

# 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



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## Conventional Building Practices

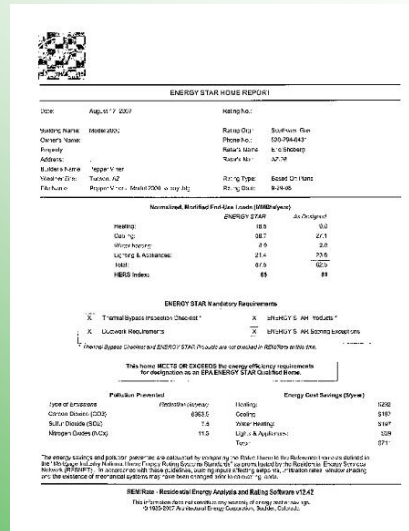


## We Created New Specifications for Computer Modeling

- 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

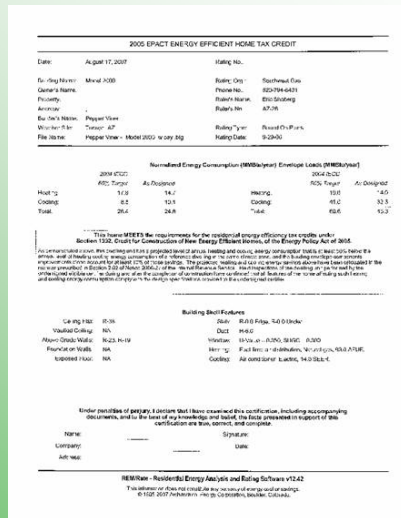
# Computer Modeling Results

- We were able to meet the Energy Star Requirements!



# Computer Modeling Results

- Better yet – with minor adjustments, we could meet the EAct 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 EPA Act 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 3<sup>rd</sup> party testing and inspection

## Performance Testing

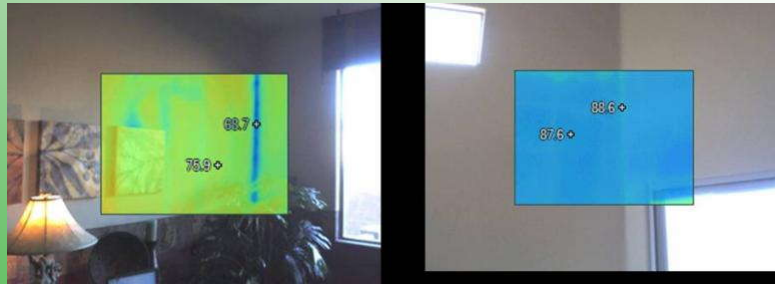
- There is only one way to ensure that the performance predicted on paper is achieved in the field.
- Performance testing and inspection of key elements in the field
  - Insulation
  - Air Barrier and Thermal Bypass
  - HVAC (Ducts, Air Flow, Sizing)
  - Infiltration

## Advanced Framing Works!

- Thermal Imaging identified hot spots and better practices fixed them.
  - Headers
  - Corners
  - Intersections
  - Tubs
  - Fireplaces
  - Soffits

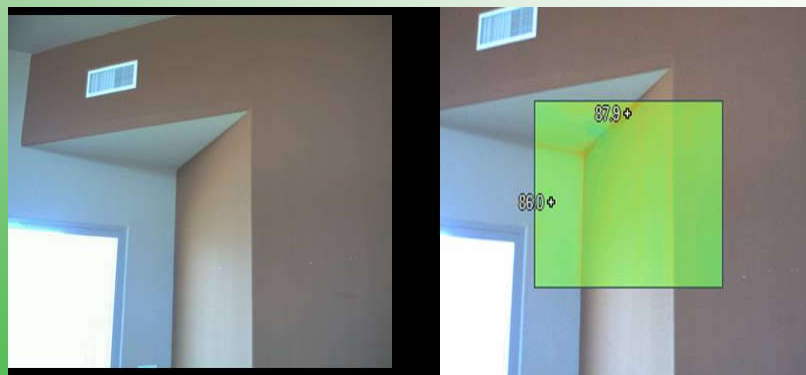
## The Results Are In

Corner



## The Results Are In

Dropped Soffit



High Performance  
is Really  
Just Proper  
Performance!

You Have to  
Market It

## Live Green at Civano North Ridge



**CONSERVE ENERGY  
COMPACT FLUORESCENT  
REFLECTOR BULBS**  
Look at your savings! Using just 24 of these bulbs saves enough energy to light the average home for 4 years, representing 18,000 K watts of electricity!



**UNVENTED ROOFS  
WITH INSULATION  
TO THE ROOF DECK**  
All mechanical systems, including heating and cooling vents, run inside an insulated envelope for greater efficiency.

### THIRD PARTY TESTING

Your new home is third-party tested to verify it meets all energy saving benchmarks. Testing includes:

- Thermal bypass checklist
- Insulations inspection
- Duct testing for leakage
- Whole house tightness testing with blower door test



### TRUSS/DUCT INSULATION

**We're Building for Your Future!**  
Trusses are sized to allow energy efficient duct runs without compromising insulation for lasting energy savings, and they are reinforced to support solar panels so homeowners can take advantage of even more savings!



### ENGINEERED LUMBER

Reduces environmental impact while providing a stronger, structurally advanced framework for your home.



**DUCTWORK**  
Ductwork connections are carefully mastic sealed and fully insulated. Third-party testing for leaks insures your energy savings.

### GREEN BUILDING

A whole systems approach through design and building techniques to minimize environmental impact and reduce the energy consumption of the home while contributing to the health of its occupants.

At Pepper Viner Homes, we're proud to do our part.

### ADVANCED FRAMING

Advanced framing techniques allow us to insulate areas equal to 150 to 200 square feet which were previously left uninsulated, greatly reducing the heat and cooling gain and loss.



- Energy Star lighting including compact fluorescent bulbs
- Energy Star rated low E windows
- Energy Star appliances
- Every home earns the Energy Star Label



A technologically advanced house wrap that keeps moisture out, but lets your home breathe.

- CARPET • PAINT**
- Recyclable carpet
  - Low VOC carpet pad
  - Low VOC interior paint
  - Zero VOC paint is available



The electricity in this model is being produced by optional solar panels.

### \$ SAVE GREEN \$

**We give you credit!**  
Each Civano North Ridge home has a solar hot water heater with a solar hot water heater back up. You receive the tax credit after closing!

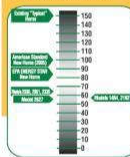


### SUPERIOR INDOOR AIR QUALITY!

- Allergens are reduced
- Fresh air intake through return air ducts
- Better control of air quality
- Greatly reduced toxic emissions from construction products
- Tighter home reduces dust

### HERS INDEX (Home Energy Rating System)

We're exceeding the standards! All Civano North Ridge models rate well ahead of even Energy Star Rated homes.



### ENERGY POLICY ACT OF 2005

- The most stringent policy ever adopted by the United States Department of Energy.
- Every Civano North Ridge model meets or exceeds this standard
- Earned Tax Credits are received on each home to offset the cost of energy saving technology



### HIGH PERFORMANCE

- 14 Seer air conditioning
- Digital programmable Thermostat
- Zone damper controls for better comfort
- 80% efficient gas furnace
- HVAC system is properly sized for optimal energy efficiency and comfort in the home

ENERGY EFFICIENT • DURABLE • COMFORTABLE • ENVIRONMENTALLY FRIENDLY • HEALTHY

# 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



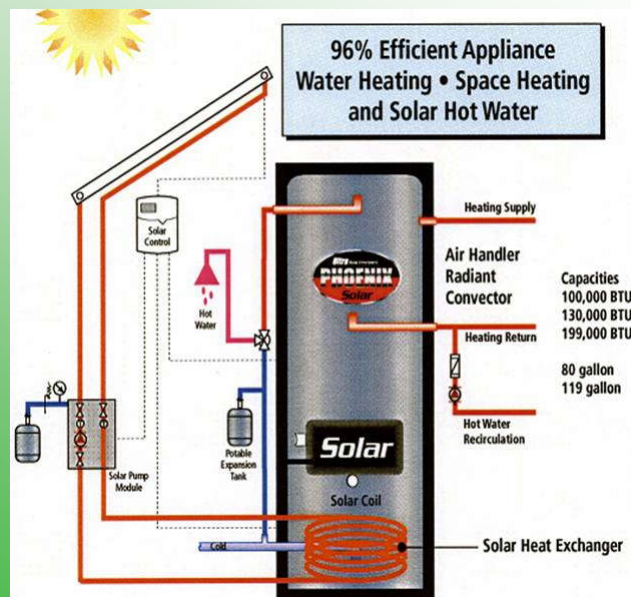
# Meet the Standard of Energy Star IAP

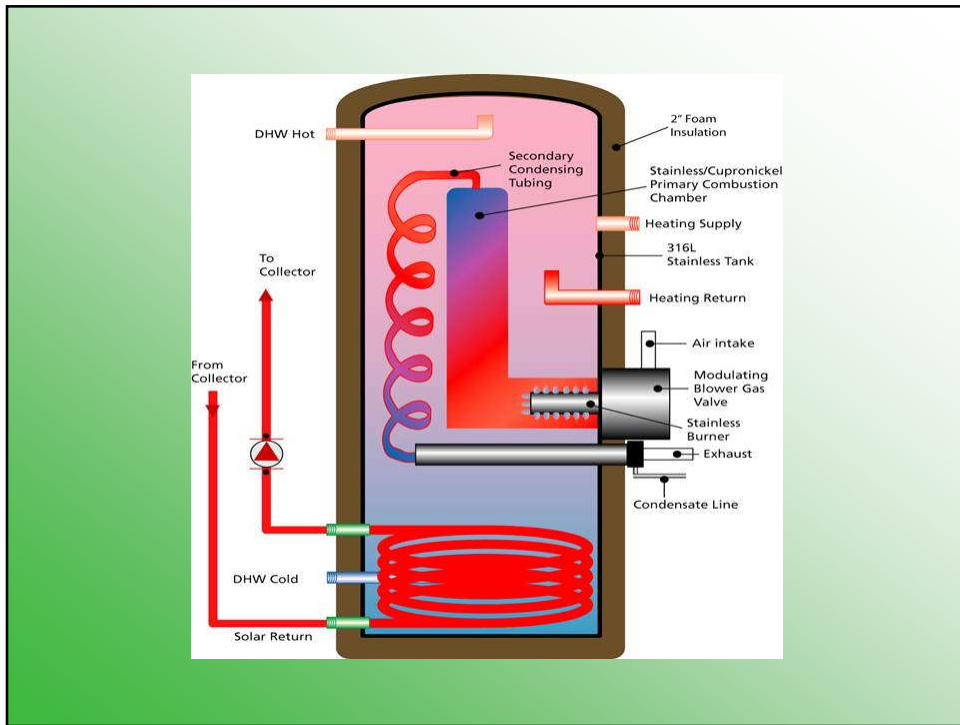
## Partner with Good People

- 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*

 PEPPER VINER HOMES

Do the Right Thing!