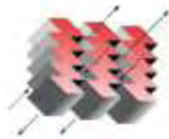
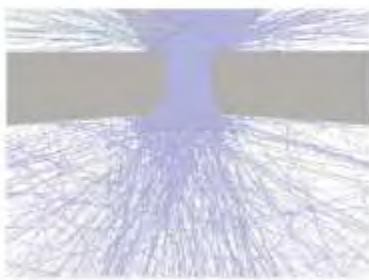




**ARCHITECTURAL ENERGY**  
C O R P O R A T I O N



# ARCHITECTURAL ENERGY C O R P O R A T I O N





# REM/*Rate* for ENERGY STAR Version 3 RESNET 2011

**V. Robert Salcido** P.E., LEED-AP, Director of Products

Architectural Energy Corporation

March 2, 2011

# RATING CALCULATIONS



## HERS, IECC, ENERGY STAR v2.0

Rated Home



Home as input



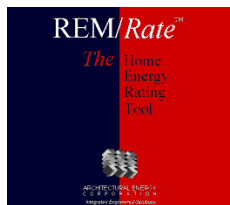
Design Home



Reference Home

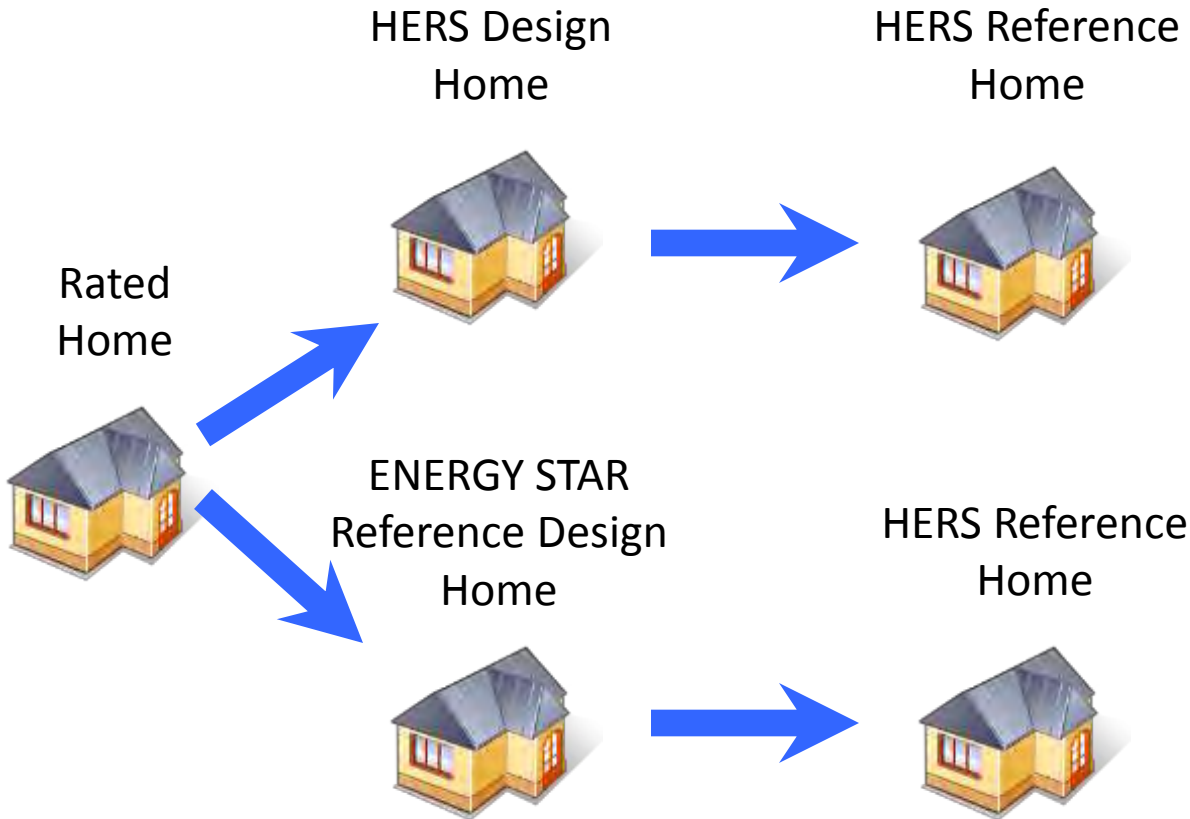


- Copy of home as input
  - Same geometry
  - Same orientation
  - Same systems
  - Same utility rates
  - Same weather data
- RESNET/IECC rules applied
  - Setpoint temperatures
  - Window shading
  - MV/Infiltration
  - Lights and Appliances
- Copy of modified rated home
  - Same geometry
  - Same orientation
  - Same systems
  - Same utility rates
  - Same weather data
- Reference home rules applied
  - U-values
  - Infiltration rate
  - Window area/orientation/SHGC
  - Mechanical efficiencies
  - Distribution system efficiency
  - Remove renewables



# RATING CALCULATIONS

## ENERGY STAR v2.5/v3.0

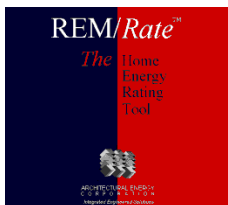


### Produces 2 HERS Indices

- Design Home HERS Index without PV
- Design Home HERS Index with PV

### Produces 2 HERS Indices

- ENERGY STAR Reference Home HERS Index
- ENERGY STAR HERS Index Target (SAF Adjusted)



- ENERGY STAR Qualified Homes HERS Index Target Procedure, Revision 2
- Based on 2009 IECC

# MANDATORY CHECK SCREEN

## ENERGY STAR v2.5/v3.0 – Mandatory Checks



REM/Rate v 12.91 - Untitled.blg

File Building View Extras Libraries Reports Tools Help

Marking any given checkbox certifies that the home complies with all mandatory requirements referenced by that checkbox. Needed for showing compliance on various reports.

**IECC - Mandatory Requirements**

<input type="checkbox"/> 2004 IECC	<input type="checkbox"/> 2009 IECC
<input type="checkbox"/> 2006 IECC	<input type="checkbox"/> 2010 NY IECC

**ENERGY STAR Version 2**

<input type="checkbox"/> Thermal Bypass Checklist ...	<input type="checkbox"/> ENERGY STAR Products
---	---

**ENERGY STAR Version 2.5 and 3.0**

Checklists Fully Enforced for 3.0

<input checked="" type="checkbox"/> Thermal Enclosure	<b>ENERGY STAR Product Count</b>
<input checked="" type="checkbox"/> HVAC System Quality Installation Contractor	
<input checked="" type="checkbox"/> HVAC System Quality Installation Rater	
<input checked="" type="checkbox"/> Water Management System Builder	
<input checked="" type="checkbox"/> Indoor airPlus Verification	

Conditioned Basement Exclusion

<input checked="" type="checkbox"/> Basement Qualifies for SAF exclusion? (See Help)	Basement Conditioned Floor Area: 1000
	Number of Bedrooms in Basement: 1

**Analysis**

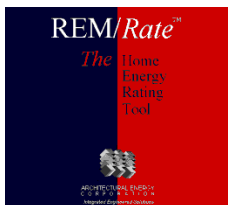
Updated:

<b>Design Loads (kBtu/hr)</b>	
Heating	0.0
Cooling	0.0
<b>Annual Loads (MMBtu/yr)</b>	
Heating	0.0
Cooling	0.0
Water Heating	0.0
<b>Annual Consumption (MMBtu/yr)</b>	
Heating	0.0
Cooling	0.0
Water Heating	0.0
Lights and App...	0.0
Photovoltaics	0.0
Total	0.0
<b>Annual Energy Costs (\$/yr)</b>	
Heating	0.0
Cooling	0.0
Water Heating	0.0
Lights and App...	0.0
Photovoltaics	0.0
Service Charge	0.0
Total	0.0

**Errors/Warnings**

Energy Area Compliance

Detailed Albany, NY 02/24/11



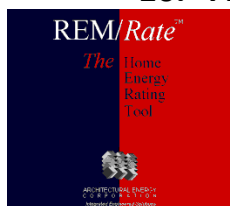
# CODE COMPLIANCE

## For ENERGY STAR v2.5 Compliance

1. Design Home HERS Index without PV  $\leq$  ENERGY STAR Reference Home HERS Index *and*
2. Design Home HERS Index  $\leq$  ENERGY STAR HERS Index Target (SAF Adjusted) *and*
3. Duct leakage to outside  $\leq$  6 CFM25/100 sq. ft. of conditioned floor area

## For ENERGY STAR v3.0 Compliance

1. Design Home HERS Index without PV  $\leq$  ENERGY STAR Reference Home HERS Index *and*
2. Design Home HERS Index  $\leq$  ENERGY STAR HERS Index Target (SAF Adjusted) *and*
3. Duct leakage to outside  $\leq$  4 CFM25/100 sq. ft. of conditioned floor area *and*
4. Envelope insulation levels must meet or exceed 2009 IECC levels *and*
5. Slab on grade insulation  $\geq$  R-5 at 2009 IECC depth for Climate Zones 4 and above *and*
6. Insulation achieves RESNET Grade I insulation or Grade II with rigid sheathing *and*
7. Windows meet 2009 IECC minimum requirements for U-Value or SHGC *and*
8. Duct insulation meets EPA minimum requirements of R-6 *and*
9. Mechanical ventilation rate is within 100-120% of ASHRAE 62.2-2010 values *and*
10. All ENERGY STAR checklists verified and complete





**ENERGY STAR VERSION 2.5 HOME REPORT**

Date:	February 23, 2011	Rating No.:	2011-
Property:	908 Garfield Avenue	Rating Org.:	Robison Energy, LLC
	Louisville, CO 80027	Rater's Name:	Tony Lisanti
Builder's Name:	Big Builders	Rater's ID:	R0075
		Rating Date:	2/17/2011

**Normalized, Modified End-Use Loads (MMBtu/year)**

	<i>ENERGY STAR</i>	<i>As Designed</i>	
Heating:	117.7	41.1	
Cooling:	20.6	12.5	
Water heating:	13.4	3.8	
Lighting & Appliances:	46.5	49.4	
<b>Total:</b>	<b>198.2</b>	<b>106.9</b>	
<b>HERS Index of Reference Design Home</b>	<b>84</b>	<b>45</b>	<b>HERS Index w/o PV</b>
<b>HERS Index Target (SAF Adjusted)</b>	<b>77</b>	<b>37</b>	<b>HERS Index</b>
<b>Size Adjustment Factor:</b>	<b>0.92</b>		

*HERS Index w/o PV <= HERS Index of Reference Design Home AND HERS Index <= HERS Index Target to comply.*

**Mandatory Requirements for All ENERGY STAR Version 2.5 Qualified Homes**

- Duct leakage to outside < 6 CFM25 per 100 sq.ft. of conditioned floor area.
- Envelope insulation levels meet or exceed 2009 IECC levels. (Not Required for Version 2.5!)
- Slab on Grade Insulation > R-5 at IECC 2009 Depth, Climate Zones 4 & above. (Not Required for Version 2.5!)
- Insulation achieves RESNET Grade I installation or Grade II for walls. (Not Required for Version 2.5!)
- Windows meet the 2009 IECC Requirements - Table 402.1.1. (Not Required for Version 2.5!)
- Duct insulation meets the EPA minimum requirements of R-6. (Not Required for Version 2.5!)
- Mechanical ventilation rate is within 100-120% of ASHRAE 62.2-2007 values. (Not Required for Version 2.5!)
- ENERGY STAR Checklists verified and complete. (Not Required for Version 2.5!)

**This home MEETS OR EXCEEDS the energy efficiency requirements for designation as an EPA ENERGY STAR Version 2.5 Qualified Home.**

Type of Emissions	Reduction	Energy Cost Savings (\$/year)	
Carbon Dioxide (CO2) - tons/yr	8.8	Heating:	\$2752
Sulfur Dioxide (SO2) - lbs/yr	54.5	Cooling:	\$665
Nitrogen Oxides (NOx) - lbs/yr	19.6	Water Heating:	\$622
		Lights & Appliances:	\$263
		<b>Total:</b>	<b>\$4303</b>

The energy savings and pollution prevented are calculated by comparing the Rated Home to the ENERGY STAR Version 3 Reference Home as defined in the "ENERGY STAR Qualified Homes HERS Index Target Procedure for National Program Requirements, Version 3.0" promulgated by the Environmental Protection Agency (EPA). In accordance with RESNET Mortgage Industry National Home Energy Rating Systems Standards, building inputs affecting setpoints infiltration rates, window shading and the existence of mechanical systems may have been changed prior to calculating loads.

**REMRate - Residential Energy Analysis and Rating Software v12.91**

This information does not constitute any warranty of energy cost or savings.  
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