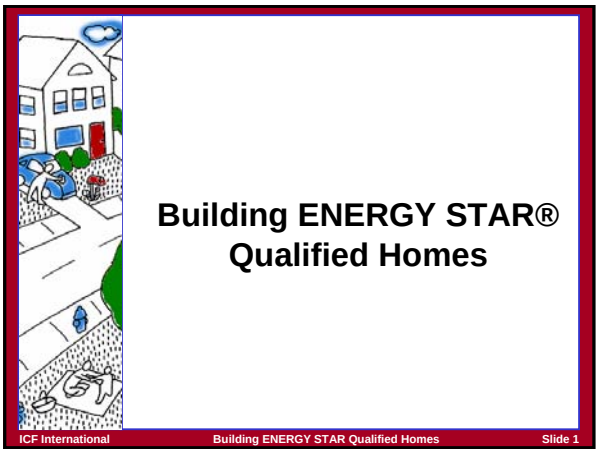
Building ENERGY STAR® Qualified Homes
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Slide 1


A Little About Us…
HUD's Community Planning and Development Training Initiative
Course developed by HUD and ICF International
Who are your trainers?
ICF INTERNATIONAL
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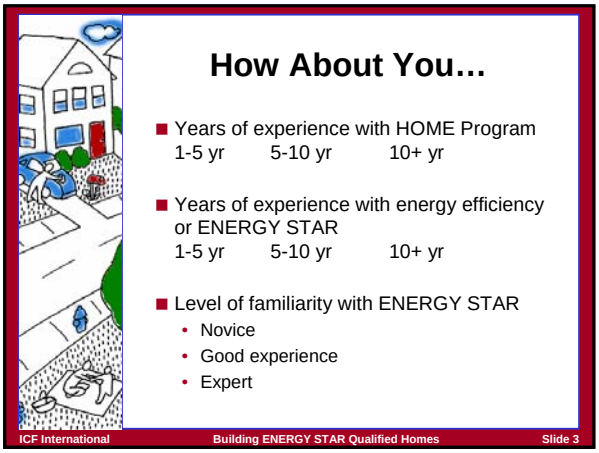
Slide 2


How About You…
Years of experience with HOME Program
1-5 yr 5-10 yr 10+ yr
Years of experience with energy efficiency or ENERGY STAR
1-5 yr 5-10 yr 10+ yr
Level of familiarity with ENERGY STAR
Novice
Good experience
Expert
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Slide 3

Course Objectives

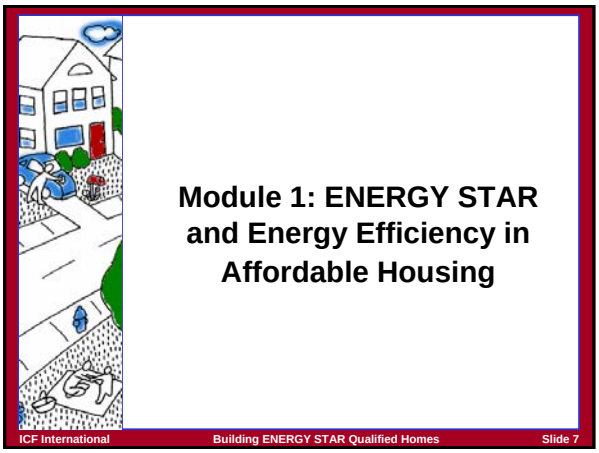
- Review ways to:
  - Meet ENERGY STAR
  - Incorporate energy efficiency into rehabilitation activities
  - Take steps to incorporate “green” practices
- Answers questions
- Share approaches

Group Norms

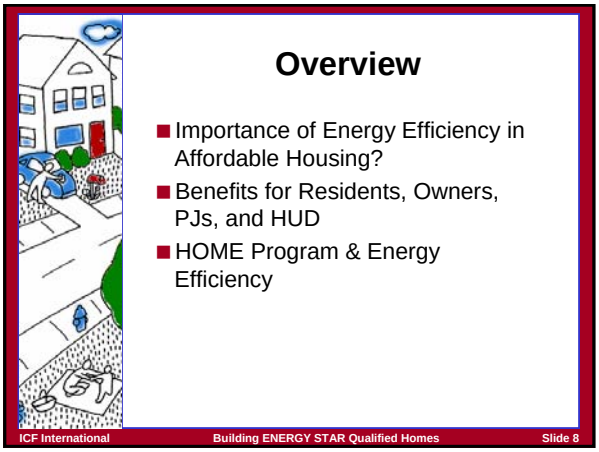
- Ask questions
- Please keep side conversations to a minimum
- Parking lot
- No cell phones that ring, please

Logistics

- Timing of breaks and lunch
- Telephones
- Restrooms
- Hey, where’s the coffee??

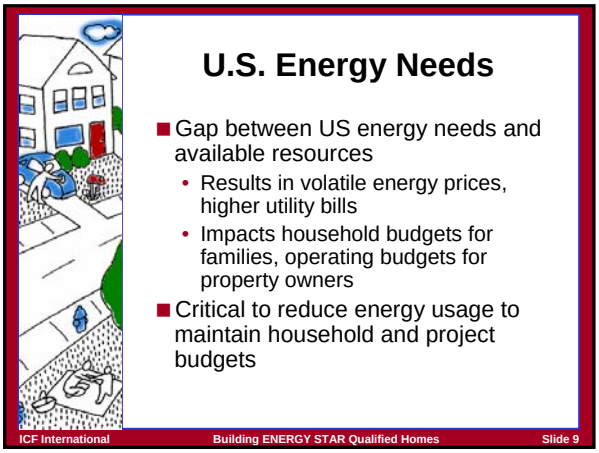


Module 1: ENERGY STAR and Energy Efficiency in Affordable Housing



Overview

- Importance of Energy Efficiency in Affordable Housing?
- Benefits for Residents, Owners, PJs, and HUD
- HOME Program & Energy Efficiency



U.S. Energy Needs

- Gap between US energy needs and available resources
  - Results in volatile energy prices, higher utility bills
  - Impacts household budgets for families, operating budgets for property owners
- Critical to reduce energy usage to maintain household and project budgets

Home Energy Affordability Gap

Total U.S. Affordability Gap = $29.8 billion
Average Gap per Household = $1,047

AVERAGE $ HOME ENERGY BILLS EXCEED AFFORDABLE HOME ENERGY BILLS FOR HOUSEHOLDS BELOW 185% OF POVERTY LEVEL (PL).

2006 State Home Energy Affordability Gap Results

- **Smallest Gap: Washington**
  - Average Gap per Household = $444
  - < 50% PL = 35.1%
  - 51-74% PL = 14.1%
  - 75-99% PL = 10.1%
- **Largest Gap: Vermont**
  - Average Gap per Household = $1,949
  - < 50% PL = 78.9%
  - 51-74% PL = 31.6%
  - 75-99% PL = 22.6%

Source: Fischer, Sheehan, & Colton, Public Finance and General Economics

Activity

1. To what extent is the rate of increase in energy costs a concern in your HOME-funded projects?
2. What specific efforts or activities is PJ taking to address these concerns?
3. Do you think ENERGY STAR can help address these concerns? How?

Energy Efficiency in Affordable Housing

- Rising energy costs
  - Choices between utility bills and other needs – food, shelter, medicine
- Connection between inability to pay utility bills and consequences such as homelessness, malnutrition, heart disease, heat stroke
- Build more energy efficient to improve qualify of life

Benefits of Energy Efficiency

- Energy bill savings
- Improved home performance
  - More comfortable
  - Improved air quality
- Greater durability
- Long-term maintenance savings
  - Less likely to fall into disrepair

Benefits of Energy Efficiency

- Benefits to residents and owners
  - Increased savings for households
  - Increased property viability
  - Easier to rent or sell
  - Adds value to the home
- Benefits to PJ and HUD
  - Reduces HUD's energy bills by 5% = $2 billion savings over next 10 years
  - Improved long-term financial stability of projects benefit PJs

Example: Energy Bill Savings in Utah

- State of Utah Division of Housing and Community Development: Olene Walker Housing Loan Fund (OWHLF)
- Results of ENERGY STAR Policy
  - Single-family ENERGY STAR qualifying homes – about ***$200 in utility savings per year*** with additional loan cost of only $85 per household per year
  - Example: One single-family home in Utah County
    - ✓ Yearly energy costs without ENERGY STAR would have been $1,429; with ENEGRY STAR, they are $974 – a ***32% savings to the homeowner***

Source: "Financing Energy-Efficiency Housing." NCSHA – Housing Finance Agency Institute, January 13-16, 2008.

Partnerships for Home Energy Efficiency

- In July 2001, HUD established a department-wide Energy Task Force
  - Identify measures to support energy efficiency and conservation goals of the National Energy Policy
  - Intra-agency partnership with DOE and EPA
    - ✓ Began in July 2005
    - ✓ Help households save 10% on home energy bills over the next 10 years ~$20 billion per year
- See attachment 1-1 for HUD action items

HUD Energy Action

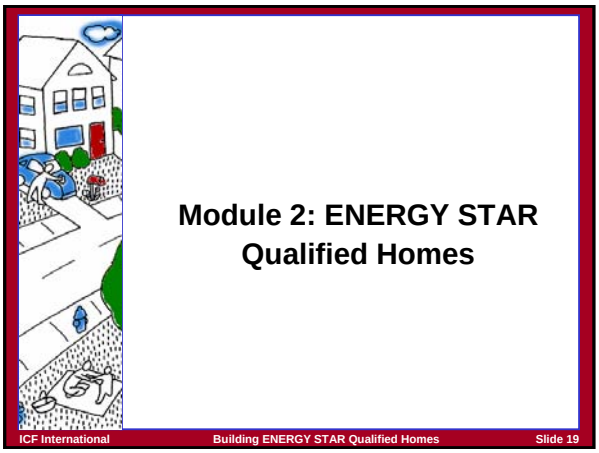
HOME Program & Energy Efficiency

- Encourages ENERGY STAR in HOME development projects
- New construction must meet International Energy Conservation Code (IECC)
  - PJs urged to use ENERGY STAR qualified homes guidelines
- Must track ENERGY STAR in IDIS

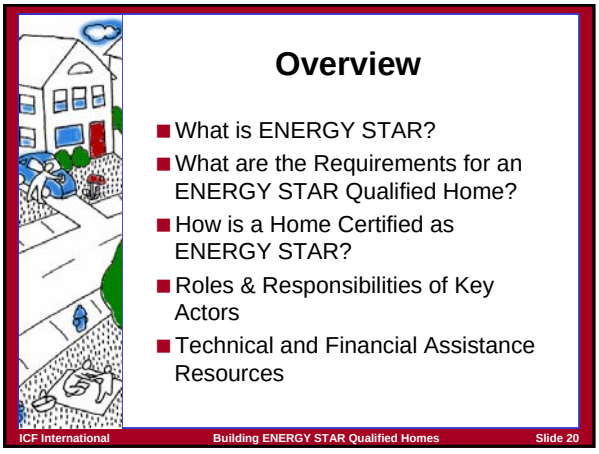
Example: ENERGY STAR Policy in Utah

- Olene Walker Housing Loan Fund functions as a revolving loan fund using state legislative appropriations, USDA-RD funding and HUD HOME allocations
- OWHLF's ENERGY STAR policy
  - All new construction projects receiving OWHLF funding are required to adopt ENERGY STAR standards.
  - All rehabilitation projects receiving OWHLF funding are encouraged to adopt ENERGY STAR standards.
    - ✓ Rehabilitation projects that are unable to achieve ENERGY STAR qualification in their preliminary rating require efficiency improvements with a SIR of 1.0 or better.
  - Financial incentives include reduced interest rates and greater loan amounts

Source: "Financing Energy-Efficiency Housing." NCSHA – Housing Finance Agency Institute, January 13-16, 2008.

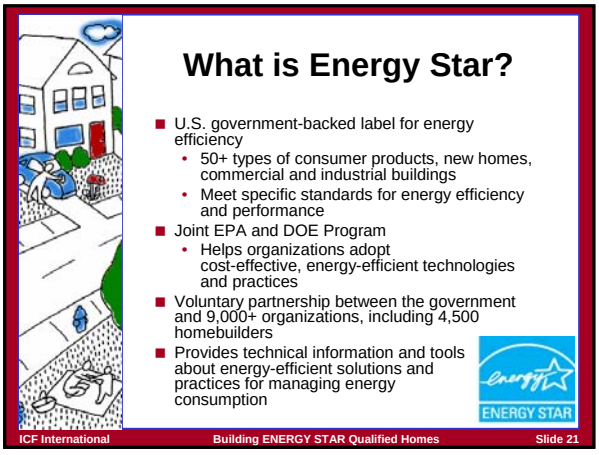


Module 2: ENERGY STAR Qualified Homes



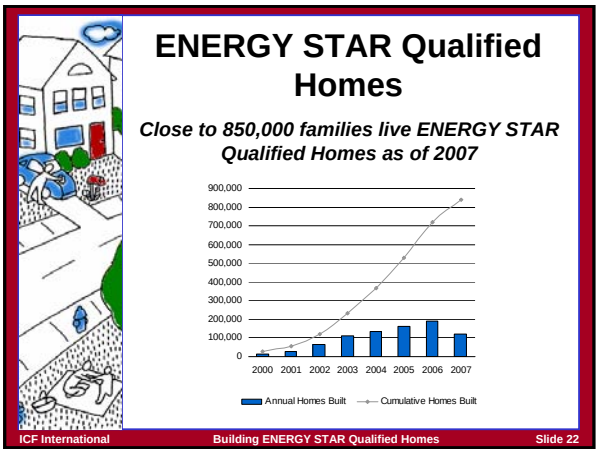
Overview

- What is ENERGY STAR?
- What are the Requirements for an ENERGY STAR Qualified Home?
- How is a Home Certified as ENERGY STAR?
- Roles & Responsibilities of Key Actors
- Technical and Financial Assistance Resources



What is Energy Star?

- U.S. government-backed label for energy efficiency
  - 50+ types of consumer products, new homes, commercial and industrial buildings
  - Meet specific standards for energy efficiency and performance
- Joint EPA and DOE Program
  - Helps organizations adopt cost-effective, energy-efficient technologies and practices
- Voluntary partnership between the government and 9,000+ organizations, including 4,500 homebuilders
- Provides technical information and tools about energy-efficient solutions and practices for managing energy consumption


ENERGY STAR Qualified Homes
Close to 850,000 families live ENERGY STAR Qualified Homes as of 2007
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
2000 2001 2002 2003 2004 2005 2006 2007
Annual Homes Built
Cumulative Homes Built
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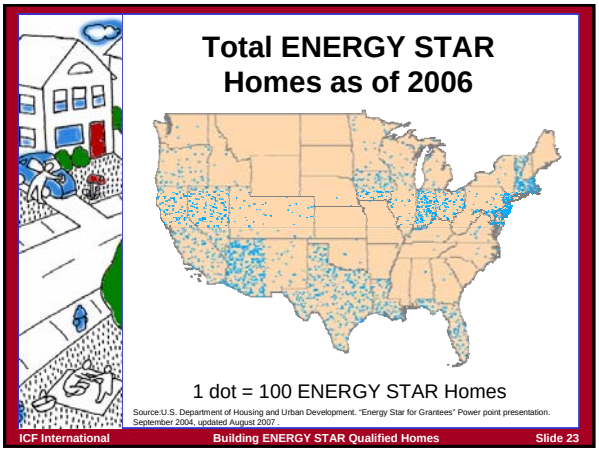
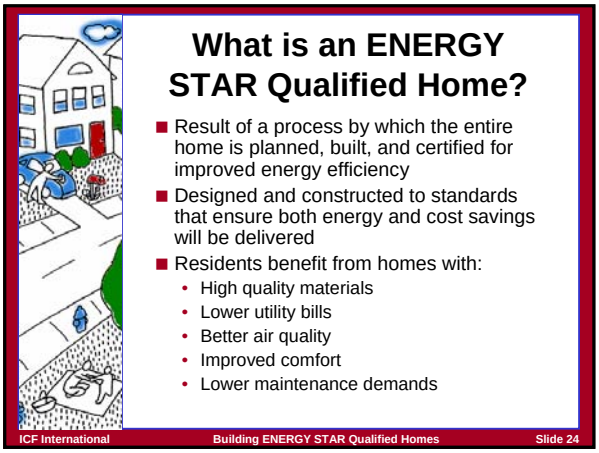
Building ENERGY STAR Qualified Homes
Slide 22

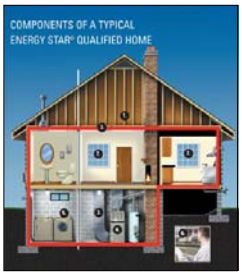

Total ENERGY STAR Homes as of 2006
1 dot = 100 ENERGY STAR Homes
Source:U.S. Department of Housing and Urban Development. "Energy Star for Grantees" Power point presentation. September 2004, updated August 2007 .
ICF International
Building ENERGY STAR Qualified Homes
Slide 23


What is an ENERGY STAR Qualified Home?
Result of a process by which the entire home is planned, built, and certified for improved energy efficiency
Designed and constructed to standards that ensure both energy and cost savings will be delivered
Residents benefit from homes with:
High quality materials
Lower utility bills
Better air quality
Improved comfort
Lower maintenance demands
ICF International
Building ENERGY STAR Qualified Homes
Slide 24

Standards and Requirements

- Any home 3 stories or less
- Eligible types of homes:
  - Single family
  - Low-rise multi-family homes
  - Manufactured homes
  - Systems-built homes
  - Existing retrofitted homes
- Intended for new construction, but can be gut rehabilitation
- Existing homes are unlikely to cost-effectively meet ENERGY STAR standard

Components of a ENERGY STAR Home



- Effective insulation
- High performance windows
- Tight construction and ducts
- Efficient heating and cooling equipment
- Lighting and appliances
- Third-party verification

- Designed and built using a “whole-house” approach

http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_features

Effective Insulation

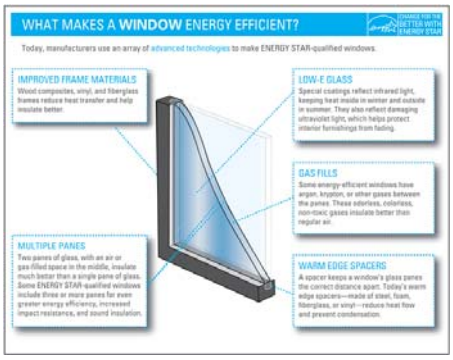
- As much as half of energy used in a home goes to heating and cooling.
- Properly installed and inspected insulation in floors, walls, and attics

- Ensures even temperatures throughout the house, reduced energy use, and increased comfort.
- Reduced potential for condensation that can lead to decay of building materials

Photo: http://www.energystar.gov/ia/home_improvement/home_sealing/DIY_COLOR_100_dpi.pdf

High Performance Windows

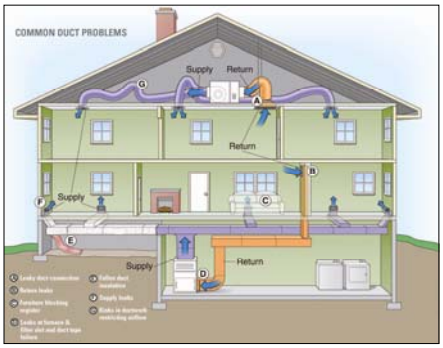
- ENERGY STAR Qualified Windows
  - Use advanced technologies to help keep heat in during winter and out during summer.
  - Maintain consistent temperatures throughout homes
  - Reduce the emissions of greenhouse gases and air pollutants from entering and exiting the house
  - Tailored for four climate zones and independently tested for superior energy performance.
    - ✓ Energy performance is independently tested and certified according to procedures established by the National Fenestration Rating Council (NFRC)



Tight Construction and Ducts

- ENERGY STAR qualified homes must have efficient duct systems that carry air from central heaters or air conditioners to each part of the home and back again
  - Reduces drafts, moisture, dust, pollen, and noise
  - Improves comfort and indoor air quality
  - Reduces utility and maintenance costs
- Duct systems found in ENERGY STAR qualified homes are third-party tested for tightness and verified to be properly insulated

Common Duct Problems



http://www.energystar.gov/ia/products/heat_cool/ducts/DuctSealingBrochure04.pdf

Effective Heating & Cooling Equipment

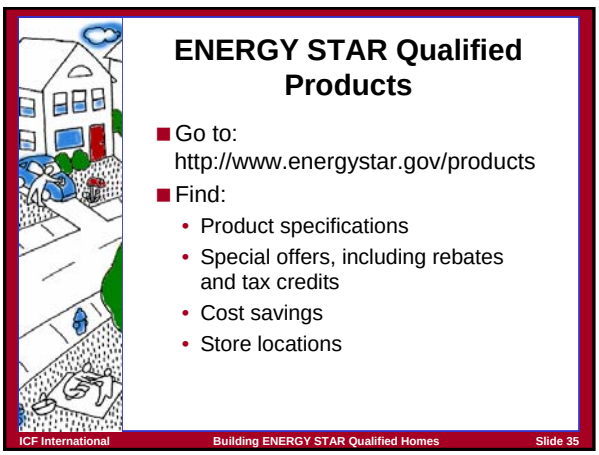
- ENERGY STAR qualified heating systems are designed to
  - Use less energy than standard systems
  - Reduce the risk of back-drafting carbon monoxide
  - Last longer than standard models
- ENERGY STAR qualified cooling equipment can
  - Lower energy use
  - Increase comfort
  - Improve durability
  - Operate more quietly than standard models
- Mechanical ventilation systems circulate fresh air using ducts and fans
  - Can improve air quality by removing allergens, pollutants, and moisture that can cause mold problems

Lighting and Appliances

- Compact Fluorescent Light Bulbs (CFLs)
  - Use about 75% less energy than a comparable standard incandescent bulb
  - ENERGY STAR qualified fixtures come with a 2-year warranty
  - Replacing the five most frequently used light fixtures with ENERGY STAR qualified lighting can save about $65 each year

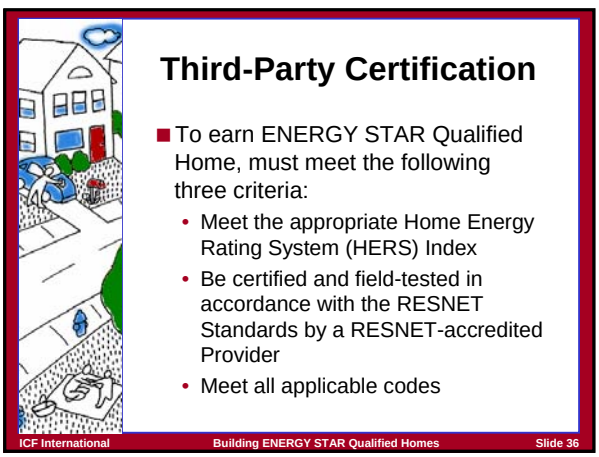
- ENERGY STAR Qualified Appliances
  - Include refrigerators, freezers, dishwashers, clothes washers, dehumidifiers
  - Use 10-50% less energy
  - Have superior components and performance compared to standard appliances

ENERGY STAR Qualified Products



ENERGY STAR Qualified Products

- Go to: http://www.energystar.gov/products
- Find:
  - Product specifications
  - Special offers, including rebates and tax credits
  - Cost savings
  - Store locations



Third-Party Certification

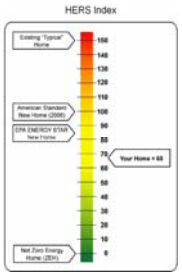
- To earn ENERGY STAR Qualified Home, must meet the following three criteria:
  - Meet the appropriate Home Energy Rating System (HERS) Index
  - Be certified and field-tested in accordance with the RESNET Standards by a RESNET-accredited Provider
  - Meet all applicable codes

Home Rating Infrastructure

- Residential Energy Services Network (RESNET) www.natresnet.org
  - Founded by National Association of State Energy Officials
  - Adopting and maintaining national standards for home energy ratings
  - Certifying and Accrediting Body for Home Energy Raters (contractors)
  - Over 5,000 Home Energy Raters in the U.S.
- HERS Raters
  - Independent, third-party home energy raters
  - Inspect, test, and certify homes meeting ENERGY STAR qualified homes label
    - ✓ Can advise how to select energy-efficient features
  - Must be trained and certified by state agencies and RESNET
  - Developer's responsibility to contract with HERS Rater

HERS Index

- Numeric value scale to rate the efficiency of homes
- The lower the score, the more energy efficient the home
  - 100 score is equivalent to home built to IECC 2004
  - Each point represents 1% (more efficient or less efficient)
  - 0 score would indicate a zero energy home
- ENERGY STAR home is one that would achieve a HERS Index score of:
  - ≤80 in the North
  - ≤85 in the South
- A typical existing home (1970) might be a 130 on the scale or 30% worse than a home built to code (IECC 2004)



Two Paths for Qualifying Homes

1. Performance Path
   - Rater simulates home energy efficiency based on the building plans with specialized computer software
   - Can identify the most effective upgrades to meet ENERGY STAR performance standards
2. Prescriptive Path
   - Use a set of climate-specific construction specifications developed by EPA called a Builder Option Package (BOP)

Prescriptive Path

www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_prescriptive

ENERGY STAR Qualified Homes
Exercise #1

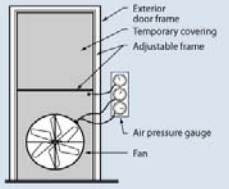
On-site Inspections

- Ensures home performance is consistent with ENERGY STAR standards
- HERS Raters complete:
  - Blower door test
    - ✓ Tests for air leaks in the house structure or envelope
  - Duct blaster test
    - ✓ Tests for air leaks in the duct system
  - Thermal Bypass Checklist
    - ✓ Visual inspection of common construction areas where air can flow through or around insulation.
- See Attachment 2-2

Blower Door Test

Diagnostic Tools

Testing the airtightness of a home using a special fan called a blower door can help to ensure that air sealing work is effective. Often, energy efficiency incentive programs, such as the DOE/ EPA ENERGY STAR Program, require a blower door test (usually performed in less than an hour) to confirm the tightness of the house.



Source: U.S. Department of Energy, Energy Efficiency and Renewable Energy, Consumer's Guide

ENERGY STAR Qualified Homes
Thermal Bypass Inspection Checklist

Benefits of ENERGY STAR Label

- Third-Party Inspection
  - Performs to ENERGY STAR standards
- Adds Value to the Home
  - Homebuyers value energy efficiency
  - Appraisers value energy efficiency and ENERGY STAR assurance of quality
- Increased Discretionary Income
  - Using less energy = Increased discretionary income
  - Substantial savings on utility bills and maintenance

Costs and Savings

- Savings and benefits outweigh initial purchase costs
  - ENERGY STAR qualified homes use substantially less energy for heating, cooling, and water heating delivering $200 to $400 in annual savings.
  - Additional cost of energy efficient features typically adds only a modest amount to a home buyer's monthly mortgage payment.
- Purchasing ENERGY STAR Qualified Home = even more savings
- Builders and architects make a difference
  - More experience, lower costs and more savings

Average Savings for ENERGY STAR Homes

Savings of ~$2,400 over average 7-8 year homeownership tenure

	Monthly	Annual
Additional Mortgage Costs*	- $15	- $180
Utility Savings**	$40	$480
Total Cost Savings	**$25**	**$300**

* Based on $2,000 additional house price/value
** Likely to increase while mortgage remains fixed

Source: "Benefits for Homeowners." ENERGY STAR. http://www.energystar.gov/index.cfm?c=new_homes.nh_benefits

Example: ENERGY STAR Costs for OWHLF

- Olene Walker Housing Loan Fund (OWHLF)
  - Incremental costs:
    - ✓Average of $2,300-$2,500 per Single-family unit
    - ✓Average of $1,900-$2,100 per Multi-family unit
  - Average cost of obtaining ENERGY STAR qualification rating:
    - ✓$250 for each Single-family unit
    - ✓$350 for each Multi-family unit

Source: "Financing Energy-Efficiency Housing." NCSHA – Housing Finance Agency Institute, January 13-16, 2008.

Example: ENERGY STAR Savings in North Carolina

- Carousel Place – Raleigh, NC
  - ENERGY STAR qualified, two-story, 55-unit apartment building
  - Occupancy at the senior building is limited to low-income persons age 55 and older

Source: "A Case Study in Building ENERGY STAR Qualified Affordable Housing in North Carolina." EPA, January 2008.

Example: ENERGY STAR Savings in North Carolina

- Additional cost to construct Carousel Place to ENERGY STAR standards was approximately $82,500, or $1,500 per unit.
- Savings due to ENERGY STAR and discount from utility company:
  - Monthly savings
    - ✓ Up to $29 for a one-bedroom unit
    - ✓ Up to $45 for a two-bedroom unit
  - Annual savings $350-$550
- Simple payback of ENERGY STAR related construction costs of 3-4 years

Source: "A Case Study in Building ENERGY STAR Qualified Affordable Housing in North Carolina." EPA, January 2008.

Determining Energy Savings
Exercise #2

Key Roles & Responsibilities

- PJ/Grantee
  - Responsible for incorporating ENERGY STAR standards into development programs
  - Encourage or require developers to meet ENERGY STAR standards
  - Update construction standards and program procedures
- Developer
  - Integrate ENERGY STAR into design and construction of project
  - Give contractors enough information in the specifications and training
  - Review site plans with HERS Rater

Role of Construction and HERS Contractors

- Construction Contractors and Subs
  - Build the project according to the plans and ENERGY STAR standards
- HERS Raters
  - Review site plans with the developer
  - Inspect the design features and the efficiency measures for appropriate installation and overall energy performance

Role of Property Owners and Occupants

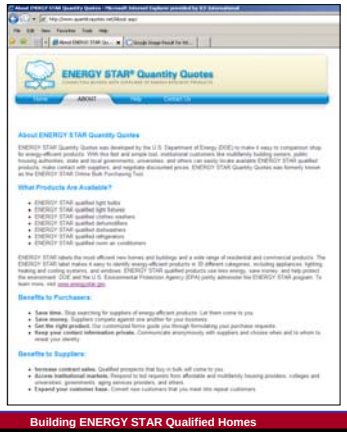
- Property Owner
  - Upkeep of efficiency features
    - ✓ Regularly schedule inspections of efficient building features, such as duct work and insulation
  - Educate tenants of the appropriate uses energy efficient appliances
- Occupant
  - Follow energy conservation practices
  - Use energy equipment and appliances properly
  - Report malfunctions or symptoms that building features are failing to the property owner for resolution

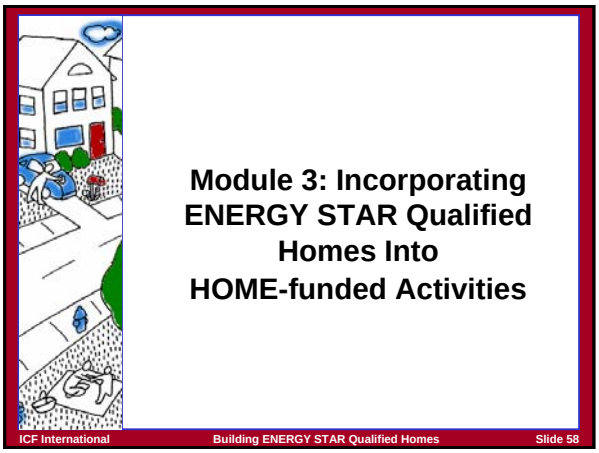
Available Resources

- Funding Resources – Attachment 2-3
  - Examples:
    - ✓ Federal programs at HUD, DOE, IRS, HHS
    - ✓ Nonprofits and Foundations
    - ✓ Lenders
    - ✓ Utility Grant/Loan Programs
- Technical Resources – Attachment 2-4
  - Examples:
    - ✓ Alliance to Save Energy
    - ✓ Partnership for Advancing Technology in Housing (PATH)
    - ✓ Database of State Incentives for Renewables & Efficiency (DSIRE)

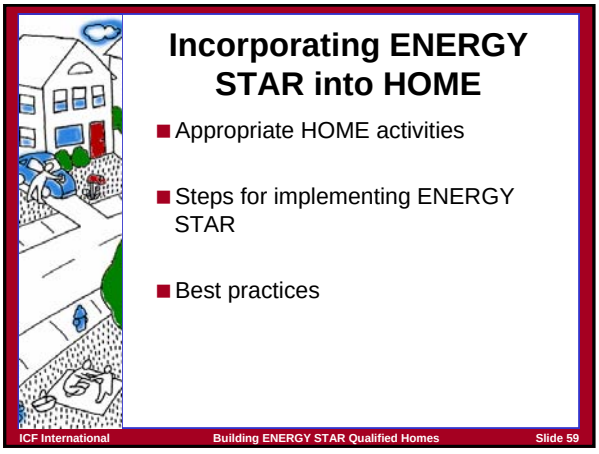
Bulk Purchasing

- ENERGY STAR Quantity Quotes
  - Save money on the purchase price of ENERGY STAR qualified products
- Increases the return on investment and reduces the payback period.
- Allows large homebuilders and property owners to comparison shop for ENERGY STAR qualified products
  - Purchasers can locate available ENERGY STAR qualified products
  - Make contact with the suppliers
  - Negotiate discounted prices through the online purchasing tool



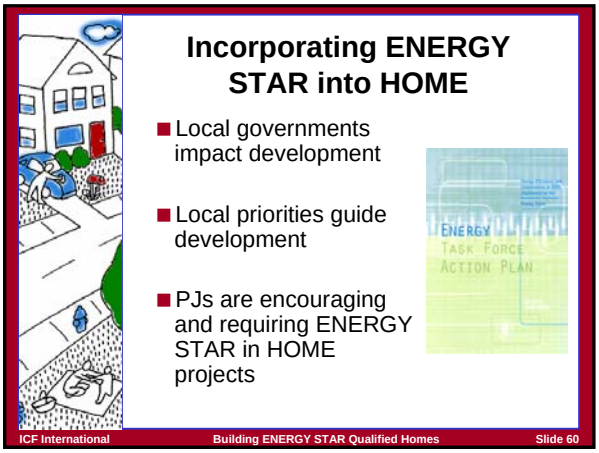


Module 3: Incorporating ENERGY STAR Qualified Homes Into HOME-funded Activities



Incorporating ENERGY STAR into HOME

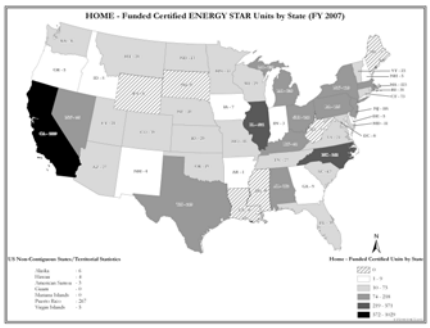
- Appropriate HOME activities
- Steps for implementing ENERGY STAR
- Best practices



Incorporating ENERGY STAR into HOME

- Local governments impact development
- Local priorities guide development
- PJs are encouraging and requiring ENERGY STAR in HOME projects

ENERGY STAR Certified Homes by HOME Program: 2007



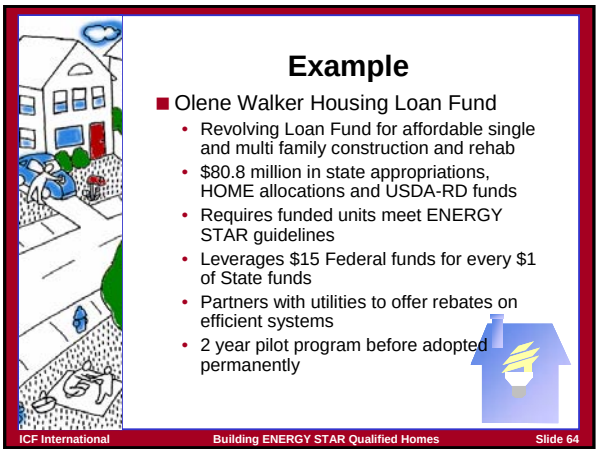
Examples

- Pomona, CA
  - Educating CHDOs about ENERGY STAR qualified homes
  - Offering technical assistance to build capacity of developers interested in implementing ENERGY STAR guidelines
- Richland, WA
  - Required developers follow ENERGY STAR guidelines for the development of 3 single family homes
  - Subsidized the increased affordability of energy efficient, sustainable homes for low-income households

Incorporating ENERGY STAR into HOME

- HOME activities appropriate for ENERGY STAR
  - Land Acquisition
  - Single Family New Construction
  - Single Family Gut Rehab
  - Multifamily* New Construction
  - Multifamily* Gut Rehab
  - Homebuyer Assistance

*Not exceeding 3 stories


Example
Olene Walker Housing Loan Fund
Revolving Loan Fund for affordable single and multi family construction and rehab
$80.8 million in state appropriations, HOME allocations and USDA-RD funds
Requires funded units meet ENERGY STAR guidelines
Leverages $15 Federal funds for every $1 of State funds
Partners with utilities to offer rebates on efficient systems
2 year pilot program before adopted permanently
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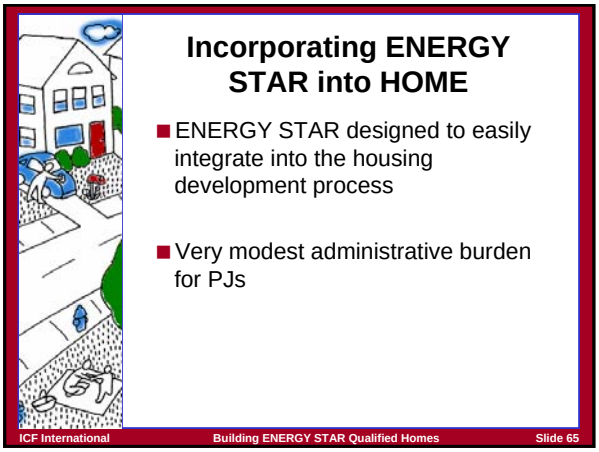
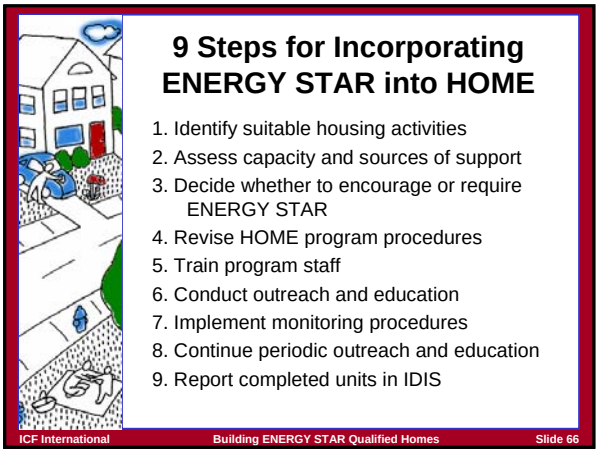
Building ENERGY STAR Qualified Homes
Slide 64


Incorporating ENERGY STAR into HOME
ENERGY STAR designed to easily integrate into the housing development process
Very modest administrative burden for PJs
ICF International
Building ENERGY STAR Qualified Homes
Slide 65


9 Steps for Incorporating ENERGY STAR into HOME
1. Identify suitable housing activities
2. Assess capacity and sources of support
3. Decide whether to encourage or require ENERGY STAR
4. Revise HOME program procedures
5. Train program staff
6. Conduct outreach and education
7. Implement monitoring procedures
8. Continue periodic outreach and education
9. Report completed units in IDIS
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9 Steps for Incorporating ENERGY STAR into HOME

1. Identify HOME activities with goals compatible to ENERGY STAR
   - HUD encourages PJs to adopt ENERGY STAR guidelines
2. Assess local capacity and support for ENERGY STAR
   - Number and capacity of contractors
   - Availability of HERS raters and installers
   - ENERGY STAR experience in the development community
   - Funding institutions with experience and willingness to finance ENERGY STAR

9 Steps for Incorporating ENERGY STAR into HOME

- What is your community's capacity?
  - Strong: Network of experienced developers and HERS raters creating ENERGY STAR homes
  - Moderate: Limited supply of HERS raters and experienced ENERGY STAR developers
  - Limited: Less than 10 HERS rates in state and few developers with ENERGY STAR experience but a willingness to learn
  - None: Less than 10 HERS raters in state and little interest from development community in ENERGY STAR

9 Steps for Incorporating ENERGY STAR into HOME

3. Decide to require or encourage ENERGY STAR

- Based on capacity assessment
- Ensure an ENERGY STAR requirement will not significantly hurt production
- Consider funding a pilot program

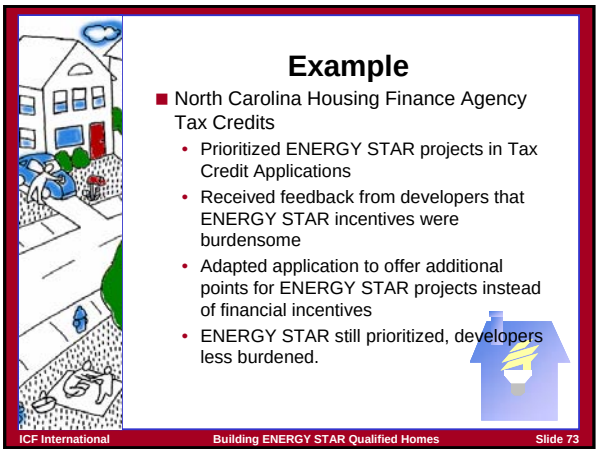
Considerations for Requiring ENERGY STAR

	Benefits	Drawbacks
Require ENERGY STAR	■ Guarantees HOME-funded units will meet ENERGY STAR ■ All developers held to same standard ■ All developers will become proficient in ENERGY STAR development	■ May reduce number of units produced ■ Small capacity developers may have difficulty developing projects initially
Encourage ENERGY STAR	■ Small capacity developers will not be overburdened ■ PJ can choose incentives based on its circumstances	■ Less assurance that units will be ENERGY STAR

Example

■ Olene Walker Housing Loan Fund

- April 2005 – Pilot Loan Project – new construction meet ENERGY STAR; Rehab encouraged to meet ENERGY STAR standards
- Following pilot – provided financial incentives to encourage ENERGY STAR – increased loan amounts and lower interest rates
- Oct 2007 – permanent program requires ENERGY STAR


Example
North Carolina Housing Finance Agency Tax Credits
Prioritized ENERGY STAR projects in Tax Credit Applications
Received feedback from developers that ENERGY STAR incentives were burdensome
Adapted application to offer additional points for ENERGY STAR projects instead of financial incentives
ENERGY STAR still prioritized, developers less burdened.
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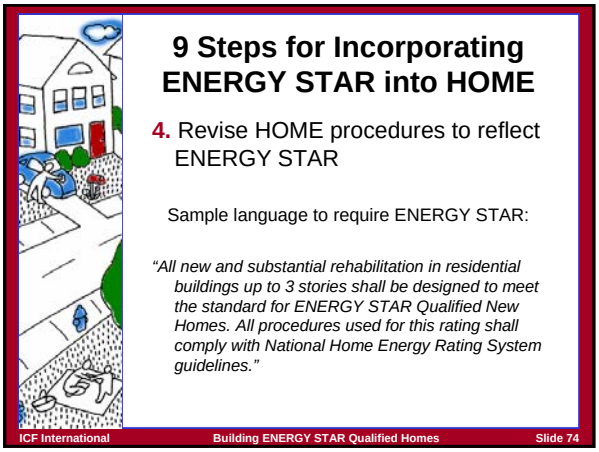
9 Steps for Incorporating ENERGY STAR into HOME
4. Revise HOME procedures to reflect ENERGY STAR
Sample language to require ENERGY STAR:
"All new and substantial rehabilitation in residential buildings up to 3 stories shall be designed to meet the standard for ENERGY STAR Qualified New Homes. All procedures used for this rating shall comply with National Home Energy Rating System guidelines."
ICF International
Building ENERGY STAR Qualified Homes
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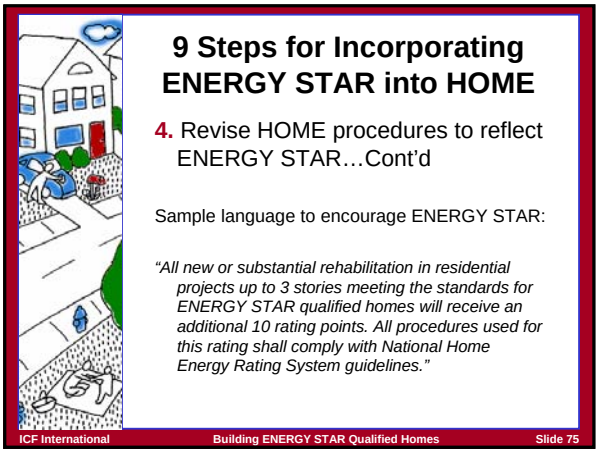
9 Steps for Incorporating ENERGY STAR into HOME
4. Revise HOME procedures to reflect ENERGY STAR…Cont'd
Sample language to encourage ENERGY STAR:
"All new or substantial rehabilitation in residential projects up to 3 stories meeting the standards for ENERGY STAR qualified homes will receive an additional 10 rating points. All procedures used for this rating shall comply with National Home Energy Rating System guidelines."
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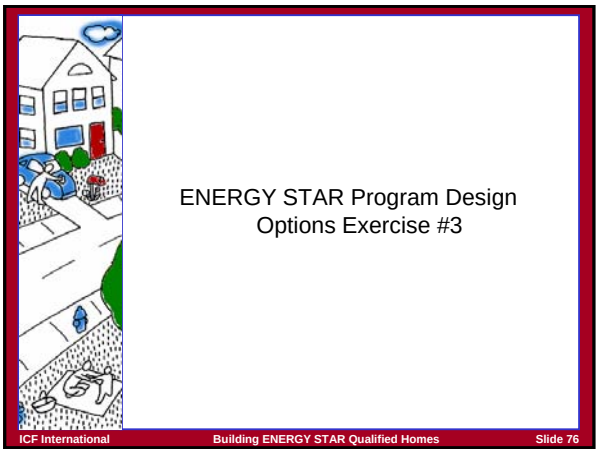
Slide 75


ENERGY STAR Program Design
Options Exercise #3
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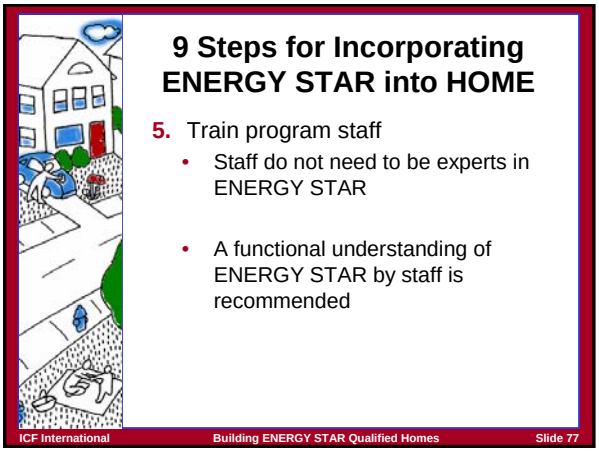
Building ENERGY STAR Qualified Homes
Slide 76


9 Steps for Incorporating ENERGY STAR into HOME
5. Train program staff
• Staff do not need to be experts in ENERGY STAR
• A functional understanding of ENERGY STAR by staff is recommended
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Training Possibilities
ENERGY STAR for State Housing Agencies
Why Devote Time and Money to Energy Efficiency?
HUD Energy Action
Incorporating ENERGY STAR to Support Energy Efficient Affordable Housing
CHANGE FOR THE BETTER WITH ENERGY STAR
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9 Steps for Incorporating ENERGY STAR into HOME

6. Conduct outreach and education

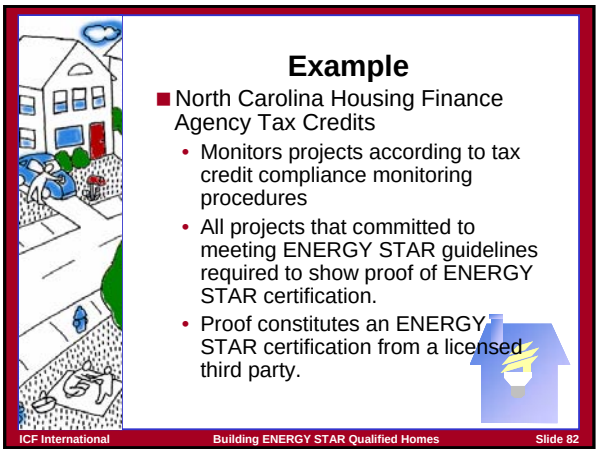
- Research potential local partners
- Identify the services and resources partners can offer and how to access these resources
- Link developers to resources

ENERGY STAR Partners
Exercise #4

9 Steps for Incorporating ENERGY STAR into HOME

7. Implement monitoring procedures

- New inspection criteria are unnecessary
- Require proof of HERS verification with other project documentation


Example
North Carolina Housing Finance Agency Tax Credits
Monitors projects according to tax credit compliance monitoring procedures
All projects that committed to meeting ENERGY STAR guidelines required to show proof of ENERGY STAR certification.
Proof constitutes an ENERGY STAR certification from a licensed third party.
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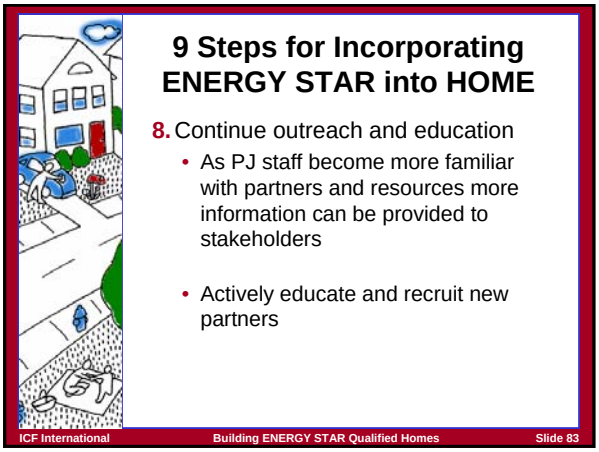
9 Steps for Incorporating ENERGY STAR into HOME
8. Continue outreach and education
As PJ staff become more familiar with partners and resources more information can be provided to stakeholders
Actively educate and recruit new partners
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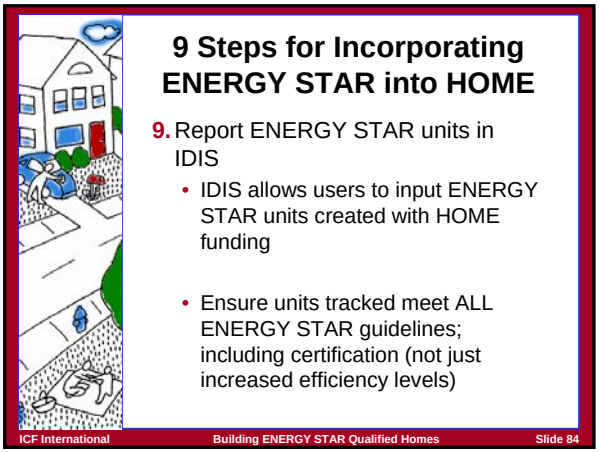
9 Steps for Incorporating ENERGY STAR into HOME
9. Report ENERGY STAR units in IDIS
IDIS allows users to input ENERGY STAR units created with HOME funding
Ensure units tracked meet ALL ENERGY STAR guidelines; including certification (not just increased efficiency levels)
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Common Challenges

A. Misperceptions or concerns by stakeholders about ENERGY STAR may create opposition

B. Less experienced CHDOs or developers may encounter delays or make missteps that result in time or cost increases

C. Property or homeowners not familiar with energy efficiency features may not realize their full benefits

Best Practices

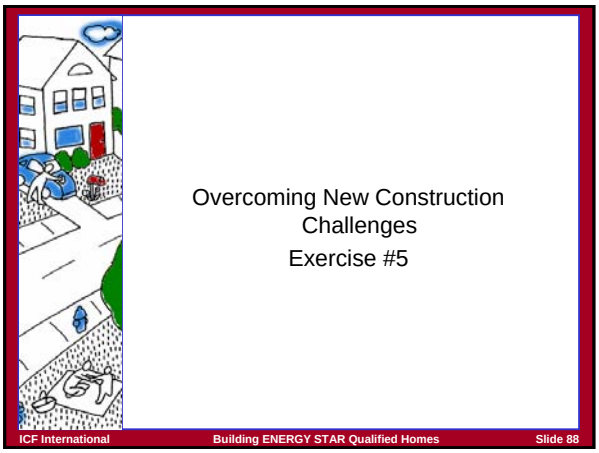
A. Overcome resistance to ENERGY STAR through education
- Up-front costs are paid back with efficiency related savings
- Increased leverage and match opportunities

B. Provide additional support and oversight for less experienced CHDOs/developers
- Provide upfront TA and guidance and additional review of project plans
- Provide increased oversight of first 2-3 projects
- Link developer with staff or mentor experienced in ENERGY STAR process

Best Practices

C. Educate property owners and homeowners about proper operation and maintenance of energy efficiency features
- Offer manuals and training on proper use of efficient features

D. Reach out to PJs with ENERGY STAR experience


Overcoming New Construction Challenges
Exercise #5
ICF International
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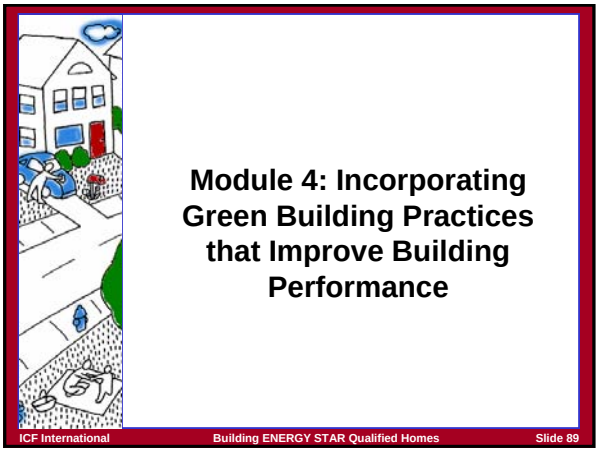
Slide 88


Module 4: Incorporating Green Building Practices that Improve Building Performance
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Building ENERGY STAR Qualified Homes
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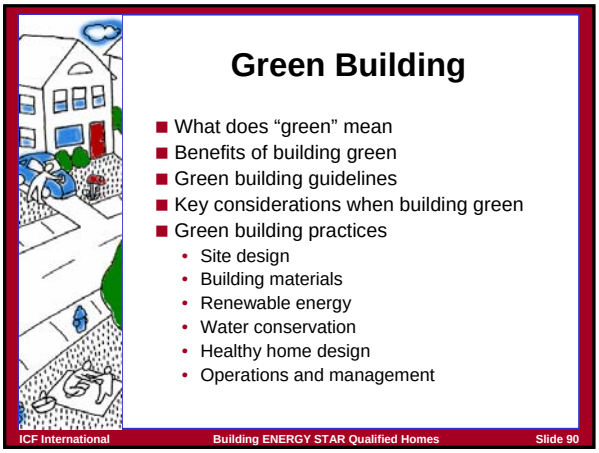
Green Building
What does “green” mean
Benefits of building green
Green building guidelines
Key considerations when building green
Green building practices
Site design
Building materials
Renewable energy
Water conservation
Healthy home design
Operations and management
ICF International
Building ENERGY STAR Qualified Homes
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Discussion

- What are the most common complaints or challenges regarding long-term physical performance and occupant comfort that you hear about affordable properties?

Definition of Green Building

- Green or sustainable building is the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition
  - EPA Green Building Program

Benefits of Green Building

- Economic
  - Reduce operating costs
  - Reduce strain on infrastructure
- Environmental
  - Protect ecosystems
  - Improve air and water quality
  - Reduce waste
- Occupant
  - Enhance comfort and health
  - Improve worker and occupant safety

Example: North Carolina HealthyBuilt Homes

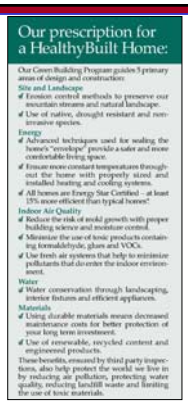
NC HealthyBuilt Homes Program of Greater Asheville

- Voluntary, statewide green building certification program
- There are currently 105 certified HealthyBuilt Homes and 489 "in progress" in the Western North Carolina area
- Program partners:
  - ENERGY STAR, www.energystar.gov
  - WNC Green Building Council, www.wncgbc.org
  - HealthyBuilt Homes, www.HealthyBuiltHomes.org
  - NC Solar Center, www.ncsc.ncsu.edu
  - NC State University, www.ncsu.edu
  - NC State Energy Office, www.energyNC.net

ENERGY STAR PARTNER

HealthyBuilt Homes Program

- Targeted at small to medium-sized home builders who may not have the resources to compete with larger green builders
- Offers a recognized green certification, technical and marketing assistance, design reviews, workshops, and field consultation services


Our prescription for a HealthyBuilt Home:

Our Green Building Program guides 5 primary areas of design and construction:

Site and Landscape
- Erosion control methods to preserve our mountain streams and natural landscape.
- Use of native, drought resistant and non-invasive species.

Energy
- Advanced techniques used for sealing the home's "envelope" provide a safer and more comfortable living space.
- Ensure more constant temperatures throughout the home with properly sized and installed heating and cooling systems.
- All homes are Energy Star Certified – at least 15% more efficient than typical homes!

Indoor Air Quality
- Reduce the risk of mold growth with proper building science and moisture control.
- Minimize the use of toxic products containing formaldehyde, glues and VOCs.
- Use fresh air systems that help to minimize pollutants that do enter the indoor environment.

Water
- Water conservation through landscaping, interior fixtures and efficient appliances.

Materials
- Using durable materials means decreased maintenance costs for better protection of your long term investment.
- Use of renewable, recycled content and engineered products.

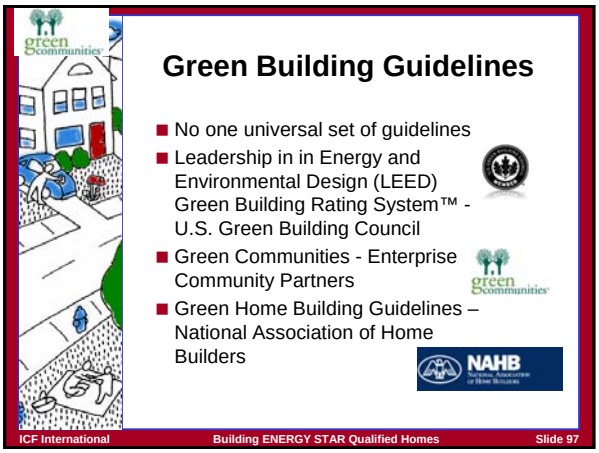
These benefits, ensured by third party inspections, also help protect the world we live in by reducing air pollution, protecting water quality, reducing landfill waste and limiting the use of toxic materials.

Source: NC HealthyBuilt Homes Asheville Brochure http://www.wncgbc.org/healthybuilt/benefits.php

Benefits of HealthyBuilt Homes

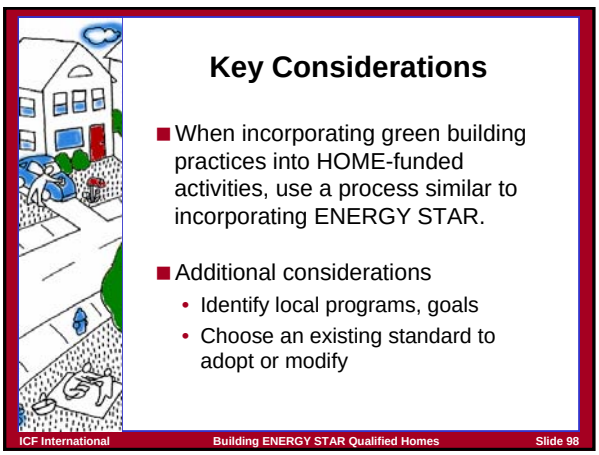
Source: NC HealthyBuilt Homes Asheville Brochure http://www.wncgbc.org/healthybuilt/benefits.php

- Reduced Risk of Mold
- Third Party Verification
- Reduced Energy and Operating Costs
- Improved Comfort and Durability
- Higher Home Value
- Environmental Protection



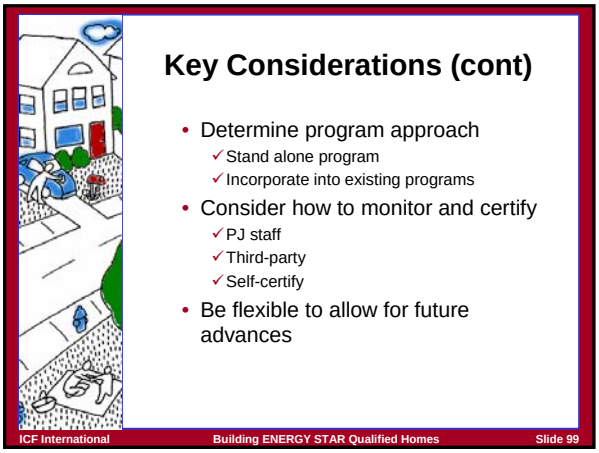
Green Building Guidelines

- No one universal set of guidelines
- Leadership in in Energy and Environmental Design (LEED) Green Building Rating System™ - U.S. Green Building Council
- Green Communities - Enterprise Community Partners
- Green Home Building Guidelines – National Association of Home Builders



Key Considerations

- When incorporating green building practices into HOME-funded activities, use a process similar to incorporating ENERGY STAR.
- Additional considerations
  - Identify local programs, goals
  - Choose an existing standard to adopt or modify



Key Considerations (cont)

- Determine program approach
  - ✓Stand alone program
  - ✓Incorporate into existing programs
- Consider how to monitor and certify
  - ✓PJ staff
  - ✓Third-party
  - ✓Self-certify
- Be flexible to allow for future advances

Site Design

- Minimize impact on surroundings; preserve natural environment
  - Orient building to maximize solar potential
  - Plant trees for shading
  - Plan landscaping to minimize water demand
  - Grow privacy screens
- Control rainwater
  - Use canopies and overhangs
  - Consider site grading and drainage
- Control groundwater
  - Keep groundwater away from foundation

Green Building Materials

- Choose materials that have the following features, to the extent feasible
  - Low-toxicity
  - Low or zero emissions
  - Recycled content
  - Recyclable
  - Sustainable (renewable resources)
  - Durable
  - Moisture-resistant
  - Energy-efficient
  - Water conserving

Resource Efficiency

- Reduce amount of materials used and wasted
  - Efficient floor plans
  - Advanced framing techniques
  - Building dimensions to reduce need for cutting
  - Materials that are pre-cut or need no on-site finishing
- Disassemble or deconstruct
- Conduct on-site recycling

Renewable Energy

- Solar Thermal Energy – Hot Water
  - Reduces need for conventional hot water heating by two-thirds
  - Can be installed in most locations, with pipe-freeze protection
- Solar Photovoltaic
  - Converts sunlight into electricity
  - Can connect to electric grid
  - Solar site analysis needed
  - High up front cost

Renewable Energy

- Wind Power
  - Height and space requirements best suited for rural areas
  - Unlikely to be a viable option for affordable housing
- Geothermal Power
  - Uses constant temperature of earth
  - Some space and site considerations – need a site assessment
  - Higher installation cost, but payback in 5-10 years

Water Management

- Interior Moisture Control
  - Critical to prevent mold, insects, rodents
  - Install plumbing in interior walls, when feasible
  - Bathrooms – do not use paper-faced gypsum board around tubs
- Water conservation
  - EPA has established its WaterSense^{SM} program to label products that are water efficient
  - High efficiency toilets
  - Bathroom sinks
  - Showerheads
  - ENERGY STAR appliances
  - Point-of-use hot water systems, for distant locations

Healthy Home Design

- Ventilation. Key to controlling humidity and air pollutants
  - Use exhaust fans in kitchens and bathrooms
  - Vent clothes dryers
  - Meet ASHRAE Standard 62.2 for dilution ventilation.
- Control emissions. Use electric appliance and ensure proper installation and maintenance of gas appliances
- Test and control for radon

Operations and Management

- Benefits of building green can be lost with poor operation or management practices
  - Update building operations and maintenance procedures
  - Use less toxic cleaners
  - Use walk-off mats to keep dust and debris out of interiors
  - Vacuum frequently, use HEPA filter if possible
  - Enforce no-smoking policies
  - Develop integrated pest management plan
  - Perform routine maintenance and replace HVAC filters regularly

Module 5: Incorporating Energy Efficiency into Moderate Rehab and Other Activities

Energy Efficiency and Moderate Rehabilitation

- Key steps to incorporate energy efficiency into rehab activities
- Understanding energy usage in older buildings
- Energy efficiency measures
- Methods for determining costs and savings
- Multi-family new construction
- Homeowner/occupant education

Discussion

- What are your concerns about energy efficiency in your future rehabilitation projects?

Key Steps for Incorporating Energy Efficiency

1. Identify local capacity and supplemental funding
   - Weatherization program
   - Local utilities
   - Regional energy consortium
2. Identify HOME-funded Activities that can incorporate energy efficiency
   - Amount of assistance provided
   - On-going or one-time relationship
   - Payback period
   - Beyond economics

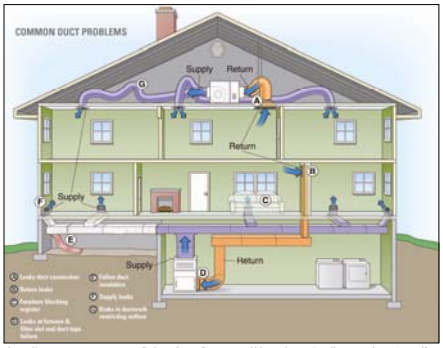
Key Steps (cont)

3. Determine role of program staff
   Assess local contractor capacity
4. Outreach to stakeholders and participants
5. Revise HOME program procedures

How Energy is Wasted in Buildings

- Old and poorly maintained HVAC systems
- Structural damage, leaks and decay
- Insufficient and poorly installed insulation
- Leaky and poorly installed ducts
- Inefficient and/or leaky windows and doors
- Lack of homeowner awareness = wasteful habits

Common Duct Problems



http://www.energystar.gov/ia/products/heat_cool/ducts/DuctSealingBrochure04.pdf

Energy Efficiency Features for Rehabilitation

- Match outcome of property analysis to what features are most cost-effective
- Consider requiring low-cost, short payback items
- At minimum, encourage moderate cost, moderate payback items
- Allow for exemptions based on specific property condition and needs

Typically Low-Cost Features

- Seal air leaks and manage air flow
  - Seal the building envelope
    - ✓ Use caulk or spray foam
  - Segregate and maintain combustion equipment
  - Provide adequate ventilation
    - ✓ Exhaust venting
    - ✓ Whole house ventilation
  - If no mechanical ventilation, assess ventilation system to ensure adequate indoor air quality before sealing

Typically Low-Cost Features

- Increase insulation
  - Follow or beat recommended levels for geographic area.
  - Attic floor is often biggest need
  - Proper installation is critical for effectiveness

NOT This Way! Uneven and compressed

Typically Low-Cost Features (cont)

- Seal and insulate ducts, replace air filters
  - Focus on ducts in attics, crawlspaces, unheated basement and garages
  - Use mastic or foil-backed tape
- Install programmable thermostats

Typically Moderate-to-High Cost Features

- Install ENERGY STAR appliances and lighting
  - Based on condition of existing appliances
- Replace windows
  - For pre-1978 buildings, use lead-safe work practices

Typically Moderate-to-High Cost Features (cont)

- Install high efficiency HVAC
  - Replace if over 10 years (15 for boilers) and having repair or performance issues
  - Ensure proper sizing of new equipment.
- Ensure proper placement of return and delivery ducts and registers

Example of Addressing Energy Efficiency in Rehab

- City of Boston, Department of Neighborhood Development - Residential Design Standards for Rehabilitation
  - Individual replacement systems must be ENERGY STAR
  - Projects 3-stories or less must be ENERGY STAR
  - Projects over 3-stories must exceed ASHRAE 90.1- 2004 by 20% or equivalent
  - Includes green and healthy building standards

Energy Efficiency Standards for Rehab

Exercise #6

Methods for Assessment

- Four methods to assess existing building and identify possible energy efficiency measures
- Select method(s) that meet your needs and priorities
  - Energy Audit
  - HUD Rehab Advisor
  - ENERGY STAR on-line calculator
  - Home Performance with ENERGY STAR

Energy Audits

- Energy audit
  - Inspection checklist
  - Diagnostic testing
  - Recommendations and cost analysis
- Where to find qualified auditors
  - Train PJ staff
  - Weatherization program
  - RESNET (www.natresnet.org)
  - Building Performance Institute (www.bpi.org)

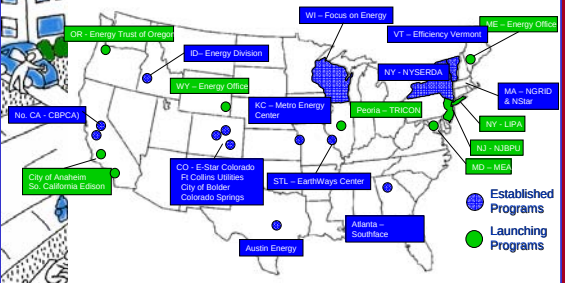
On-line Assessment Methods

- HUD Rehab Advisor
  - Enter property-specific information for possible energy efficient measures and estimated savings
  - http://rehabadvisor.pathnet.org/index.asp.
- ENERGY STAR on-line calculators
  - Calculates costs savings on specific products

Home Performance with ENERGY STAR

- No ENERGY STAR label for existing homes.
- Whole-house evaluation
  - Energy efficiency
  - Related health and safety
- Goal is to improve whole-house energy performance
- Provides summary report
  - Results, recommendations, estimated savings/costs
- Available in locally-sponsored areas

National Activity



New Construction High Rise Rental Properties

- No established energy efficiency standards for rental properties over 3 stories
- PJs can require or encourage energy efficiency measures
  - Principles of ENERGY STAR qualified homes apply
- ENERGY STAR and other pilot programs under development

Homeowner/Occupant Education

- Proper operation and maintenance is necessary to achieve energy cost savings
- Provide information to occupants about proper use of new equipment/appliances
- Ensure property owners update maintenance plans to reflect manufacturer's recommendations
- Provide information on non-toxic cleaners and maintaining and healthy indoor environment