



# The Rater and the Energy Value Housing Award Program



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# Presentation Overview

- Categories
- Application Criteria
- Systems Engineering
- Evolution and Trends
- 2005 Gold Winners



# Housing Categories

- Affordable
- Custom/Demonstration
- Production
- Factory Built (HUD and Modular)
- Multi-Family (new – 3 stories or less)

# Climates

- Cold  $>5500$  HDD
  - Moderate 3000-5500 HDD
  - Hot  $<3000$  HDD
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- HDD = Heating Degree Days (Base 65F)



# Application Criteria

- Energy Value
  - What makes the home more efficient than code/other homes in the local market
- Design
  - How energy efficiency is considered during the design process
- Construction
  - Examines management methods and construction processes related to energy and resource efficiency



# Application Criteria (continued)

- Marketing
  - Examines how energy efficiency is incorporated into marketing and customer-relations efforts
- Energy Programs
  - Examines participation in voluntary programs such as those run by utilities, ENERGY STAR, HERS ratings, etc.





# Weight of Scores

	<b>Custom</b>	<b>All other categories</b>
<b>Energy Value</b>	52%	40%
<b>Design</b>	10%	
<b>Construction</b>	10%	
<b>Marketing and Customer Relations</b>	23%	35%
<b>Energy Programs</b>	5%	

# Energy Value

- Energy Value Statement
  - Mission Statement
- Energy Performance (includes plans/test results)
  - Doors/Windows/Walls/Ceiling/Floors
  - Ducts and Air Infiltration
  - HVAC and DHW
  - Lighting and Appliances
  - Solar Energy (Hot Water and Photovoltaic)





# Design

- Energy Focus in the Building Design Process
  - Material and Product Selection
  - Proper Building Function
  - IAQ considerations
  - Pre-construction Energy Analysis

## **Design** (continued)

- **Energy Relationship to Site**
  - Climate and Site Conditions
  - Solar Orientation
  - Site planning
  - Landscape practices
    - Solar access
    - Seasonal Shading
    - Windbreaks



# Construction

- Management and Construction Methods Focus on Energy
  - Systematized Management and Construction Processes
  - Inspections
  - Training (principles and diagnostic tools)
    - Supervisors
    - Crews
    - Sub-contractors



# Marketing

- Incorporating Energy
  - Brochures
  - Advertisement and Publicity
  - Energy Displays, Cutaways, Site Signs
  - Other Innovations
    - power bills guaranty
    - web page, web links etc..



# Customer Relations

- Communicating Energy Message
  - Potential Customers
  - Clients
  - Sales Staff (training)
  - Real Estate Agents (training)
  - Others

# Customer Relations (Continued)

- Homeowner Testimonials
  - Comfort
  - Utility Bills
  - Other
- Homeowner Manuals
  - Maintenance & Operations
    - Building Structure
    - HVAC, DHW, Appliances, Lighting





# Customer Financing

- Energy Efficiency Financing
  - Energy Efficient Mortgages (EEM)
  - PITI+E Monthly Cash Flow
  - Rebates, Tax Credits

# Systems Engineering

- Get Low-Hanging Fruit First!
- The Home is a System
- HVAC and Envelope Interact
  - Energy use reduced (whole building)
  - IAQ Improved (green, healthy, sustainable)
  - HVAC Equipment and Ducts Costs Less

# Evolution and Trends – Ducts

- Reducing/eliminating ducts outside the heated space
  - Dropped Hallway and Perimeter Chases
  - Fewer, smaller or **no ducts** outside of heated space
- Extending the Building Envelope
  - Cathedralized, Un-vented Attics
  - Sealed Perimeter Insulated Crawlspace
- High Velocity HVAC w/smaller Ducts



# Evolution and Trends – HVAC Systems

- HVAC “Right-Sized” to Design Loads
- Radiant heating
- Combo DHW and Space Heating
- Zone Heating/Cooling
- Compressor-less Cooling Systems

# Evolution and Trends – Air Leakage and Ventilation

- Envelope Leakage Testing
- Spray Foam Insulation
- Blown in Blanket Insulation
- Insulated Concrete Form Systems
- Structural Insulated Panels
- Whole House Ventilation
  - Heat Recovery
  - Energy Star™ Exhaust Fans
  - HVAC Fans Recycler™



# Evolution and Trends - ENERGY STAR™ Technologies

- HVAC
- Lighting
- Appliances
- Ceiling Fans
- Electronics



# Evolution and Trends

- “Solar Ready”
- Passive Solar Design
- Sun Tempered Design
- Active / Passive Solar DHW
- Active Solar Space Heat
- Solar Electric (PV)



- **2006 Awards Presented at IBS Show in January**
- **Look for magazine, 2007 Application and more at:**  
<http://www.nahbrc.org/evha>



**Hot Climate,  
Custom Home**  
**AndersonSargent  
Custom Builder, LP**

- **Dallas** area builder with a 20 year commitment to Energy Efficiency
- 2 year waiting list
- Zero Energy Home – HERS rating **94.5**
  - ICF walls, spray foam ceiling - 0.11 ACH<sub>50</sub>
  - 8 KW photovoltaic system, solar hot water with tankless gas backup, passive solar design

*“It’s possible to build a house that is comfortable to live in, is architecturally pleasing, and doesn’t have an energy bill.” – Jim Sargent*





**Bend, Oregon**  
HERS Rating – **92.7**

- Cost effective hybrid envelope system - 2" urethane foam and cotton batts for wall and ceiling
- Many solar design features, including Southern orientation and concrete floors for thermal mass





### Denver

HERS Rating – **92.0**

- Blown-in Basement and A.G. walls, R-5 sheathing A.G.
- 92.1 AFUE furnace; Air Cycler for ventilation
- Builder provides dinner seminars to teach homeowners about proper operation and maintenance of home.



*Cold Climate,  
Production Home*  
**Aspen Homes  
of Colorado, Inc.**





**Springdale, AK**  
HERS Rating – **91.1**

- Concrete form foundation, R-24 SIP walls
- Solar water with 10KW PV pump, solar orientation, open houseplan with daylighting
- Judges commended “integrated design process.”



*Moderate Climate,  
Custom Home*  
**Stitt Energy  
Systems, Inc.**



## Orlando

HERS Rating - **93**

- Collapsible SIPs cathedral ceilings
- R-19 wall insulation with R-4 sheathing, raised heel roof trusses
- 0.87 EF sealed combustion tankless water heater
- In every factory, Palm Harbor tests every duct system to 3% of CFA (at CFM<sub>25</sub>)



**Hot Climate,  
Factory-Built Home**  
**Palm Harbor  
Homes**



- Fort Collins, CO**  
HERS Rating - 90
- Sealed-combustion gas tankless water heater
  - Ducts 100% in conditioned space
  - Designed to get “every penny’s worth” in an affordable home -  
Construction costs: \$70 per ft.<sup>2</sup>



**Cold Climate,  
Affordable Home**  
**Aspen Homes  
of Colorado, Inc.**



# Other Technical Resources

- USEPA Energy Star  
<http://www.energystar.gov>
- USHUD PATH  
<http://www.pathnet.org>
- RESNET  
<http://www.natresnet.org>



## Teams assistance with high efficiency homes

<http://www.buildingamerica.gov>

1. Con Sol [www.bira.ws](http://www.bira.ws)
2. Building Science Consortium [www.buildingscience.com](http://www.buildingscience.com)
3. Consortium Advanced Residential Buildings [www.carb-swa.com](http://www.carb-swa.com)
4. Davis Energy Group [www.davisenergy.com/index.htm](http://www.davisenergy.com/index.htm)
5. IBACOS [www.ibacos.com](http://www.ibacos.com)
6. Industrialized Housing Partnership [www.baihp.org](http://www.baihp.org)
7. NAHB Research Center [www.nahbrc.org](http://www.nahbrc.org)





# Energy Value Housing is Economic and Environmental Security

