Energy Star for Manufactured Homes - How Raters Can Work With Manufacturers

2006 RESNET Building Performance Conference

"Embracing the Future“

February 27 - March 1, 2006
Plaza San Antonio
San Antonio, Texas

Neil Moyer

FSEC

Building America U.S. Department of Energy — Industrialized Housing Partnership

Break Out Session 8
10:30 - Noon

Factory-Built Homes

Manufactured Homes: These are homes built entirely in the factory under a federal building code administered by the U.S. Department of Housing and Urban Development (HUD).

Must meet all local codes

Modular Homes: These factory-built homes are built to the state, local or regional code where the home will be located. Modules are transported to the site and installed.

Panelized Homes: These are factory-built homes in which panels - a whole wall with windows, doors, wiring and outside siding - are transported to the site and assembled. The homes must meet state or local building codes where they are sited.

Pre-Cut Homes: This is the name for factory-built housing in which building materials are factory-cut to design specifications, transported to the site and assembled. Pre-cut homes include kit, log and dome homes. These homes must meet local, state or regional building codes.

Mobile Homes: This is the term used for factory-built homes produced prior to June 15, 1976, when the HUD Code went into effect. By 1970, these homes were built to voluntary industry standards that were eventually enforced by 45 of the 48 contiguous states.

Mfg Housing- What is it?

Home built entirely in the factory under the Federal Manufactured Home Construction & Safety Standards (HUD Code) June 15, 1976.

Mfg Housing- What is it?

Single- or multi-section and are transported to the site & installed.

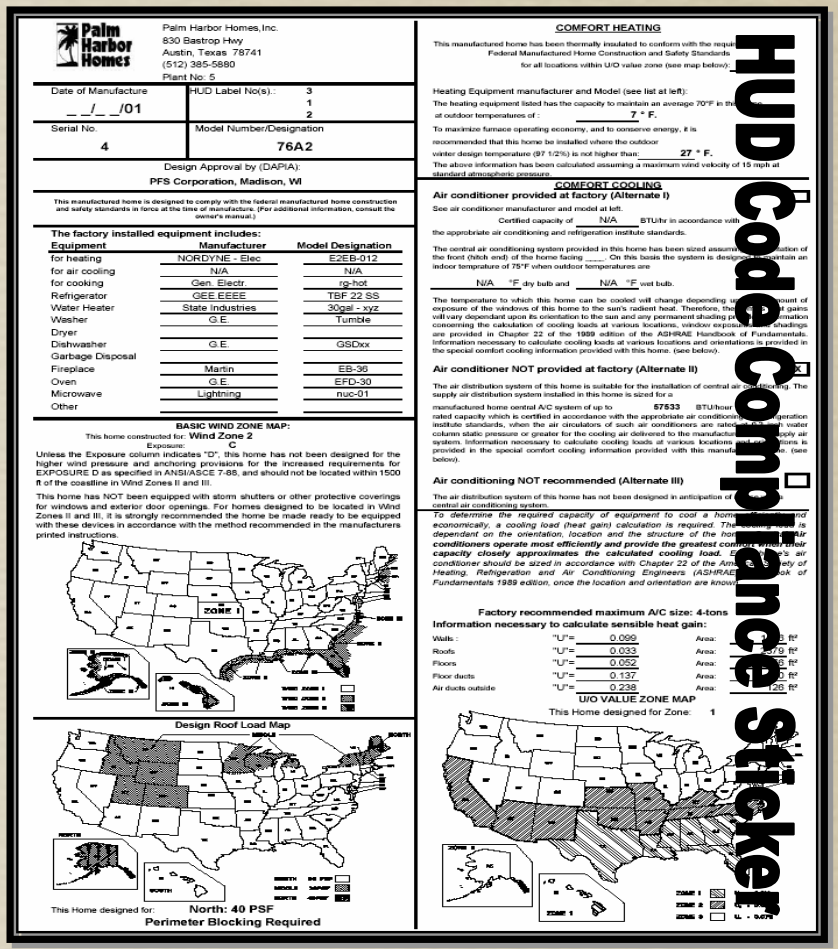
Mfg Housing- What is it?

Federal standards regulate:

- design & construction
- strength & durability
- transportability
- fire resistance
- energy efficiency
- quality

HUD Code sets performance standards:

- heating & air conditioning
- plumbing
- thermal
- electrical systems



Palm Harbor Homes

Palm Harbor Homes, Inc.
830 Bastrop Hwy
Austin, Texas 78741
(512) 385-5880
Plant No: 5

Date of Manufacture	HUD Label No(s).:
_ _/_ _/01	3 1 2
Serial No.	Model Number/Designation
4	76A2

Design Approval by (DAPIA):
PFS Corporation, Madison, WI

This manufactured home is designed to comply with the federal manufactured home construction and safety standards in force at the time of manufacture. (For additional information, consult the owner's manual.)

The factory installed equipment includes:

Equipment	Manufacturer	Model Designation
for heating	NORDYNE - Elec	E2EB-012
for air cooling	N/A	N/A
for cooking	Gen. Electr.	rg-hot
Refrigerator	GEE EEEE	TBF 22 SS
Water Heater	State Industries	30gal - xyz
Washer	G.E.	Tumble
Dryer		
Dishwasher	G.E.	GSDxx
Garbage Disposal		
Fireplace	Martin	EB-36
Oven	G.E.	EFD-30
Microwave	Lightning	nuc-01
Other		

BASIC WIND ZONE MAP:
This home constructed for: **Wind Zone 2**
Exposure: **C**

Unless the Exposure column indicates "D", this home has not been designed for the higher wind pressure and anchoring provisions for the increased requirements for EXPOSURE D as specified in ANSI/ASCE 7-88, and should not be located within 1500 ft of the coastline in Wind Zones II and III.

This home has NOT been equipped with storm shutters or other protective coverings for windows and exterior door openings. For homes designed to be located in Wind Zones II and III, it is strongly recommended the home be made ready to be equipped with these devices in accordance with the method recommended in the manufacturers printed instructions.

Design Roof Load Map

This Home designed for: **North: 40 PSF**
Perimeter Blocking Required

COMFORT HEATING

This manufactured home has been thermally insulated to conform with the requ... Federal Manufactured Home Construction and Safety Standards for all locations within U/O value zone (see map below).

Heating Equipment manufacturer and Model (see list at left):

The heating equipment listed has the capacity to maintain an average 70°F in the... at outdoor temperatures of : **7** ° F.

To maximize furnace operating economy, and to conserve energy, it is recommended that this home be installed where the outdoor winter design temperature (97 1/2%) is not higher than: **27** ° F.

The above information has been calculated assuming a maximum wind velocity of 15 mph at standard atmospheric pressure.

COMFORT COOLING

Air conditioner provided at factory (Alternate I)

See air conditioner manufacturer and model at left.
Certified capacity of N/A BTU/hr in accordance with the approbriate air conditioning and refrigeration institute standards.

The central air conditioning system provided in this home has been sized assum... the front (hitch end) of the home facing ____. On this basis the system is design... maintain an indoor temperature of 75°F when outdoor temperatures are N/A °F dry bulb and N/A °F wet bulb.

The temperature to which this home can be cooled will change depending u... amount of exposure of the windows of this home to the sun's radiant heat. Therefore, the... gains will vary dependant upon its orientation to the sun and any permanent shading p... information concerning the calculation of cooling loads at various locations, window exposure... shadings are provided in Chapter 22 of the 1989 edition of the ASHRAE Handbook of Fundamentals. Information necessary to calculate cooling loads at various locations and orientations is provided in the special comfort cooling information provided with this home. (see below).

Air conditioner NOT provided at factory (Alternate II) X

The air distribution system of this home is suitable for the installation of central air ... cooling. The supply air distribution system installed in this home is sized for a manufactured home central A/C system of up to **57533** BTU/hour rated capacity which is certified in accordance with the approbriate air conditioning... operation institute standards, when the air circulators of such air conditioners are rated... water column static pressure or greater for the cooling air delivered to the manufactu... supply air system. Information necessary to calculate cooling loads at various locations ... tions is provided in the special comfort cooling information provided with this manufa... (see below).

Air conditioning NOT recommended (Alternate III)

The air distribution system of this home has not been designed in anticipation of ... central air conditioning system.

*To determine the required capacity of equipment to cool a hom... and economically, a cooling load (heat gain) calculation is required. The... is dependent on the orientation, location and the structure of the hom... **conditioners operate most efficiently and provide the greatest com... their capacity closely approximates the calculated cooling load.** E... 's air conditioner should be sized in accordance with Chapter 22 of the Ame... ety of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE... ok of Fundamentals 1989 edition, once the location and orientation are know...*

Factory recommended maximum A/C size: 4-tons

Information necessary to calculate sensible heat gain:

Walls :	"U"= 0.099	Area:	... ft²
Roofs	"U"= 0.033	Area:	...79 ft²
Floors	"U"= 0.052	Area:	... ft²
Floor ducts	"U"= 0.137	Area:	... ft²
Air ducts outside	"U"= 0.238	Area:	26 ft²

U/O VALUE ZONE MAP
This Home designed for Zone: **1**

HUD Code Compliance Sticker

Mfg Housing- Why Important?

According to MHI…

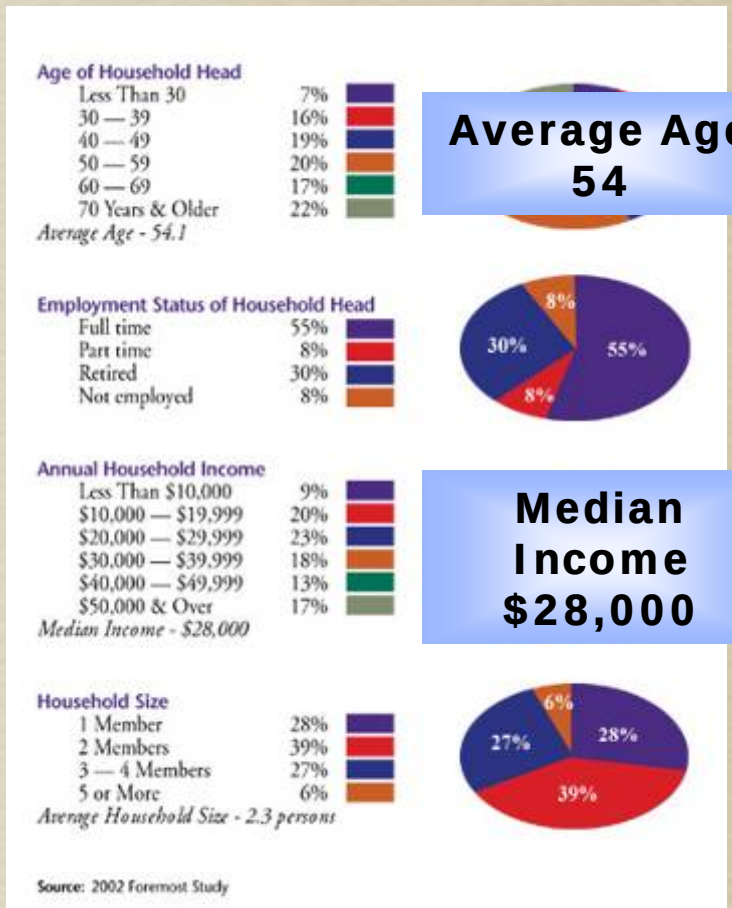
- HUD-code represented ~20% of all new single-family housing starts

Total shipments 2004

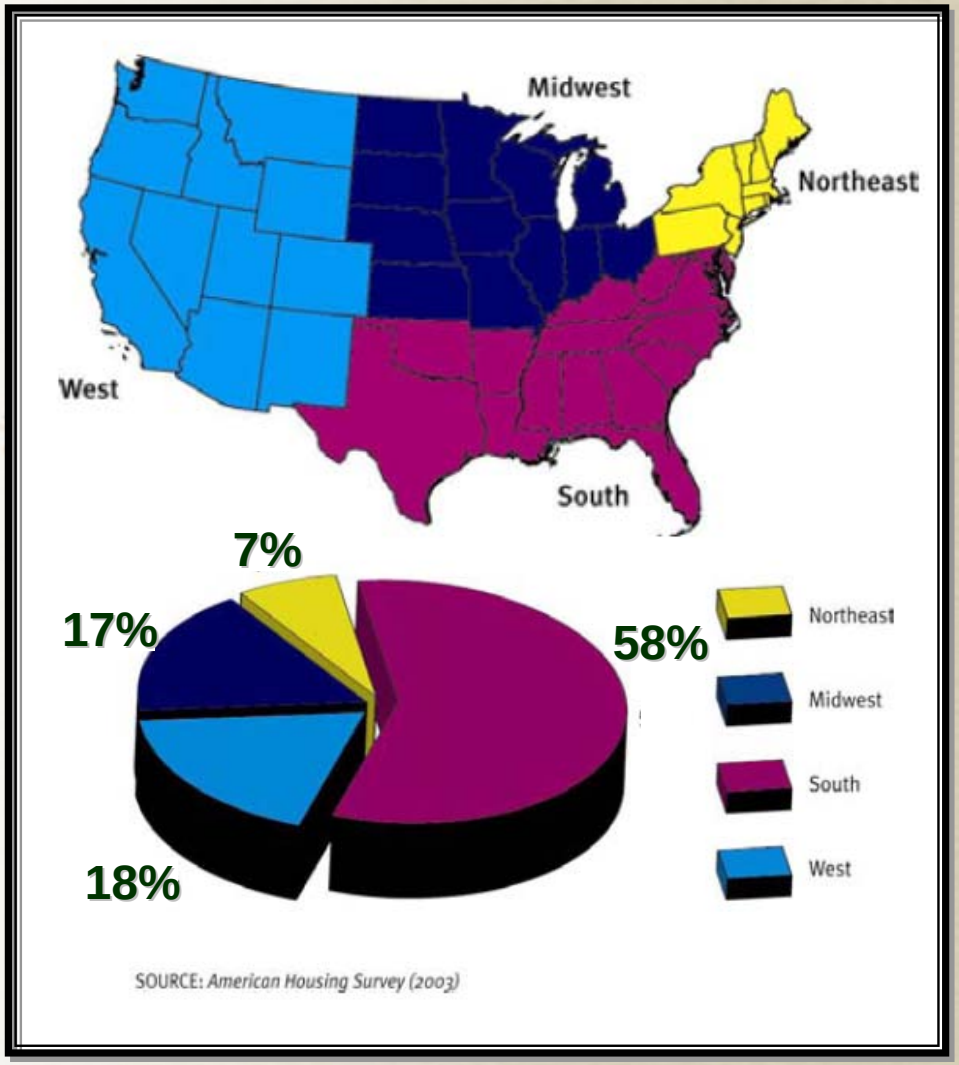
- **30,802** homes from **210** manufacturing facilities
  - **74%** multi-section
  - **26%** single-section

Average $ (excluding land)

- Single-section **$31,700**
- Multi-section **$59,800**



Where are They Going...



www.baihp.org

The Partners, Plan, Progress...

- Partners
  - Manufacturers
    - Palm Harbor Homes, Fleetwood Homes, Southern Energy Homes, Cavalier Homes
  - Suppliers
    - Stylecrest, LaSalle Air Systems, Tamarack Technologies
- Plan
  - Diagnostics: moisture (and energy) problems
  - Monitoring: document improvements and/or energy savings
  - Partnership: change in the design and manufacture of air distribution & ventilation systems
  - Training: conducting seminars and other educational activities.
- Progress
  - No reported moisture problems! And some energy savings too.

The “Opportunity” of Moisture

Moisture were experienced by a number of manufactured homes in the hot, humid climate of the Southeast United States.

Solving moisture “concerns” is the highest research priority of the HUD code industry. According to the Manufactured Housing Research Alliance (MHRA).

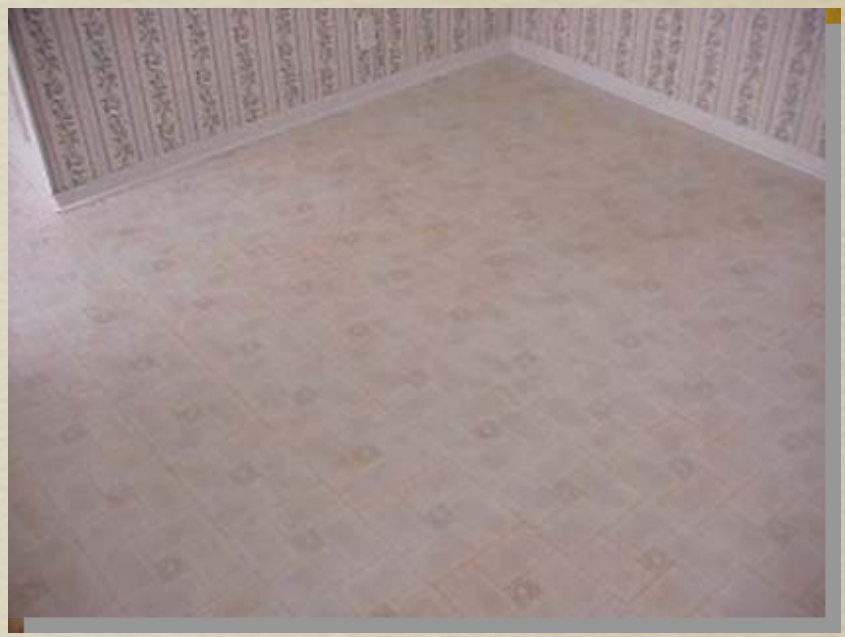
The “Opportunities”

- Repeat repairs resulting in recurring reports of retrogressing…
  - Going back again & again to repair a problem that just will not go away
  - Current repair strategy…
    - Replace damage product with same product
    - Look for water leaks (roof – plumbing)
    - Blame customer (in frustration)

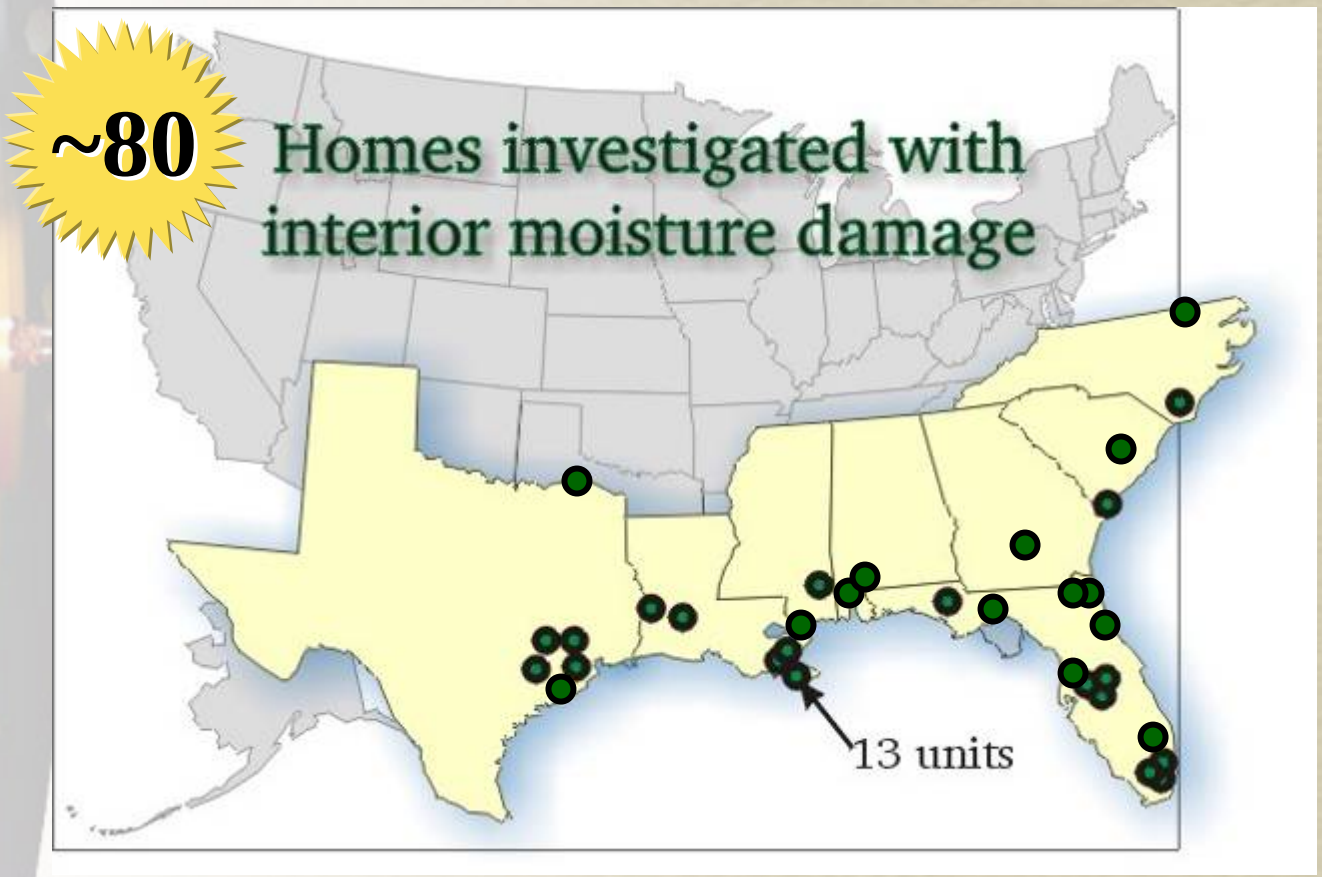
Why Were We There?

Unmitigated moisture problems

- Provide some understanding of moisture dynamics
- Emphasis on air transported water vapor
  - Conditions
  - Drivers (or causes)
  - Possible fixes



Where Investigated?



Opportunities: Envelope Integrity

- Damage to…
  - Floors
  - Walls
  - Ceilings

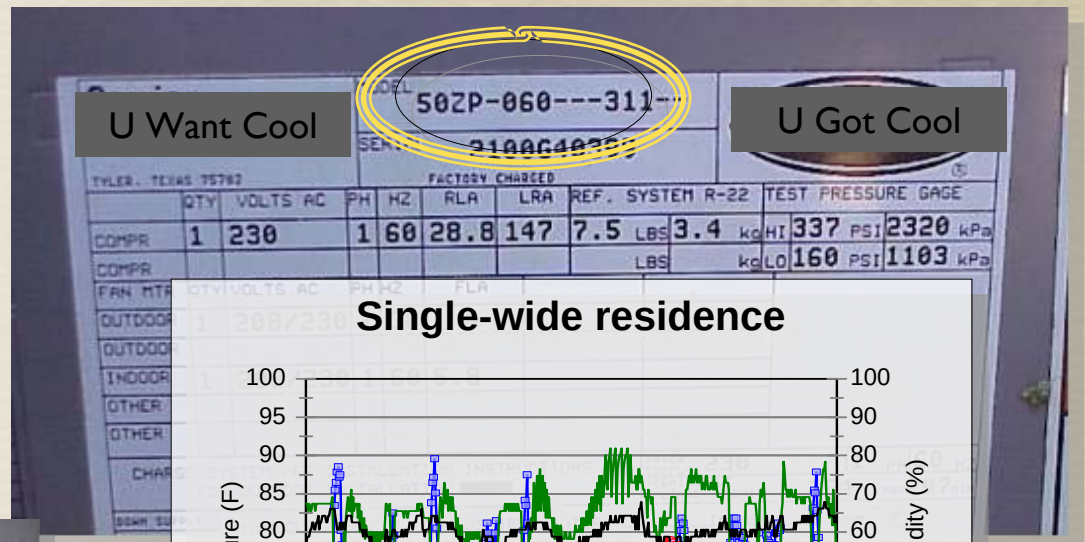
Opportunities: Biologicals

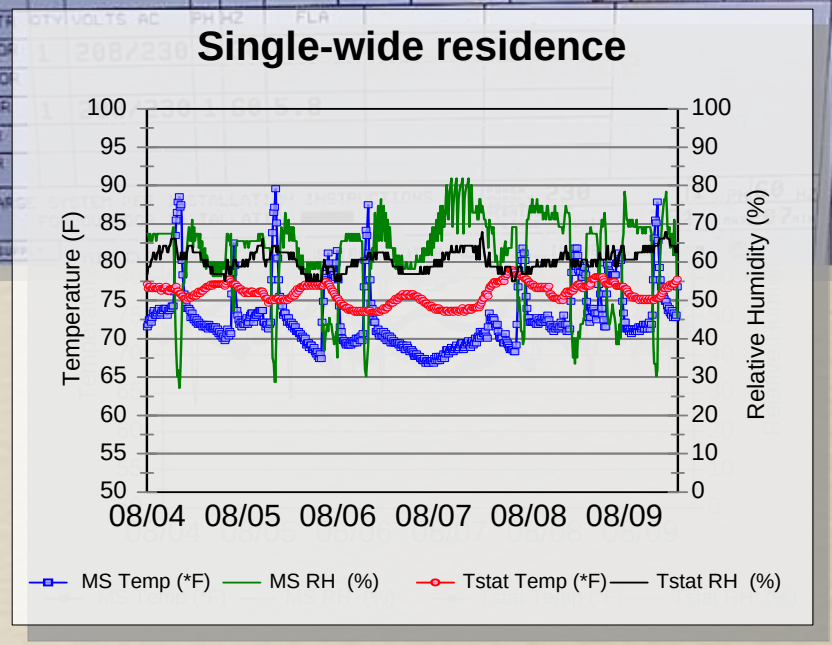
- Biological growth
  - Molds & Mildews

Opportunities: Comfort

Comfort complaints

- Cave syndrome
  - “cold & damp”
- Swamp thing
  - “warm & humid”

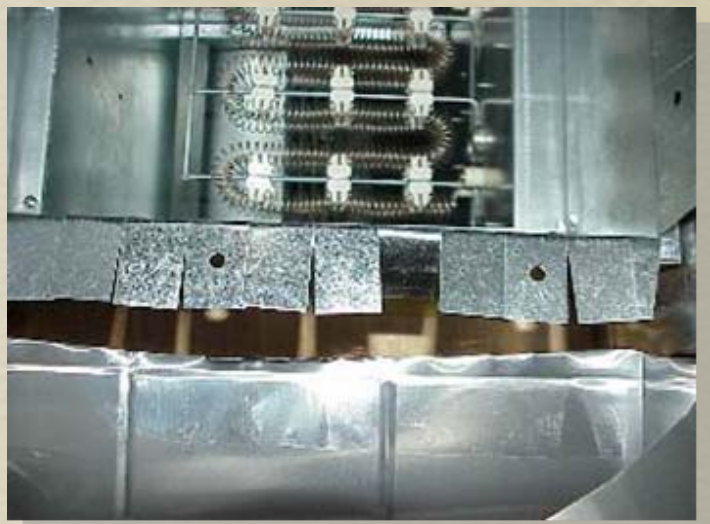




Opportunities: Energy

High energy bills

- Usually coupled with other problems
- House sold as energy efficient model



Opportunities for Research & Technical Assistance

- Industry Identified Need
  - Homes in Failure due to Moisture Problems
- Commonality
  - Located in Southeast (hot-humid)
  - At least one major repair attempt
  - Thermostat setting 68^{o} – 75^{o} F
  - Significant supply duct leakage
  - Vinyl wall or floor covering involved
  - Interior doors closed for extended periods
  - Belly board failure: numerous penetrations & tears
  - Ventilation systems usually not used

Presented paper: Moisture Problems in Manufactured Housing: Probable Causes and Cures. ASHRAE IAQ2001, San Francisco, CA, Nov 2001.

Air Distribution Dilemmas

"The Greatest Opportunity"

Unique Construction

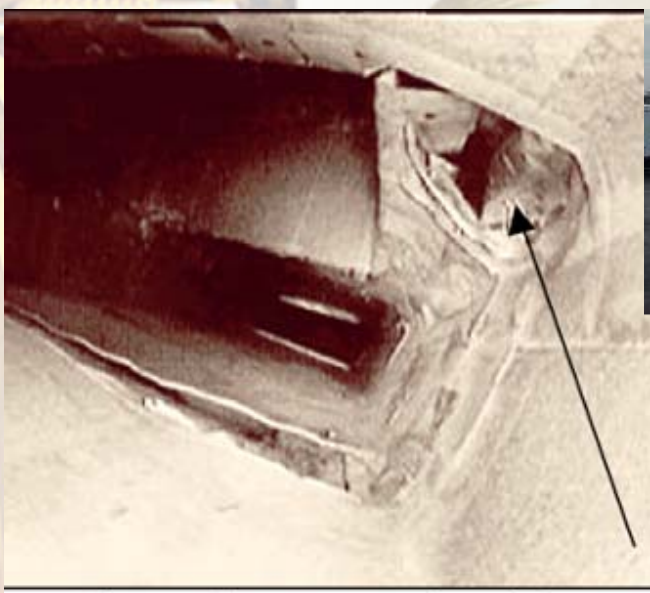
Field Installation problems

Model centers

Final Set-Ups

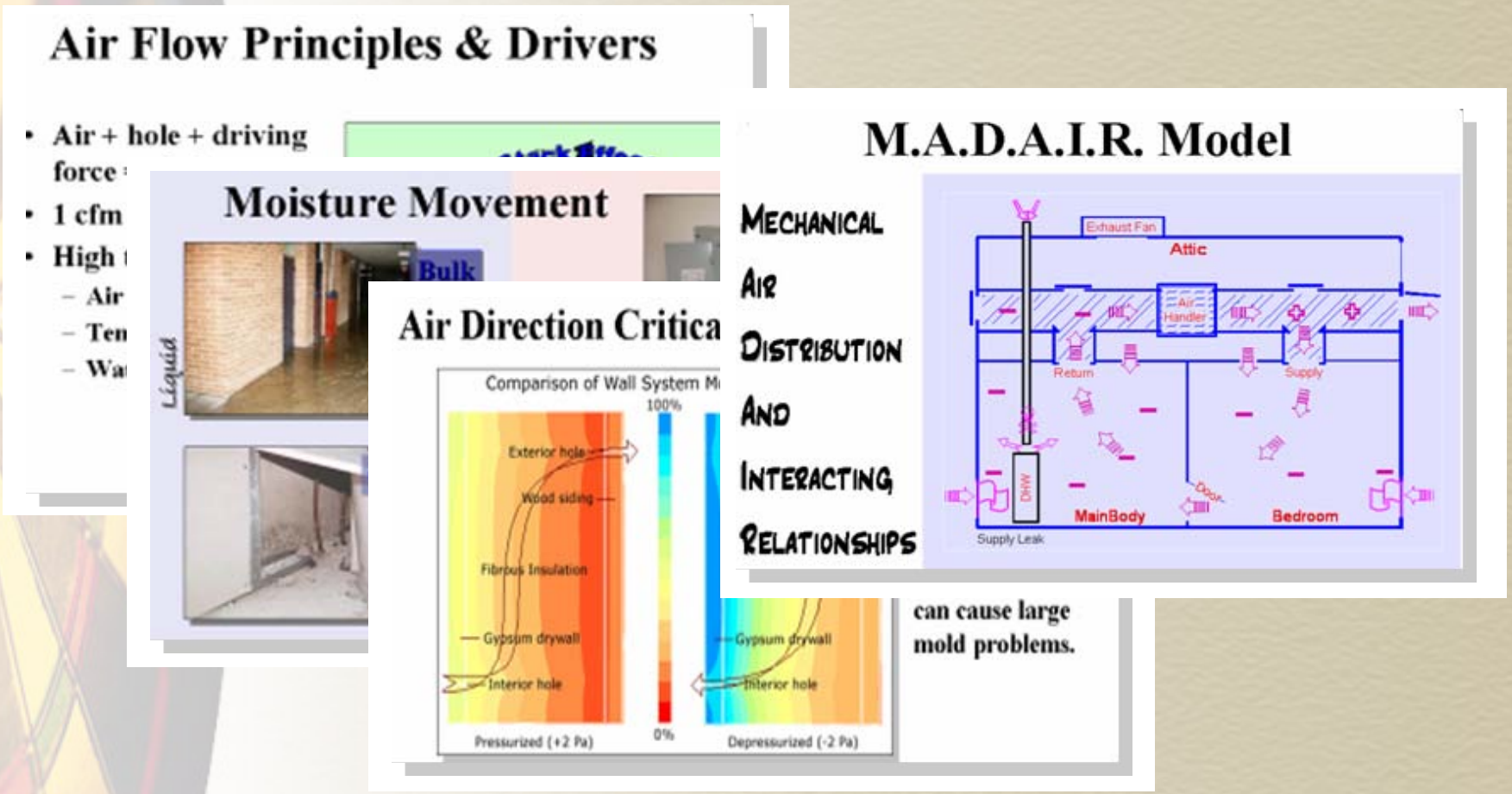
And The “13” in Louisiana…

	House wrt out
All fans off	-0.0 pa
Air handler (AHU) on & supply registers as found	-4.5 pa
AHU on & supply registers open	-2.5 pa
AHU on & all interior doors closed except hall	-4.5 pa
AHU on & all interior doors	-8.5 pa



View at plenum – note large hole

Providing Building Science Basics



Training

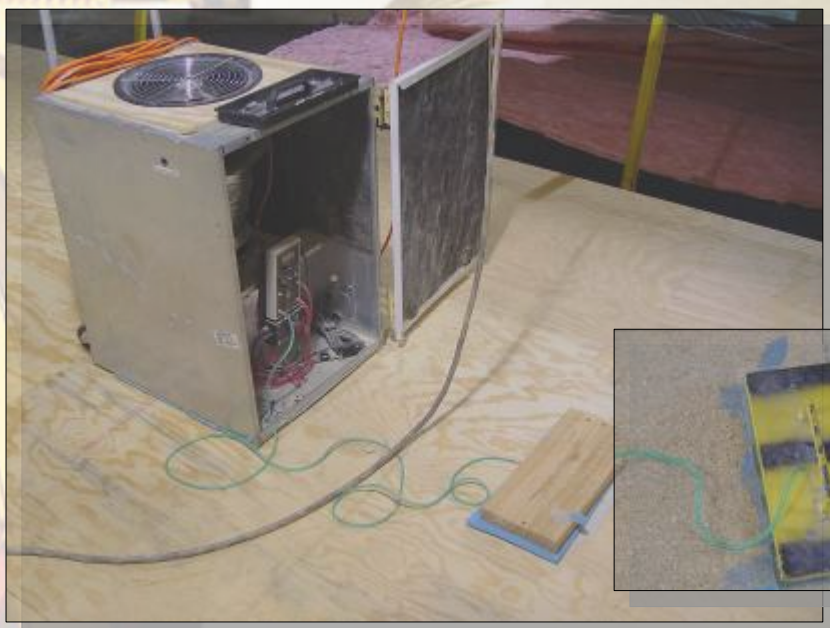
Moisture Diagnostics & Duct Systems

- Fleetwood
- Palm Harbor
- Southern Energy

Sealed
-&-
Tested

Target:
- < 30 cfm25/1000 sqft
- All factories

Sealed -&- Tested



Southern Energy Homes

Target:

- < 30 cfm25/1000 sqft
- 100% of floor systems
- All factories in Alabama

Mastic Sealed

Cavalier Homes, Inc.

FLEETWOOD

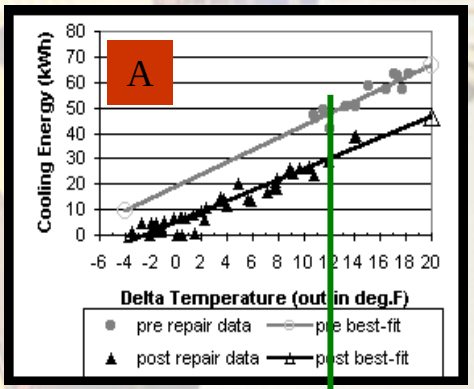
Target:

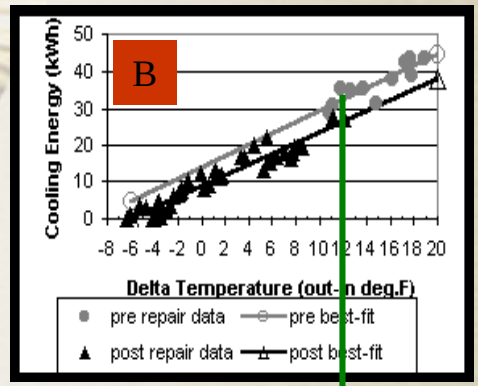
- Mastic used
- All factories

Duct Leakage Impacts

- Partners: Fleetwood, Stylecrest

House	Pre CFM25out	Post CFM25out	Pre airflow	Post airflow
A	167	31	1248	1355
B	114	23	1271	1421





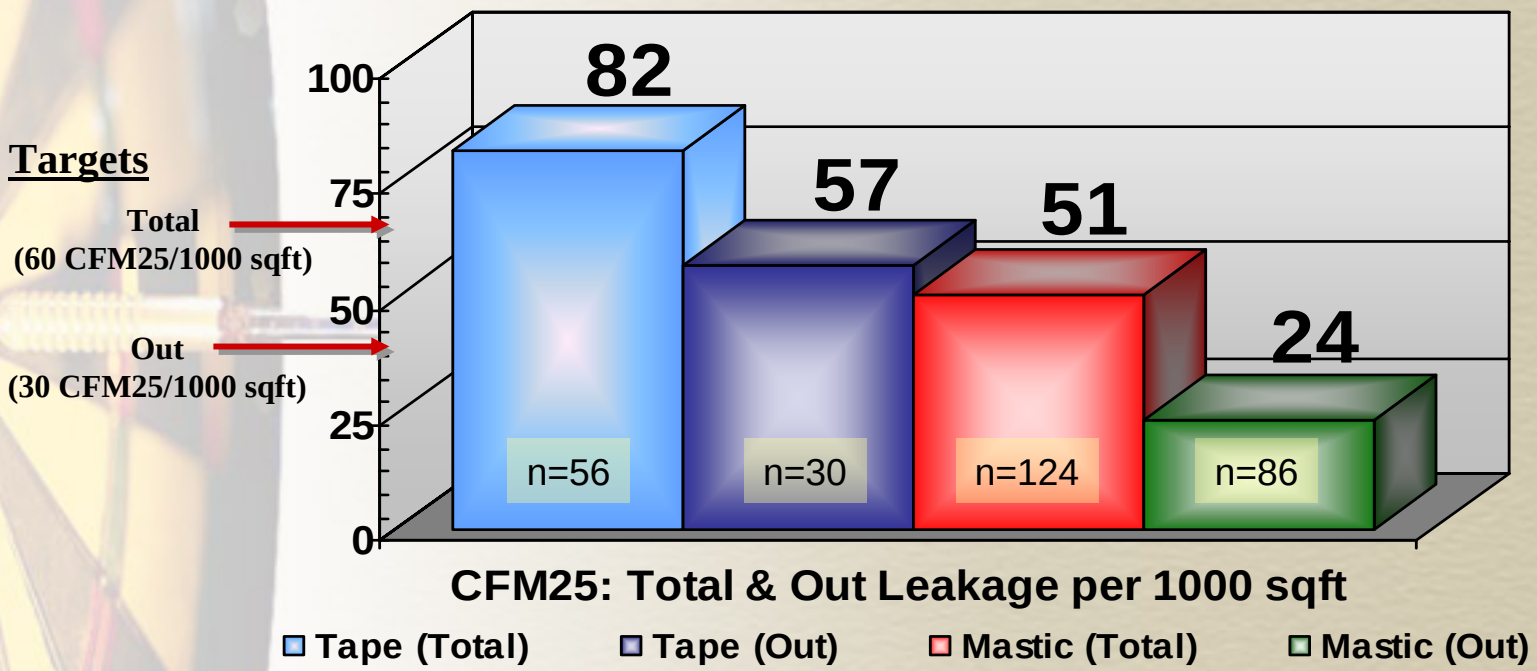
Cooling Energy vs. dT.

37 % savings

18 % savings

Presented paper:" Performance and Impact from Duct Repair and Ventilation Modifications of Two Newly Constructed Manufactured Houses Located in a Hot and Humid Climate", 13th Symposium on Improving Building Systems in Hot & Humid Climates, 2002, TX

BAIHP Duct Data Averages

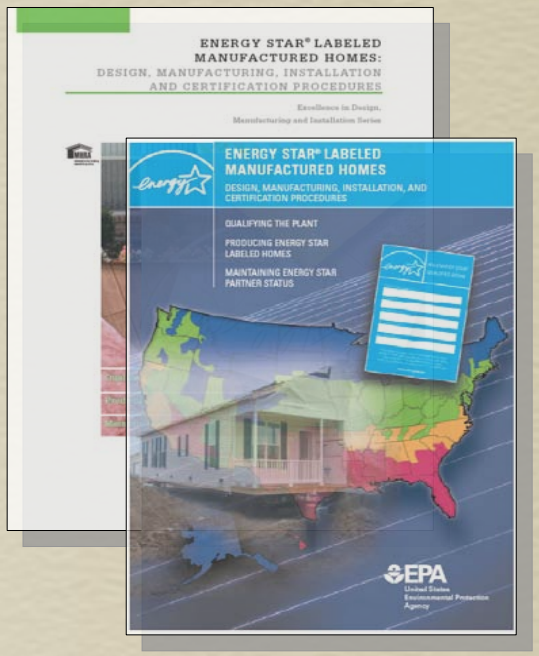


Material & labor Costs / floor: < $8
(about $0.09 per squarefoot)

Presented paper: Achieving Airtight Ducts in Manufactured Housing. Symposium on Improving Building Systems in Hot and Humid Climates, Richardson, Texas, May 2004.

EnergyStar Manufactured Homes

- Factory Qualification
- Factory Demonstration
- Field Sampling



In 2001, EPA introduced the ENERGY STAR label for manufactured homes. Guidelines focus on certification of the HUD-code plant and award the ENERGY STAR label to any homes manufactured to prescriptive design requirements. Revised in 2003

How to participate in ENERGY STAR - Certifying the Plant

1-Hire a Manufactured Housing ENERGY STAR Certifier

2-Design Homes To Meet ENERGY STAR Requirements

3-Incorporate ENERGY STAR Design Features into Quality Control and Inspection Procedures

4-Manufacture, Inspect, & Test Duct Tightness in the Plant

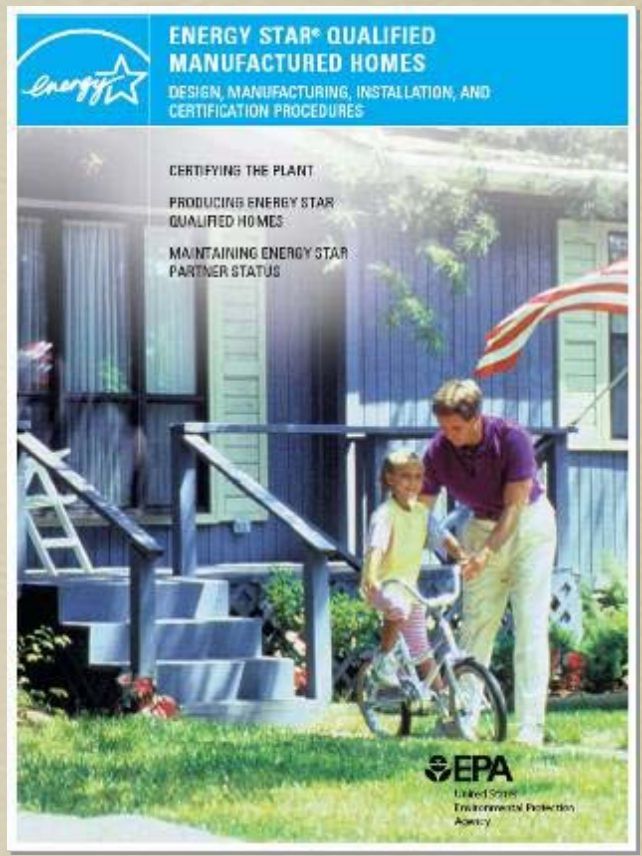
5-Develop Site Installation Checklist

6-Install, Inspect, & Test a Minimum of 3 Homes in the Field

7-Incorporate ENERGY STAR Practices into Operations

8-Establish ENERGY STAR Information Manager Account

9-Submit ENERGY STAR Partnership Agreement



www.energystar.gov/ia/partners/downloads/manufactured_procedures.pdf

How to participate in ENERGY STAR - Certifying the Plant

1-Hire a Manufactured Housing ENERGY STAR Certifier

Capabilities and Qualifications

MANUFACTURED HOUSING DESIGN, CONSTRUCTION AND INSTALLATION METHODS
(Must check all boxes below)

- Familiarity with Federal Manufactured Home Construction and Safety Standards
- Familiarity with plant production processes
- Familiarity with DAPIA/IPIA oversight processes
- Knowledge of manufactured home design, construction, installation, material use, and fabrication techniques

BUILDING SCIENCE AND ENERGY EFFICIENCY EXPERIENCE
(Must check at least one box below)

- Certified Home Energy Rating System (HERS) rater or provider
- Licensed Engineer or Architect
- Minimum 5 years of energy consultant experience

(Must check all boxes below)

- Hands-on experience conducting duct and whole-house air leakage measurements in manufactured (HUD-code) homes
- Experience and training in the principles of building science
- Experience and training in energy efficiency construction practices

DOCUMENT PREPARATION AND RECORD KEEPING
(Must check all boxes below)

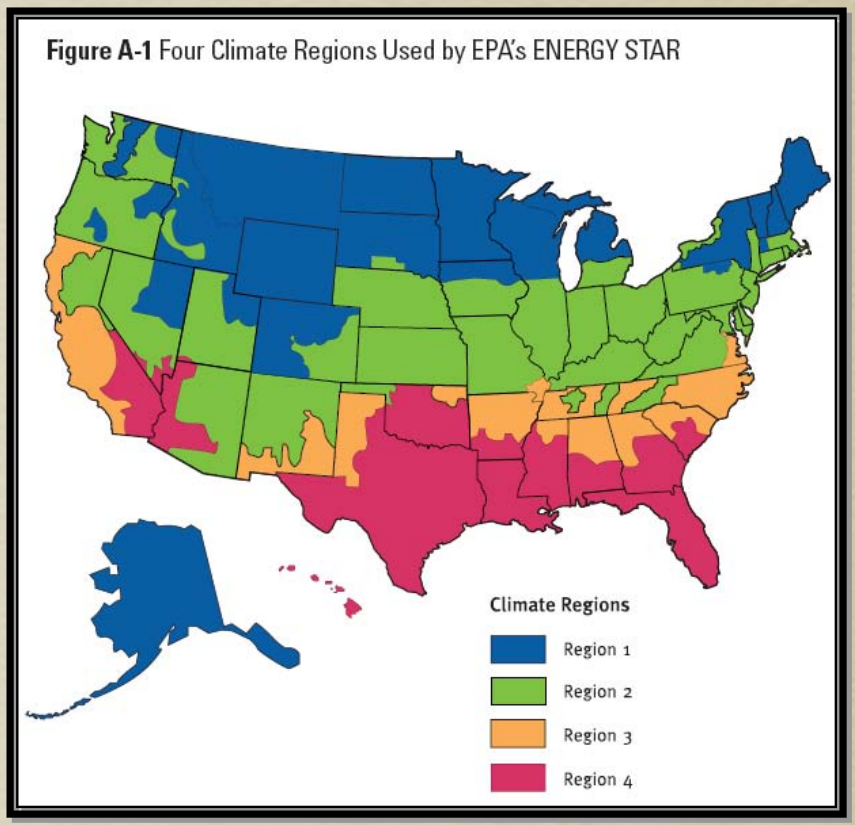
- Familiarity with HUD-required documentation for manufactured housing
- Capability to maintain computer records and communicate via email

How to participate in ENERGY STAR - Certifying the Plant

*2-*Design Homes To Meet ENERGY STAR Requirements

Finding the right package of energy measures is a two-step process

1. Select the climate region where the home will be installed.
2. Select from the packages of energy options provided for the chosen climate region.



Prescriptive Packages

CLIMATE REGION 4

Basic Requirements:

- Maximum shell leakage: 7.0 ACH_{50}
- Minimum cooling SEER: 12.0[19] (Except as noted)
- Minimum duct insulation: R-6

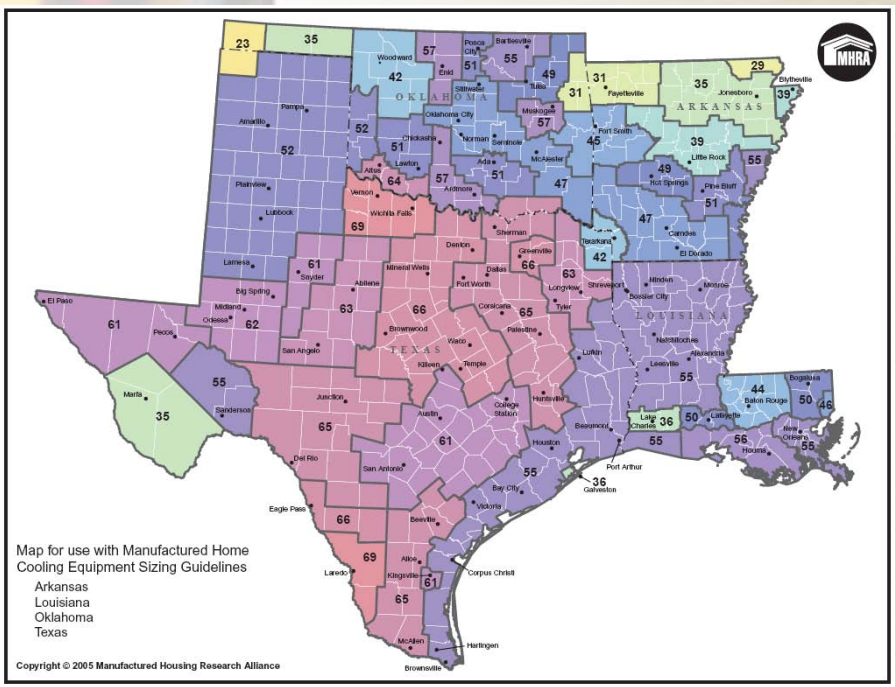
Packages for homes with maximum 3% duct losses

Heating Type	Minimum Heating Efficiency	Maximum Uo-value	Maximum Window SHGC	High Efficiency WH[20]	Programmable Thermostat	Package Number
Gas/Oil Furnace	0.80 AFUE	0.111	0.50			4-1
Heat Pump	7.2 HSPF	0.097	0.50			4-2
		0.104	0.50		✓	4-3
		0.108	0.50	✓	✓	4-4
Electric Resistance[21]	1.0 EF	0.074	0.40		✓[22]	4-5
		0.075	0.40	✓	✓[22]	4-6
Electric Resistance (Florida Only)[21]	1.0 EF	0.111	0.40		✓[22]	4-7
		0.114	0.40	✓	✓[22]	4-8

Packages for homes with maximum 5% duct losses

Heating Type	Minimum Heating Efficiency	Maximum Uo-value	Maximum Window SHGC	High Efficiency WH[20]	Programmable Thermostat	Package Number
Gas/Oil Furnace	0.80 AFUE	0.102	0.50			4-9
		0.116	0.50		✓	4-10
Heat Pump	7.2 HSPF	0.093	0.50			4-11
		0.100	0.50		✓	4-12
		0.105	0.50	✓	✓	4-13
	7.6 HSPF	0.102	0.50		✓	4-14
		0.106	0.50	✓	✓	4-15
	8.0 HSPF	0.104	0.50		✓	4-16
		0.108	0.50	✓	✓	4-17
Electric Resistance[21]	1.0 EF	0.070	0.40		✓[22]	4-18
		0.071	0.40	✓	✓[22]	4-19
Electric Resistance (Florida Only)[21]	1.0 EF	0.116	0.40		✓[22]	4-20

Manufactured Home Cooling Equipment Sizing Guidelines



For ENERGY STAR® qualified manufactured homes and homes built to the HUD standards

www.mhrahome.org/media/sizing/guidelines.pdf

Floor Area (square feet)	Up to 840		841 to 1,120		1,121 to 1,280		1,281 to 1,440		1,441 to 1,680		1,681 to 1,960	
Sizing Group		HUD		HUD		HUD		HUD		HUD		HUD
1	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	2	2
2	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	2	2
3	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	2	2
4	1	1	1.5	1.5	1.5	1.5	1.5	1.5	2	1.5	2	2
5	1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2	2
6	1	1	1.5	1.5	1.5	1.5	1.5	1.5	2	1.5	2	2
7	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2
8	1	1	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2
9	1	1	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2
10	1	1	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2
11	1	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2.5
12	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2.5	2.5
13	1	1.5	1.5	1.5	1.5	2	2	2	2	2	2	2.5
14	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2	2.5	2.5
15	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2.5	2.5	2.5
16	1.5	1.5	1.5	2	2	2	2	2	2	2.5	2.5	2.5
17	1.5	1.5	1.5	2	1.5	2	2	2	2	2.5	2.5	2.5
18	1.5	1.5	1.5	2	2	2	2	2	2	2.5	2.5	2.5
19	1.5	1.5	1.5	2	2	2	2	2	2	2.5	2.5	3
20	1.5	1.5	1.5	2	2	2	2	2	2.5	2.5	2.5	3
21	1.5	1.5	1.5	2	2	2	2	2.5	2	2.5	2.5	3
22	1.5	1.5	1.5	2	2	2	2	2.5	2.5	2.5	2.5	3
23	1.5	1.5	2	2	2	2	2	2.5	2.5	2.5	2.5	3
24	1.5	1.5	1.5	2	2	2	2	2.5	2.5	2.5	2.5	3
25	1.5	1.5	2	2	2	2.5	2	2.5	2.5	3	2.5	3
26	1.5	1.5	2	2	2	2.5	2	2.5	2.5	3	2.5	3
27	1.5	2	2	2	2	2.5	2	2.5	2.5	3	3	3
28	1.5	2	2	2	2	2.5	2	2.5	2.5	3	2.5	3.5
29	1.5	2	2	2	2	2.5	2	2.5	2.5	3	3	3.5
30	1.5	2	2	2	2	2.5	2.5	2.5	2.5	3	3	3.5
31	1.5	2	2	2.5	2	2.5	2.5	2.5	2.5	3	3	3.5
32	1.5	2	2	2.5	2	2.5	2	2.5	2.5	3	3	3.5
33	1.5	2	2	2.5	2	2.5	2	2.5	2.5	3	3	3.5
34	1.5	2	2	2.5	2.5	2.5	2.5	2.5	2.5	3	3	3.5

~or~ COMPUTER ANALYSIS TO CREATE ENERGY STAR DESIGNS

CALIFORNIA HOME ENERGY EFFICIENCY RATING SYSTEM

9400 Topanga Canyon Blvd., Suite 220
Chatsworth, CA 91311
818-407-1500 fax: 818-407-1188
Contact: Tom Hamilton
thamilton@cheers.org
www.cheers.org

ENERGY GAUGE USA

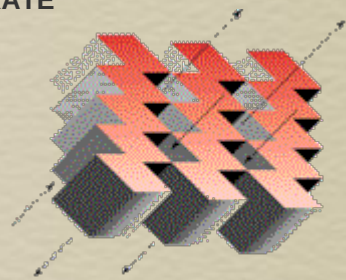
Florida Solar Energy Center
1679 Clearlake Road
Coca, FL 32922-5703
321-638-1492 fax: 407-638-1010
Contact: Tei Simmerman
engauge@fsec.ucf.edu
www.energygauge.com/USARes/default.htp

E-STAR COLORADO

1981 Blake Street
Denver, CO 80202-1272
303-297-7395 fax: 303-297-0948
Contact: Megan Edmunds
comments@e-star.com
www.e-star.com

REM/RATE

Architectural Energy Corporation
2540 Frontier Avenue, Suite 201
Boulder, CO 80301
303-444-4149 fax: 303-444-4304
Contact: Michael Holtz
AECinfor@archenergy.com
www.archenergy.com



TREAT

Taitem Engineering/Performance Systems Development
109 South Albany Street
Ithaca, NY 14850
607-277-1118
Contact: Ethan MacCormick
EmacCormick@PSDconsulting.com
www.psdconsulting.com/psd/treat.html

How to participate in ENERGY STAR - Certifying the Plant

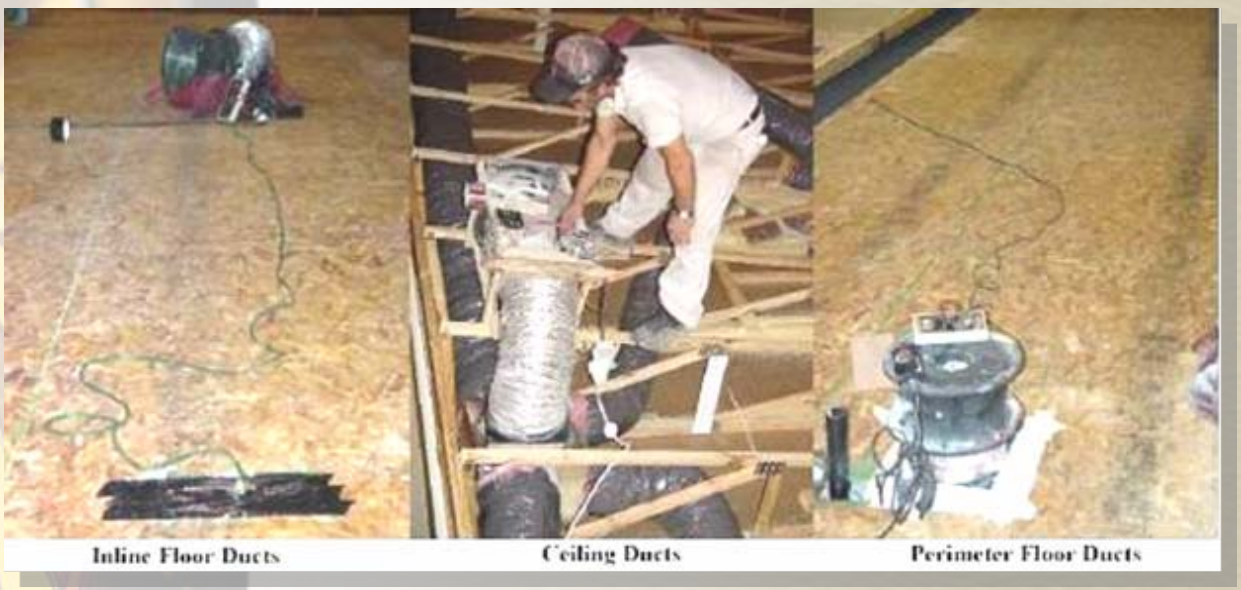
3-Incorporate ENERGY STAR Design into QC & Inspection Procedures

Information about the ENERGY STAR features in the new home designs must now be incorporated into the

- **Design Approval Primary Inspection Agency (DAPIA)-approved packages,**
- plant **Quality Control Manual**, and the
- **Manufacturers' Installation Manual.**

How to participate in ENERGY STAR - Certifying the Plant

4-Manufacture, Inspect, & Test Duct Tightness in the Plant



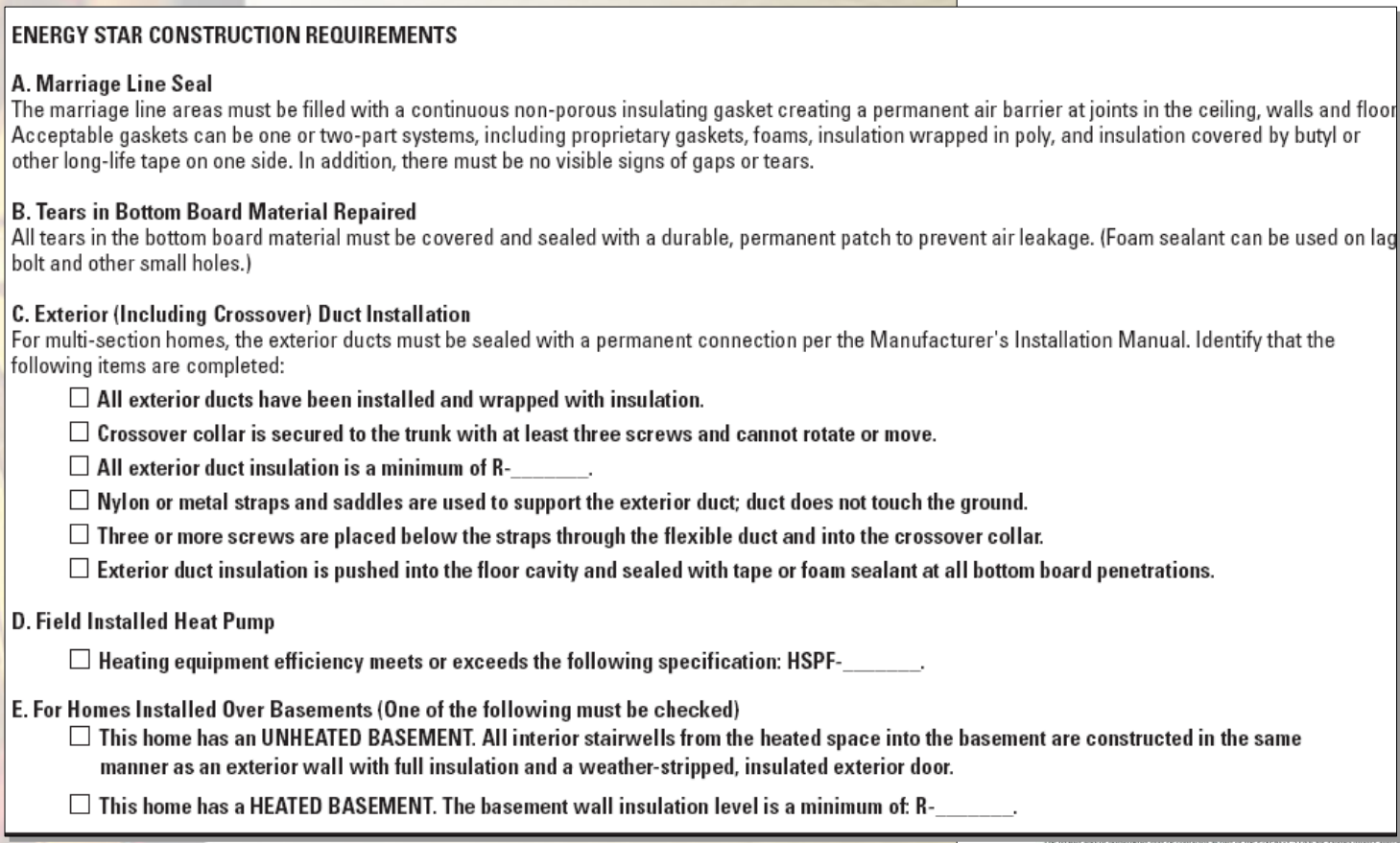
In-plant Duct Testing Incorporated into Production Line

The primary hurdle to certification is consistent production of tight duct systems.

Presented paper: Energy Star Manufactured Homes: The Plant Certification Process," Proceedings of ACEEE 2004 Summer Study, American Council for an Energy Efficient Economy, Washington, DC, August 2004

How to participate in ENERGY STAR - Certifying the Plant

*5-*Develop Site Installation Checklist



ENERGY STAR CONSTRUCTION REQUIREMENTS

A. Marriage Line Seal
The marriage line areas must be filled with a continuous non-porous insulating gasket creating a permanent air barrier at joints in the ceiling, walls and floor. Acceptable gaskets can be one or two-part systems, including proprietary gaskets, foams, insulation wrapped in poly, and insulation covered by butyl or other long-life tape on one side. In addition, there must be no visible signs of gaps or tears.

B. Tears in Bottom Board Material Repaired
All tears in the bottom board material must be covered and sealed with a durable, permanent patch to prevent air leakage. (Foam sealant can be used on lag bolt and other small holes.)

C. Exterior (Including Crossover) Duct Installation
For multi-section homes, the exterior ducts must be sealed with a permanent connection per the Manufacturer's Installation Manual. Identify that the following items are completed:

- ☐ All exterior ducts have been installed and wrapped with insulation.
- ☐ Crossover collar is secured to the trunk with at least three screws and cannot rotate or move.
- ☐ All exterior duct insulation is a minimum of R-_____.
- ☐ Nylon or metal straps and saddles are used to support the exterior duct; duct does not touch the ground.
- ☐ Three or more screws are placed below the straps through the flexible duct and into the crossover collar.
- ☐ Exterior duct insulation is pushed into the floor cavity and sealed with tape or foam sealant at all bottom board penetrations.

D. Field Installed Heat Pump

- ☐ Heating equipment efficiency meets or exceeds the following specification: HSPF-_____.

E. For Homes Installed Over Basements (One of the following must be checked)

- ☐ This home has an UNHEATED BASEMENT. All interior stairwells from the heated space into the basement are constructed in the same manner as an exterior wall with full insulation and a weather-stripped, insulated exterior door.
- ☐ This home has a HEATED BASEMENT. The basement wall insulation level is a minimum of: R-_____.

APPENDIX C

SAMPLE SITE INSTALLATION CHECKLIST FOR ENERGY STAR QUALIFIED MANUFACTURED HOMES

Note: This form can be automatically custom-generated for each home by the MHRA ENERGY STAR Information Manager

Home serial number

State Telephone

successfully completed.
e home (near the HUD data plate or the main electrical panel).

Telephone

City State

Telephone

State County

a permanent air barrier at joints in the ceiling, walls and floor.
lation wrapped in poly, and insulation covered by butyl or

atch to prevent air leakage. (Foam sealant can be used on lag

e Manufacturer's Installation Manual. Identify that the

e or move.

ot touch the ground.
e the crossover collar.
sealant at all bottom board penetrations.

ace into the basement are constructed in the same
terior door.
ium of: R-_____.

Date

o the home manufacturer at the address above.

able on the web at: http://www.mhrahome.org. This is a model

C.1

How to participate in ENERGY STAR - Certifying the Plant

6-Install, Inspect, & Test a Minimum of 3 Homes in the Field

✓ Inspect the installation and certify that the items on the Site Installation Checklist have been completed successfully

✓ Certify that the duct pressurization tests measuring air leakage to the outside

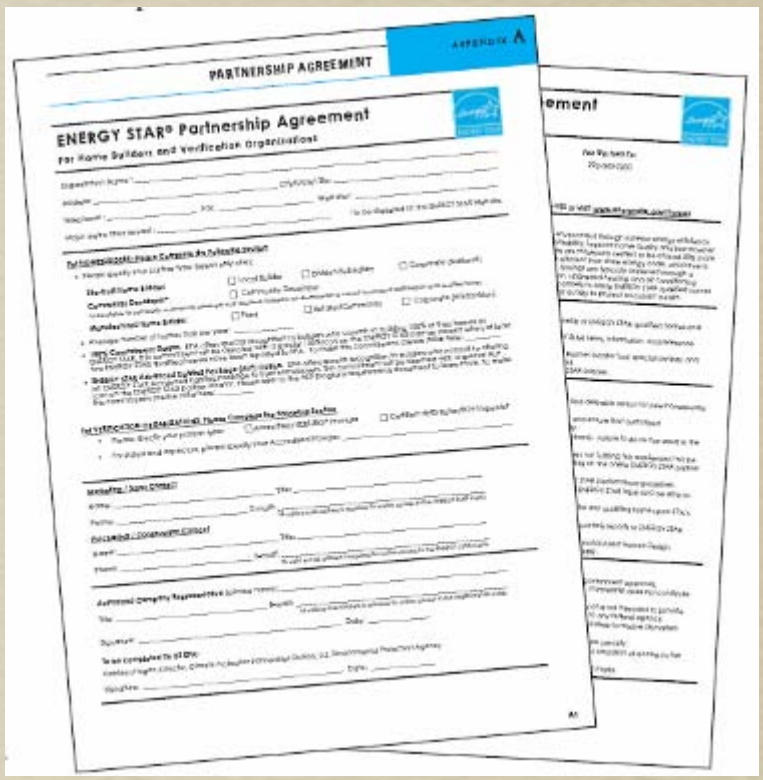
✓ Certify the shell leakage tests.

How to participate in ENERGY STAR - Certifying the Plant

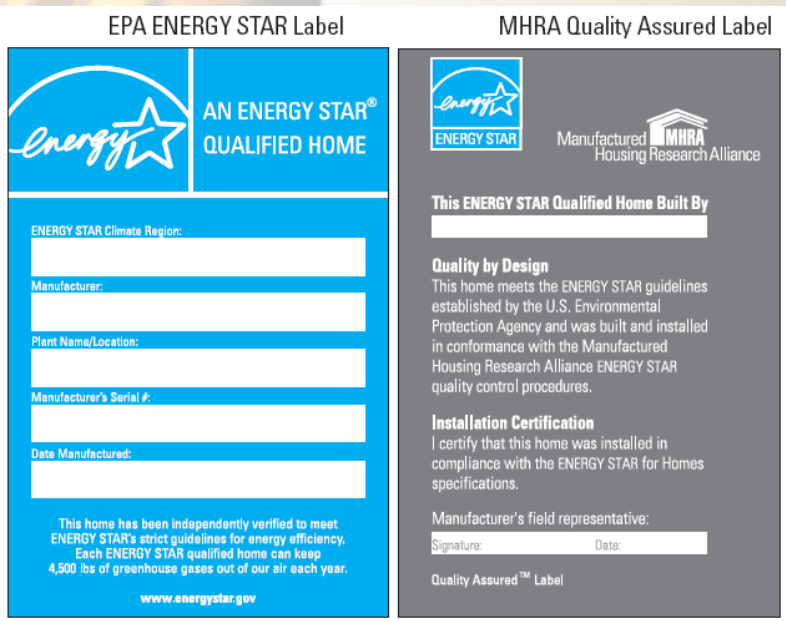
7-Incorporate ENERGY STAR Practices into Operations

8-Establish ENERGY STAR Information Manager Account

9-Submit ENERGY STAR Partnership Agreement



PRODUCING ENERGY STAR QUALIFIED HOMES



Manufacture and Inspect Homes in the Plant *[Plant Production Staff]*

Manufactures qualified homes in accordance with the designs created during the plant certification process.

Install and Inspect Homes in the Field *[Installer, Plant Rep]*

Plant representative (e.g., the factory field representative or retailer) uses the Site Installation Checklist developed during the plant certification process or custom-generated for each home by the MHRA ENERGY STAR Information Manager to monitor set-up.

Affix the ENERGY STAR Label and the Quality Assured Label *[Plant Representative or Plant Field Rep]*

Every qualified home must have an EPA-issued ENERGY STAR qualified home label and a Quality Assurance Provider label affixed to it.

Conduct Periodic Field Evaluations To Verify Performance *[Manufactured Housing ENERGY STAR Certifier]*

A plant must at all times retain an accredited ENERGY STAR Certifier responsible for conducting field evaluations on no less than 2 percent (2%) of its ENERGY STAR qualified homes sold and installed on a homeowner's site or a minimum of one home each calendar year, whichever is greater.

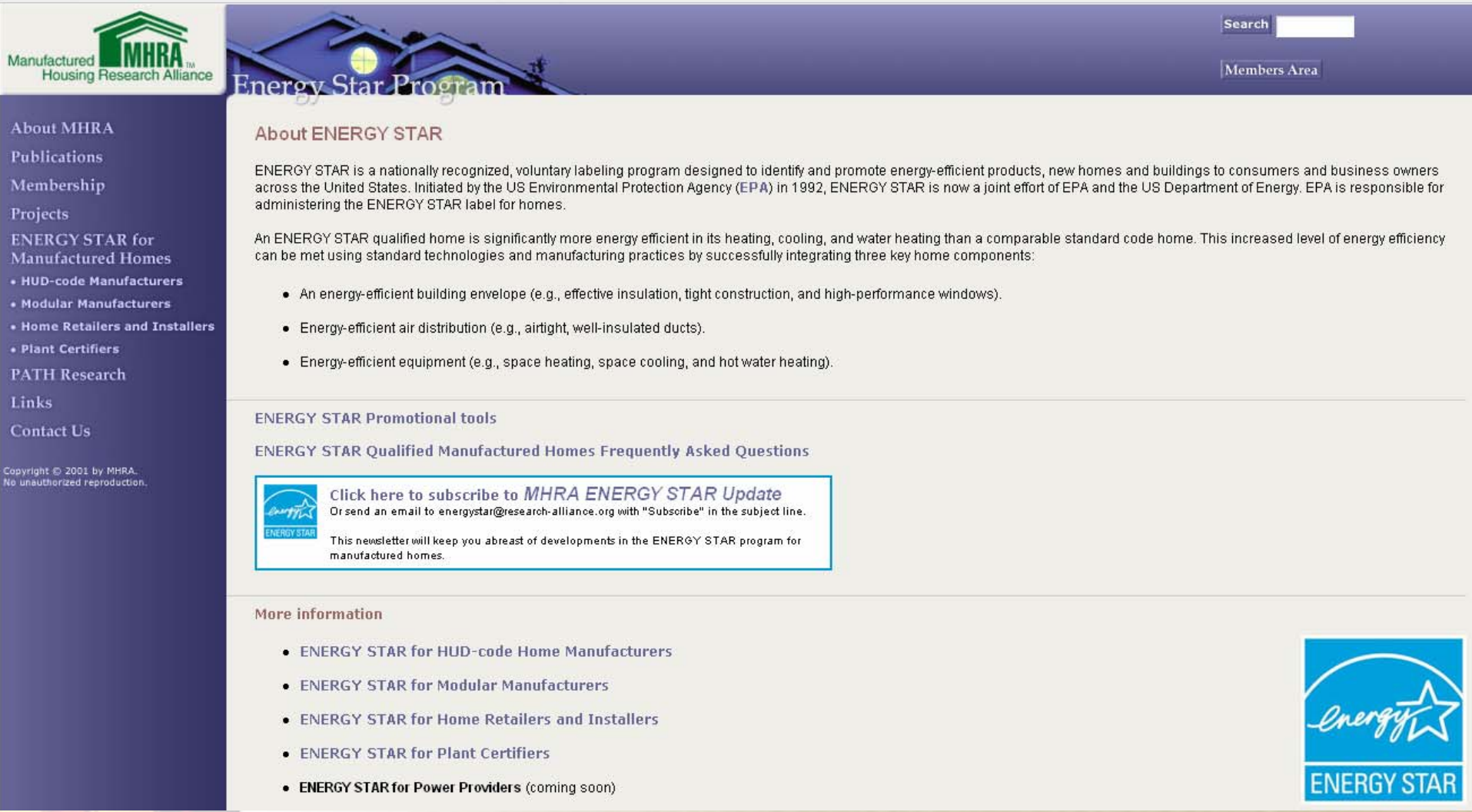
The Certifier's Role at a Glance

~ or ~

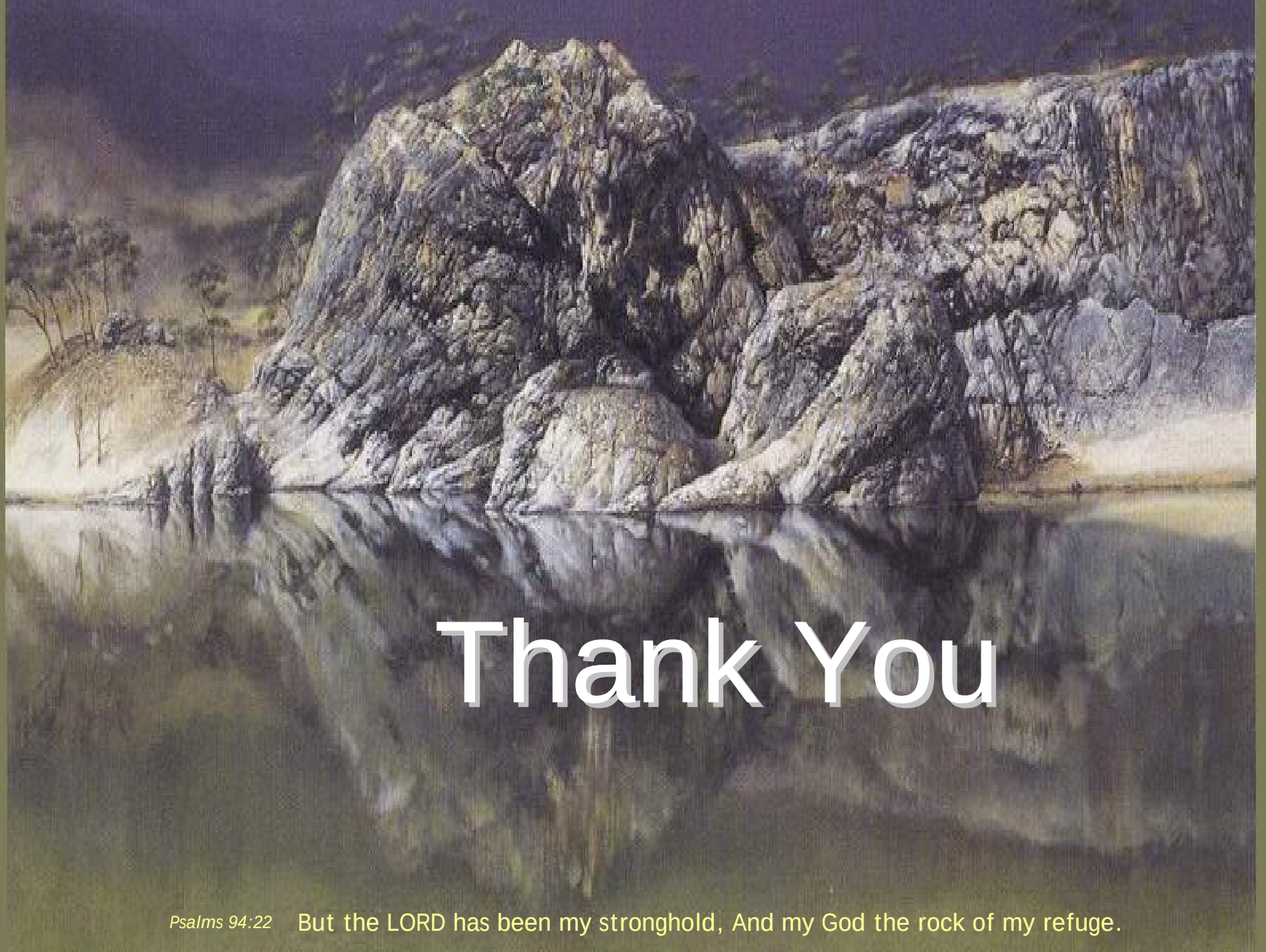
What does a Rater do?

- ✓ Oversee the plant qualification process
- ✓ Train plant production staff in ENERGY STAR techniques
- ✓ Review and if acceptable, approve plant processes and the plant's ENERGY STAR-related documentation including ENERGY STAR home designs, ENERGY STAR Site Installation Checklist, Quality Control Manual and the Manufacturer's Installation Manual.
- ✓ Conduct quality control inspection and testing of a representative sample of completed homes
- ✓ Participate in and contribute to periodic meetings regarding program quality control and oversight.

Stay Informed



www.mhrahome.org/pages/es_main.htm



Psalms 94:22 But the LORD has been my stronghold, And my God the rock of my refuge.