



**VERMONT ENERGY**  
INVESTMENT CORPORATION

# Building Energy Labeling

RESNET Conference | February 24, 2010  
Richard Faesy | *Vermont Energy Investment Corp.*  
(with much assistance from Dunsky Associates)

# Overview

- Labeling history and use
- Some examples
- Elements of a label



## VALUING BUILDING ENERGY EFFICIENCY THROUGH DISCLOSURE AND UPGRADE POLICIES A ROADMAP FOR THE NORTHEAST U.S.

### A DUNSKY ENERGY CONSULTING REPORT

in collaboration with VERMONT ENERGY INVESTMENT CORPORATION

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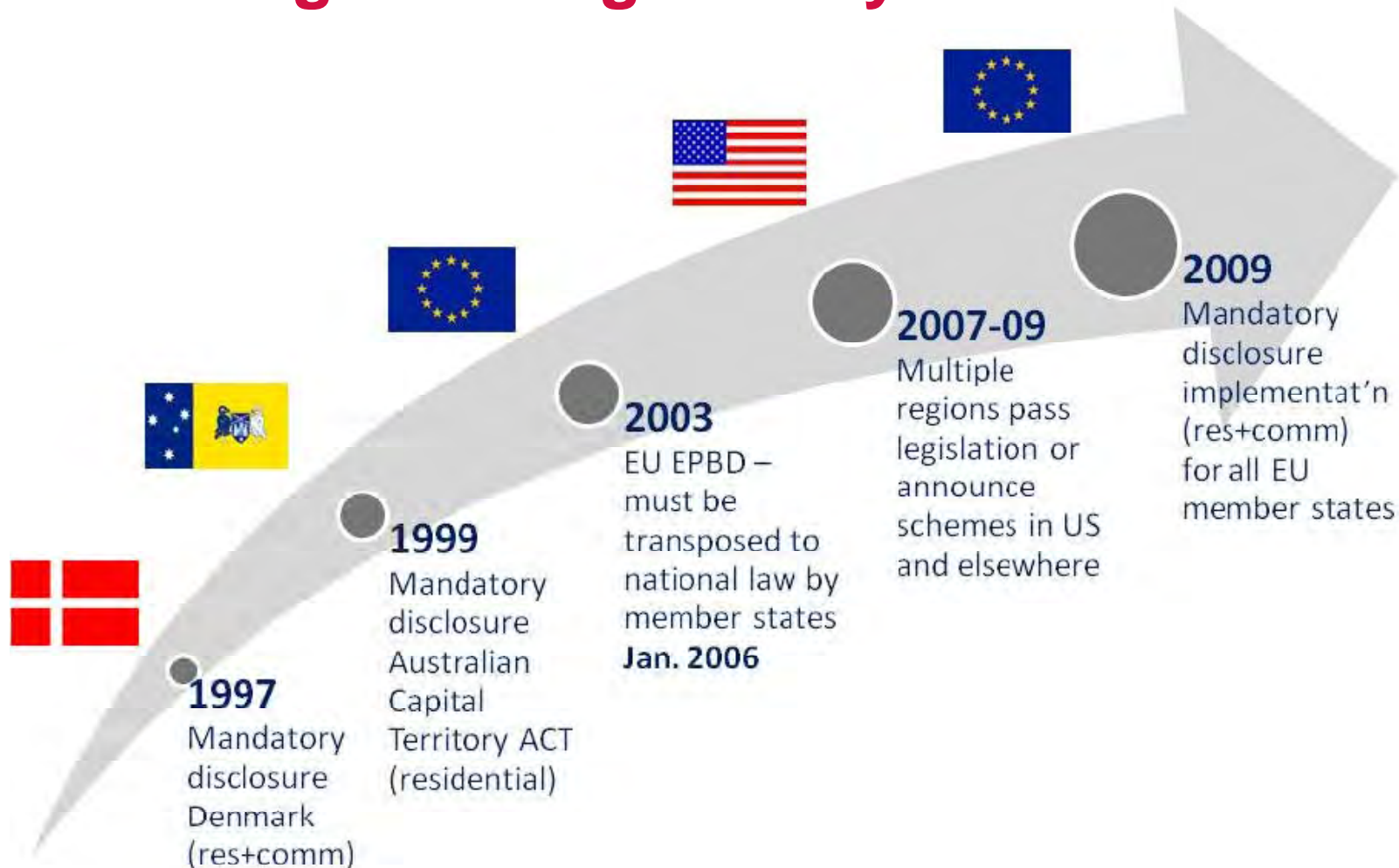
### For NORTHEAST ENERGY EFFICIENCY PARTNERSHIPS

under the direction of Ed Schmidt, Director of Regional Initiatives

NOVEMBER 2009

[www.neep.org](http://www.neep.org)

# Building Labeling History



# International Labeling Initiatives

Jurisdiction	Status
Australia national	Planned for May 2011
Australian Capital Territory (ACT)	In effect
Denmark	In effect
European Union	In effect
France	In effect
New Zealand	Under consideration
Ontario	Planned for <b>DATE TBD</b>
Quebec	Pilots planned for 2011
Shandong China	In effect
UK	In effect



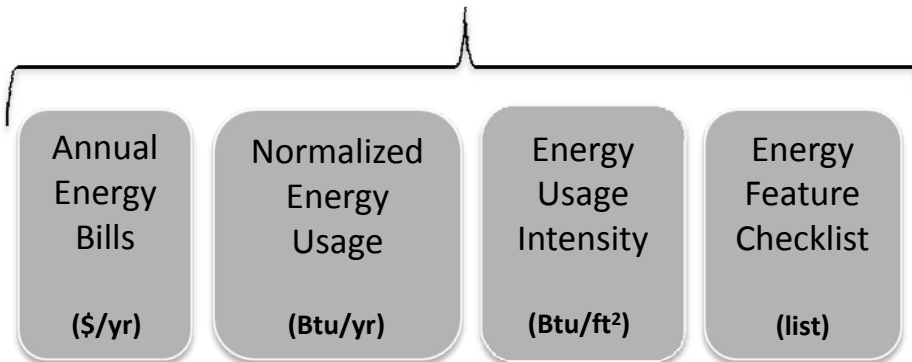
# U.S. Labeling Initiatives

Jurisdiction	Status
Austin, TX	In effect
California	Past proposal
Federal Government	Active proposal
Maine	In effect
Massachusetts	Past proposal
Montgomery County, MD	In effect
Nevada	Planned for 2011
New Jersey	Past proposals
New York City	Unknown
New York State	In effect
Oregon	In Development
Santa Fe, New Mexico	In effect
Vermont	Defeated
Washington	Unknown

# KEY ISSUE

## Type of Rating

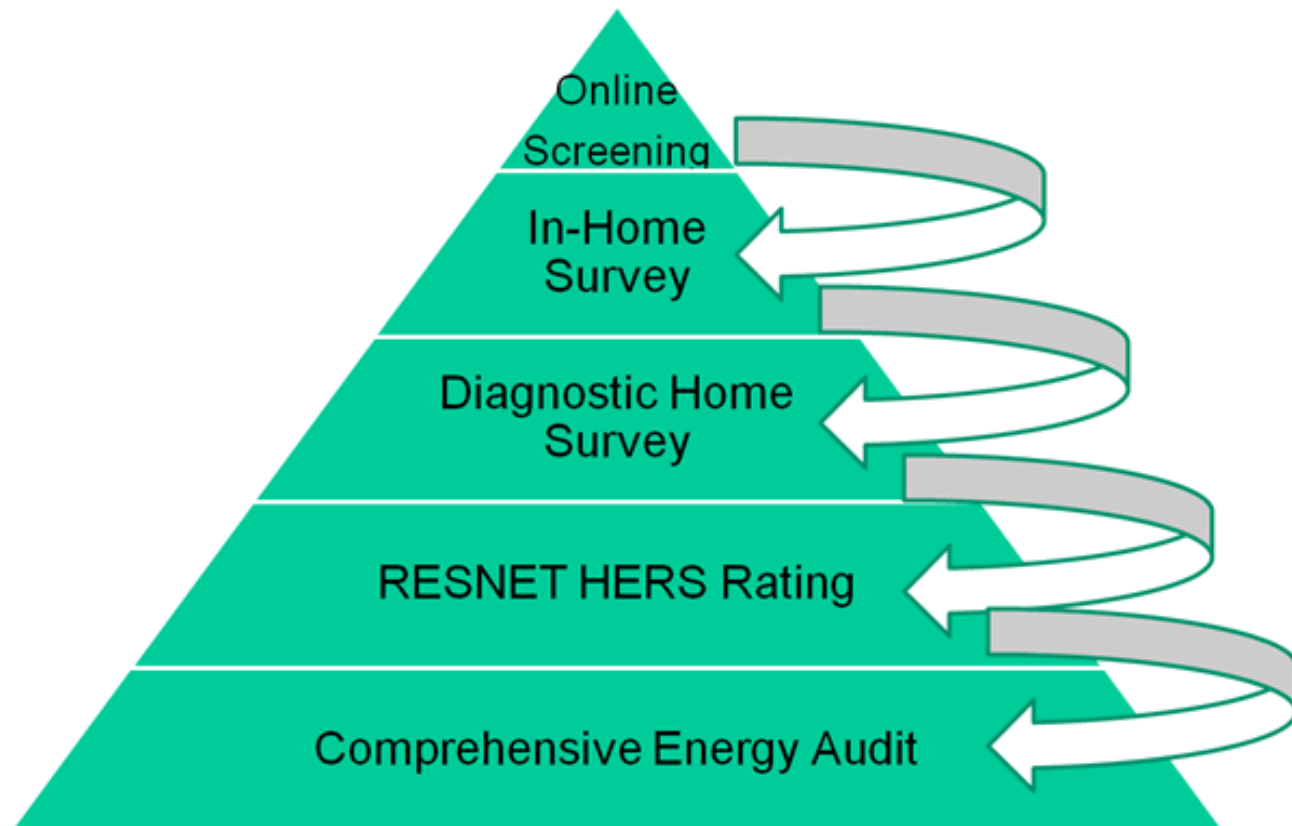
Require limited tools/infrastructure.  
Provide least valuable information.



Complexity / Robustness

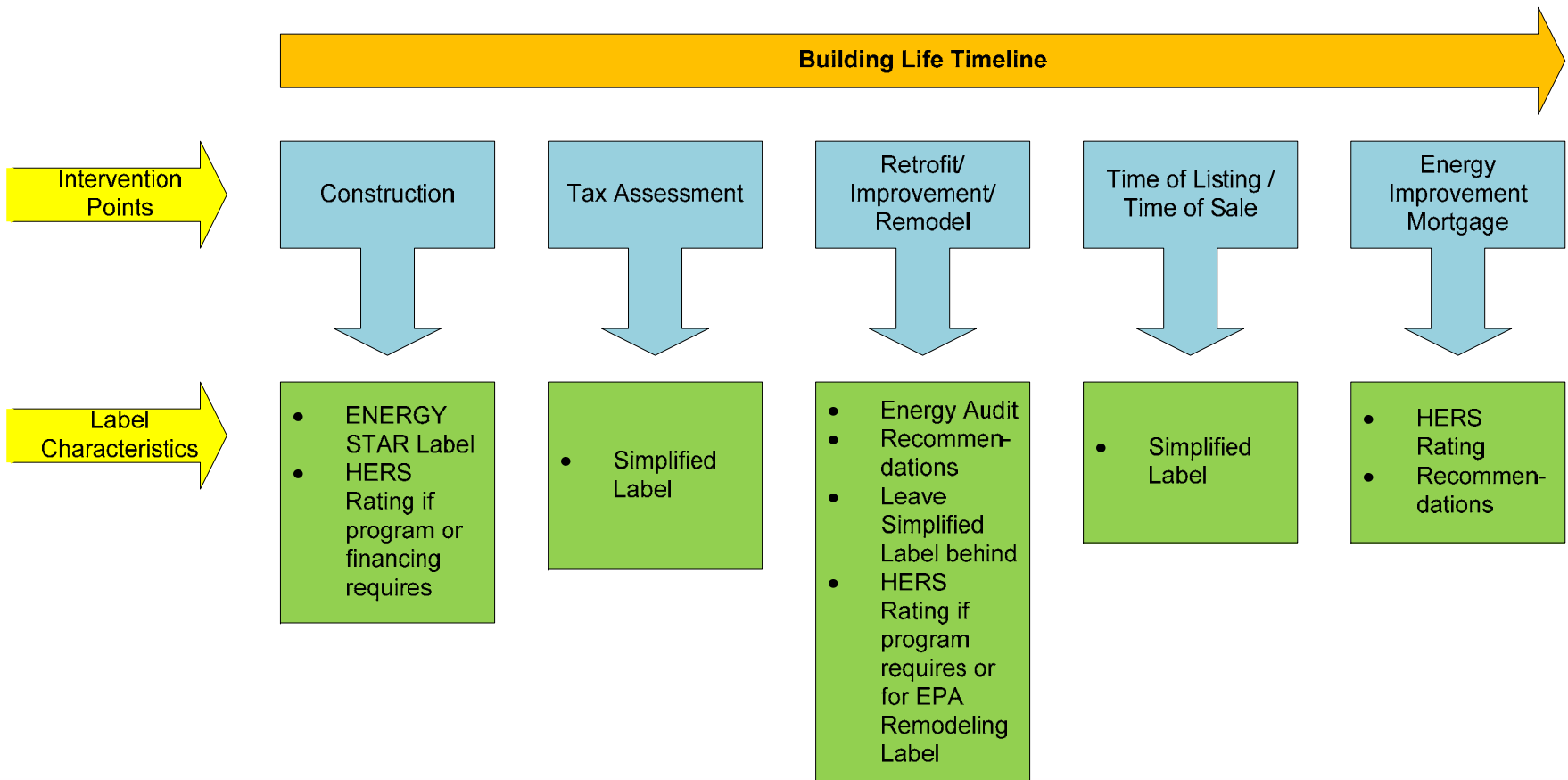


# U.S. DOE Proposed Data Hierarchy for “Integrated Rating Tools”





# Labeling Characteristics for Building Intervention Points



# Energy Performance Certificate

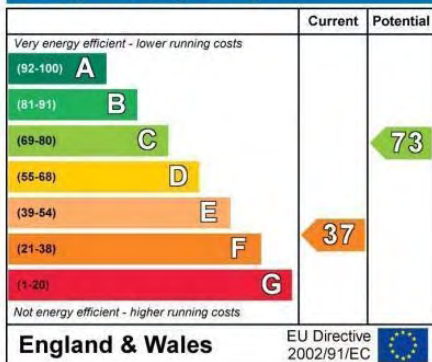


17 Any Street,  
Any Town,  
County,  
YY3 5XX

Dwelling type: Detached house  
Date of assessment: 02 February 2007  
Date of certificate: [dd mmmm yyyy]  
Reference number: 0000-0000-0000-0000-0000  
Total floor area: 166 m<sup>2</sup>

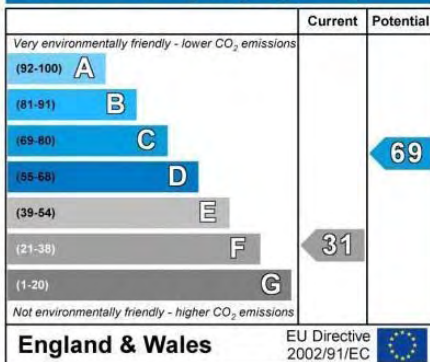
This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO<sub>2</sub>) emissions.

## Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills will be.

## Environmental Impact (CO<sub>2</sub>) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

## Estimated energy use, carbon dioxide (CO<sub>2</sub>) emissions and fuel costs of this home

	Current	Potential
Energy Use	453 kWh/m <sup>2</sup> per year	178 kWh/m <sup>2</sup> per year
Carbon dioxide emissions	13 tonnes per year	4.9 tonnes per year
Lighting	£81 per year	£65 per year
Heating	£1173 per year	£457 per year
Hot water	£219 per year	£104 per year

Based on standardised assumptions about occupancy, heating patterns and geographical location, the above table provides an indication of how much it will cost to provide lighting, heating and hot water to this home. The fuel costs only take into account the cost of fuel and not any associated service, maintenance or safety inspection. This certificate has been provided for comparative purposes only and enables one home to be compared with another. Always check the date the certificate was issued, because fuel prices can increase over time and energy saving recommendations will evolve.

To see how this home can achieve its potential rating please see the recommended measures.



Remember to look for the energy saving recommended logo when buying energy-efficient products. It's a quick and easy way to identify the most energy-efficient products on the market.

For advice on how to take action and to find out about offers available to help make your home more energy efficient, call 0800 512 012 or visit [www.energysavingtrust.org.uk/myhome](http://www.energysavingtrust.org.uk/myhome)

## Recommended measures to improve this home's energy performance

17 Any Street,  
Any Town,  
County,  
YY3 5XX

Date of certificate: [dd mmmm yyyy]  
Reference number: 0000-0000-0000-0000-0000

## Summary of this home's energy performance related features

The following is an assessment of the key individual elements that have an impact on this home's performance rating. Each element is assessed against the following scale: Very poor / Poor / Average / Good / Very good.

Element	Description	Current performance	
		Energy Efficiency	Environmental
Walls	Cavity wall, as built (no insulation)	Poor	Poor
Roof	Pitched, 250 mm loft insulation	Good	Good
Floor	Solid, no insulation (assumed)	-	-
Windows	Partial double glazing	Poor	Poor
Main heating	Boiler and radiators, mains gas	Average	Average
Main heating controls	Programmer, room thermostat and TRVs	Average	Average
Secondary heating	None	-	-
Hot water	From main system, no cylinderstat	Poor	Poor
Lighting	Low energy lighting in 75% of fixed outlets	Very good	Very good

Current energy efficiency rating **F 37**

Current environmental impact (CO<sub>2</sub>) rating **F 31**

## Recommendations

The measures below are cost effective. The performance ratings after improvement listed below are cumulative, that is they assume the improvements have been installed in the order that they appear in the table.

Lower cost measures (up to £500)	Typical savings per year	Performance ratings after improvement	
		Energy efficiency	Environmental impact
1 Cavity wall insulation	£137	D 60	D 60
2 Low energy lighting for all fixed outlets	£75	D 63	D 61
<b>Sub-Total</b>	<b>£212</b>		
Higher cost measures (over £500)			
3 Upgrade heating controls	£56	D 64	D 63
4 Replace boiler with Band A condensing boiler	£187	D 67	D 67
<b>Total</b>	<b>£355</b>		

Potential energy efficiency rating **D 67**

Potential environmental impact (CO<sub>2</sub>) rating **D 67**

## Further measures to achieve even higher standards

The further measures listed below should be considered in addition to those already specified if aiming for the highest possible standards for this home.

5 Solar photovoltaics panels, 25% of roof area	£188	C 71	C 73
<b>Enhanced energy efficiency rating</b>		<b>C 71</b>	
<b>Enhanced environmental impact (CO<sub>2</sub>) rating</b>			<b>C 73</b>

# Display Energy Certificate



How efficiently is this building being used?

A Government Dept  
12<sup>th</sup> & 13<sup>th</sup> Floor  
Jubilee House  
High Street  
Anytown  
A1 2CD

Certificate Reference Number:  
1234-1234-1234-1234

This certificate indicates how much energy is being used to operate this building. The Operational Rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website [www.communities.gov.uk/epbd](http://www.communities.gov.uk/epbd).

## Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient

**A** 0-25

**B** 26-50

**C** 51-75

**D** 76-100

100 would be typical

**E** 101-125

**108**

**F** 126-150

**G** Over 150

Less energy efficient

## Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual readings.

Main heating fuel: Gas  
Building Environment: Air Conditioned  
Total useful floor area (m<sup>2</sup>): 2927  
Asset Rating: 92

	Heating	Electrical
Annual Energy Use (kWh/m <sup>2</sup> /year)	126	129
Typical Energy Use (kWh/m <sup>2</sup> /year)	120	96
Energy from renewables	0%	20%

## Administrative information

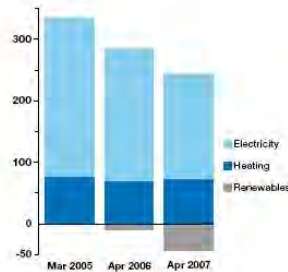
This is a Display Energy Certificate as defined in SI2007:991 as amended.

Assessment Software: QR v1  
Property Reference: 991123776612  
Assessor Name: John Smith  
Assessor Number: ABC12345  
Accreditation Scheme: AEC Accreditation Ltd  
Employer/Trading Name: EnergyWatch Ltd  
Employer/Trading Address: Alpha House, New Way, Birmingham, B2 1AA  
Issue Date: 12 May 2007  
Nominated Date: 01 Apr 2007  
Valid Until: 31 Mar 2008

Related Party Disclosure: EnergyWatch are contracted as energy managers  
Recommendations for improving the energy efficiency of the building are contained in Report Reference Number 1234-1234-1234-1234

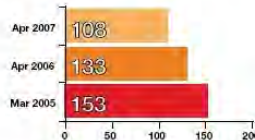
## Total CO<sub>2</sub> Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO<sub>2</sub>.



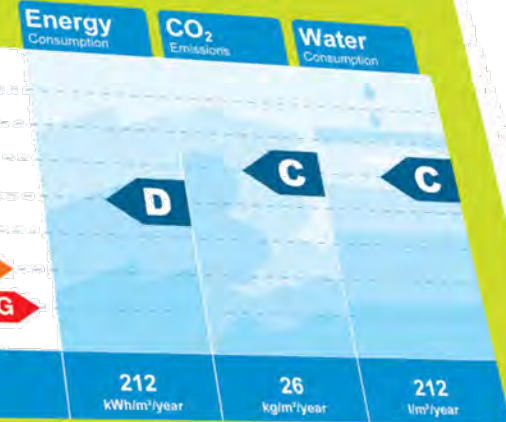
## Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods



# The Council House

How does this building compare?



## Towards a class A building

### Simple actions

Turn off your PC monitor when you go for lunch and when you go home.  
Use natural daylight as much as possible. Turn off lights in empty rooms.  
Don't open windows if you're too hot - ask for the heating to be turned down.  
Can you use the stairs instead of the lift?

### Technical solutions

Adjust heating times to suit weather conditions.  
Install a woodfuel biomass boiler to replace gas fired plant.  
Adjust lighting controls to be more sensitive to daylight.  
Draughtproof all windows and doors.  
Replace all PC monitors with flat screens.

## Energy sources



Improving performance by one class could save annually:

The energy consumption of	The CO <sub>2</sub> emissions of a car going	Water consumption for
25 family houses	29 weeks around the earth	54780 showers

For further information  
Bristol City Council  
Energy Management Unit  
Ian Walkins  
Tel: +44 (0)117 9224438  
ian\_walkins@bristol-city.gov.uk

[www.display-campaign.org](http://www.display-campaign.org)

# Home Energy Rating Certificate

Lot 21 Thorn Bush Road  
Hinesburg, VT 05461



**5 Stars Plus  
Verified Condition**

## Uniform Energy Rating System

Uniform Energy Rating System					Energy Efficient				
1 Star	1 Star Plus	2 Stars	2 Stars Plus	3 Stars	3 Stars Plus	4 Stars	4 Stars Plus	5 Stars	5 Stars Plus
500-401	400-301	300-251	250-201	200-151	150-101	100-91	90-96	85-71	70-0

HERS Index: **55**

### General Information

Conditioned Area: 2146 sq. ft. House Type: Single-family detached  
Conditioned Volume: 15473 cubic ft. Foundation: Unconditioned basement  
Bedrooms: 3

### Mechanical Systems Features

Heating: Fuel-fired hydronic distribution, Propane, 92.0 AFUE.  
Water Heating: Integrated, Propane, 0.85 EF, 80.0 Gal.

Duct Leakage to Outside: NA  
Ventilation System: Exhaust Only: 169 cfm, 54.0 walls.  
Programmable Thermostat: Heating: Yes Cooling: No

### Building Shell Features

Ceiling Flat: R-37 Exposed Floor: R-39, R-0  
Vaulted Ceiling: NA Window Type: U:0.35, SHGC:0.30  
Above Grade Walls: R-19 Infiltration:  
Foundation Walls: R-10.0 Rate: Htg: 830 Cfg: 830 CFM50  
Slab: None Method: Blower door test

### Lights and Appliance Features

Percent Fluorescent Pin-Based: 70.00 Clothes Dryer Fuel: Electric  
Percent Fluorescent CFL: 0.00 Range/Oven Fuel: Propane  
Refrigerator (kWh/yr): 460.00 Ceiling Fan (cfm/Watt): 0.00  
Dishwasher Energy Factor: 0.86

The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

REM Rate - Residential Energy Analysis and Rating Software v12.5 Vermont

This information does not constitute any warranty of energy cost or savings.  
© 1985-2008 Architectural Energy Corporation, Boulder, Colorado.

Rating Number: 6038J685  
Export Build Fun No: 13723  
Certified Energy Rater: Sara Davie  
Rating Date: December 15, 2008  
Rating Ordered For: Collin Frisbie

### Estimated Annual Energy Cost:

Use	Verified Condition		
	MMBtu	Cost	Percent
Heating	71.7	\$2276	87%
Cooling	0	\$0	0%
Hot Water	3.9	\$125	4%
Lights/Appliances	22.6	\$658	26%
Photovoltaics	-0.0	-\$0	-0%
Service Charges		\$119	4%
<b>Total</b>		<b>\$3389</b>	<b>100%</b>

**This home meets or exceeds the minimum**

**criteria for all of the following:**

- Federal Energy Policy Act, 2006\*
- Vermont Energy Star Homes Criteria\*
- Vermont Residential Energy Code\*

\* Compliance with criteria for this program is determined by the rater.

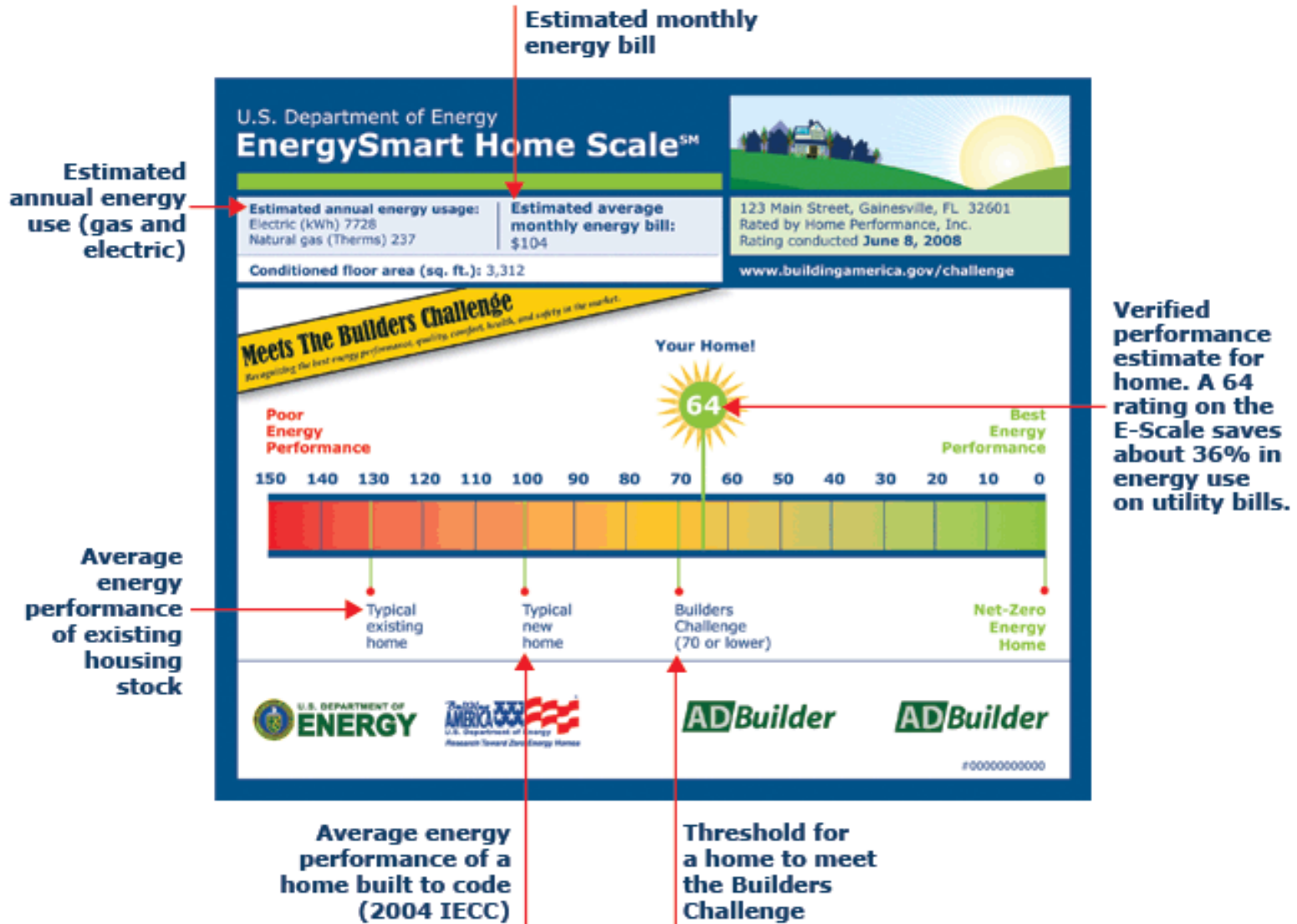
Vermont Energy Investment Corp.

255 South Champlain St.  
Burlington, VT 05401  
800-639-8069

Fax 802-658-1643

www.velc.org

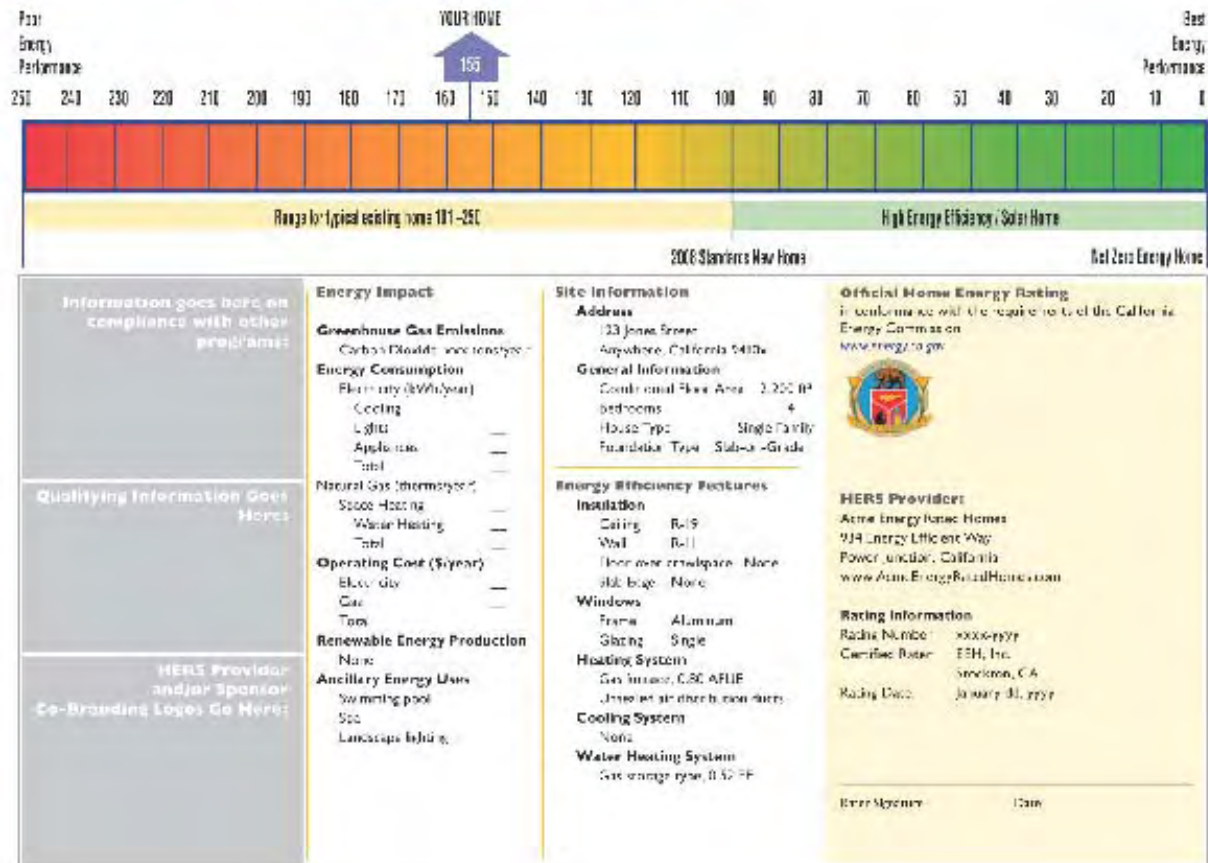




# Proposed California Label

## Sample Rating Certificate

### California Home Energy Rating Certificate

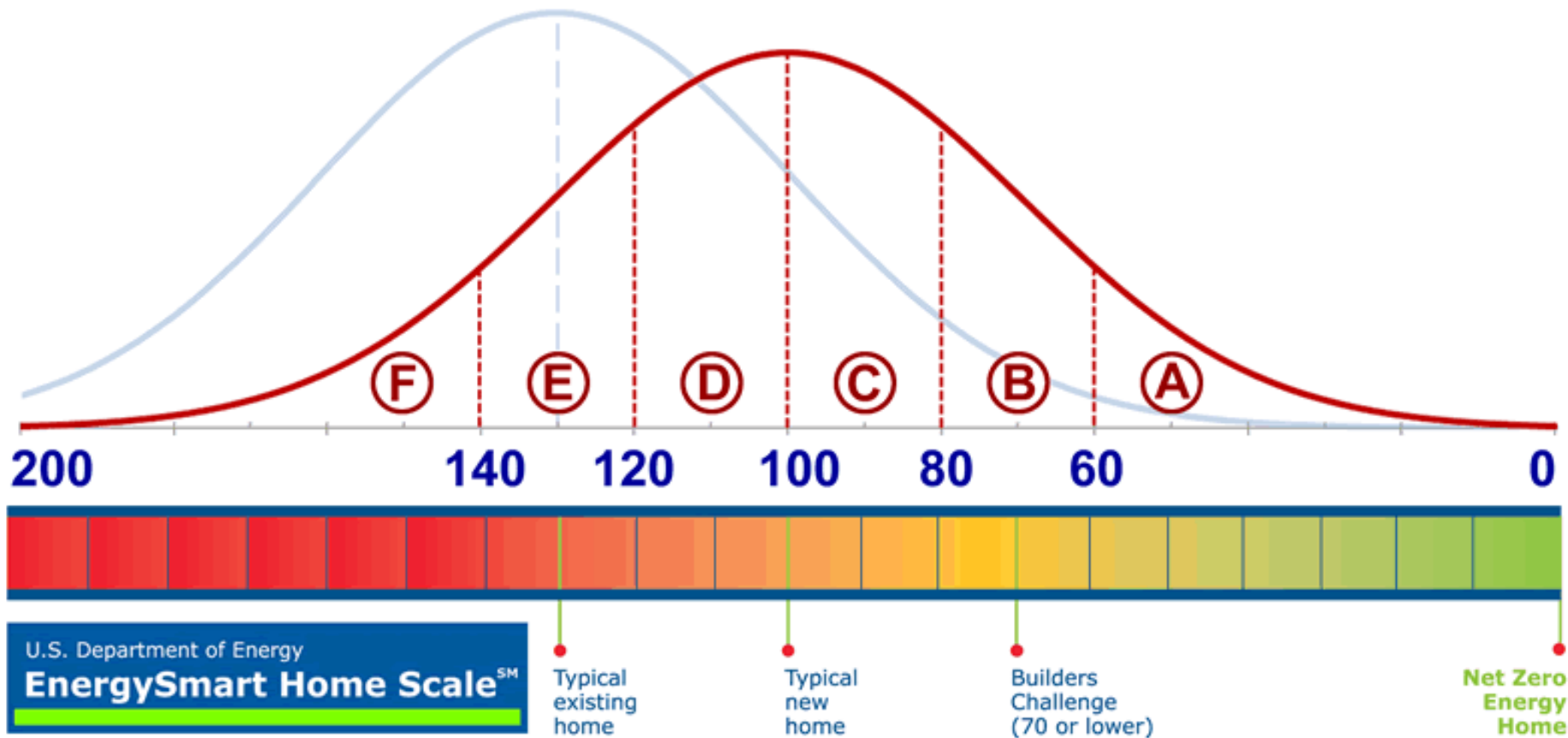


**California Home Energy Rating System Program Phase II**





# The Fairey Model



# RESNET Rating Report Requirements

- 1 to 5+ Stars
- HERS Index
- Estimated annual purchased energy consumption & cost for:
  - Space heating
  - Space cooling
  - Domestic hot water
  - All other energy use
  - Total
- Property Address
- Rater Name
- Date of Rating
- Tool used and version #
- Disclosure Statement & Provider's address & phone #

# Proposed Label Features & Attributes

- Do we have it almost right already?
  - Keep what we already have
  - Peg meaningful benchmarks on HERS scale
  - Change stars to letters (A-F)
    - Letters from simplified audit tools
  - HERS score from full rating
- What about carbon use?
  - Generate an absolute carbon scale
  - Carbon as the future currency
  - Consumers will get that lower is better
- Come up with a pretty national uniform customer-facing label
- Allow for local additions to national minimum

# Questions?

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802-453-5100 x19