- Get copies of paperwork relating to energy efficient ratings that have been completed (get complete copies, not just the first page)
- Gathering data is critical as you will need to explain where you information came from

Site Inspection Issues

- Get all the energy ratings, projected or actual cost savings and ask what these costs would be without the energy efficient components to determine actual or projected savings. This information is needed to compare to determine if there is functional depreciation. Get all the associated paperwork.

- Get as much information as possible

- Use a form – have the owner or the builder fill it out. The Appraisal Institute has a comprehensive form included below that is available to all to use. If this forms seems to long, make your own. I have found that many times a property has some energy efficient items rather than an entire list. As noted previously there are many shades of green. Sometimes it is helpful to first determine what energy efficient items exist and then focus on obtaining the data needed to determine value for these items. It is critical to note what the energy efficient items are as Fannie/Freddie/FHA and VA require that they be noted and discussed in the property improvements section of the appraisal report, even if your market analysis does not show support for value.

- ASK QUESTIONS it is critical that you get the information you need for a credible appraisal!

Calypso Continuing Education Form

Energy Efficient Forms and Certification

Glossary for Residential Energy Efficient and Green Buildings Addendum

ICC-700 National Green Building Standard (NGBS): An ANSI-approved residential green building standard developed by the National Association of Home Builders (NAHB) and the International Code Council (ICC). http://www.nahb.org/page.aspx/generic/sectionID=2510 or http://www.homeinnovation.com/

LEED: Leadership in Energy and Environmental Design LEED provides building owners and operators with a framework for identifying and implementing green building design, construction, operations and maintenance solutions. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988

Energy Star®: ENERGY STAR certified new homes must meet strict energy efficiency guidelines set by the U.S. Environmental Protection Agency.. http://www.energystar.gov/index.cfm?c=new homes.hm index

Home Energy Score (HES): The Home Energy Score compares the energy consumption of homes to other homes in the area and provides homeowners with suggestions for improving their homes' efficiency.

HERS Index: The Home Energy Rating System (HERS) Index is the Industry Standard by which a home's energy efficiency is measured This Index is assessed by a qualified third party certifier based on the physical characteristics of the house. . http://www.resnet.us/hers-index

Building Envelope: The building envelope is composed of all the components that separates the building's interior from the exterior. These components include the following: the foundation, exterior walls, roof, doors and windows.

Geothermal: A geothermal heat pumps use the constant temperature below ground of soil or water to heat and cool a home. http://energy.gov/energysaver/articles/geothermal-heat-pumps

Low-E: Low emittance coating on the glass surface reflects heat waves back into the building. Heat and light have different wavelengths, the coating allows visible light to pass through the glass, but reflects the radiant heat energy back into the building. Approximately 40% of the sun's harmful ultra violet rays are blocked by the coating and the building's insulating properties are enhanced.

Whole Building Ventilation System: Whole-building ventilation provides continuous or intermittent low-flow ventilation in a home to remove general airborne contaminants from diverse sources, including finishes, furnishings, people, pets, household chemicals, and household activities. Whole-building ventilation strategies can be divided into three types: **exhaust-only** ventilation systems, **supply-only** ventilation systems, **balanced** ventilation systems

Energy Recovery Ventilation System: AKA Heat Recovery Ventilators (HRV). These systems exchange the indoor air for outdoor air without losing the heat of the indoor air. In some climates, HRV's are also used to dehumidify the incoming air.

Passive Solar: A passive solar home collects heat as the sun shines through south-facing windows and retains it in materials that store heat, known as thermal mass. A passive solar home design possess basic elements that work together including: **windows oriented** within 30 degrees of true south and not be shaded during the heating season; **thermal mass** like concrete, brick, stone, and tile absorbs heat created by the sunlight during the heating season; **distribution mechanisms** transfer solar heat from where it is collected and stored to different areas of the house by conduction, convection, and radiation; and **control strategies** include like properly sized roof overhangs, low-emissivity blinds, operable insulating shutters, and awnings. http://www.nrel.gov/docs/fy01osti/27954.pdf http://rredc.nrel.gov/solar/glossary

Glossary for Residential Energy Efficient and Green Buildings Addendum

ICC-700 National Green Building Standard (NGBS): An ANSI-approved residential green building standard developed by the National Association of Home Builders (NAHB) and the International Code Council (ICC). http://www.nahb.org/page.aspx/generic/sectionID=2510 or http://www.homeinnovation.com/

LEED: Leadership in Energy and Environmental Design LEED provides building owners and operators with a framework for identifying and implementing green building design, construction, operations and maintenance solutions. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988

Energy Star®: ENERGY STAR certified new homes must meet strict energy efficiency guidelines set by the U.S. Environmental Protection Agency.. http://www.energystar.gov/index.cfm?c=new homes.hm index

Home Energy Score (HES): The Home Energy Score compares the energy consumption of homes to other homes in the area and provides homeowners with suggestions for improving their homes' efficiency.

HERS Index: The Home Energy Rating System (HERS) Index is the Industry Standard by which a home's energy efficiency is measured This Index is assessed by a qualified third party certifier based on the physical characteristics of the house. . http://www.resnet.us/hers-index

Building Envelope: The building envelope is composed of all the components that separates the building's interior from the exterior. These components include the following: the foundation, exterior walls, roof, doors and windows.

Geothermal: A geothermal heat pumps use the constant temperature below ground of soil or water to heat and cool a home. http://energy.gov/energysaver/articles/geothermal-heat-pumps

Low-E: Low emittance coating on the glass surface reflects heat waves back into the building. Heat and light have different wavelengths, the coating allows visible light to pass through the glass, but reflects the radiant heat energy back into the building. Approximately 40% of the sun's harmful ultra violet rays are blocked by the coating and the building's insulating properties are enhanced.

Whole Building Ventilation System: Whole-building ventilation provides continuous or intermittent low-flow ventilation in a home to remove general airborne contaminants from diverse sources, including finishes, furnishings, people, pets, household chemicals, and household activities. Whole-building ventilation strategies can be divided into three types: **exhaust-only** ventilation systems, **supply-only** ventilation systems, **balanced** ventilation systems

Energy Recovery Ventilation System: AKA Heat Recovery Ventilators (HRV). These systems exchange the indoor air for outdoor air without losing the heat of the indoor air. In some climates, HRV's are also used to dehumidify the incoming air.

Passive Solar: A passive solar home collects heat as the sun shines through south-facing windows and retains it in materials that store heat, known as thermal mass. A passive solar home design possess basic elements that work together including: **windows oriented** within 30 degrees of true south and not be shaded during the heating season; **thermal mass** like concrete, brick, stone, and tile absorbs heat created by the sunlight during the heating season; **distribution mechanisms** transfer solar heat from where it is collected and stored to different areas of the house by conduction, convection, and radiation; and **control strategies** include like properly sized roof overhangs, low-emissivity blinds, operable insulating shutters, and awnings. http://www.nrel.gov/docs/fy01osti/27954.pdf http://rredc.nrel.gov/solar/glossary

Downloadable pdf of these forms is located in your learning extras

Calypso Continuing Education Form

Energy Efficient Forms and Certification

Energy Efficient and Green Building Appraiser Addendum

Appraisal file ID/#	**Client ID/#**
Client:	
Subject property address:	
City: **State:**	**ZIP Code:**

Green Building Page

☐ The subject property represents a Green Building because it has utilized processes that are environmentally responsible and resource efficient throughout the building's lifecycle. These processes and features include: design and citing of the structure, construction methods, operation & maintenance, renovation, and deconstruction. These Green Building practices are an enhancement to the conventional building design concerns of economy, comfort, utility, and durable life expectancy. The subject property meets the following criteria requisite of a Green Building:

☐ The subject property is energy efficient. (See rating organization page for details.)

☐ The subject property is resource efficient. (See rating organization page for details.)

☐ The subject property represents an environmentally responsible structure. (See rating organization page for details.)

☐ Site ______________________________

☐ Water Efficiency ______________________________

☐ Energy Efficiency ______________________________

☐ Waste ______________________________

☐ Indoor Air Quality ______________________________

☐ Materials ______________________________

☐ Operation and Maintenance ______________________________

Downloadable pdf of these forms is located in your learning extras

Calypso Continuing Education Form

Energy Efficient Forms and Certification

Energy Efficient and Green Building Appraiser Certification and Addendum

Appraisal file ID/#		Client ID/#
Client:		
Subject property address:		
City:	State:	ZIP Code:

The appraiser hereby certifies the following:

- ☐ The information contained herein is representative of the physical conditions at the subject property.
- ☐ The information contained herein has been considered, as it relates to my value opinion, or other conclusions and opinions rendered within this appraisal.
- ☐ The information contained herein is a result of the appraiser's due diligence in inspecting and researching conditions about the subject property; and because of the nature of the improvements, has required greater time expenditure by me to conduct additional research and analyze more data than would be typical for a non-energy efficient home.
- ☐ This certification and addendum are not a surety, warranty, or guarantee, either express or implied, regarding the actual performance of energy efficient components at the subject property. The appraiser's conclusions and opinions regarding their performance are based on sources deemed to be reliable, but represent an extraordinary assumption that if proven to be otherwise, may impact on conclusions, opinions, including value opinion rendered by me.
- ☐ Other relevant certification specific to the subject property:

This certification is an addendum to other certifications contained within the appraisal report and does not supersede such certifications.

Appraiser's signature	Appraiser's license number
Appraisal date	Effective date of the appraisal

Downloadable pdf of these forms is located in your learning extras

Section 5 Chapter 1 Summary

In this chapter you learned the following:

- What components and design features you must consider and identify during the site visit when appraising energy-efficient housing.
- What certifications or addenda you might consider utilizing in your report to support your opinions and conclusions.
- What data is critical to be analyzed and supported in your appraisal of an energy-efficient home.

Chapter 2

Data Collection Issues and Considerations

Section 5 Chapter 2 Learning Objectives

After completing this chapter the real estate professional will be able to do the following:

- Identify questions to ask during interviews.
- Describe some of the entities that can assist you in acquiring data for your appraisal of an energy-efficient home.

Chapter 2

Data Collection Issues and Considerations:

- Data collection is critical to accurate valuation.
- Without accurate data regarding costs you cannot calculate the savings.
- Collecting the data can be time consuming and difficult – this must be factored into your Scope of Work.
- Costs and performance can vary greatly from property to property depending on the homeowner and the builder.
- You need complete documents! Much of the value could be hidden.

Data Collection Issues and Considerations

Appraisers can use interviews/surveys of direct market participants (buyers, sellers, real estate agents or builders) to gather information and data on energy efficient properties. Questions could include, why did you buy an energy efficient property, what are you saving, how much more did the property cost than a typical property, do you feel you paid a premium for an energy efficient property, do your operating savings exceed the premium paid etc.

Appraising Energy Efficient Properties can be more complicated and take more time than a typical residential appraisal, this must be kept in mind when developing your Scope of Work and quoting fees for appraising energy efficient properties.

Section 5 Chapter 2 Summary

In this chapter you learned the following:

- To identify questions to ask during interviews .
- Some of the entities that can assist you in acquiring data for your appraisal of an energy-efficient home.

Section 5 Summary

In this Section we learned to:

- Identify data that needs to be collected during the site inspection and where to find it.
- Identify additional data that may need to be collected that would not be available at the time of the site inspection.
- Identify the forms that are available to use for data collection.

Section 6
Valuation

Chapter 1
Cost Approach

Learning Objectives

For many appraisers the following section is a review, but one that will be very helpful if you don't frequently use the income approach or cost approach. After successfully completing this section the participant will be able to describe the following:

- How to utilize the cost approach when appraising an energy-efficient home.
- How to utilize the income approach when appraising an energy-efficient home.
- How to utilize the sales comparison approach when appraising an energy-efficient home.

Chapter 1

Learning Objectives

- Identify what resources are available to develop a Cost Approach for an energy efficient property.
- Identify the information needed to develop an accurate Cost Approach for an energy efficient property along with additional data that may need to be collected above and beyond what you might typically collect.
- Identify how to calculate depreciation for an energy efficient property.
- Identify how to explain your Cost Approach and analysis to your client.

What resources are available to develop a Cost Approach for an Energy Efficient Property:

You must account for the green features in a property accurately in your Cost Approach. There are several ways to do this.

Cost Data Services:

- Marshal and Swift Residential Cost Handbook (It may be difficult to find exact adjustments in the residential Cost Handbook.) If you choose to use the Marshall and Swift Residential Cost Handbook you may need to use the Segregated Cost Section in order to accurately account for all the specific energy efficient items in your subject. Marshall and Swift does offer online support for subscribers if needed. https://www.marshallswift.com/

- Cost Data Service: http://building-cost.net/

- Local builder estimates can be the most accurate. Many costs are so specific to a market, a time of year, the immediate supply and demand for building and building materials etc.… Energy efficient items are even more market specific thus often the actual costs or local builders estimates of the actual costs are the most accurate.

What resources are available to develop a Cost Approach for an Energy Efficient Property:

To calculate the cost of solar you can use the solar PV Valuetool ® accessed via the link below. Much of the information is included in the tool but you will need the kilowatts produced by the system, the inverter and the module and inverter warranty. You also need to understand discounted cash flow to use this tool.

See the PV Value Cost Approach in your learning extras.

For more information see corresponding links in the bibliography document located in your learning extras.

Other points

1. The total economic life may be longer for energy efficient items/buildings as they often are more durable and have a longer life than typical building materials. This will affect your calculations for physical depreciation.

2. Functional depreciation must be considered when developing a Cost Approach for energy efficient items/buildings as energy efficient items/buildings can be an over improvement for their market, a super-adequacy. Functional depreciation can be determined by comparing the cost to paired sales if available or to the capitalized income (using the estimated or actual savings – explained further in the income approach).

3. Finally, you must be clear in your cost approach and explain exactly how the Cost Approach was developed so that your client can replicate the cost figures and calculations if needed.

NOTE:

It is generally accepted that it costs more to build an energy efficient property, however as was shown in the video "The Banner Bank Building" in the Introduction this is not always the case. Here as an example:

> "Cost approach: Data from the Appraisal Institutes Professional Development Program: Appraising Sustainable Housing indicates the cost of building energy efficient homes is 0-20% higher than a typical home. Magraw-Hill cost manual indicates the cost increase for green building is XX%, experienced builders report the cost increase for green building is XX%, Marshall Swift cost publications indicates the cost increase for green buildings is XX% higher. I have reconciled this data and have determined that a reasonable estimate of the increased cost to build an energy efficient property is XX% higher than typical code built property in the market of the subject property."

NOTE

Look up these percentages for your own cost data services and market and reconcile them to arrive at what you, the appraiser, determine would be the increase for an energy efficient property versus a typical code built property in your market.

See the link to Zero Energy Homes recent study on costs of energy efficient construction in the learning extras.

For more information see corresponding links in the bibliography document located in your learning extras.

Identify the information needed to develop an accurate Cost Approach for an Energy Efficient Property along with additional data that may need to be collected above and beyond what you might typically collect:

You must be able to identify the energy efficient items when completing the Cost approach for an energy efficient property. You cannot complete the Cost Approach using the regular cost estimators without adjusting for the energy efficient items. This is why using actual builder estimates is more accurate if the property being appraised is new construction.

Using a work sheet like the Appraisal Institutes' Residential Green and Energy Efficient Addendum or a similar form you develop yourself is so important as it allows you to know what you need to include in your Cost Approach.

Obtaining the ACTUAL anticipated savings as compared to a typical code built property is often the most difficult task.

I have found that obtaining the actual estimates for the entire project as well as the energy efficient items and/or systems separately is needed and you will need to develop costs for many of these systems individually to compare them to the capitalized income savings to develop an adjustment for the Sales Comparison Approach, especially if no paired sale data is available.

Identify how to calculate depreciation for an Energy Efficient Property:
An energy efficient item/property can have both physical and functional depreciation. When calculating **physical depreciation**, the energy efficient items should be looked at individually, separate from the property as a whole, as they may have different economic lives and therefore need to be depreciated at different rates.

Step 1: Estimate the cost of the item new (using cost services or builder estimates.)

Step 2: Estimate the physical depreciation using the economic age-life method. The effective age divided by the total economic life will give you the percentage of depreciation to apply. If you are estimating the value of a specific item use the expected life of the item, for a property, use the expected life of the property.

Step 3: Deduct the physical depreciation from the cost new to get the depreciated cost.

Calculating **functional depreciation** (super adequacy) can be much harder. Consider the age old example of an in ground pool. The cost new is $40,000. In some markets the pool would add $40,000 in value to a new home, in some it might only add $10,000 which would show functional depreciation of $30,000. Energy efficient items can be the same way.

Example:

A geothermal heating system for a proposed new construction has a cost of $116,346. Using the income approach and taking the estimated yearly savings of the geothermal system of $7,644 and an applicable residential cap rate of 8% ($7,644/.08) gives you a value of $95,552. Comparing these two values shows functional depreciation of $20,794. This example is simpler than some as this is for a new property and there is no physical depreciation.

Using paired sales would be a more accurate way to develop functional depreciation, however, when none exist the appraiser must consider other methods such as the one shown above. Residential cap rates can be developed using sales of rented residential properties in your market. This will be discussed further in the next Chapter on the Income Approach.

Identify and explain your Cost Approach and analysis to your client:

The best way to accomplish this is with an example:

In the Site Section of the Appraisal Report:

“The subject house is heated and cooled with a geothermal hot air heating/cooling system. There are four wells for the system.”

In the Improvements Section of the Appraisal Report:

“The house is heated with four geothermal wells that service four geothermal units that produce forced warm air in the winter and air conditioning in the summer. There are two gas fired heating systems for back up as the geothermal systems require more power than can be supplied by a generator. There will be an automatic generator. There is a 400-amp electrical system. There is radiant warming heat in all the tile and stone floors. The home is well insulated and very energy efficient.”

In the Cost Approach Section of the Appraisal Report:

"The physical depreciation figure is the actual total accrued depreciation as calculated by using the economic age-life method (see addendum). Site value derived from the analysis of sales in Mytown and comparable areas. Cost approach values are from local builder estimates with primary weight given to the cost of building the subject house as it is new construction. Physical depreciation is calculated using the Age-life method of depreciation: the estimated effective age of the subject (1 years) divided by the total economic life (60 years) equals the percentage of total accrued depreciation of the subject (2%)."

"The cost of the geothermal heating system was obtained from the heating contractor."

"Functional depreciation noted due to the fact that the sales comparison approach to value indicates that the market will not pay the full cost for houses of this type of construction. Functional depreciation is calculated by comparing the subject cost per square foot of $300 to the highest market accepted cost per square foot which is $200 based on the six comparable sales and multiplying the difference of $100 by the square footage of the house of 2,000 square feet for an adjustment of $200,000.

Example Two:

In the Additional Features Section of the Appraisal Report:

"The subject property is a passive solar design. There are triple pane, windows and doors, and blown in cellulose insulation in the ceiling, floors and walls. The primary heat source is a is thermostatically controlled 20,000 BTU electric heat pump with a heat recovery ventilation unit. Vapor and wind membranes. The wood for the timber frame is from local sources. There is an 8.5 kw solar photo voltaic system."

In the Condition of the Improvements Section of the Appraisal Report:

"Depreciation is measured three ways; physical, functional and external. The subject property is a partially built, new home. No physical depreciation noted. Functional depreciation noted due to the lack of the typical number of bedrooms. The cost per square foot of $300 per square foot is much higher than the cost of typical new homes in the area, and the cost of the higher quality of the subject will not be returned by the market. The subject property does not conform with what the market perceives as the ideal improvement due to an unusual design and the lack of typical market expected above
grade bedrooms. This affects both value and marketability. The subject property does not "conform" to what the market wants. Functional depreciation could be cured by making adding additional bedrooms, however, this would require making the building larger and the cost would exceed the benefit so the functional depreciation is incurable. The property is under improved due to its lack of market required above grade bedrooms. Conformity is defined as the appraisal principle that real property value is created and sustained when the characteristics of a property conform to the demands of its market. No external obsolescence noted."

In the Cost Approach Section of the Appraisal Report:

"The cost approach was developed using Marshall and Swift Cost Data (good quality). Depreciation was calculated using the age-life method based on a total economic life of 70 years, an effective age of 0 years, and a remaining economic life of 70 years. No physical depreciation. The "as is" value of site improvements includes site preparation of $5,000, driveway $20,000, septic system $20,000, drilled well $10,000 and connection to electrical grid $5,000. Functional depreciation noted as was explained in the Condition of the Improvements Section of the Appraisal Report."

Chapter 1 Summary

In this Chapter we learned to:

- Identify what resources are available to develop a Cost Approach for an energy efficient property.

- Identify the information needed to develop an accurate Cost Approach for an energy efficient property along with additional data that may need to be collected above and beyond what you might typically collect.

Chapter 2
Income Approach

Chapter 2

Learning Objectives

- Identify what steps to take to develop an Income Approach for an energy efficient property.
- Identify the information needed to develop an accurate Income Approach for an energy efficient property.
- Identify how to calculate yearly savings for an energy efficient item or property.
- Identify how to calculate an adjustment using the yearly energy savings and a discounted cash flow analysis, a capitalization rate, a gross rent multiplier or a residential cap rate.

Chapter 2

Income Approach

Identify what steps to take to develop an Income Approach for an energy efficient property:

1. Determine the annual savings for the entire property or for individual items, depending on what you need. Are you attempting to determine an adjustment for the total property? This may be the case with new construction, however, you could be appraising an older property that is to have solar added or a new geothermal heating system. Then you would need to determine an adjustment for an individual item or items.

2. Use the annual savings to develop an adjustment using:

- Discounted Cash Flow Analysis
- A Gross Rent Multiplier
- A Residential Capitalization Rate.

It is very important to attempt to develop your Capitalization Rate, Gross Rent Multiplier or your Residential Cap Rate using Comparable Sales other than those used in your Sales Comparison Approach to avoid “inbreeding” of the approaches. If you do use the same sales as those in your Sales Comparison Approach, you should find additional ones to use as well. It is not acceptable to develop the Income Approach using only the Sales in the Sales Comparison Approach.

Identify the information needed to develop an accurate Income Approach for an energy efficient property:

Information needed:
Annual savings as compared to a similar code built property or the individual item to be valued.

For **discounted cash flow analysis**, you will need a term, typically the term of the mortgage or the expected life of the item being valued and a rate, typically the rate of the mortgage.

For a **gross rent multiplier**, you will need sales prices of comparable rented residential properties and their rents.

For a **residential cap rate**, you will need sales of comparable rented residential properties, their rents and their expenses.

You **MUST** verify all data obtained above the same as you would verify comparable sales for the Income Approach to Value for it to be valid.

Identify how to calculate yearly savings for an energy efficient item or property:

Step 1:

Determine the annual savings for the entire property or for individual items. Are you attempting to determine an adjustment for the total property? This may be the case with new construction, however, you could be appraising an older property that is to have solar added or a new geothermal heating system. Then you would need to determine an adjustment for an individual item or items You may be able to determine annual energy savings for the property based on the HERS rating as compared to the HERS rating of a typical. As shown earlier:

1. The US Department of Energy has determined that a typical resale home scores 130 on the HERS index, while a standard new home is awarded a rating of 100. A home with a HERS Index Score of 50 is 50% more energy efficient than a typical code built home. The subjects HERS score of 54 means it is 46% more energy efficient than a typical code built home.

   Using this information if you can calculate the typical energy use of a standard new home in your market then you can use the percentages from the HERS rating to determine annual energy savings.

Another way to calculate annual energy savings is:

> Determine energy costs of the comparable sales using the seller disclosures. Look at electric and heating costs. Use the range of energy costs for the comparable sales were analyzed to determine a monthly and annual savings in energy costs. (For example, $70-$150/month electric and $100 to $200/month fuel), $170 to $350 per month total energy costs and $2,040 to $4,200 in savings per year).

Lastly, you can work with the contractors to determine what the annual savings will be. Heating contractors can provide what the heating costs will be with the system being installed versus a typical heating system in a code built property. If there is to be solar the solar contractors can also provide you with annual savings with the solar system versus what electric costs would be without it. I prefer to calculate annual savings this way if possible as it is property specific and there is less error.

Identify how to calculate an adjustment using the yearly energy savings and a discounted cash flow analysis, a gross rent multiplier or a residential cap rate:

Discounted cash flow analysis (Present Value):
To calculate the present value of the energy savings using a Discounted Cash flow analysis (DCF) you can use the term of the mortgage or the expected economic life of the item and the rate of the mortgage. If the term is 30 years and the rate is 4% and you have reconciled the energy savings to be $1,000 a year for a solar system being installed in an existing property or $4,000 a year for a new energy efficient property you can use your HP 12-c calculator to do the calculation or excel and calculate a present value where the payment is $1,000 or $4,000, n is 15 (expected economic life) and i is 4. If calculating the value for an energy efficient item use the expected economic life of the item for n.

Using the HP 12-C Financial Calculator solve for present value. Clear the financial register as shown in the video below then enter $1,000 or $4,000, change sign (CHS) as payment, n =15- and I = 4 then solve for present value (PV). You answer will be $11,118 - $44,474.

https://www.youtube.com/watch?v=PaAfpRZ8fCw

You are calculating a one payment per year calculation as explained in the video on the previous slide and assuming the payment is made at the end of the year. Term = n and Rate = i. You are calculating a time value of money payment, present value.

Fannie Mae discourages the present value method and HUD allows it.

Using excel – see link in learning extras.

Gross Rent Multiplier:

You can calculate value using a gross rental multiplier (GRM) using rented residential properties in your market that have sold. Assume you find six sales with sales prices of $100,000, $105,000, $120,000, $95,000, $108,000 and $115,000 with corresponding monthly rents of $700, $750, $800, $600, $750 and $800. Dividing the sales price by the monthly rent will give you gross rent multipliers of $142.86, $140, $150, $158.33, $144 and $143.75. You determine through your analysis that Comparable Sales 3, 4 and 6 should be given most weight and reconcile to a gross rent multiplier of $150.

The yearly energy savings shown above of $1,000 per year or $4,000 per year is $83.33 per month to $333.33 per month.

You can then develop an adjustment using the gross rent multiplier of $150 x monthly energy costs savings ($83.33-$333.33) = $12,500 to $50,000

Another example of the gross rent multiplier: 6.2.11

If possible, look for rents for energy efficient properties as compared to rent of non-energy efficient properties. Finding rental numbers for energy efficient properties in many markets may be almost impossible, however, there could be energy efficient apartments complexes, condominiums or housing developments with rental properties.

If they can be found, look at the difference in rent and find gross rent multipliers of energy efficient properties that have sold, apply the gross rent multiplier to the additional income to determine an adjustment.

Again, in my market, this would be data that would be almost impossible to find, however, it may be more readily accessible in other markets so it is shown here.

Rent for an energy efficient property ………………... $1,500
Rent for a non-energy efficient property……………… $1,200
Rent premium………………………………………….. $300

Gross Rent Multiplier (GRM) for energy efficient properties…...110
(Sale price of $165,000/$1,500 = 110)

110 GRM x $300 (rent premium) = $33,000

Fannie Mae prefers the GRM method and HUD also allows this method.

Capitalization Rate:

The table to the right provides a simplified example of extracting of a capitalization rate from the market.

In an ideal world capitalization rates would be obtained from properties that have the same energy efficiency as the subject property.

	Sale 1	Sale2	Sale 3
Sale price:	$125,000	$375,000	$260,000
Net operating income:	$12,500	$36,000	$26,525
Implied cap Rate:	.10	.096	.102
Reconciled Rate:	10%		

Calculating a total property adjustment using the capitalization rate developed in the previous slide:

Annual Net Savings of the Entire Property: $72,000

Capitalized at 10%= $720,000

Indicated Value $720,000

Residential capitalization rate:

"The geothermal system for the subject was valued at $95,000 based on the cost at $116,346 per the builder reconciled."

"The yearly savings for the geothermal system, per the heating contractor has been determined to be $7,644. The yearly savings is then capitalized at the residential/condominium capitalization rate in the subject's market of 8% resulting in an adjustment of $95,552 ($7,644/.08) for the geothermal heating system."

Example of a residential/condominium capitalization rate:

Location	XXXXX, Unit 16		XXXXX, Unit 15		XXXXX, Unit 701	
	XXXXX, XX		XXXX, XX		XXXX, XX	
Building Size(SF)	1,840		1,845		1,494	
No. of Bedrooms	3		3		3	
Sale Price	$419,000		$419,000		$255,000	
Sale Date	4/28/2014		6/20/2014		5/15/2014	
	Expenses - Est	**Per SF**	**Expenses - Est**	**Per SF**	**Expenses - Est**	**Per SF**
Real Estate Taxes	$5,000	$2.72	$5,000	$2.71	$3,825	$2.56
Condo Fees	$4,356	$2.37	$4,356	$2.36	$2,487	$1.66
Insurance	$1,000	$0.54	$1,000	$0.54	$800	$0.54
Electricity	$1,200	$0.65	$1,200	$0.65	$1,000	$0.67
Fuel	$2,500	$1.36	$2,500	$1.36	$2,500	$1.67
Utilities						
Water/Sewer						
Rubbish						
Lawn/Snow Removal						
Maintenance/Repairs						
Reserves	$1,054	$0.57	$1,054	$0.57	$659	$0.44
Advertising						
Management	$2,634	$1.43	$2,634	$1.43	$1,648	$1.10
Legal & Accounting Fees	$500	$0.27	$500	$0.27	$500	$0.33
Total Expenses - Estimated	$18,244	$9.92	$18,244	$9.89	$13,419	$8.98
Potential Gross Income	$52,675	$28.63	$52,675	$28.55	$32,950	$22.05
Effective Gross Income	$52,675	$28.63	$52,675	$28.55	$32,950	$22.05
Less: Expenses - Estimated	$18,244	$9.92	$18,244	$9.89	$13,419	$8.98
Equals: Net Operating Income	$34,431	$18.71	$34,432	$18.66	$19,531	$13.07
Expense Ratio	35%		35%		41%	
Indicated Overall Rate	8.2%		8.2%		7.7%	
Gross Income Multiplier	8.0		8.0		7.7	

It can be difficult to develop a residential capitalization rate as you have to determine income and expenses for the sales used and reconcile the income and expenses with market data. This approach is not likely to be used as often as the gross rent multiple method in a residential appraisal due to the complexity and time involved in developing a capitalization rate.

Section 6 Chapter 2 Summary

In this Chapter we learned to:

- Identify what steps to take to develop an Income Approach for an energy efficient property.
- Identify the information needed to develop an accurate Income Approach for an energy efficient property.
- Identify how to calculate yearly savings for an energy efficient item or property.
- Identify how to calculate an adjustment using the yearly energy savings and a discounted cash flow analysis, a gross rent multiplier or a residential capitalization rate.

Chapter 3
Sales Comparison

Section 6 Chapter 3 Learning Objectives

- Identify how to find comparable sales.
- Understand how to calculate paired sales.
- Identify Regression Analysis and how it works.
- Identify how to interview market participants when no market data is available.

Chapter 3

Sales Comparison

Identify how to find comparable sales:

Finding comparable sales for energy efficient residential properties can be very difficult due to the limited amount of data that is available. As well as the fact that many energy efficient residential properties are built specifically for an owner who does not plan to and often does not sell.

Many MLS systems now have energy efficient categories and once listing brokers begin using these fields on a more regular basis, the availability of comparable sales and data should improve.

The VT/NH MLS system, NNEREN, has the following fields under building certifications:

Coded Features - Google Chrome

www.nnerenmls.com/nne/cf/CFS1.html

Coded Features

NOTE: When searching FOR features, *OR* results in listings with 1 or more of the selected features, *AND* results in only listings with ALL of those features. When omitting features (NOT search), *AND* results in listings with NONE of the selected features. Do not use *OR* for a NOT search.

Accept Reset

ASSOCIATION AMENITIES		AUCTION INFORMATION		BASEMENT		BUILDING CERTIFICATIONS	
or and		or and		or and		or and	
Basketball	Not	Absolute Auction	Not	Bulkhead	Not	Energy Star Cert. Home	Not
Building Maint.	Not	Available Prior Viewing	Not	Climate Controlled	Not	HERS Rated	Not
Cable	Not	Buyer Inspection Allowed	Not	Crawl Space	Not	LEED for Homes-Platinum	Not
Club House	Not	Buyer Premium	Not	Daylight	Not	LEED for Homes-Gold	Not
Common Heat/Cool	Not	Buyer Reg Required	Not	Dirt	Not	LEED for Homes-Silver	Not
Docks	Not	Minimum Bid	Not	Exterior Stairs	Not	LEED for Homes-Certified	Not
Electric	Not	Reserve Auction	Not	Finished	Not	Ntl Grn Bldg Stnd-Emerald	Not
Elevator	Not	Sold AS IS	Not	Frost Wall	Not	Ntl Grn Bldg Stand-Gold	Not
Exercise Facility	Not			Full	Not	Ntl Grn Bldg Stand-Silver	Not
Garden Space	Not			Gravel	Not	Ntl Grn Bldg Stand-Bronze	Not
Heat	Not			Interior Stairs	Not	Passive House	Not
Indoor Pool	Not			Locked Storage Space	Not	VT Blds Greener Certified	Not
Indoor Storage	Not			No Tenant Access	Not	Other	Not
Not Applicable	Not			Partial	Not		
Outdoor Pool	Not			Partially Finished	Not		
Playgrnd/Tot Lot	Not			Roughed In	Not		
RV Parking	Not			Slab	Not		
Sauna	Not			Storage Space	Not		
Security	Not			Stubbed In	Not		
Sewer	Not			Sump Pump	Not		

I'm Cortana. Ask me anything.

7:02 PM 8/17/2016

Efficiency Vermont has also started to keep a data base of properties that they have been involved with along with releases from the property owners allowing them to share data. There may be similar groups in your area doing the same.

Unless your MLS has fields and data for energy efficient certifications and/or items it is likely that locating comparable sales will be difficult.

It also makes sense to keep your own data base and encourage other appraisers in your market to do the same so that you can begin to collect your own data on energy efficient sales.

Do NOT think that making an adjustment of zero is the answer. Whatever adjustment you make must be supported by market data, even an adjustment of zero.

Understand how to calculate paired sales

If you can find comparable sales, then you can use them to complete a paired sale analysis. You can also use paired sales from another market area as long as it is similar to your market.

	Subject	Sale 1	Sale 2	Sale 3
Sales Price	N/A	$250,000	$270,000	$300,000
Price/SF				
Financing	N/A	Cash	Cash	Cash
Date of Sale	N/A	Current	Current	Current
Lot Size	1 Acre	1 Acre	1 Acre	1 Acre
Design	Cape	Cape	Cape	Cape
Construction Quality	Good	Good	Good	Good
Age/Eff Age	New	5 Years	2 Years	1 Year
Condition	Good	Average Plus	Good	Good
Room Count	5-3-2	5-3-2	5-3-2	5-3-2
GLA	2000	1800	2000	1800
Energy Efficient Items	HERS 50	Code	Code	HERS 50
Heat/Cooling	Radiant/None	Radiant/None	Radiant/None	Radiant/None
Garage	2 Car	2 Car	2 Car	2 Car
Amenities	FP/Deck	FP/Deck	FP/Deck	FP/Deck
Other	None	None	None	None
Data Source	Builder	MLS	MLS	MLS

The data in the table on the proceeding slide allows you to determine a paired sale analysis for the subject's HERS rating of 50.

Comparable Sales 1 and 2 are identical with the exception of the GLA difference of 200 SF showing a GLA adjustment of $20,000/200, $100/SF. You can then apply the GLA adjustment to Comparable Sale 3 to get an adjusted value of $320,000. Now Comparable Sale 3 is equal to Comparable Sale 2 with the exception of the HERS rating.

The adjusted value for Comparable Sale 3 of $320,000 as compared to the sales price for Comparable Sale 2 shows an adjustment for a HERS rating of 50 is $50,000.

An adjustment for condition can be determined giving Comparable Sale 1 a positive adjustment of $20,000 for size for an adjusted value of $270,000 and comparing it to the sales price of Comparable Sale 2 of $270,000 showing no adjustment is required for condition. You can also look at Comparable Sale 1 versus Comparable Sale 3 and see that once you apply the $50,000 adjustment for the HERS rating of 50, they both have adjusted values of $300,000 also showing that no adjustment is needed for the difference in condition.

Adjusted values of Comparable Sale 1, positive $20,000 for size and positive $50,000 for HERS rating for an adjusted value of $320,000. Comparable Sale 2 has a positive adjustment of $50,000 for HERS with an adjusted value of $320,000 and Comparable Sale 3 has a $20,000 adjustment for size and an adjusted value of $320,000 showing a value of the subject property with a HERS rating of 50 is $320,000.

Paired sale analyses is **never** simple, however, a simple example is much easier to understand and is used here for explanation of the method only.

Identify Regression Analysis and how to use it

Regression analysis is “a statistical process for estimating the relationships among variables.” More specifically, “regression analysis helps one understand the typical value of the dependent variable (or criterion variable) changes when any one of the independent variables is varied, while the other independent variables are held fixed.” (Wikipedia: Regression Analysis)

Regression is another form of paired data analysis; it differs in that it uses all the data points (comparable sales) not just two. Regression analysis can be used to support adjustments, see trends and to forecast and since more than two data points are used, regression is more reliable than paired sales.

There are two types of regression analysis, simple regression and multiple regression. Simple regression looks at the relationship between a dependent variable and one independent variable and multiple regression looks at the relationship between a dependent variable and several independent variables.

End of Page

Identify Regression Analysis and how to use it

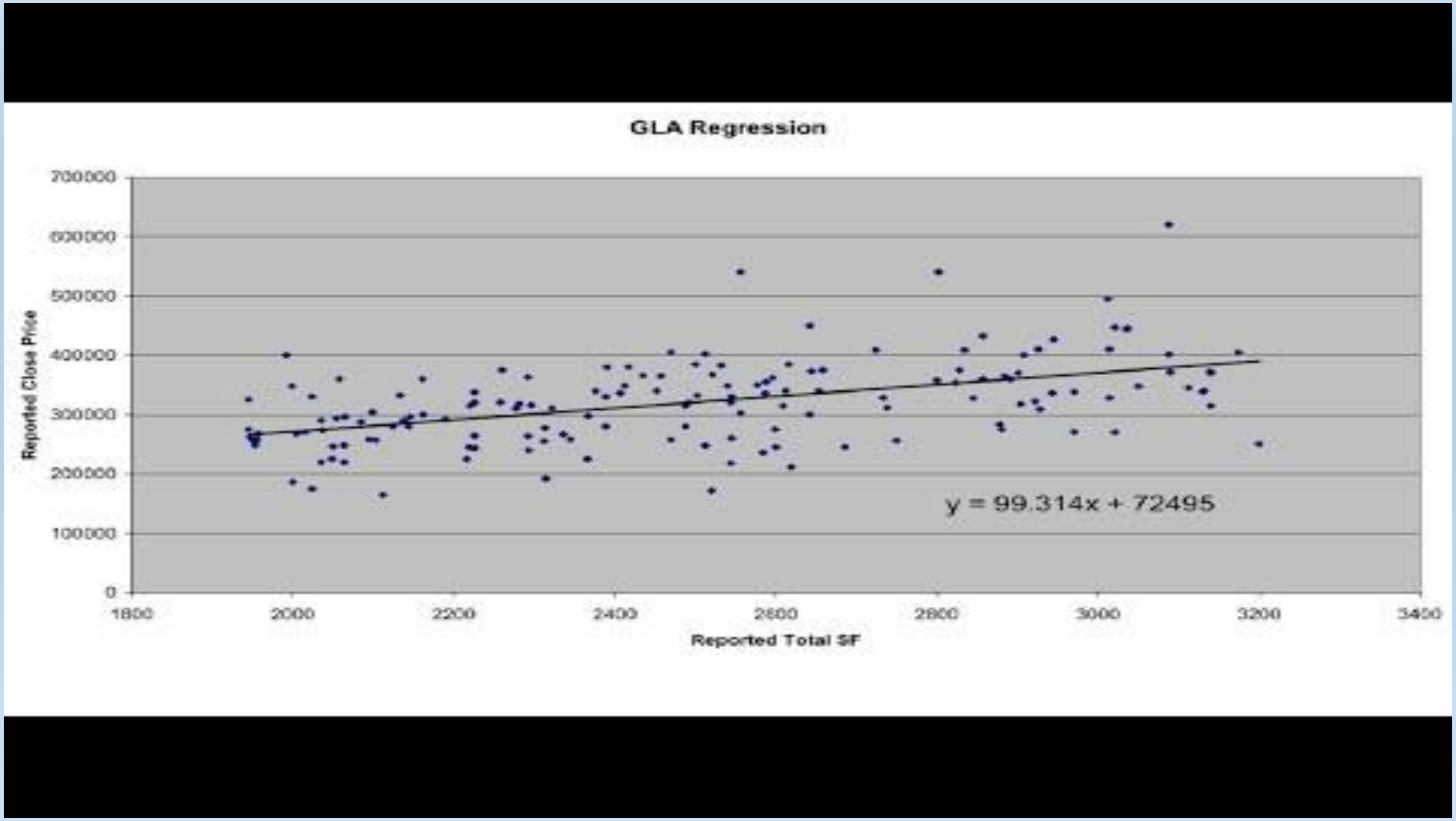
Regression is complicated and is beyond the scope of this course. It is suggested that a regression class be taken if learning how to use regression in the appraisal process is of interest. Calypsoedu is developing an Appraisal Regression class in the near future. Check our website regularly for new and upcoming seminars.

It is worth noting that many experts in the appraisal industry feel that all appraisals both residential and commercial, will have adjustments made using regression analysis in the near future.

Identify Regression Analysis and how to use it

Here is a very short video showing an example of regression:

https://www.youtube.com/watch?v=jKuQrk0Ii4Y



End of Page

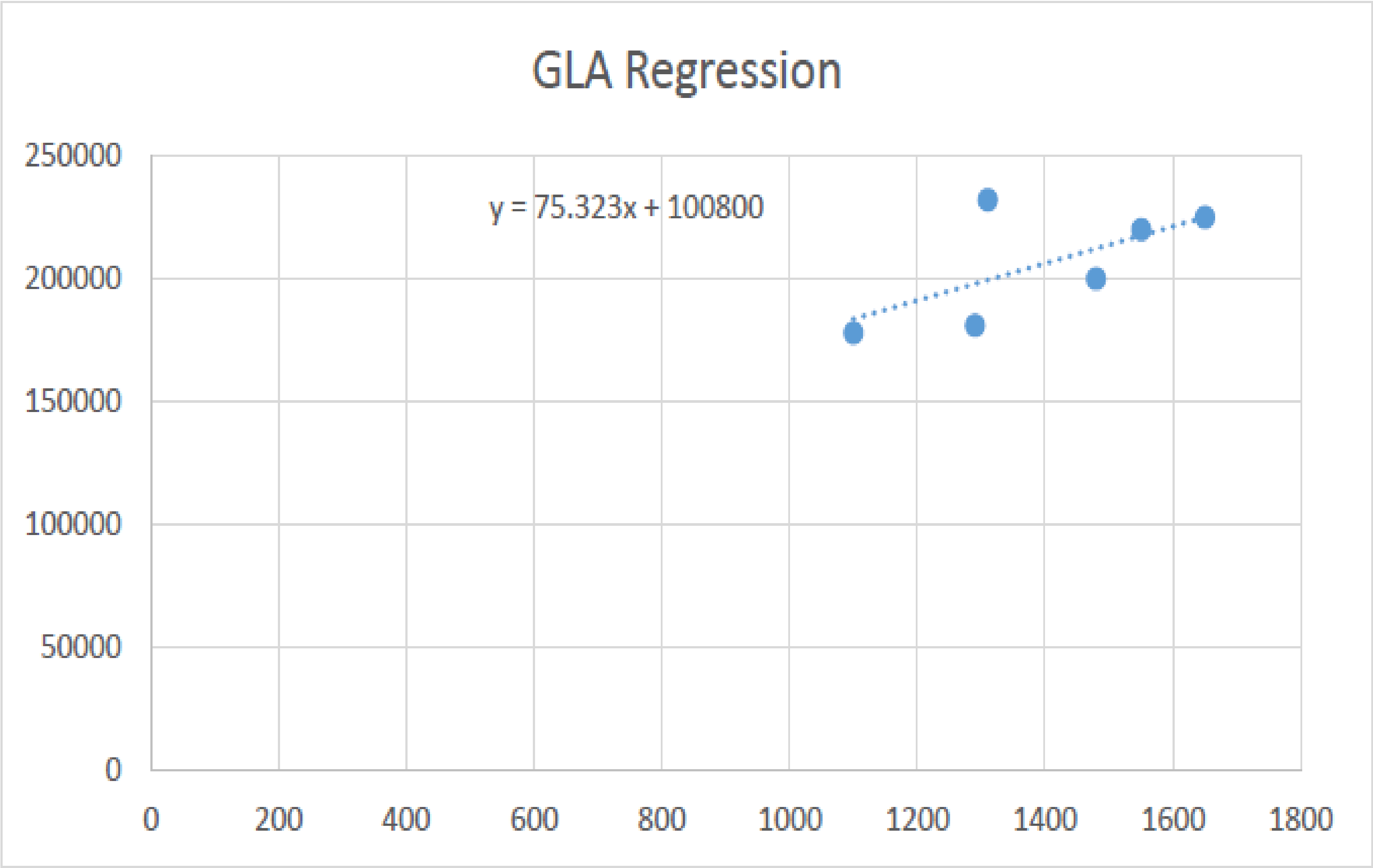
Identify Regression Analysis and how to use it

Again, regression is not a simple concept and cannot be fully understood in this class. It is however, a powerful tool if an appraiser has MLS data to work with and understands how to do regression analysis.

On the next page we will show a very simple regression on a property I appraised using 6 sales. This regression is for sales price and building square feet, not for energy efficient items, however, the concept would not differ.

NOTE:

Regression is only as reliable as the data used, bad data will give bad results.


GLA Regression
y = 75.323x + 100800
250000
200000
150000
100000
50000
0
0
200
400
600
800
1000
1200
1400
1600
1800

The example above is for 6 sales ranging from $178,000 to $225,000 with corresponding GLA of 1,100 to 1,650. There is one outlier that needs to be analyzed carefully to determine why it differs and that it does not have the same characteristics as the subject before it is discarded.

With the exception of the outlier, the data points are all very close to the trend line showing that sales price is highly correlated (related) to the GLA (gross living area). Y shows us that our adjustment for GLA is $75.323, rounded to $75.

This example of simple linear regression shows that even with 6 data points if there is a strong correlation the data is meaningful. Again, you could do the same using code built properties as compared to HERS rated properties of 50, geothermal heated properties versus properties with conventional heating systems etc. What you must have for regression is reliable data.

Identify how to interview market participants when no market data is available:

If there is absolutely no market data available, you as an appraiser can conduct market research by directly interviewing market participants, either consumers and/or providers. This process is a great method of determining what the market actually will pay for energy efficient items and/or properties, however, it is time consuming and therefore costly.

Most appraisers do not conduct primary market surveys, however, if you choose to you can always publish these studies and sell them as a way to offset the expense of developing them. It is possible that you could have a client that would allow this type of research to be part of the Scope of Work, however, this is unlikely.

There is, in my opinion a huge need for appraiser driven market studies for energy efficient items and properties. It is hard for appraisers to use studies done by others as they must understand the methodology used and USPAP requires that appraisers deem any studies done by others as credible or they cannot be used.

Section 6 Chapter 3 Summary

In this Chapter we learned to:

- Identify how to find comparable sales.
- Understand how to calculate paired sales.
- Identify Regression Analysis and how it works.
- Identify how to interview market participants when no market data is available.

Chapter 4

Reconciliation

Section 6 Chapter 4 Learning Objectives

- Identify USPAP requirements regarding reconciliation.
- Identify and describe how to reconcile within each approach.
- Identify and describe how to reconcile between approaches.

Identify USPAP Requirements Regarding Reconciliation:

			Standards Rule 1-6 - In developing a real property appraiser, and appraiser must:	
			1-6(a)	reconcile the quality and quantity of data available and analyzed within the approaches used, and
			1-6(b)	reconcile the applicability or suitability of the approaches used to arrive at the value conclusion(s).

USPAP is very clear that all data must be reconciled and analyzed within the approaches used and that the approaches used must also be reconciled and analyzed.

Reconciliation is a "test of reasonableness". If you think of it that way it will help you understand how critical it is to weight your methods and comparable sales, analyze what you have done and explain your rationale. Ask yourself "what would me peers do?"

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Identify and describe how to reconcile within each approach:

USPAP Requires that appraisers reconcile the approaches used. Within each approach, Cost, Income and Sales, there should be a summary of what you have done and what you feel is most reliable and why.

In the Cost Approach you can explain and analyze how your costs were obtained and how you calculated all forms of depreciation. Disclose how you verified your data and where the data came from and what data you feel is most reliable and produces the best results.

Do the same for the Income Approach. Explain how you determined the savings and what ways were used to convert the savings into an adjustment. You may have calculated an adjustment using the gross rent multiplier, present value, discounted cash flow analysis or used a residential cap rate that you developed. Describe what data you feel is most reliable and why, and which approach you deem to be the best.

Do the same for the Sales Comparison Approach. Did you use paired sales analysis, which sales were most similar and why, how did you weight the sales you used. If you use regression analysis explain what you did and why you feel it is reliable. Decide which approach you think is most credible and explain why.

Identify and describe how to reconcile between approaches:

Reconciliation – Example 1:

Value or HERS rating in the Sales Comparison Approach.............................$50,000

Value of HERS rating in the Cost Approach…..$60,000

Value of HERS rating in the Income Approach….........................$20,000 to $55,000

Using Discounted Cash Flow Analysis…$20,000-$42,000
Using Gross Rent Multiplier……………...$30,000-$50,000
Using Direct Capitalization……………… $55,000

Reconciliation: It is likely that a purchaser of an energy efficient property would place a high value on energy efficiency and that energy efficiency of the property would be a major contributing factor in the choice to purchase this home so I have placed most weight on the sales comparison approach to value with consideration given to both the Cost and Income Approaches.

You as the appraiser can use whatever explanation you find is reasonable based on your analysis and what data you deem to be most reliable in your market. What is critical is that you EXPLAIN what you have done and analyze the results for your client. It is not likely that you will be able to develop all three approaches and most likely will only have two. It is also important to keep in mind that adjustments cannot be made on the basis of cost alone.

Reconciled adjustment for HERS rating.........**......$50,000**

Reconciliation – Example 2:

Paired-Data Analysis ………………………..…… $50,000

Depreciated Cost……………………………..…….$62,000

Income Approach – Using Direct Capitalization…$40,000

Reconciliation: All three approaches show a reasonable range of value. Less weight is given to the Cost Approach due to the difficulty of accurately calculating depreciation. The Paired Data and Income approach were given equal weight because the Paired Sales are from the market and the Income Approach considers energy savings which is what a typical buyer would also consider. These two approaches were reconciled at $45,000.

Reconciled value for HERS rating................$45,000

NOTE:

Fannie Mae and Freddie Mac guidelines require that appraisers have support for the adjustments in the sales comparison approach. The guidelines do not require the support to be derived from only the sales comparison approach, however, they do require 2 approaches be developed if sales are not used.

Section 6 Chapter 4 Summary

In this Chapter we learned to:

- Identify and describe how to reconcile within each approach.
- Identify and describe how to reconcile between approaches.
- Identify USPAP requirements regarding reconciliation.

Section 6 Summary

In this Section we learned to:

- Complete a Cost Approach for an Energy Efficient Property.
- Complete an Income Approach for an Energy Efficient Property.
- Complete a Sales Comparison Approach for an Energy Efficient Property.
- Reconcile within and between the three approaches to value.

Section 7

Case Study

Section 7 Learning Objectives

After completing this section the real estate professional will be able to do the following:

- Identify the elements important to developing in appraisal for an energy-efficient home used in the following case study.
- Describe the steps taken by the appraiser developing the appraisal of an energy-efficient home in the following case study.
- Describe how to use the cost approach when developing an appraisal for an energy-efficient home.
- Describe how to use the income approach when developing an appraisal for an energy-efficient home.

Case Study

Case study 1 is an appraisal of a partially built high performance property in a market where there are no comparable high performance house sales. The subject property construction is significantly superior to even the best code built new homes in the market.

The subject is located on a typical 12 acre lot with mountain view. The subject will be 4,045 square feet in size with an above grade room count of 8 rooms, 3 bedrooms and 3 baths. There is 2,385 square foot basement with 812 square feet finished with a family room, bedroom, bath and wine cellar. There are patios, decks and porches, 2 fireplaces, central air conditioning and an on demand generator.

The subject will have a geothermal heating system with a cost of $116,500

A roof mounted solar voltaic system with a cost of $13,000 ($21,000 cost new less federal rebate of $5,500 and State of XX rebate of $2,500).

A water recovery system for yard sprinklers with a cost of $8,000.

The total cost per square foot per the actual costs and the builders estimate to complete is $650

Additional Features Section of the Appraisal Report

In the Additional Features Section:

The subject house is a partially built, architect designed, custom built post and beam house with two stick built additions. The house is on a full basement that is approximately 56% finished. The basement finish included in this appraisal is the finish that was complete as of the date of inspection, the "as is" value. The first and second floor value in this appraisal is based on the "as completed" value and this appraisal is subject to the first and second floors being finished.

The house is heated with four geothermal wells that service four geothermal units that produce forced warm air in the winter and air conditioning in the summer. There are two gas fired heating systems for back up as the geothermal systems require more power than can be supplied by a generator. There will be an automatic generator. There is a 400 amp electrical system. There is radiant warming heat in all the tile and stone floors. The home is well insulated and energy efficient. The cost of the geo thermal heating system is $116,500.

There will be a 4,000 watt roof mounted solar voltaic system with an annual kilowatt energy production provided by the solar installer of 4,500 kilowatts and per the PV Tool of 4,281 kilowatts. The solar installers records are more accurate as they are specifically property based. The energy production for the solar panels is reconciled at 4,500 kilowatts per year.

Additional Features Continued:

There is a water recovery system consisting of a water drainage system that is collected in a cistern. This water is used to supply water for a yard sprinkler system.

The first floor consists of a large mud room entry with half bath, laundry room, entry area, sun room, large open living room with cathedral ceiling and walk in custom stone fireplace, custom kitchen and master bedroom with stone fireplace, walk in closet and full, custom bath. There is walnut flooring. There is a wraparound porch on the front and side of the house, a large rear porch and a porch off the master bedroom. The second floor has a guest suite with deck, a full bath and walk in closet and large family room that looks into the first floor living room area. The walkout basement has acid etched concrete flooring, a walk in wine cellar and a partially complete bedroom, full bath, family room, media room and office.

All the cabinets and finishes are custom. Lights are custom made by a local lighting artist. There are soapstone counters and sink in the kitchen. There is a detached slab for a future barn.

End of Page

Additional Features Continued:

The basement was plumbed, rough wired, insulated and framed. The finish walls, interior doors, trim, bathroom and the wine cellar are not complete in the basement.

At the time of inspection the majority of the first and second floors were complete. This appraisal is being completed under the hypothetical condition that the first and second floors are completed. Unfinished items include the kitchen cabinets, some of the kitchen trim, the main floor rear porch railings and the master bedroom porch railings; the laundry room cabinets, the first floor half bath cabinets, the generator, the rear exterior stonework, the stair cases and the cabinets in the second floor bedroom.

Cost Approach

Cost Approach:

COST APPROACH

COST APPROACH TO VALUE (not required by Fannie Mae)

Provide adequate information for the lender/client to replicate the below cost figures and calculations.

Support for the opinion of site value (summary of comparable land sales or other methods for estimating site value) Recent comparable land sales in the subject market area include a 2.81 acre lot on Example Road in Any Town which sold for $170,000 on 5/18/2012; a 10 acre lot on on Example Road in Any Town which sold for $300,000 on 9/13/2013 and a 50 acre lot on on Example Road in Any Town which sold for $210,000 on 6/19/2014.

ESTIMATED ☐ REPRODUCTION OR ☒ REPLACEMENT COST NEW	OPINION OF SITE VALUE		....= $	300,000
Source of cost data Local Builders Estimates	Dwelling 4,045 Sq. Ft. @ $ 628.00		...........= $	2,540,260
Quality rating from cost service N/A Effective date of cost data N/A	Bsmt: 2385 Sq. Ft. @ $ 80.00		...........= $	190,800
Comments on Cost Approach (gross living area calculations, depreciation, etc.)	Solar System			13,000
See Attached Addendum.	Garage/Carport 0 Sq. Ft. @ $		...........= $	0
	Total Estimate of Cost-New		...........= $	2,744,060
	Less 60 Physical	Functional	External	
	Depreciation $45,734	$1,326,7	= $(	1,372,494)
	Depreciated Cost of Improvements		................................= $	1,371,566
	"As-is" Value of Site Improvements. Included in Costs		........= $	
Estimated Remaining Economic Life (HUD and VA only) 59 Years	INDICATED VALUE BY COST APPROACH		.....................= $	1,671,600

Cost Approach Continued:

The physical depreciation figure is the actual total accrued depreciation as calculated by using the economic age-life method (see addendum). Site value derived from the analysis of sales in any town and comparable areas. Cost approach values are from local builder estimates with primary weight given to the cost of building the subject house as it is new construction. Physical depreciation is calculated using the Age-life method of depreciation: the estimated effective age of the subject (1 years) divided by the total economic life (60 years) equals the percentage of total accrued depreciation of the subject (2%).

Functional depreciation noted due to the fact that the sales comparison approach to value indicates that the market will not pay the full replacement cost for houses of this quality of construction. Functional depreciation is calculated by comparing the subject cost per square foot of $628 to the highest market accepted cost per square foot of $300. The market accepted cost per square foot was based on sales of properties in the market of similar construction less their land value. Comparable Sale One was given the most weight as it is located in the same neighborhood as the subject and is similar construction. The square footage of the subject of 4,045 square feet was multiplied by the difference of $328 showing a functional utility adjustment of $1,326,760.

Cost Approach Continued:

Replacement cost figures used in the Cost Approach are for valuation purposes. No one, client or third party, should use these figures for insurance purposes. The definition of market value on page four of this report is not consistent with the definition of insured value.

The solar system is included at the cost provided by the installer.

Sales Comparison Approach

SALES COMPARISON APPROACH

FEATURE	SUBJECT	COMPARABLE SALE NO. 1		COMPARABLE SALE NO. 2		COMPARABLE SALE NO. 3	
Address	No Where Road Small Town, VT	No Where Road 1 Small Town, VT		No Where Road 2 Small Town, VT		No Where Road 3 Small Town, VT	
Proximity to Subject		1.20 miles SW		19.33 miles SSW		21.54 miles SSW	
Sale Price	$		$ 1,500,000		$ 1,250,000		$ 1,000,000
Sale Price/Gross Liv. Area	$ 0.00 sq. ft.	$ 428.08 sq. ft.		$ 226.08 sq. ft.		$ 272.78 sq. ft.	
Data Source(s)		nnerenmls #?????;DOM333		nnerenmls #?????;DOM736		nnerenmls #?????;DOM879	
Verification Source(s)		Town Records/Appraised		Town Records/Appraiser		Town Records/Broker	
VALUE ADJUSTMENTS	DESCRIPTION	DESCRIPTION	+(-) $ Adjustment	DESCRIPTION	+(-) $ Adjustment	DESCRIPTION	+(-) $ Adjustment
Sale or Financing Concessions		ArmLth Cash;0		ArmLth Conv;0		ArmLth Conv;0	
Date of Sale/Time		s06/14;c04/14		s03/14;c02/14		s07/12;c06/12	
Location	B;SkiArea;	B;SkiArea;		B;Res;	+250,000	B;Res;	+200,000
Leasehold/Fee Simple	Fee Simple	Fee Simple		Fee Simple		Fee Simple	
Site	12 ac	233 ac	-221,000	224.6 ac	-213,000	119 ac	-107,000
View	B;Mtn;	B;Mtn;		B;Mtn;		B;Mtn;	
Design (Style)	DT1.75;Traditiona	DT2;Traditional		DT1.75;Contemp		DT1.75;Contemp	
Quality of Construction	Q1	Q1		Q2	+250,000	Q2	+200,000
Actual Age	1	17		224		192	
Condition	C1	C3	+150,000	C2	+250,000	C2	+200,000
Above Grade	Total / Bdrms. / Baths	Total / Bdrms. / Baths		Total / Bdrms. / Baths		Total / Bdrms. / Baths	
Room Count	6 / 2 / 2.1	10 / 4 / 4.0	-15,000	12 / 6 / 4.2	-25,000	10 / 3 / 4.0	-15,000
Gross Living Area 250	4,045 sq. ft.	3,504 sq. ft.	135,300	5,529 sq. ft.	-371,000	3,666 sq. ft.	94,800
Basement & Finished Rooms Below Grade	2385sf1812sfwu 1rr1br1.0ba2o	1036sf1036sfwu 1rr0br0.0ba2o	38,800	4850sf3842sfwo 2rr0br0.0ba0o	-101,500	985sf0sfwu	90,600
Functional Utility	Average	Average		Average		Average	
Heating/Cooling	FWA/GeoThC/Air	OilHW/Radiant/N	+95,000	HW/Radiant/Elec/N	+95,000	OilHW/None	+95,000
Energy Efficient Items	Solar/WaterRecv	Typical	8,000	Typical	8,000	Typical	8,000
Garage/Carport	10dw	3ga6dw	-30,000	2ga5dw	-20,000	2ga4dw	-20,000
Porch/Patio/Deck	Patio/Dcks/Prch's	Porches	+10,000	Porches/Patio	+10,000	Porch	+20,000
Amenities	2 Fireplaces	FP/Hearth/WdSt		4 FP's/WdStv's		Fireplace	+20,000
Amenities	WineCellar/Genr	Playhouse		Pond/Barns/Shd		Barn	-70,000
Amenties	Stonework	Landscaping		Landscaping		Landscaping	
Net Adjustment (Total)		[X] + [ ] -	$ 171,100	[X] + [ ] -	$ 132,500	[X] + [ ] -	$ 716,400
Adjusted Sale Price of Comparables		Net Adj. 11.4%% Gross Adj. 46.9%%	$ 1,671,100	Net Adj. 10.6%% Gross Adj. 127.5%	$ 1,382,500	Net Adj. 71.6% Gross Adj. 114.0%	$ 1,716,400

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FEATURE	SUBJECT	COMPARABLE SALE NO. 4		COMPARABLE SALE NO. 5		COMPARABLE SALE NO. 6	
Address	No Where Road Small Town, VT	No Where Road 4 Small Town, VT		No Where Road 5 Small Town, VT			
Proximity to Subject		2.73 miles SSE		3.81 miles SSE			
Sale Price	$		$ 1,250,000		$ 2,900,000		$
Sale Price/Gross Liv. Area	$ 0.00 sq. ft.	$ 257.84 sq. ft.		$ 980.39 sq. ft.		$ 0.00 sq. ft.	
Data Source(s)		nnerenmls #4387434;DOM 97		nnerenmls #4382635;DOM125			
Verification Source(s)		Town Records/Appraised		Town Records/Broker			
VALUE ADJUSTMENTS	DESCRIPTION	DESCRIPTION	+(-) $ Adjustment	DESCRIPTION	+(-) $ Adjustment	DESCRIPTION	+(-) $ Adjustment
Sale or Financing Concessions		Listing ;		Listing ;			
Date of Sale/Time		Active	-125,000	Active	-290,000		
Location	B;SkiArea;	B;Res;		B;Res;			
Leasehold/Fee Simple	Fee Simple	Fee Simple		Fee Simple			
Site	12 ac	29.9 ac		116 ac	-104,000		
View	B;Mtn;	B;Mtn;		B;Mtn;			
Design (Style)	DT1.75;Traditiona	DT2.5;Traditional		DT2;Contempora			
Quality of Construction	Q1	Q2	+500,000	Q1	-580,000		
Actual Age	1	11		8			
Condition	C1	C2	+250,000	C1			
Above Grade	Total / Bdrms. / Baths	Total / Bdrms. / Baths		Total / Bdrms. / Baths		Total / Bdrms. / Baths	
Room Count	6 / 2 / 2.1	10 / 3 / 3.1	-10,000	11 / 4 / 3.0	-5,000		
Gross Living Area 250	4,045 sq. ft.	4,848 sq. ft.	-200,800	2,958 sq. ft.	271,800	sq. ft.	
Basement & Finished Rooms Below Grade	2385sf1812sfwu 1rr1br1.0ba2o	1400sf800sfwo 1rr1br1.0ba1o	50,600	1203sf0sfwo	90,600		
Functional Utility	Average	Average		Average			
Heating/Cooling	FWA/GeoThC/Air	OilHW/Radiant/N	+95,000	GasRadiant/None	+95,000		
Energy Efficient Items	Solar/WaterRecv	Typical	8,000	Typical	8,000		
Garage/Carport	10dw	2gd6dw	-20,000	2gd6dw	-20,000		
Porch/Patio/Deck	Patio/Dcks/Prch's	3Patios/LgDk/Pr		Patios/Pr's/Dk's			
Amenities	2 Fireplaces	8FP's/Sauna	-50,000	Fireplaces			
Amenities	WineCellar/Genr	Pool/Arbor/Ponds		TCt/HTb/Pnd/GrnH	-200,000		
Amenties	Stonework	Landscaping		Stonework/GstH	-200,000		
Net Adjustment (Total)		[X] + [ ] -	$ 497,800	[ ] + [X] -	$ 933,600	[X] + [ ] -	$ 0
Adjusted Sale Price of Comparables		Net Adj. 39.8% Gross Adj. 104.8%	$ 1,747,800	Net Adj. -32.2% Gross Adj. 64.3%	$ 1,966,400	Net Adj. 0.0 % Gross Adj. 0.0 %	$ 0

End of Page

Sales Comparison Approach Comments:

COMPARABLES CHOSEN:

After extensive research of the marketplace, the comparables on the URAR were chosen. The one mile preferred distance guideline for comparables was exceeded in order to include the most similar sales available. This is common in my state where appraisers must travel further than the preferred guidelines to locate comparable sales. The six month preferred time guideline for closed sales was extended in order to include the most similar sales available.

The comparable search parameters began with an MLS search for similar homes with similar acreage sold within the past three months located in the same neighborhood as the subject property, of similar age and condition and construction containing similar square footage. I also searched the XX Property Transfers for sales that were not included in the MLS system. When no sales were found that fit these parameters, I extended my search to include similar areas that sold in the past year in the subject county and areas of neighboring counties that are similar to the subject. The searches showed limited sales of similar homes. The most recent, similar sales were chosen and included in the appraisal report.

End of Page

Sales Comparison Approach Comments:

ADJUSTMENT INFORMATION:

Adjustments were made to the comparables to adjust to the subject for differences in items that the market recognizes as having value. These base factors are derived from matched pair analysis of similar properties sold in the market where possible, and from the appraiser's knowledge of the market. Location, lot size and view adjustments are as extracted from the market. GLA $250/SF. Finished basement adjustment $50/SF. Quality of construction and condition adjustments 10% to 20%. Bathroom adjustment $10,000/full bath. Fireplace $5,000-$$50,000. Hearth and wood stove $5,000-$20,000. Garage adjustment $10,000/bay. Porch, deck, workshop and shed adjustment $5,000-$10,000. Pond $10,000-$50,000. Barn $10,000-$100,000. (These numbers are provided as example only and are not intended to be taught as the correct numbers to use. Every market is different!)

The geothermal system for the subject was valued at $95,000 based on the cost at $116,346 per the builder reconciled with the yearly savings of $7,644 capitalized at the residential/condominium capitalization rate in the subjects market of 8% or $95,552.

VALUATION OF THE SOLAR PV SYSTEM:

System Description and amount of energy produced: Owned 4,000 watt roof mounted solar photo voltaic system with an annual kilowatt energy production per the solar installer of 4,500 kw and per the PV value tool of 4,281 kw. The solar installers records are more accurate as they are specifically property based. The energy production for the solar panels is reconciled at 4,500 kilowatts per year.

Valuation of system using multiple approaches:

1. Value as determined using actual cost savings. Local power rate of $0.1483/kw. Calculated value is 4,000 kw x .1483 = $593/year and $49.43 per month. With a term of 15 years the value would be $8,895. This method does not account for energy increases or loss of production due to deterioration of the system as it ages.

2. Cost new is $ $21,000, less $5,500 federal rebate and State of VT rebate of $2,500 for a rounded cost new of $13,000

Sales Comparison Approach Comments:

VALUATION OF THE SOLAR PV SYSTEM:

3. Calculate the present value of the energy savings using a Discounted Cash flow analysis (DCF) with a term of 15 years, the life of the system and a rate of 3% (mortgage rate). The payment is the yearly savings of energy of $593. The present value, as explained in the Income Approach Section of class, is future energy savings is $7,079, rounded to $7,000.

4. Use a market derived Gross Rent Multiplier of 157 x the monthly savings of $49.42 = $7,758, rounded to $8,000.

5. Calculate the value suing the PV Valuetool ® that shows a range of $9,032 - $9,883, rounded to $9,500.

Property Type:	Residential	PV Project Type:	Proposal	PV Ownership:	Owned

Cost Approach Method | Physical Age / Life | Depreciated Cost

Source:	ESF 9-3-16 VT	Gross Replacement Cost New:	$0.00	$0.00 /watt
Life:	25	Straight Line Depreciation:	$0.00	$0.00 /watt/yr
Age:	0	Accumulated SL Depreciation:	$0.00	$0.00 /watt
Additional Depreciation:		None	$	$ /watt
Additional Depreciation:		None	$	$ /watt
Estimated Depreciated Value		Cost Approach:	$0.00	$0.00 /watt

Income Approach Method | Energy Value DCF

Solar Resource		O & M Expense		Utility Rate	
System Size Watts:	4,000	Inverter Size Watts:	4,000	NREL Utility Co:	Lyndonville Electric Dept
Module Warranty Yrs:	25	Inverter Warranty Yrs:	15	NREL Utility Rate:	14.83 ¢/kWh
System Age Yrs:	0	Inverter Age Yrs:	0	User Provided Utility Rate:	- ¢/kWh
Remaining Yrs:	25	Inverter Replaced:	No	Utility Rate Used:	14.83 ¢/kWh
Derate Factor:	0.77	Inverter Replacement Cycle Yrs:	15	EIA Escalation Rate:	2.57% CAGR
Degradation Rate:	0.50%	Inverter Replacement Cost		User Provided Esc Rate:	- % CAGR
Array Tilt:	22.6 °	Survey Data:	75 ¢/W	Escalation Rate Used:	2.57% CAGR
Array Azimuth:	180 °	User Provided:	- ¢/W	Comments:	
Annual kWh Est:	3,969	Replacement Cost Used:	75 ¢/W		
		O & M Exp (future):	$3,000.00		
		O & M Exp (discounted):	$1,616.14		

Cost of Capital	WACC Used	+ Risk Premium	= Discount Rate	Estimated Energy Value / Income Aproach	
Fannie Mae Date: September 2, 2016		200 Basis Points	4.96%	$9,031.76	$2.26 /watt
Fannie Mae Rate:30 Yr 90 day 2.96%	2.96%	125 Basis Points	4.21%	$9,882.57	$2.47 /watt
User Provided Interest Rate: - %		50 Basis Points	3.46%	$10,841.39	$2.71 /watt

End of Page

Sales Comparison Approach Comments

VALUATION OF THE SOLAR PV SYSTEM:

These value conclusions are not from the market and are based on either cost or income. This is acceptable per secondary market guidelines, which states there must be support for conclusions, but does not require the conclusions be based only on the sales comparison approach.

No data was found that would allow the use of the Sales Comparison Approach to Value.

Sales Comparison Approach Comments:

VALUATION OF THE SOLAR PV SYSTEM:

Reconciliation:
Value of Solar PV using a energy savings - $9,000

Value of Solar Using Cost - $13,000

Value of Solar PV using Discounted Cash Flow analysis - $7,000

Value of Solar PV using Gross Rental Multiplier- $8,000

Value of Solar PV using the PV Valuetool ® - $9,500

Reconciled value of solar PV System - $8,000

VALUATION OF THE WATER RECOVERY SYSTEM

No market data was found to support and added value for the water recovery system and no adjustment was made.

RECONCILATION

FINAL COMMENTS:

The gross and net adjustments for all three comparable sales exceed the preferred guidelines. Fourth and fifth comparable listings are included after being adjusted for the current list to sales price ration to further support the value and marketability of the subject property and of homes of similar construction. No other sales were found to be more comparable. Most weight was given to Comparable Sale 1 as it is most similar to the subject in location and construction. Comparable Sale 1 was weighted 40%, Comparable Sales 2 and 3 were weighted 20% each as they are closed sales and Listings 4 and 5 were weighted 10% each as they are listed properties.

Final Reconciliation:

Most weight was applied to the sales comparison approach to value. The cost approach is considered most accurate for new homes and would be considered applicable and necessary for this appraisal assignment but was not relied upon equally with the sales comparison due to the difficulty in calculating the functional depreciation from the market for a home of this type construction. The income approach was considered but was not utilized due to the lack of market rental data.

RECONCILATION CONTINUED

	Adjuisted	Weight	
	Value		
Sale 1	$1,671,000	0.4	$668,400
Sale 2	$1,382,000	0.2	$276,400
Sale 3	$1,716,400	0.2	$343,280
Listing 4	$1,748,000	0.1	$174,800
Listing 5	$1,966,000	0.1	$196,600
			$1,659,480

Section 7 Summary

In this section you learned the following:

- Elements important to developing in appraisal for an energy-efficient home used in the following case study.
-
- Steps taken by the appraiser developing the appraisal of an energy-efficient home in the following case study.
- How to use the cost approach when developing an appraisal for an energy-efficient home.
- How to use the income approach when developing an appraisal for an energy-efficient home.

Section 8
Competency

Section 8 Learning Objectives

- Identify how USPAP defines competency.
- Identify how the National Association of Realtors defines competency.
- Identify the ways to gain competency.
- Identify why competency matters.

Identify how USPAP defines competency

341 **COMPETENCY RULE**

342 **An appraiser must: (1) be competent to perform the assignment; (2) acquire the necessary competency to**

343 **perform the assignment; or (3) decline or withdraw from the assignment. In all cases, the appraiser must**

344 **perform competently when completing the assignment.**

345 **Being Competent**

346 **The appraiser must determine, prior to accepting an assignment, that he or she can perform the**

347 **assignment competently. Competency requires:**

348 **1. the ability to properly identify the problem to be addressed;**

349 **2. the knowledge and experience to complete the assignment competently; and**

350 **3. recognition of, and compliance with, laws and regulations that apply to the appraiser or to the**

351 **assignment.**

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Identify how USPAP defines competency

352 Comment: Competency may apply to factors such as, but not limited to, an appraiser's
353 familiarity with a specific type of property or asset, a market, a geographic area, an intended
354 use, specific laws and regulations, or an analytical method. If such a factor is necessary for an
355 appraiser to develop credible assignment results, the appraiser is responsible for having the
356 competency to address that factor or for following the steps outlined below to satisfy this
357 COMPETENCY RULE.
358 For assignments with retrospective opinions and conclusions, the appraiser must meet the
359 requirements of this COMPETENCY RULE at the time of the assignment, rather than the
360 effective date.
361 **Acquiring Competency**

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Identify how USPAP defines competency

362 **If an appraiser determines he or she is not competent prior to accepting an assignment, the appraiser**
363 **must:**
364 **1. disclose the lack of knowledge and/or experience to the client before accepting the assignment;**
365 **2. take all steps necessary or appropriate to complete the assignment competently; and**
366 **3. describe, in the report, the lack of knowledge and/or experience and the steps taken to complete**
367 **the assignment competently.**
368 Comment: Competency can be acquired in various ways, including, but not limited to,
369 personal study by the appraiser, association with an appraiser reasonably believed to have the
370 necessary knowledge and/or experience, or retention of others who possess the necessary
371 knowledge and/or experience.

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Identify how USPAP defines competency

372 In an assignment where geographic competency is necessary, an appraiser who is not familiar
373 with the relevant market characteristics must acquire an understanding necessary to produce
374 credible assignment results for the specific property type and market involved.
375 **When facts or conditions are discovered during the course of an assignment that cause an appraiser to**
376 **determine, at that time, that he or she lacks the required knowledge and experience to complete the**
377 **assignment competently, the appraiser must:**
378 **1. notify the client;**
379 **2. take all steps necessary or appropriate to complete the assignment competently; and**
3. describe, in the report, the lack of knowledge and/or experience and the steps
380 **taken to complete**
381 **the assignment competently.**
382 **Lack of Competency**
383 If the assignment cannot be completed competently, the appraiser must decline or withdraw from the
384 assignment.

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End of Page

Identify the ways to gain competency:

The bottom line for appraisers is competency.

- To appraise an energy efficient residential or commercial property, an appraiser requires additional knowledge and skill above and beyond what is required for a typical residential property.

- Competency can be gained in several ways, through education, experience or by partnering with an individual who is competent to assist and guide you.

- There are more advanced classes offered. The Appraisal Institute offers 2 day classes for solar, residential case studies and commercial case studies.

Remember:

Fannie/Freddie/FHA Require Competency prior to accepting an assignment!

Identify why competency matters

First and foremost, competency matters because USPAP requires it!

Standard 1	**In developing a real property appraisal, an appraiser must identify the problem to be solved, determine the scope of work necessary to solve the problem and correctly complete research and analyses necessary to create a credible report**
Standards Rule 1-1 In developing a real property appraisal an appraiser must:	
1-1(a)	be aware of, understand and correctly employ those recognized methods and techniques that are necessary to produce a credible appraisal;
1-1(b)	not commit a substantial error of omission or commission that significantly affects an appraisal and.
1-1(c)	not render appraisal services in a careless or negligent manner, such as by making a series of errors that, although individually might not significantly affect the results of an appraisal, in the aggregate affects the credibility of those results.

States Boards are required to enforce USPAP. If an appraiser accepts an assignment that they are not competent to perform, their license is at risk. Appraisers MUST adhere to competency requirements per USPAP and to secondary market guidelines when performing secondary market appraisals.

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Appraisers do not create value; the market determines value. The appraisers job is to determine what the market shows the value is through research and analysis. Value MUST be supported.

In summary, USPAP does not identify every method that should be used in an appraisal report. That is the appraisers job. USPAP does state that the appraiser must "be aware of, understand and correctly employ those recognized methods and techniques that are necessary to produce a credible appraisal."

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Identify how the National Association of Realtors defines competency:

In the Code of Ethics and Standards of Practice of the National Association of Realtors (1-1-2016) Article 11.1 states:

- Standard of Practice 11-1 When Realtors® prepare opinions of real property value or price they must: 1) be knowledgeable about the type of property being valued, 2) have access to the information and resources necessary to formulate an accurate opinion, and 3) be familiar with the area where the subject property is located unless lack of any of these is disclosed to the party requesting the opinion in advance.

For more information see corresponding links in the bibliography document located in your learning extras.

Section 8 Summary

In this Section we learned to:

- Identify how USPAP defines competency.
- How the National Association of Realtors defines competency.
- Identify the ways to gain competency.
- Identify why competency matters.

End of Page

Other Considerations

Other Considerations

How do we quantify the value of energy efficiency in a way that can be used by our clients?

- Identify the cost savings of energy efficient items.
- Demonstrate that the benefits (cost savings) outweigh the costs.
- Identify whether or not energy efficient items will cost more to maintain and repair.
- Identify the payback period based on savings.

Other Considerations Continued

Trends matter.

- The International Energy Conservation Code (IECC) has increased from 2006 to 2015 showing a growing awareness of energy efficiency.
- Explain what trends exist in your market regarding trends in energy efficient building and housing.

Additional Resources in your learning extras:

- ElevateEnergy.com
- The Appraisal Foundation – Valuation Advisory 7
- US Department of Energy – Building Energy Codes Program

For more information see corresponding links in the bibliography document located in your learning extras.

Dodd-Frank:

- It is a common misconception that the Dodd-Frank Appraiser Independence Rules state that no one can talk to the appraiser.

- What is really stated is that no one can "influence or attempt to influence the development, reporting, result or review of an appraisal." It also requires the lender to provide the borrower a copy of the appraisal report three days prior to closing or sign a waiver.