Building Certificates in the United States

What is RESNET and How Does Certification Work in the USA?

Steve Baden, Executive Director
Philip Fairey, President

Web site: *resnet.us*

What is RESNET

- An industry-based, not-for-profit membership corporation
  - Membership composed of program administrators, raters and allied industries
  - Governed by a board of 21 elected by membership
- A national standards making body for building energy efficiency rating and certification systems in the USA
  - Consensus-based standard development and amendment process
  - Transparent review and adoption process – formal public review and comment process

Services Provided by RESNET

- Insurance Coverage for Raters
  - Professional Liability (Errors & Omissions)
  - Business and Property (General Liability) membership
- Information portal for consumers, builders, and the media to find detailed information on ratings and certified Raters (RESNET rater web directory)
- Advocacy with government agencies and financial markets to monetize improved building energy performance and reduced carbon emissions

History of Ratings in USA

- **1992:** Energy Policy Act (EPAct 92) calls for U.S. Department of Energy (DOE) to promulgate rule for Home Energy Rating Systems (HERS®)
- **1993:** U.S. Department of Energy creates HERS Council to draft rules
- **1995:** RESNET formed by mortgage industry and National Association of State Energy Officers (NASEO)
- **1996:** U.S. DOE rule for voluntary HERS fails
- **1999:** RESNET creates first national HERS Standards, which are subsequently adopted by NASEO
- **2006:** RESNET adopted major revisions to national HERS Standards

Home Energy Rating System
National Oversight Structure

RESNET
&
Mortgage Industry
National Home Energy Rating System Standard

Rater Training and Certification

Program Administration

Technical Standards

Accredited Home Energy Rating System Provider
* certifies raters
* provides software
* provides quality control / oversight of raters

Certified Rater
(Independent Contractor or Employee)

Home Owner

Who Recognizes RESNET

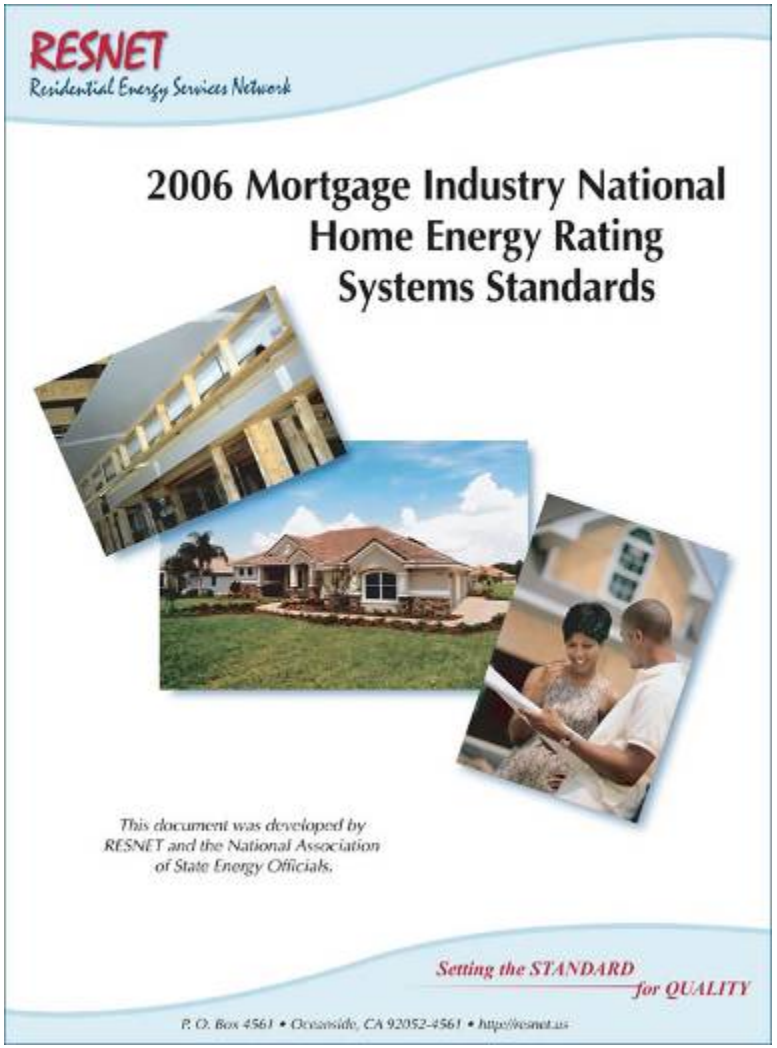
- Mortgage industry for capitalizing energy efficiency in the mortgage
- Financial markets for certification of “white” certificates
- Federal government agencies
  - IRS for tax credit qualification
  - U.S. EPA for ENERGY STAR home qualification
  - U.S. Department of Energy for *Building America Challenge* qualification
- States for energy code compliance in 16 states.

Results of a Rating

- Recommendations for cost-effective improvements that can be achieved by the Rated building
- Rating report containing the following:
  - The HERS® Index
  - Estimated annual energy consumption and carbon emissions
  - Estimated annual energy cost
- Other possible results:
  - Attribute trading (carbon, renewable energy, etc.)
  - Qualification for ENERGY STAR program
  - Qualification for federal income tax credits
  - Qualification for energy efficient mortgage
  - Compliance with energy codes

RESNET Standards

- Administrator Accreditations
  - Rating Providers
  - Training Providers
  - Software Providers
- Technical Standards
  - Reference and Rated building configurations
  - Operating conditions
  - Calculation procedures
  - Minimum rated features
  - Software verification



Standards Development

- Proposals accepted from any interested party
- Proposals reviewed by appropriate RESNET Standing Committee (SC)
  - Recommendation by SC to Board of Directors to either accept, accept with modifications or deny
- Proposals posted on RESNET web site for minimum of 30 days for public comment
- Public comments reconciled by appropriate Standing Committee(s) with final recommendation to Board
- Board votes on final SC recommendation
- RESNET Standards Revision committee must approve or deny final Board vote

Rater Certification

- Raters are certified by Rating Provider organizations
- Rater knowledge and skill sets specified by RESNET Standards
- Training Providers accredited by RESNET
  - Curricula approval
  - Instructors certified by RESNET (exam)
- Rater candidates must pass national online core exam
- Rater candidates must perform 5 ratings in the field under supervision of certified rater
- Rater candidate may then be certified by accredited RESNET Rating Provider

Quality Assurance

- Each Rating Provider organization required to employ certified Quality Assurance Designee
- QA Designee must independently verify internal consistency of 10% of all building input files
- QA Designee must independently verify the accuracy of 1% of each Rater's homes in the field
- RESNET monitors Rating Provider compliance with using annual Provider reporting and audits.

Rating System Advantages

- It is **the** national “yardstick” for home energy performance – the necessary standards exist
- A cadre of trained, certified professionals to provide advice, inspection and testing exists
- It provides a streamlined process for energy efficiency improvements over time
- It provides a consistent, consumer-friendly metric for making purchase decisions (like mpg)
- It is likely to encourage more rapid adoption of “beyond code” programs (already used).

Some Recent Stats

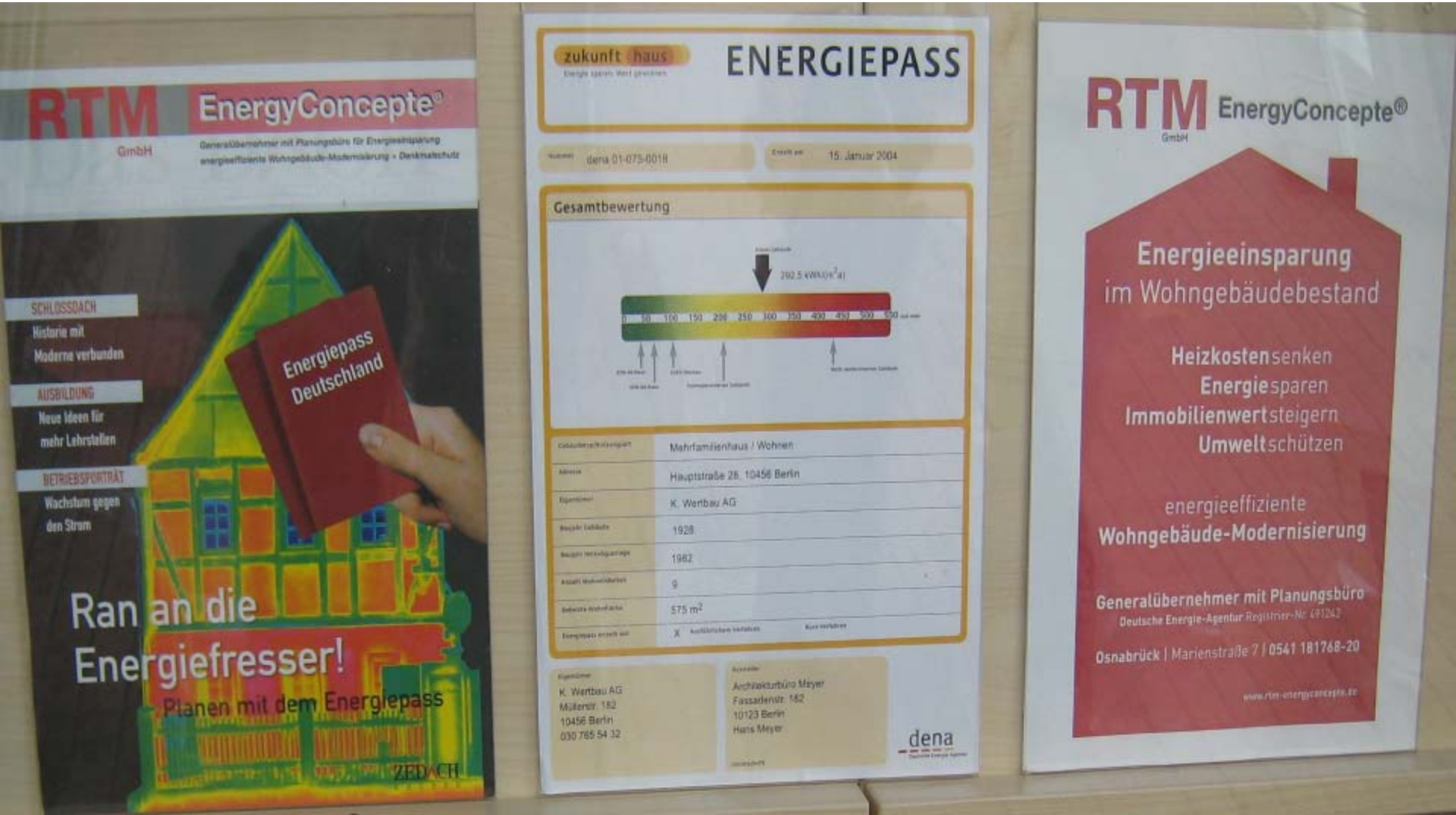
- United States now has more than 5,000 certified raters, covering every state in the USA
- There are 80 accredited Rating Providers
- There are 24 accredited Training Providers
- There are 2 accredited Software Providers
- More than 165,000 new homes were rated in 2006, representing approximately 10% of U.S. housing starts.

2007 RESNET Rater Map

International Collaboration

- EU EPBD Concerted Action
  - 2005: Introduction at in Brussels
  - 2007: Eduardo Maldonado meets with RESNET Board & presents at RESNET Conference
- Canada
  - Canadian rating program adopts HERS Index
  - Becomes first international affiliate of RESNET
- Shanghai, China
  - Incorporates RESNET rating standard into building energy code compliance
  - Shanghai Real Estate Science Institute adopts HERS Index
  - Becomes an international affiliate of RESNET

Germany


RTM
GmbH
EnergyConcepte®
Generalübernehmer mit Planungsbüro für Energieeinsparung
energieeffiziente Wohngebäude-Modernisierung + Denkmalschutz
SCHLOSSDACH
Historie mit Moderne verbunden
AUSBILDUNG
Neue Ideen für mehr Lehrstellen
BETRIEBSPORTRÄT
Wachstum gegen den Strom
Energiepass Deutschland
Ran an die Energiefresser!
Planen mit dem Energiepass
ZEDACH
zukunft haus
ENERGIEPASS
dena 01-075-0018
15. Januar 2004
Gesamtbewertung
292,5 kWh/(m²a)
0 50 100 150 200 250 300 350 400 450 500 550
Mehrfamilienhaus / Wohnen
Hauptstraße 28, 10456 Berlin
K. Wertbau AG
1928
1982
9
575 m²
X
K. Wertbau AG
Müllerstr. 182
10456 Berlin
030 765 54 32
Architekturbüro Meyer
Fassadenstr. 182
10123 Berlin
Hans Meyer
dena
RTM
GmbH
EnergyConcepte®
Energieeinsparung
im Wohngebäudebestand
Heizkosten senken
Energie sparen
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Wohngebäude-Modernisierung
Generalübernehmer mit Planungsbüro
Deutsche Energie-Agentur Registrier-Nr. 691242
Osnabrück | Marienstraße 7 | 0541 181768-20
www.rtm-energyconcepte.de

France


Nouvelle BMW 320d 177ch
Le plaisir est une énergie renouvelable.
BMW Série 3
Le plaisir de conduire
621 DZG 78
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93, avenue Emile Zola - PARIS 15e
www.bmwparis.fr
Consommation
CO2
4,9 l / 100 km
131g / km
AVENIR

???


HUMMER

Invited to 2008 RESNET Conference

February 18 – 20, 2008
San Diego, California

+ American Home Energy Rating Industry Forum
+ Quality Assurance Innovations
+ Marketing & Business Develop Opportunities
+ Technical Updates

www.resnet.us/conference

The RESNET HERS Index

On The Path to Zero Energy Homes

Web site: *resnet.us*

Major Changes in 2006

- NAECA heat pump and air conditioner standard changed to SEER-13 / HSPF-7.7
- Reference Home now based on 2004 IECC
- All home energy uses considered in ratings
- On-site power production now included in rating calculations
- Insulation inspections and grading (I, II & III) now required (or take the worst grade)
- Software verification testing now required
- HERS Index implemented.

Whole-Home Energy Use

Code Energy Uses:

- Space Heating
- Space Cooling
- Water Heating

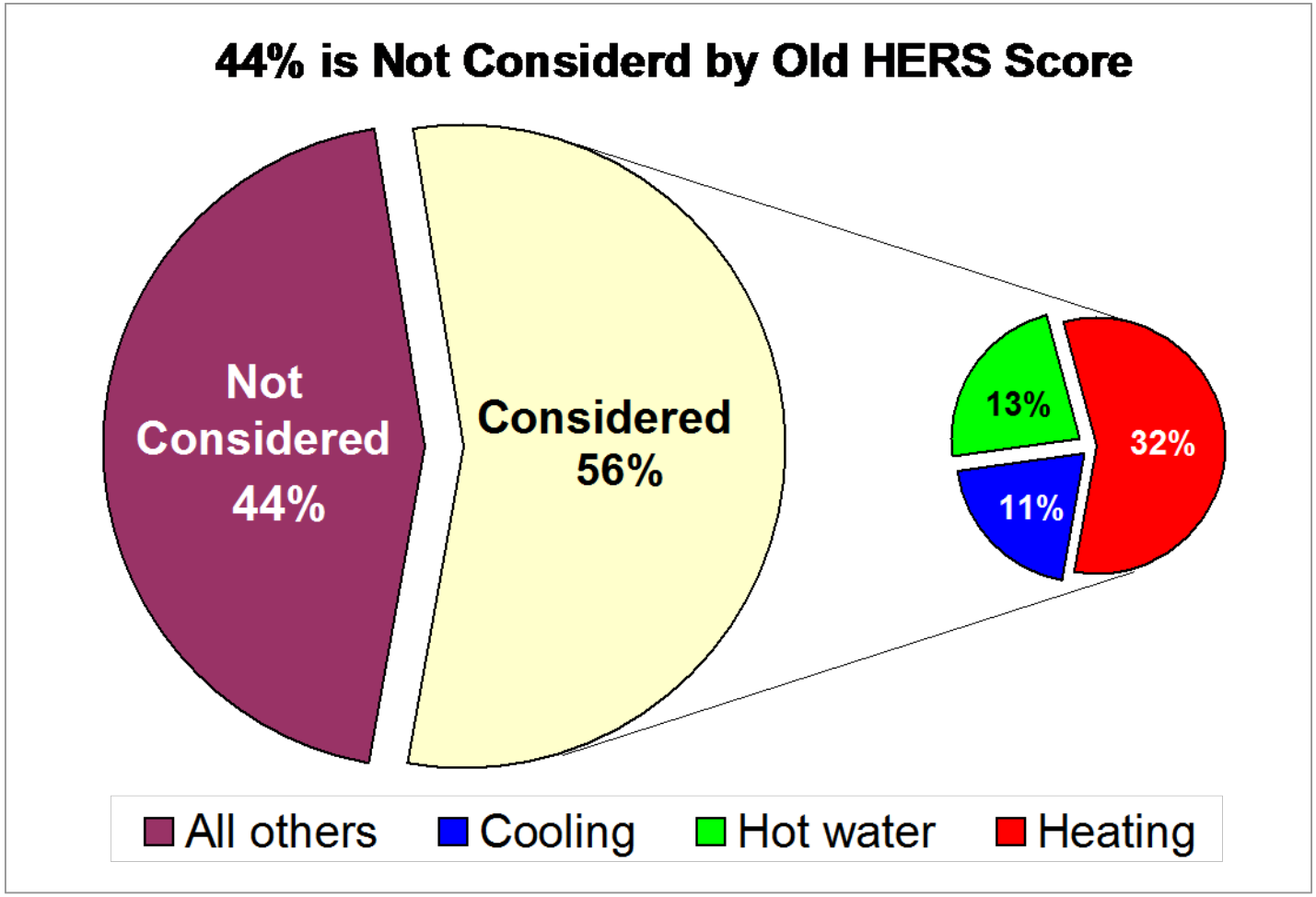
- Only 40-60% of total home energy use
- Pushing the limits of acceptable efficiency

Other Energy Uses:

- Rated Uses:
  - Lighting
  - Refrigerators
  - Ceiling fans
  - Dishwashers
- Non-rated Uses:
  - All other typical miscellaneous loads

Old HERS Score

National Average “Typical” Home



Long-Term Strategy

- Over time, increase the percentage of total home energy use that is “rated” by the system
- Philosophy – for each new rated devise:
  - There must be an accepted reference energy use
  - There must be an equitable means of comparing alternative devises to the reference devise
- Add reference energy use and comparison methodology for new device to standards
- Remove reference energy use for the devise from the non-rated loads category.

On-Site Power Production

- On-site power production now included in the HERS Index calculation
- Fossil fuel uses (e.g. gas heating) converted to equivalent electricity at 40% efficiency (e.g. 100 Btu of gas = 40 Btu of electricity)
- Purchased Energy fraction (PEfrac) =

$$\frac{\textbf{(Total Energy Use) – (On-site Power Production)}}{\textbf{(Total Energy Use)}}$$

- PEfrac used as a multiplier in the calculation of the HERS Index.

HERS Survey

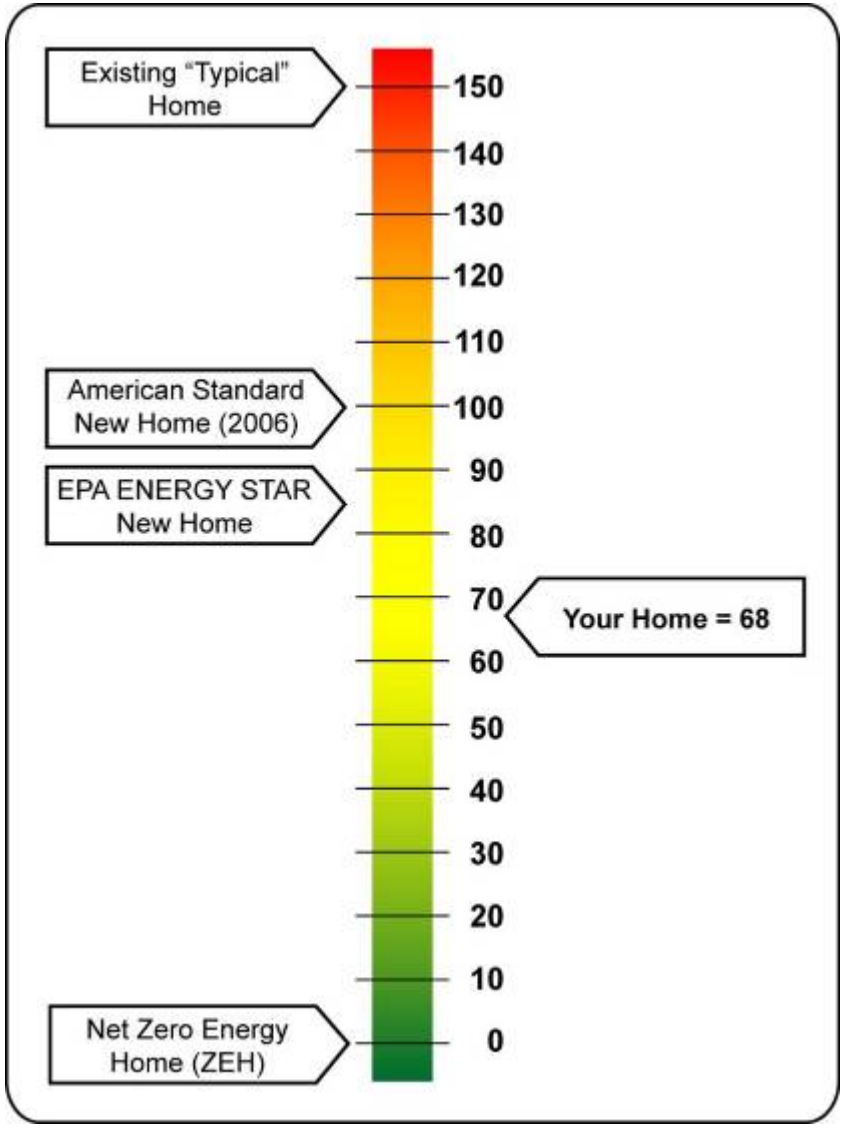
- Prior to adopting 2006 Standards, RESNET conducted online survey to determine the form and content for presenting the results from Ratings
- Two options surveyed:
  - Zero represents the least efficient building possible and 100 represents most efficient building possible
  - Zero represents building with zero net purchased energy use and 100 represents “Code Standard” building
- Result: 74% of builder and consumer respondents favored system where 0 represented a building with zero purchased energy use.

The HERS Index

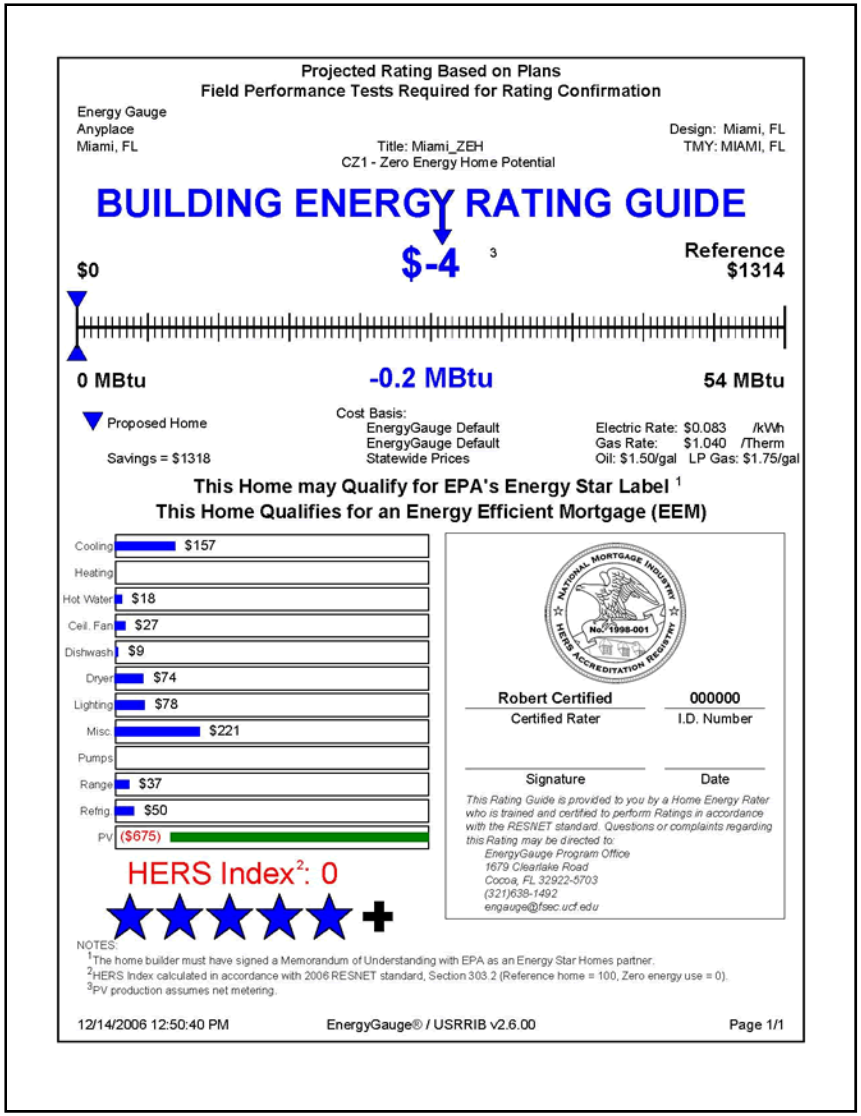
- 100 = American Standard New Home
  - Model energy code standard (IECC 2004) for envelope components
  - NAECA standard heating, cooling and hot water equipment
  - **Plus** . . . RESNET standard lighting, appliance and miscellaneous loads
- 0 = A home that consumes zero net annual purchased energy
- In other words . . . Zero actually means zero.

The Zero Energy "Yardstick"

- A national energy use index that measures whole-home energy performance on a relative scale
  - 100 = The energy use of the "American Standard Home"
  - 0 = No net purchased energy use – the "Zero Energy Home"
- ENERGY STAR homes have a HERS Index of 85 or lower
- Widely used in the "Beyond Code" marketplace



Yes, It Can be Done



Projected Rating Based on Plans
Field Performance Tests Required for Rating Confirmation

Energy Gauge
Anyplace
Miami, FL

Title: Miami_ZEH
CZ1 - Zero Energy Home Potential

Design: Miami, FL
TMY: MIAMI, FL

BUILDING ENERGY RATING GUIDE

$0

$-4 [3]

Reference
$1314

0 MBtu

-0.2 MBtu

54 MBtu

Proposed Home

Savings = $1318

Cost Basis:
EnergyGauge Default
EnergyGauge Default
Statewide Prices

Electric Rate: $0.083 /kWh
Gas Rate: $1.040 /Therm
Oil: $1.50/gal LP Gas: $1.75/gal

This Home may Qualify for EPA's Energy Star Label [1]
This Home Qualifies for an Energy Efficient Mortgage (EEM)

Cooling	$157
Heating	
Hot Water	$18
Ceil. Fan	$27
Dishwash	$9
Dryer	$74
Lighting	$78
Misc.	$221
Pumps	
Range	$37
Refrig	$50
PV	($675)

HERS Index[2]: 0

NATIONAL MORTGAGE INDUSTRY HERS ACCREDITATION REGISTRY No. 1998-001

Robert Certified — Certified Rater
000000 — I.D. Number

Signature
Date

This Rating Guide is provided to you by a Home Energy Rater who is trained and certified to perform Ratings in accordance with the RESNET standard. Questions or complaints regarding this Rating may be directed to:

EnergyGauge Program Office
1679 Clearlake Road
Cocoa, FL 32922-5703
(321)638-1492
engauge@fsec.ucf.edu

NOTES:
[1] The home builder must have signed a Memorandum of Understanding with EPA as an Energy Star Homes partner.
[2] HERS Index calculated in accordance with 2006 RESNET standard, Section 303.2 (Reference home = 100, Zero energy use = 0).
[3] PV production assumes net metering.

12/14/2006 12:50:40 PM EnergyGauge® / USRRIB v2.6.00 Page 1/1

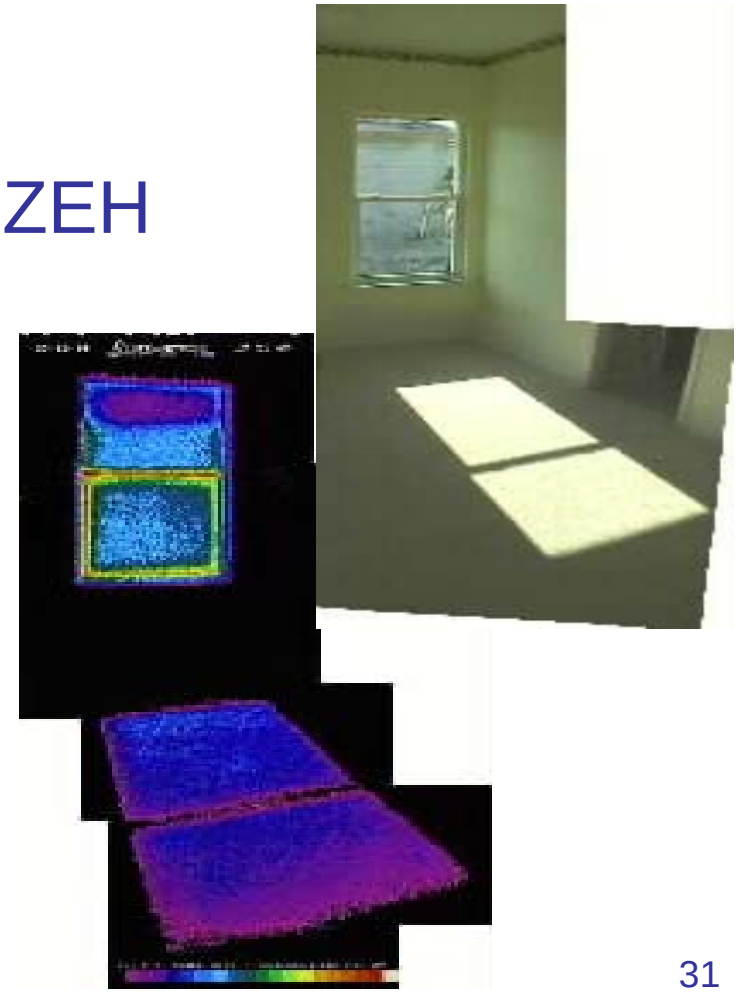
Efficiency + Solar = ZEH

- Excellent partners
- Old wisdom still true:
- "*First* efficiency, *then* solar"
- Together, they can make a big difference
- First house in Florida to nearly eliminate site energy use.
- *Super-efficient* + *Solar* = Zero Energy Home

Could Windows be Important?

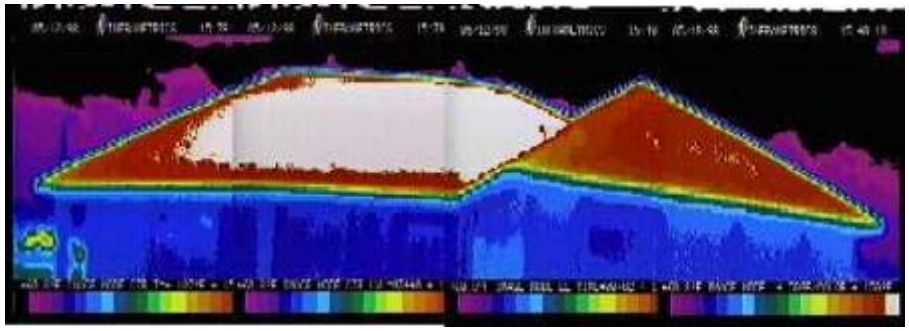
Control House

ZEH

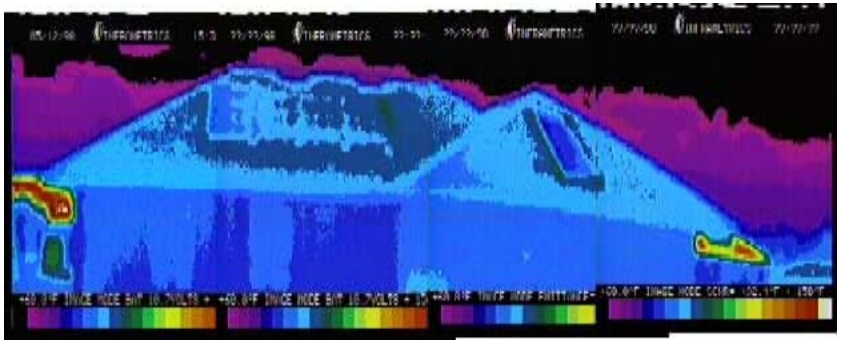


Are Roofs Important?

Control House

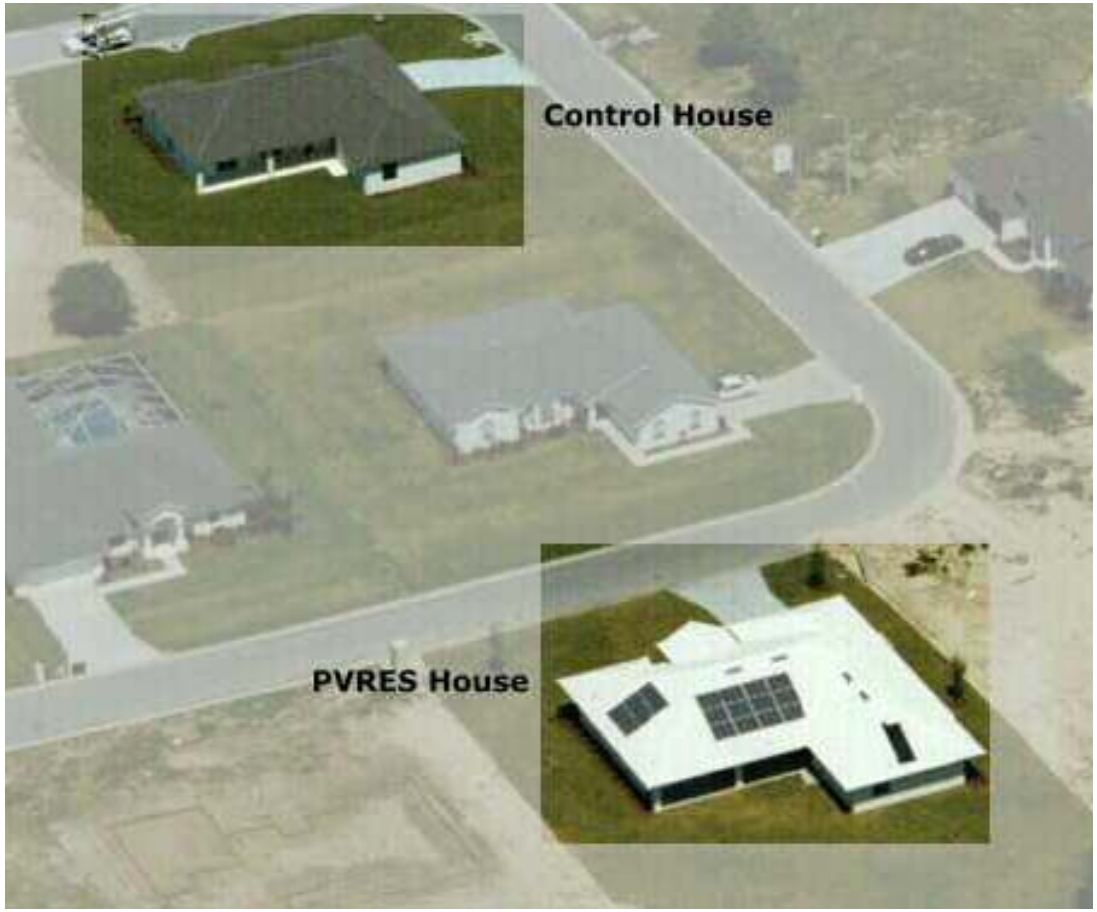


ZEH

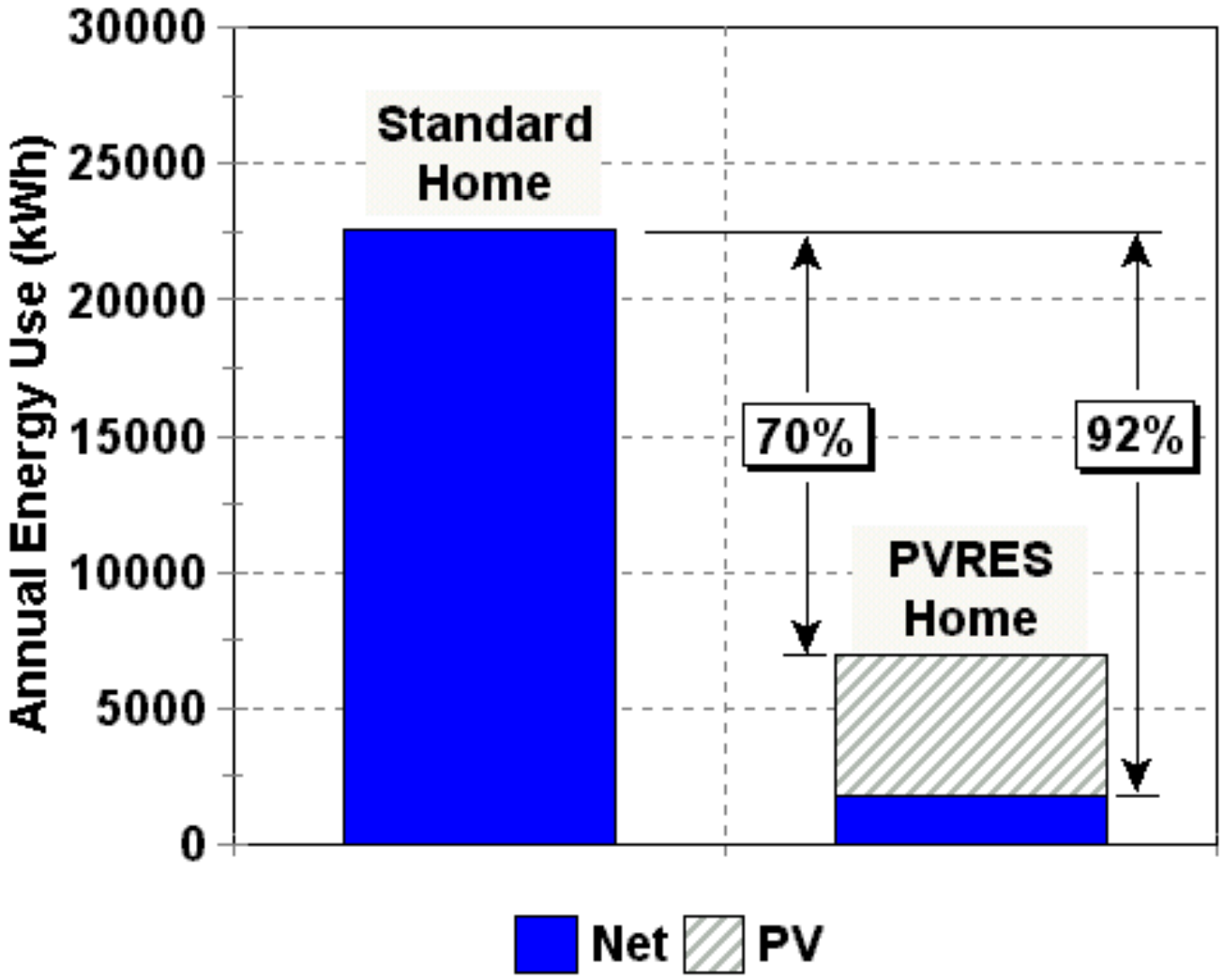


Lakeland ZEH

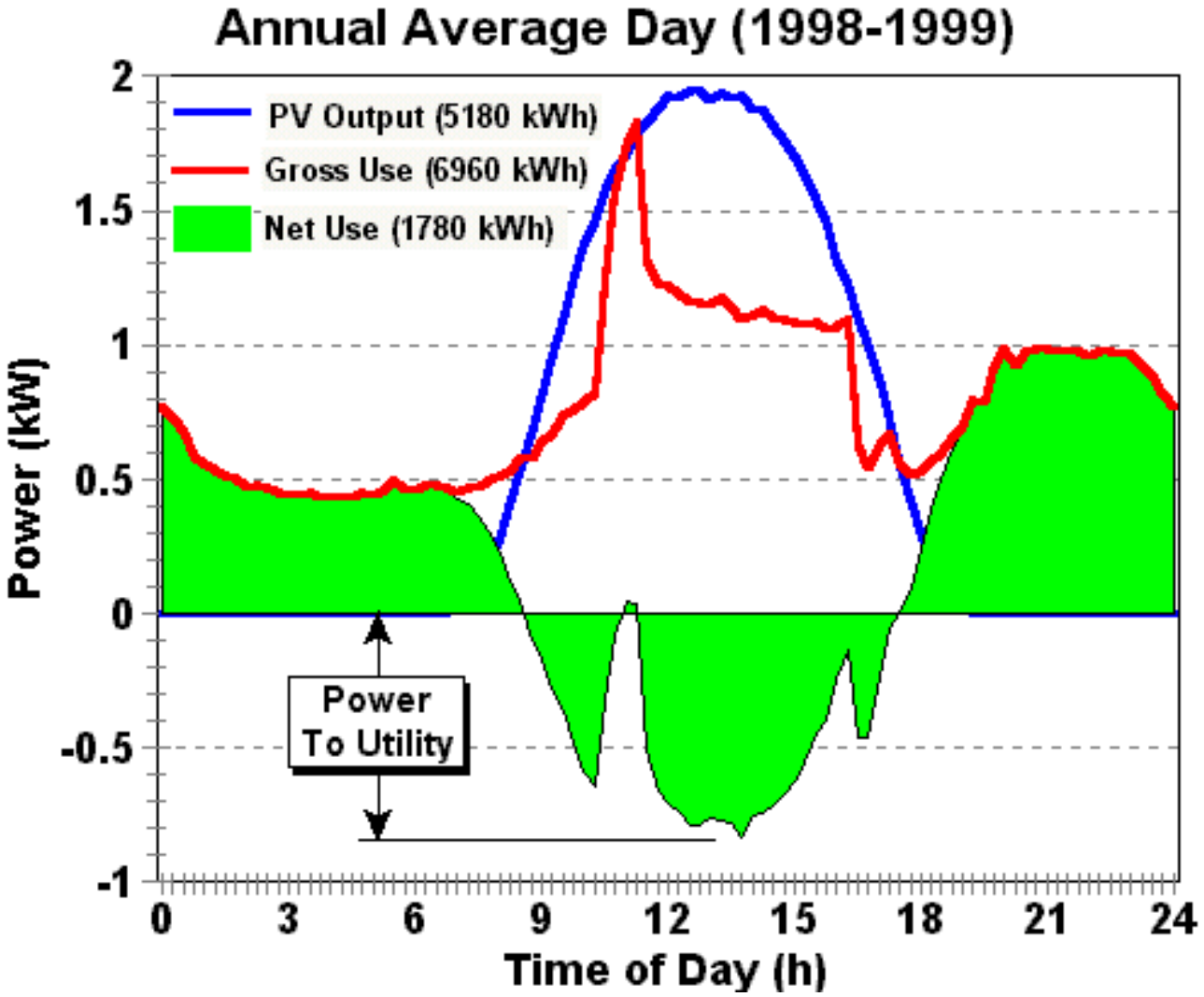
- Seeing is believing!
- Side-by-side test
- ZEH used 80% less measured cooling!
- 92% of energy use generated
- No peak demand when solar included
- First FL ZEH home still active in Lakeland, FL



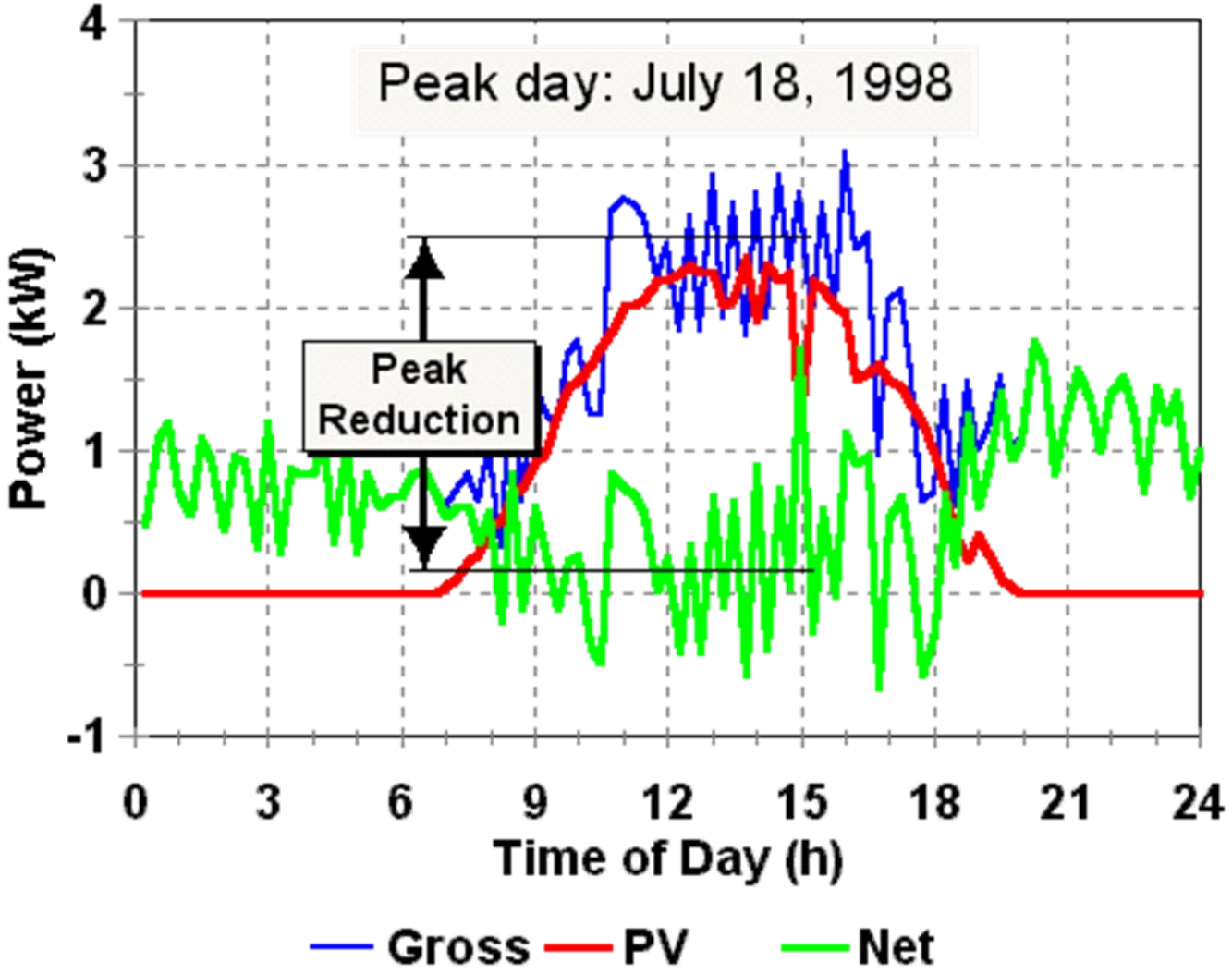
Efficiency First



Net Energy Use



Hottest Day – Ever!




Thank You