Bringing High Performance Building into the Mainstream

Do the Right Thing!
Systems in Place

- Low E Windows
- 2x6 Construction
- R30 to R38 Attic Insulation
- Unvented Roof Designs

Good Practices…
But, Needed a Comprehensive Plan to Quantify Energy Savings and Lead to the Next Level.
We Chose

• Recognizable sign of quality
• Measurable
• Third party verification
• A path to follow

Energy Star pre 2007

• These are just some of the energy features included in earlier Energy Star homes:
  – Low-E Dual Pane Windows
  – 13 SEER AC Unit
  – 80 AFUE Gas Furnace
  – Mastic Sealed and Tested Ducts
  – Return Air Paths
  – Insulation Inspections
  – Tight Construction (Blower Door Test)
Energy Star Home

• The Energy Star Home now (2007 and beyond) includes these additional items:
  – Thermal Bypass Checklist Compliance: Framing Details, Air Barriers and Insulation Alignment – 16 items to check!
  – Energy Star Product Category
  – Manual J 8 equipment sizing
  – Revised index based on tougher 2006 code
  – Indoor air program
  – Advanced lighting program

Getting Started

• Expert evaluation by Eric Shoberg
  – RESNET Energy Rater – Southwest Gas
• On-site visits
• Assess Current status
• Make a “hit list”
• Develop a plan
• Plenty of room for improvement
Conventional Building Practices
Conventional Building Practices

We Created New Specifications for Computer Modeling

• Mechanical (14 SEER AC & 93% efficient furnace) sized by Manual J
• Windows (.35U - .30SHGC)
• Insulation (R19-R38 standard)
• Commitment to Thermal Bypass Checklist
• 2x6 Walls
• Tyvek House Wrap
Computer Modeling Results

• We were able to meet the Energy Star Requirements!

• Better yet – with minor adjustments, we could meet the EPAct Standards.
• We could offer a savings of 50%
• We will qualify for a $2,000 per house tax credit!
Effect of Solar on Ratings

- Renewable Energy lowers HERS Index score, no effect on EPAct qualification
- Direct effect of annual load replaced.
- Sales Office Model 2627 went from 62 (projected score)
  - To 57 with Solar Hot Water
  - To 41 with 2.4 KW of photo voltaic
  - To 36 with actual tested infiltration and duct tightness included in calculations!

We Adjusted

- Redraw Trusses
  - Allow for proper duct runs
  - Allow for a full blanket of insulation
  - Build support for solar panels
- Use Advanced Framing Techniques
  - Corners
  - Intersecting
  - Headers
We Committed!!

All Future Pepper Viner Projects WILL be Built to this Standard!!
Or Beyond!!

High Performance – High Design Homes
We Prepared to Take Bids!

- Identified key areas – mechanical, framing, insulation and stucco
- Created High Performance work scopes
- Defined new procedures

We Prepared Our Trades to Bid!

- Educated Trade Partners
  - Scopes were different
  - Not necessarily more expensive
- Brought in Experts
  - Shared knowledge from manufacturers
- Conducted individual meetings to alleviate fears
Ready to Build

• On-site Meeting with all Trade Partners
  – Fully explain our direction
  – Set the tone for our future
  – Show Benefits for complete buy-in
• Project Managers given additional monitoring responsibilities

Under Construction

• Constant monitoring necessary
• Issues must be identified as they arise
• Fine tune best construction practices
• Redline plans
• On-going 3rd party testing and inspection
Performance Testing

• There is only one way to ensure that the performance predicted on paper is achieved in the field.

• Performance testing and inspection of key elements in the field
  – Insulation
  – Air Barrier and Thermal Bypass
  – HVAC (Ducts, Air Flow, Sizing)
  – Infiltration

Advanced Framing Works!

• Thermal Imaging identified hot spots and better practices fixed them.
  – Headers
  – Corners
  – Intersections
  – Tubs
  – Fireplaces
  – Soffits
The Results Are In

Corner

The Results Are In

Dropped Soffit
High Performance is Really Just Proper Performance!

You Have to Market It
The Best Advertising is When Others Do Stories About You!

And it is Free!
Keep Moving Forward

• Keep learning
• Be open to different approaches
• Build test houses
• Don’t get in a new box

Thermal Bypass

• Look for a Better/Easier Way
• Try SIPs for walls
• Try Icynene at roof deck
• Stop all air movement
• Reduce mechanical size again
Meet the Standard of Energy Star IAP

Partner with Good People

- Southwest Gas
  - Energy Efficient Technologies Dept
- BASF
  - Building and Construction Markets
- Energy Star
  - EPA
- Builder’s Challenge
  - Dept of Energy
- DuPont Tyvek
New Technology

- Solar Heating/Water Heating
- New Heat Pump Technologies
- Look for Energy Generating Systems to Heat/Cool/Create Power
“Reducing energy demand through efficiency and consumer choice: the often overlooked energy option.”

Jim Wells, Director
Natural Resources & Environment
U.S. Government Accountability Office
“What is a home that is built to current energy code?
The worst home allowed by law.”

Jack Armstrong
Director, Building & Construction Markets
BASF Corporation

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