



Rating a Home for an Energy Efficient Mortgage, Start to Finish

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Purpose

“An EEM recognizes the energy savings of a home that has ‘cost effective’ energy saving improvements that increase the energy efficiency of a home.”

~ 1993 HUD Mortgage Letter

History

- ❖ 1979 Solar Bank proposal
- ❖ 1993 HUD Mortgagee Letter
 - ❖ Pilot, 5 states, \$8000 cap
- ❖ 1995-2009 HUD Mortgagee Letters
 - ❖ Restrictions lifted, including \$8000 cap (in 2009)

Players & Products

❖ **FHA/HUD**

❖ **VA**

❖ **Conventional**

❖ **EEM**

❖ **EIM (RESNET term)**

NOTE: Each mortgage insurer has specific guidelines for underwriting EEMs, and some investors can have varying overlays. Knowing these guidelines and overlays up front is extremely important for the EEM process to go smoothly.

Players and Products: *FHA*

- ❖ New construction or existing homes
- ❖ Purchase or refinance
- ❖ No additional qualifying or down payment
- ❖ Up to 5% of property value added to loan for improvements
- ❖ 90 days to complete work



Players and Products: VA

-
- ❖ Existing properties only
 - ❖ New purchase or refinance
 - ❖ No additional qualifying or down payment
 - ❖ Up to \$6,000 in energy improvements
 - ❖ 180 days to complete work



Players and Products:

Conventional

- ❖ New construction or existing homes
- ❖ New purchase or refinance
- ❖ Up to 15% of property value for existing homes; 5% for new construction
- ❖ Energy savings added to appraised value
- ❖ Work to be completed before loan closing

Types of Qualifying Improvements



- ❖ Envelope: Insulation, Air Sealing
- ❖ Mechanical systems: HVAC, Water Heating
- ❖ Solar: Passive & Active



Existing Home Process

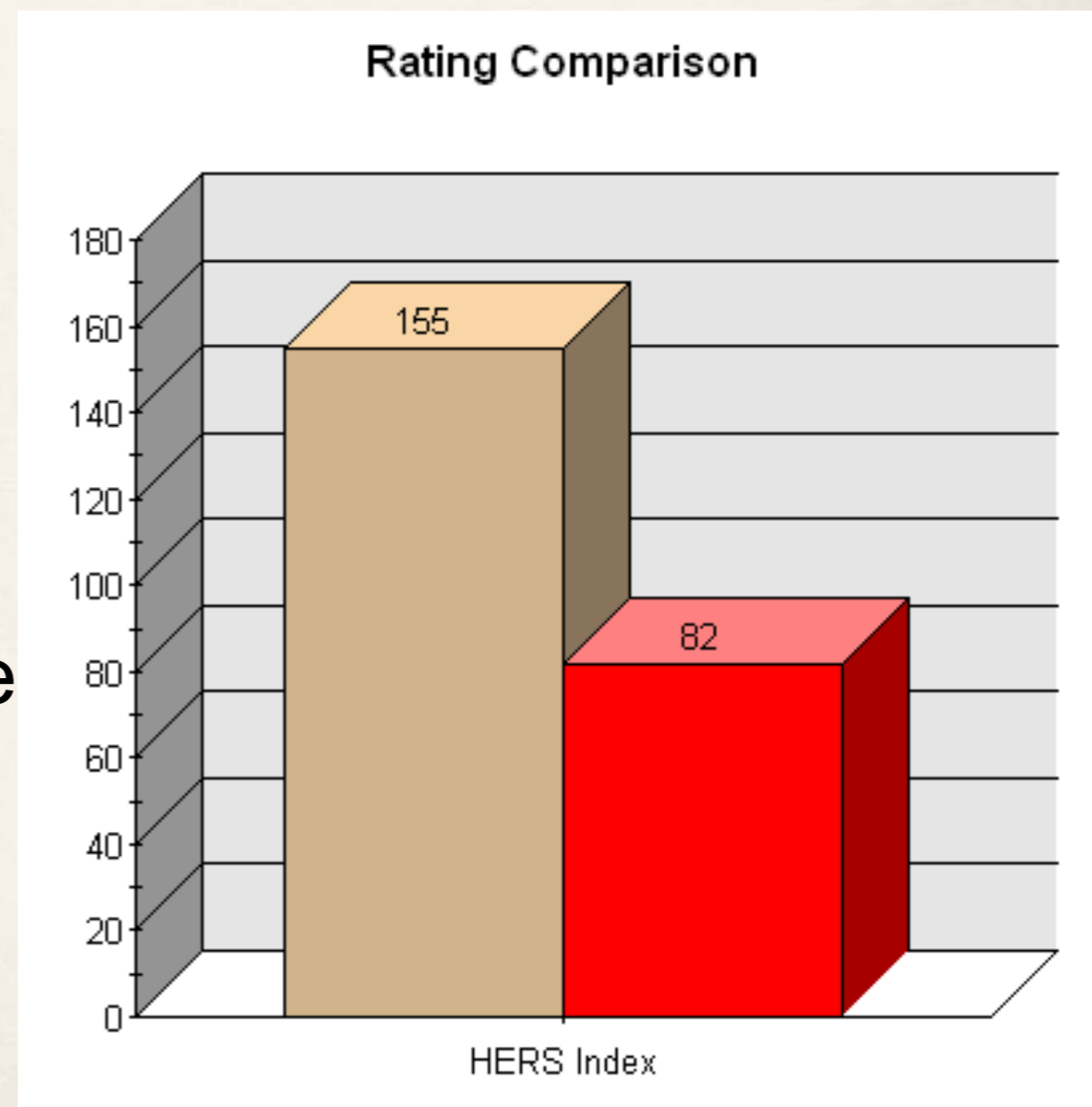


Case Study: 1970 Ranch Home EEM Refinance, Sep. 2010



Case Study: Initial Rating

- ❖ Annual Costs: \$3240
- ❖ HERS Index 155 (55% worse than code)
- ❖ Worst Problems: Duct leakage
Infiltration
Insulation



Case Study: Determining EEM Amount

The maximum amount available for energy improvements in FHA EEM is the lesser of 5% of:

Appraised value	\$175,000	\$8,750
115% of the median area price of a single family dwelling	Median price; \$250,000	\$14,375
150% of the conforming Freddie Mac limit	Limit; \$417,000	\$31,275

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Case Study: EEM Amount

- ❖ Maximum EEM Amount: \$8,750
- ❖ Weatherization Add-on: \$2,000
- ❖ Total Available for Improvements: \$10,750

Cost Effectiveness

Time Value of Money

\$100 of *Future Value* (e.g., energy savings) is worth less than \$100 in *Present Value*.

Present Value Calculation

Single payment

$$PV = \frac{FV}{(1 + i)^n}$$

Annual payments

$$PV(A) = \frac{A}{i} \cdot \left[1 - \frac{1}{(1 + i)^n} \right]$$

HERS Standards, pp. 3-10 - 3-12

Present Value Calculation

- ❖ PV = Present Value
- ❖ FV = Future Value
- ❖ i = interest rate
- ❖ n = number of years
- ❖ A = annual savings - maintenance costs

Present Value Variables

	5.5%	8%
23 years	\$7094	\$5714
10 years	\$4153	\$3697

Higher PV from:

- ❖ Lower interest
- ❖ Longer lifetimes

Improvement Analysis: Done by Rater

- ❖ Model house as-is.
- ❖ Determine improvements that are cost-effective
- ❖ Specify cost and lifetimes of improvements



Case Study: Improvement Analysis

Item:	Existing:	Proposed:	Cost:	Present Value
Duct Leakage	1233cfm25	0.0cfm25	\$1150	\$6483
Infiltration	0.75 AchNat	0.55 AchNat	\$950	\$1368
Attic Insulation	R-12 Blown Fiberglass	Roofline R-19 spray foam	\$900	\$1694
Prog. Thermostat	No	Yes	\$150	\$472
HVAC	80 AFUE Gas Furnace 10 SEER A/C	Heat Pump: 8.5 HSPF 15 SEER	\$4800	\$1121
Water Heating	Gas WH: 0.55 EF	Geyser HPWH: 2.80 EF	\$1350	\$5376
Foundation Walls	R-0	R-13 Icynene foam	\$1440	\$3404
Totals:			\$10,740	\$19,918

Case Study:

Cost of Spray Foam

Total cost of spray foam was \$4,440 but was spread out in previous table among:

- ❖ Air sealing
- ❖ Duct sealing
- ❖ Insulation (roofline & foundation walls)



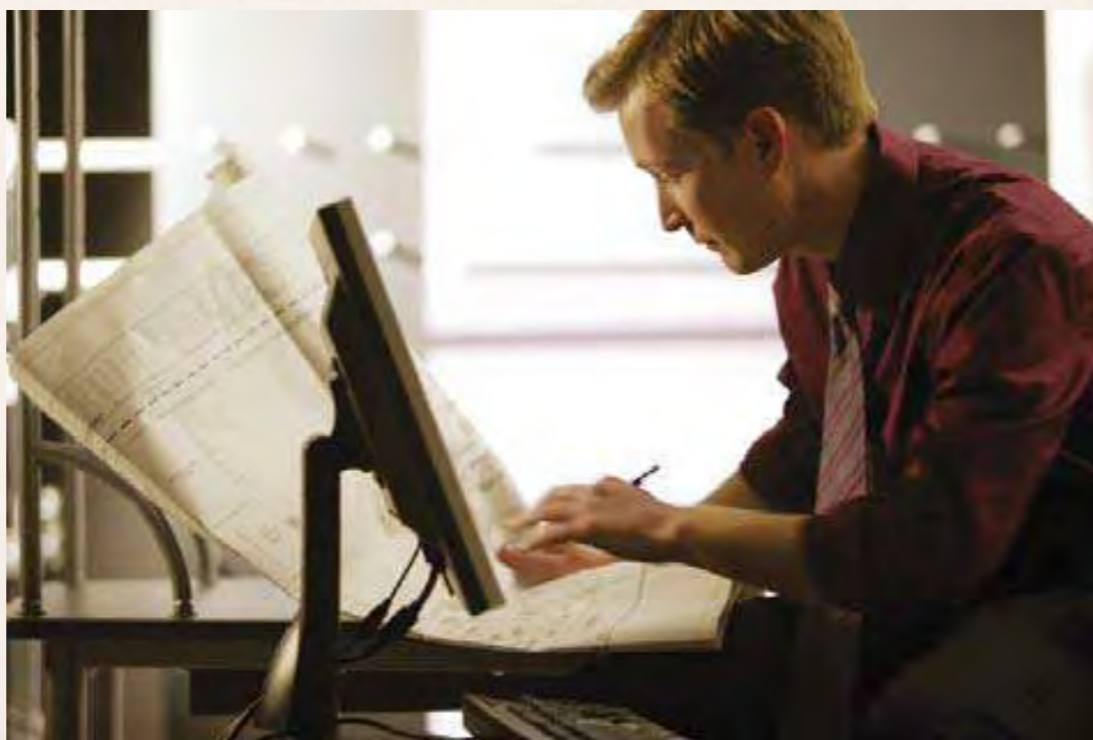
Case Study:

Cost-Effectiveness Test

- ❖ $PV = \$19,918$
- ❖ Cost of improvements = \$10,740
- ❖ **Net $PV = +\$9,178$**
- ❖ *Positive \implies Cost effective*

Reporting

- ❖ The HERS Report will provide all of the necessary energy savings documentation for underwriting approval.



Improvement Work

- ❖ Complete work according to energy package specifications.
- ❖ Change orders must be evaluated by HERS rater first
- ❖ All improvement work inspected before contractors get paid



Final Inspection

From HUD Mortgagee Letter 2005-21: change

“The lender, the rater, or an FHA fee inspector may inspect the installation of the improvements.”



Case Study: Changes

Floor Area	1964 sq ft	1964 sq ft
Volume	16632 cubic ft	28992 cubic ft
Infiltration	0.75 AchNat	0.30 AchNat
Duct Leakage	1233 cfm25	0.0 cfm25
Heating	80AFUE	8.5 HSPF
Cooling	10 SEER	15 SEER
Water Heating	Nat. Gas 0.55EF	HPWH 2.80EF
Ceiling	R-12, Flat	R-19, Sloped
AG Walls	R-11	N/A
End Walls	R-0	R-13
Exposed Floor	R-0	N/A

Case Study: Goals & Results

Item	Proposed	Final	PASS	FAIL
Duct Leakage	0.0 cfm25	0.0 cfm25	✓	
Infiltration	0.55 ACHnat	0.30 ACHnat	✓	
Attic Insulation	R-19 Foam	R-19 Foam	✓	
Prog. Thermostat	Yes	Yes	✓	
Heat Pump	15 SEER 8.5 HSPF	15SEER 8.5 HSPF	✓	
Heat Pump Water Heater	2.80 EF	2.80 EF	✓	
Fnd Wall Insulation	R-13 Foam	R-13 Foam	✓	

Case Study: Reduced Costs & HERS Index

Heating	\$1,369	\$620
Cooling	\$435	\$203
Hot Water	\$233	\$131
Lights/Appliances	\$843	\$843
Service Charges	\$360	\$0
Annual Costs	\$3,240	\$1,797
HERS Index	155	82

REM/Rate* vs. Reality

	REM/Rate		Actual Costs	
	Annual	Monthly	Annual	Monthly
Before	\$3,240	\$270	\$3,329	\$277
After	\$1,797	\$150	\$762	\$152

(5 mo. to date)

***97.3% Accuracy**

Case Study: Cash Flow

Before EEM

After EEM

	Before EEM	After EEM
Interest Rate	6.375%	4.5%
Improvements	\$0	\$10,740
Monthly Payment with PITI *	\$1,297	\$1,168
Energy Bills	\$270	\$150
True Monthly Cost	\$1,567	\$1,318
Monthly Savings		\$249
Annual Savings		\$2,988

New Purchase EEM

	Standard Loan	EEM Loan
Loan Amount	\$175,000	\$185,740
Interest Rate	4.5%	4.5%
Improvements	\$0	\$10,740
Monthly Payment with PITI *	\$1,113	\$1,168
Energy Bills	\$270	\$150
True Monthly Cost	\$1,383	\$1,318
Monthly Savings		+ \$65
Annual Savings		+ \$780

But wait! There's more...

- ❖ Received \$4,924 cash back from various incentives.
- ❖ The appraised value increased.
- ❖ The home is more comfortable and healthful to live in.



sustainable home initiative in the new economy



Conflict of Interest

- ❖ The HERS Rater cannot be directly or indirectly related to the buyer/homeowner, and the contractor cannot be directly or indirectly related to the HERS Rater.

Professionals working together

- ❖ Find one who has experience with EEMs – if you can.
- ❖ Form a team – Realtor, Lender, HERS Rater, Contractor(s)
- ❖ **COMMUNICATE EARLY** in the process to avoid closing delays
- ❖ Get paid after completion

Barriers to Widespread Use of EEMs

- ❖ Lack of awareness and knowledge
- ❖ Lack of promotion
- ❖ Not user friendly
- ❖ Lenders & underwriters have no experience with them.
- ❖ Realtors are afraid of them.
- ❖ Homeowners/buyers aren't aware of them.

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Case Study: Initial Rating

Conditioned Floor Area	1964 Sq Ft
Infiltration	0.75 ACHNat
Duct Leakage	1233 cfm25
Heating	Nat. Gas 80AFUE
Cooling	10 SEER
Water Heating	Nat. Gas 0.55EF
Ceiling	R-12, Flat
Above-Grade Walls	R-11
Foundation Walls	R-0
Exposed Floor	R-0