



***HORIZON-Residential Energy Services NH LLC***

75 South Main St., Unit 7 PMB 185, Concord, NH 03301  
tel: 603-369-4833 \* E-mail: kevin@horizon-res.com  
www.horizon-res.com

## *EPA Energy Star® Homes* Certification Report

For the property located at:



**35 Merrimack Street**

**Portsmouth, NH 03801**



# HORIZON - Residential Energy Services

75 South Main St., Unit 7 PMB 185, Concord, NH 03301 • tel: 603-369-4833  
E-mail: kevin@horizon-res.com • website: www.horizon-res.com



## EPA Energy Star® Homes Certification Report

Date: September 23, 2010

To: Joan Jones

Plans ID: HRES-G8-1487

-  
35 Merrimack Street  
Portsmouth, NH 03801

Dear Joan Jones:

**Congratulations . . . I have completed the energy performance review of this new home and have determined that it meets the standards required to be labeled as an *EPA Energy Star® Home*.**

This home was evaluated using the REM/Rate computer program developed by *Architectural Energy Corporation* of Boulder, Colorado. This program is the state of the art software in its field and has become the standard medium for determining a home's energy performance using the nationally recognized *Home Energy Ratings System (HERS)* program. This software is also used as the basis for determining if a home meets the required standards to be labeled as an *EPA Energy Star® Home*.

As you review this report, please remember that the results are not a precise prediction of overall energy consumption or utility bills, but rather a guide to compare energy costs between a number of house configurations, similar to the "miles per gallon" guide for automobiles. The program includes "average" values for numerous factors that can affect home energy usage such as weather patterns, number and living habits of the occupants, hot water usage, lights and appliance usage, thermostat settings, and certain details of construction. In a particular house, any of these factors can vary significantly from the assumptions made.

This report is based on the first and second floors as finished, insulated space.

### **Important Comments & Suggestions:**

- A Blower Door test was performed on this home to calculate the number of times it naturally expels and replaces its internal air volume. Over the past 10 years the Blower Door has become the national and international standard method of evaluating and calculating the infiltration characteristics of a dwelling.

The Blower Door test I performed on this home calculated an estimated natural air change per hour rate at .15 ACHn.

- It is Critically Important that you develop a strategy to properly ventilate this home for both Indoor-Air-Quality and long term Building Durability (moisture) reasons. Current ASHRE 62.2 national ventilation standards recommend that you operate the bathroom exhaust fan (s) at a minimum continuous rate of 74 cubic feet per minute (cfm) 24 hours per day. (See attached Air Leakage Report)

- Important – If you have, or will install combustion appliances in this home, hard wired or plug-in Carbon Monoxide Alarms should be installed on each floor as per manufacturers instructions.

- The HVAC equipment specifications used in the REM/Rate model are based on the designed performance factors of that equipment. Any deviations in actual performance from those design specifications in your home are Warranty issues that are the sole responsibility of your Heating/Cooling design, and installation contractors.
- It is strongly suggested that as the homeowners you install one or two layers of simple window coverings to the full height of the window units and the patio doors. A strategy of covering as much of the window glazing as possible on cold winter nights and hot summer days will significantly increase both winter and summer comfort and reduce energy usage.
- Develop a strategy to install compact fluorescent light bulbs, starting with the light fixtures that are used the most hours per day.
- Install low flow aerators and shower heads.
- Develop a strategy to purchase Energy Star Rated appliances and electronic devices.

Enclosed please find your official *Energy Star® Labeled Home* certificate that can be framed or filed with your other important documents. Also enclosed is an *Energy Star® Labeled Home* sticker that should be attached in a permanent location of the home such as the electrical entrance box.

Thank you for using *Horizon-RES* as your *EPA - Energy Star® Homes* Ratings Partner. Please feel free to contact me at any time if you should have questions.

Best Regards,

Kevin Hanlon  
Residential Energy Consultant

**ATTACHMENTS:**

- Home Energy Ratings System (HERS)
- REM/Rate - Energy Star Homes Report
- REM/Rate - Energy Star Homes Verification Summary
- REM/Rate - Fuel Summary Report
- REM/Rate - Air Leakage Report
- RESNET Home Energy Rating - Standard Disclosure
- EPA Energy Star Homes Certificate
- EPA Energy Star Homes Label (to be attached to electrical box)



## Home Energy Ratings System (HERS) Report

In 1992, Congress instructed the US Department of Energy (DOE) to work with the US Department of Housing and Urban Development (HUD), and the lending industry to develop a nationally recognized uniform system to measure and rate the energy performance of new and existing dwellings. In 1995 DOE published these guidelines and they have been gradually taking hold around the country. Starting in 2006, the revised method rates a home on a scale of 0 to 100 with 0 being a highly efficient home and 100 being a house that is built to the energy code minimum. The system is based on comparing the house being rated, referred to as the design house, to a computer model of the exact same house if it were built to minimum current energy use standards, referred to as the reference house. A score of 100 would be a house which meets current energy consumption standards. For ease of understanding, the scale can also be converted to a "star" system as follows:

\* \* \*

An index of 100 is a house built approx to the IECC 2004 National Energy Code.

In this region:

***An index of 80 or LESS, along with other requirements, is necessary to achieve the Energy Star label.***

### HERS Index, Star and Efficiency Scales for Rated Homes

| HERS Index Range | Stars  | Relative Energy Efficiency<br>(With respect to Reference Home) |    |      |                |
|------------------|--------|--|----|------|----------------|
| 250 - 201        | **+    | 250%   | to | 201% | Less Efficient |
| 200 - 151        | ***    | 200%   | to | 151% | Less Efficient |
| 150 - 101        | ***+   | 150%   | to | 1%   | Less Efficient |
| 100 - 91         | ****   | 1%   | to | 9%   | More Efficient |
| 90 - 86          | ****+  | 10%  | to | 14%  | More Efficient |
| 85 - 71          | *****  | 15%  | to | 29%  | More Efficient |
| 70 - 0           | *****+ | 30%  | to | 100% | More Efficient |

## AIR LEAKAGE REPORT

|                 |                           |               |                     |
|-----------------|---------------------------|---------------|---------------------|
| Date:           | September 14, 2009        | Rating No.:   | HRES-G8-1487        |
| Building Name:  | HRES-G8-1487              | Rating Org.:  | Horizon RES. NH LLC |
| Owner's Name:   | Jones                     | Phone No.:    | 603.369.4833        |
| Property:       | 35 Merrimack St.          | Rater's Name: | Kevin Hanlon        |
| Address:        | Portsmouth, NH 03801      | Rater's No.:  | HRES-02             |
| Builder's Name: | Sophie Lane LLC           |               |                     |
| Weather Site:   | Concord, NH               | Rating Type:  | Confirmed Rating    |
| File Name:      | HRES-G8-1487_CondBase.blg | Rating Date:  | Sept 14, 2009       |

### Whole House Infiltration

|                        | Blower door test |                |
|------------------------|------------------|----------------|
|                        | <i>Heating</i>   | <i>Cooling</i> |
| Natural ACH:           | 0.15             | 0.11           |
| ACH @ 50 Pascals:      | 2.58             | 2.58           |
| CFM @ 25 Pascals:      | 1088             | 1088           |
| CFM @ 50 Pascals:      | 1707             | 1707           |
| Eff. Leakage Area:     | 93.7             | 93.7           |
| Specific Leakage Area: | 0.00015          | 0.00015        |
| ELA/100 sf shell:      | 0.92             | 0.92           |

### Total Duct Leakage to Outside

|                        |        |
|------------------------|--------|
| CFM @ 25 Pascals:      | 184    |
| CFM25 / CFMfan:        | 0.1725 |
| CFM25 / CFA:           | 0.0420 |
| CFM per Std 152:       | N/A    |
| CFM per Std 152 / CFA: | N/A    |
| CFM @ 50 Pascals:      | 289    |
| Eff. Leakage Area:     | 15.85  |
| Thermal Efficiency:    | N/A    |

### Ventilation

|                             |                     |
|-----------------------------|---------------------|
| Mechanical:                 | Balanced            |
| Sensible Recovery Eff. (%): | 70.0                |
| Total Recovery Eff. (%):    | 70.0                |
| Rate (cfm):                 | 75                  |
| Hours/Day:                  | 24.0                |
| Fan Watts:                  | 80.0                |
| Cooling Ventilation:        | Natural Ventilation |

### ASHRAE 62.2 - 2003 Ventilation Requirements

For this home to comply with ASHRAE Standard 62.2 - 2003 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, a minimum of 74 cfm of mechanical ventilation must be provided continuously, 24 hours per day. Alternatively, an intermittently operating mechanical ventilation system may be used if the ventilation rate is adjusted accordingly. For example, a 148 cfm mechanical ventilation system would need to operate 12 hours per day, as long as the system operates to provide required average ventilation once each hour.

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## FUEL SUMMARY

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|                 |                           |               |                     |
|-----------------|---------------------------|---------------|---------------------|
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### HRES-G8-1487

**Annual Energy Cost (\$/yr)**

|             |    |      |
|-------------|----|------|
| Natural gas | \$ | 414  |
| Electric    | \$ | 3027 |

**Annual End-Use Cost (\$/yr)**

|                     |    |      |
|---------------------|----|------|
| Heating             | \$ | 1201 |
| Cooling             | \$ | 126  |
| Water Heating       | \$ | 280  |
| Lights & Appliances | \$ | 1833 |
| Photovoltaics       | \$ | -0   |
| Service Charges     | \$ | 102  |
| Total               | \$ | 3543 |

**Annual End-Use Consumption**

|                              |       |
|------------------------------|-------|
| Heating (kWh)                | 7522  |
| Cooling (kWh)                | 791   |
| Water Heating (Therms)       | 187   |
| Lights & Appliances (Therms) | 89    |
| Lights & Appliances (kWh)    | 10622 |

**Annual Energy Demands (kW)**

|                                   |      |
|-----------------------------------|------|
| Heating                           | 14.1 |
| Cooling                           | 1.5  |
| Water Heating (Winter Peak)       | 0.0  |
| Water Heating (Summer Peak)       | 0.0  |
| Lights & Appliances (Winter Peak) | 0.9  |
| Lights & Appliances (Summer Peak) | 2.1  |
| Total Winter Peak                 | 15.0 |
| Total Summer Peak                 | 3.6  |

**Utility Rates:**

|              |                   |
|--------------|-------------------|
| Electricity: | EI,Kwh, .160,PSNH |
| Gas:         | NG,Th,\$1.50      |

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**PERFORMANCE SUMMARY**

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|                 |                           |               |                     |
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| File Name:      | HRES-G8-1487_CondBase.blg | Rating Date:  | Sept 14, 2009       |

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**HRES-G8-1487**

**Annual Load (MMBtu/yr)**

|               |      |
|---------------|------|
| Heating       | 93.5 |
| Cooling       | 14.0 |
| Water Heating | 15.3 |

**Annual Consumption (MMBtu/yr)**

|                     |      |
|---------------------|------|
| Heating             | 25.7 |
| Cooling             | 2.7  |
| Water Heating       | 18.7 |
| Lights & Appliances | 45.1 |
| Photovoltaics       | -0.0 |
| Total               | 92.2 |

**Annual Energy Cost (\$/yr)**

|                     |    |      |
|---------------------|----|------|
| Heating             | \$ | 1201 |
| Cooling             | \$ | 126  |
| Water Heating       | \$ | 280  |
| Lights & Appliances | \$ | 1833 |
| Photovoltaics       | \$ | -0   |
| Service Charges     | \$ | 102  |
| Total               | \$ | 3543 |

**Design Loads (kBtu/hr)**

|               |      |
|---------------|------|
| Space Heating | 52.2 |
| Space Cooling | 21.8 |

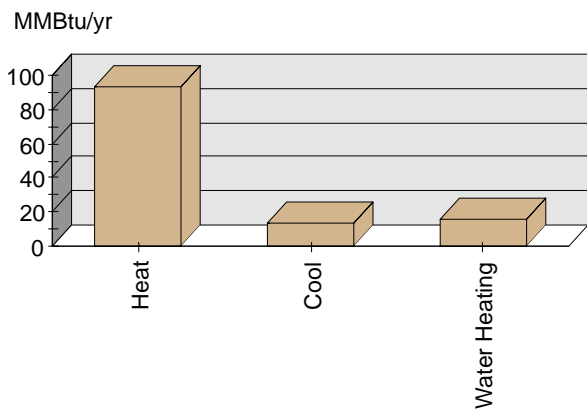
**Utility Rates:**

|              |                   |
|--------------|-------------------|
| Electricity: | EI,Kwh, .160,PSNH |
| Gas:         | NG,Th,\$1.50      |

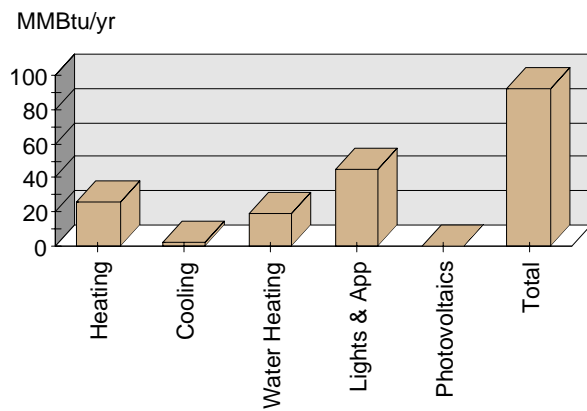
**PERFORMANCE SUMMARY**

|                 |                           |               |                     |
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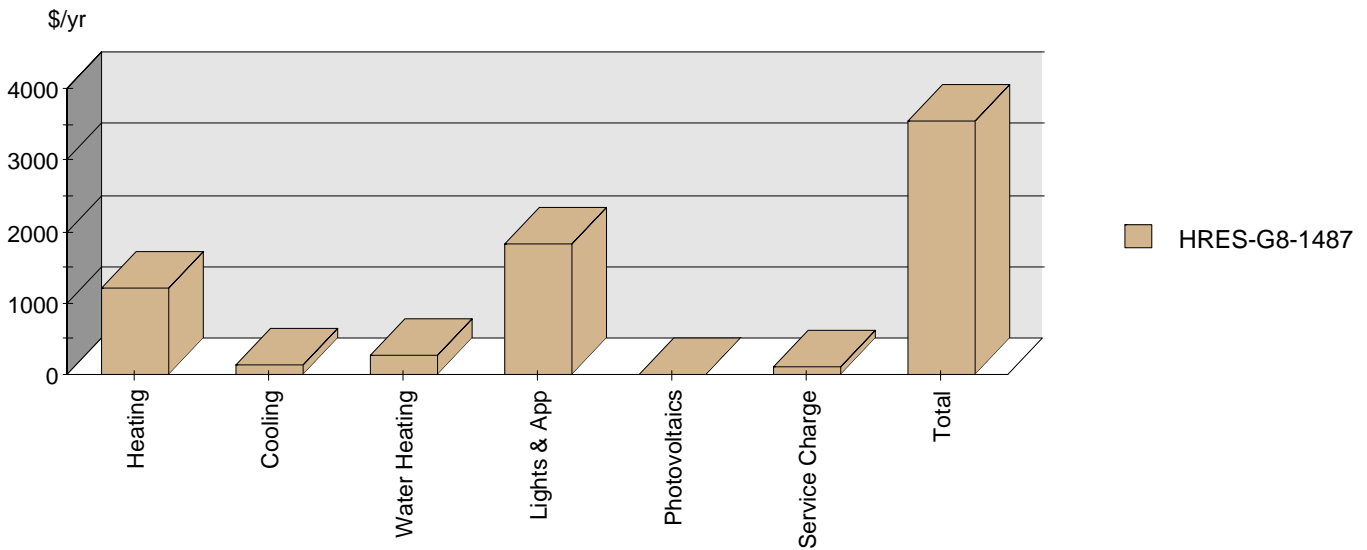
**Annual Load**



**Annual Consumption**

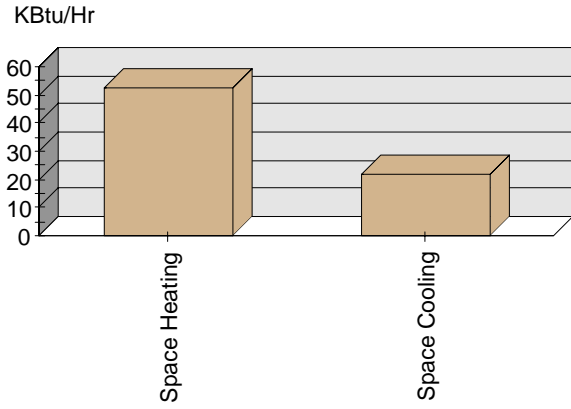


**Annual Energy Cost**





### Design Loads



### Utility Rates:

Electricity: EI,Kwh, .160,PSNH  
Gas: NG,Th,\$1.50

**2005 EPACT ENERGY EFFICIENT HOME TAX CREDIT**

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

|               | <i>2004 IECC</i>  |                    |
|---------------|-------------------|--------------------|
|               | <i>50% Target</i> | <i>As Designed</i> |
| Heating:      | 72.0              | 42.4               |
| Cooling:      | 13.8              | 6.8                |
| <b>Total:</b> | <b>85.8</b>       | <b>49.3</b>        |

**Envelope Loads (MMBtu/year)**

|               | <i>2004 IECC</i>  |                    |
|---------------|-------------------|--------------------|
|               | <i>90% Target</i> | <i>As Designed</i> |
| Heating:      | 129.7             | 80.4               |
| Cooling:      | 24.8              | 11.6               |
| <b>Total:</b> | <b>154.4</b>      | <b>92.1</b>        |

**This home MEETS the requirements for the residential energy efficiency tax credits under Section 1332, Credit for Construction of New Energy Efficient Homes, of the Energy Policy Act of 2005.**

As demonstrated above, this dwelling unit has a projected level of annual heating and cooling energy consumption that is at least 50% below the annual level of heating cooling energy consumption of a reference dwelling in the same climate zone, and the building envelope components improvements alone account for at least 10% of those savings. The projected heating and cooling energy savings above have been calculated in the manner prescribed in Section 2.02 of Notice 2006-27 of the Internal Revenue Service. Field inspections of the dwelling unit performed by the undersigned eligible certifier during and after the completion of construction have confirmed that all features of the home affecting such heating and cooling energy consumption comply with the design specifications provided to the undersigned certifier.

**Building Features**

|                                 |   |
|---------------------------------|---|
| Ceiling Flat: R-54, R-49        | Slab: R-0.0 Edge, R-0.0 Under                         |
| Vaulted Ceiling: R-34           | Duct: R-4.2   |
| Above Grade Walls: R-30, R-28   | Window: U-Value = 0.280, SHGC = 0.350                 |
| Foundation Walls: R-10.0, R-5.0 | Heating: Ground-source heat pump, Electric, 4.2 COP.  |
| Exposed Floor: R-0, R-38        | Cooling: Ground-source heat pump, Electric, 18.0 EER. |

**Under penalties of perjury, I declare that I have examined this certification, including accompanying documents, and to the best of my knowledge and belief, the facts presented in support of this certification are true, correct, and complete.**

|   |                          |
|---|--------------------------|
| Name: Kevin Hanlon                                | Signature: _____         |
| Company: Horizon RES. NH LLC                      | Date: September 14, 2009 |
| Address: 26 S.Main St. PMB 185, Concord, NH 03301 |                          |



## ENERGY STAR HOME VERIFICATION SUMMARY

|                 |                           |               |                     |
|-----------------|---------------------------|---------------|---------------------|
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| Builder's Name: | Sophie Lane LLC           |               |                     |
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### Building Information

|                                |       |                  |                        |
|--------------------------------|-------|------------------|------------------------|
| Conditioned Area (sq ft):      | 4376  | Housing Type:    | Single-family detached |
| Conditioned Volume (cubic ft): | 39634 | Foundation Type: | More than one type     |
| Insulated Shell Area (sq ft):  | 10205 | HERS Index:      | 45 *****               |
| Number of Bedrooms:            | 3     |                  |                        |

### Building Shell

|                        |                              |                        |                           |
|------------------------|------------------------------|------------------------|---------------------------|
| Ceiling w/Attic:       | A,R29R25,BLCe,1,16,8 U=0.019 | Window/Wall Ratio:     | 0.13                      |
| Vaulted Ceiling:       | V,R0R34,DPCe,1,16,12 U=0.032 | Window Type:           | .28 / .35                 |
| Above Grade Walls:     | R8.5,R21,FGBa,1,16,6 U=0.037 | Window U-Value:        | 0.280                     |
| Found. Walls (Cond):   | None                         | Window SHGC:           | 0.350                     |
| Found. Walls (Uncond): | E,R5 R=5.0                   | Infiltration:          | Htg: 1707 Clg: 1707 CFM50 |
| Frame Floors:          | H,R0,1,10,16 U=0.299         | Measured Duct Leakage: | 184.00 CFM25              |
| Slab Floors:           | R0,0,R0,O,1,NR U=0.663       | Leakage to Outside:    | 184.00 CFM                |

### Mechanical Systems

|                          |  |
|--------------------------|--|
| Heating:                 | Ground-source heat pump, 42.0 kBtuh, 4.2 COP.  |
| Cooling:                 | Ground-source heat pump, 32.0 kBtuh, 18.0 EER. |
| Water Heating:           | Conventional, Gas, 0.65 EF.                    |
| Programmable Thermostat: | Heat=Yes; Cool=Yes                             |

Note: Where feature level varies in home, the dominant value is shown.

**This home MEETS OR EXCEEDS the EPA's requirements for an ENERGY STAR Home.**



## An ENERGY STAR<sup>®</sup> Qualified Home

This home built at

### 35 Merrimack St., Portsmouth, NH

by Sophie Lane LLC

has been verified by Horizon RES. NH LLC, an independent professional or organization,  
to meet or exceed strict energy efficiency guidelines  
set by the U.S. Environmental Protection Agency.

HERS Index: 45

Sept 14, 2009

A handwritten signature in black ink, appearing to read "David Lee".

David Lee  
Chief  
ENERGY STAR Residential Branch

A handwritten signature in black ink, appearing to read "Sam Rashkin".

Sam Rashkin  
National Director  
ENERGY STAR for Homes

[www.energystar.gov](http://www.energystar.gov)

# RESNET HOME ENERGY RATING Standard Disclosure

**For home located at:** 35 Merrimack St.

**City:** Portsmouth

**State:** NH

1.  The Rater or the Rater's employer is receiving a fee for providing the rating on this home.
2.  In addition to the rating, the Rater or Rater's employer has also provided the following consulting services for this home:
- A. Mechanical system design
  - B. Moisture control or indoor air quality consulting
  - C. Performance testing and/or commissioning other than required for the rating itself
  - D. Training for sales or construction personnel
  - E. Other (specify below)

3.  The Rater or Rater's employer is:
- A. The seller of this home or their agent
  - B. The mortgagor for some portion of the financed payments on this home
  - C. An employee, contractor or consultant of the electric and/or natural gas utility serving this home

4.  The Rater or Rater's employer is a supplier or installer of products, which may include:

|  | Installed in this home by:     |                                   | OR | Is in the business of:         |                                   |
|--|--------------------------------|-----------------------------------|----|--------------------------------|-----------------------------------|
| HVAC systems   | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |    | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |
| Thermal insulation systems                                       | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |    | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |
| Air sealing of envelope or duct systems                          | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |    | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |
| Windows or window shading systems                                | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |    | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |
| Energy efficient appliances                                      | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |    | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |
| Construction (builder, developer, construction contractor, etc.) | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |    | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |
| Other (specify below):   | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |    | <input type="checkbox"/> Rater | <input type="checkbox"/> Employer |

I attest that the above information is true and correct to the best of my knowledge. As a Rater or Rating Provider I abide by the rating quality control provisions of the Mortgage Industry National Home Energy Rating Standard as set forth by the Residential Energy Services Network (RESNET). The national rating quality control provisions of the rating standard are contained in Chapter One 4.C.8 of the standard and are posted at <http://www.natresnet.org/accred/standards.pdf>. This home may have been verified under the provisions of Chapter Six, Section 603, "Technical Requirements for Sampling" of the Standard.

Kevin Hanlon

Rater's Printed Name

HRES-02

Certification #

September 14, 2009

Date

Rater's Signature