

# THE ENERGY IMPROVEMENT MORTGAGE

## *Two Case Studies*



CHRIS DWYER

The Roebel's 90-year-old Cincinnati bungalow proved to be a challenge to modernize with an Energy Improvement Mortgage.

by Chris Dwyer

**T**he Energy Improvement Mortgage (EIM) eluded me for years—like a leprechaun and his treasure. This mythic mortgage product makes promises almost too good to believe. It promises (1) lower cost of ownership for homeowners; (2) pollution reductions for the environment; (3) better home resale value; (4) bigger, and increasingly secure, loans for banks (because energy is only getting more expensive); and (5) construction work for local contractors.

An EIM is a loan that is available when a home is being sold, or refinanced. It sets aside money for energy-efficiency improvements to the home. A certified HERS rater does an inspection

on the home, suggests improvements, and once those improvements are made and signed off by the inspector, the lender repays the borrower the expenses from the improvements from an escrow account. They are certainly compelling. One might say, “This a no-brainer, my mortgage goes up a little and my energy bill goes down a lot.” If it’s such a no-brainer, why isn’t every loan like one of these?

At long last, from experience, I can tell you: Getting an EIM is not easy, but it is doable, and the EIM has the potential to make over our existing housing stock.

As a HERS rater and the owner of a home business, I dreamed up grandiose energy makeover plans for my own home/office, to be financed with an EIM. But when it came time to close the deal, I was completely stymied by the banks’ lack of knowledge and their failure to cooperate. Every local bank I talked to claimed they “knew a guy” who had “done one a while back.” But however often I heard these claims, I was hard-pressed to find any professionals willing to talk openly about

their experience getting one done. It took me 18 months to finally refinance, but I did so traditionally. So for years I debated whether the EIM existed at all—and if it did, whether it was a viable tool for financing home energy retrofits.

## THE ROEBELS

I got my first taste of EIM success when I was contacted by a young couple in Cincinnati, Ohio. Joe and Erin Roebel were planning to refinance their house, with the help of Joe’s mom, Debbie Roebel, a local real estate agent. The Roebels were ex-



pecting their first baby soon, so they wanted to consolidate some credit card debt into their mortgage while rates were in the 4%–5% range.

Their loan officer, David Ackermann, was having difficulty getting the re-fi done in the midst of tightening financial regulations across the industry. Tag-teaming with Debbie, David kept looking for creative ways to harvest some monthly savings for the growing family.

The Roebels owned an 89-year-old two-story bungalow. With their baby on the way and Cincinnati averaging about 5,000 heating degree-days per year, the Roebels were eager to convert their drafty guest bedroom into a cozy nursery worthy of a newborn. Replacing their inoperable single-pane windows seemed like the obvious first choice to them, so they started getting quotes from contractors.

Theoretically, the EIM allows lenders to increase their loan amounts to help homeowners pay for upgrades that save them monthly energy expenses. The nuances of the program vary from one bank and loan product to the next, but there is one universal prerequisite—the anticipated energy savings must be verified by a HERS rater and the improvements must show a positive net present value (NPV). In other words, home improvements must save more money per month than they cost when financed into the mortgage.

Both Debbie and David admitted that they had heard of the EIM, but they didn't quite understand what a HERS rating was or how the EIM worked, exactly (see Table 1). Therefore, they had the local utility company, Duke Energy, come out to perform its free energy audit service. Duke's audit consisted of a one-hour walk-through, noting insulation levels and making generic suggestions on various conservation measures. Debbie and David were surprised when they found out that the official HERS inspection was much more detailed, and that it would require a bit of cash. They even harbored fears that the HERS rater might expose the old home's flaws and thus kill the deal. Nevertheless, they took the plunge and called my company, Emotiv, asking, "Can we do a HERS rating? How fast can we do it? And can we pay you after closing?"

Initially stunned, I decided to take a chance. "If the home is really 89 years old," I said, "and the Roebels are really serious about doing an EIM, we can do plenty to save them energy. We can do the inspection this week, and I don't mind being paid after closing, as long as you help me tell other people how we pulled it off."

### Which Loan?

The particular loan that dictated our guidelines was an FHA, capping the home improvement allowances at \$8,000. For \$8,000, one can't do everything, but one can do a lot. By the time I arrived to perform the HERS rating and EIM financial analysis, the Roebels had already assembled their wish list of energy improvements and even had contractor quotes. The wish list and

Table 1. How the EIM Works

PURCHASE	REFINANCE
<b>Home Search</b> Find a home with energy upgrade potential.	<b>Own a Guzzler</b> Draft a makeover plan for an existing home.
<b>Contact Broker</b> Find a bank that understands EIMs.	<b>Contact Broker</b> Find a bank that understands EIMs.
<b>Verify Income, Preapproval</b> Get a HERS rating; discuss with the energy rater the ESOs that match up to your wish list.	<b>Verify Income, Preapproval</b> Get a HERS rating; discuss with the energy rater the ESOs that match up to your wish list.
<b>Get Bids</b> from contractors	<b>Get Bids</b> from contractors.
<b>Close</b> At the closing, you will open an escrow account.	<b>Close</b> At the closing, you will open an escrow account.
<b>Do the Projects</b> before you get too settled into your home.	<b>Do the Projects</b> before you get too settled into your home.
<b>HERS Follow-up Inspection</b> You have 90 days to get the work completed to spec and have it inspected by the HERS rater.	<b>HERS Follow-up Inspection</b> You have 90 days to get the work completed to spec and have it inspected by the HERS rater.
<b>Close Escrow Account</b> Pay your contractors from the escrow account and enjoy your home energy upgrades.	<b>Close Escrow Account</b> Pay your contractors from the escrow account and enjoy your home energy upgrades.

Table 2. Plan of Attack Costs

MEASURE	COST	SAVINGS
New vinyl windows U-29, SHGC-0.29	\$4,488*	\$358/yr
New closed-combustion water heater (installed by family friend who is a professional plumber)	\$400	
Rim joist insulation and air sealing with a DIY kit	\$300	
Estimated 20% air leakage reduction as residual effect of new windows and rim joist sealing	free	
<b>TOTAL</b>	\$5,188	
<b>Monthly Cash Flow</b>	\$27†	\$30

\* Windows also qualify for an additional 30% tax credit.

† The monthly finance cost is the monthly payment, including interest, that will pay for all the tabulated improvements when they are financed with a 30-year fixed mortgage at 4.75%.

the \$8,000 cap actually simplified the process tremendously, because they narrowed my scope of work. Otherwise, I would have wasted time exploring and pushing the upgrade package that I considered the most economically and ecologically responsible. And simply put, that's not what the customer wanted.

The energy audit identified several energy-saving opportunities (ESOs) available to the Roebels, including but certainly not limited to:

1. All of the 2 x 4 stud walls were uninsulated, and while they could afford to insulate, their knob-and-tube wiring would have required an expensive electrician to retrofit.
2. The foundation walls were uninsulated and had water penetration issues.
3. The attic and knee walls were poorly insulated.
4. The rim joists were uninsulated and leaky.
5. The furnace and water heater were inefficient, open-combustion models.
6. The single-pane double-hung wood windows were rickety.





CHRIS DWYER

Jane modernized her 90-year-old bungalow using an Energy Improvement Mortgage combined with an FHA 203k loan.

7. The whole home air leakage was 16 ACH at 50 Pa.

Air sealing and insulation jumped out as being the most urgent priorities, but despite my efforts to steer the Roebels toward these less glamorous measures, they held fast to their own wish list, the top of which was new windows. Only after closing did they tell me that one of the stipulations of their loan was that the home's windows had to be fully operable. So we sat at the Roebels's dining room table and developed a plan of attack that included (1) new windows; (2) major do-it-yourself air sealing, focusing on the basement; and (3) a new water heater, to be installed by a family member ("family friend" in Table 2) who is a professional plumber. As a package, these three measures showed a positive NPV.

Table 2 shows what we decided to do. There were some official-looking forms involved, but this is essentially what the bank needed to see.

At the time of closing, the bank establishes an escrow account, which acts much like a construction loan. From this account, the homeowners pay their contractors as the work is completed and is inspected by the HERS rater. They have 90 days to complete the upgrades and have the work inspected (see Table 1). At that point we would find out if the headaches, paperwork and decisions about what to improve was worth it or not.

### The Outcome

The good news is that the Roebels closed on their re-fi and gave birth to a beautiful girl. Their home will be more com-

fortable and efficient, and it has already increased in value.

The bad news is that it took four and a half months to close. But this delay had less to do with the loan being an EIM and more to do with the general climate of the home loan industry.

Unfortunately, when I returned to the Roebels's house to do the final inspection, I found that only the windows had been installed—the other two items on our original scope of work had not been done. Unbeknownst to me, and in spite of the regulations of the EIM program, the underwriters had decided to provide funding only for windows, which as a stand-alone energy improvement did not show a positive NPV.

As the supposedly necessary HERS rater, I remain perplexed and upset that the underwriters commandeered my prescription and my energy reduction targets. I can only assume that in the bank's eyes, new windows are more durable hardware than foam, and as such, are better collateral to secure the loan. In the end, the window contractor was timely paid out of the escrow account upon submission of my report. The report stated that the windows were installed to specification

and had reduced whole-house air leakage by 23%.

### What's It Going to Take?

Herein lies the key to the potential boom in EIMs. That key is teamwork. Without the realtors' faith in the benevolence of EIMs; without the lenders' cooperation; without the homeowners' patience and persistence; without the energy contractors' willingness to set flexible payment terms, the EIM will stand on four very wobbly legs. But if realtors, lenders, homeowners, and energy contractors all cooperate, we can have a win-win-win-win situation.

As long as traditional, inefficient homes are bought and sold in the usual way there is a first-cost bias against improving their energy performance. When owners come and go every five or so years, they tend to avoid sinking dollars into energy improvements unless there is a near-instantaneous payback. Unfortunately, they opt for more short-sighted, decorative features at the expense of necessary performance upgrades. On the other hand, the elegance of the EIM is that energy-guzzling homes can be purchased based on their unlocked performance potential. The EIM removes the first-cost bias that would otherwise inhibit prospective homebuyers from considering a guzzler. The EIM can resuscitate forsaken, inefficient real estate. It also opens up a new geography of opportunity for energy contractors, making a very old household a potential customer. The EIM is one way in which capitalism can simultaneously help the planet and revive local economies.



In a perfect world, I would have helped the Roebels to piece together a more aggressive home retrofit package, sure to exceed FHA's \$8,000 cap. It would have looked more like Table 3.

This kind of major renovation requires more than the EIM currently offers. It begs the question, When is as efficient as possible not even close to being as efficient as necessary?

## MORE THAN A MAKEOVER

What happens when a homeowner decides to implement a more ambitious makeover, utilizing the EIM as well as another creative financing product? One client of mine, I'll call her Jane, pushes beyond what is currently possible, toward that which is necessary.

First-time home buyer Jane eyeballed the purchase of a 90-year-old energy-guzzling home in Cincinnati—a home that needed extensive energy improvements, to say the least. Her home purchase success story is tempered by the fact that what she was able to do was but a fraction of what the suffering construction industry and community needed her to do. Smarter financing programs (which are already in existence) have the power to lift our country out of a serious funk and make over our energy infrastructure if three critical problems in the industry can be overcome. Let's look at these three problems—and one possible solution to each problem.

### The Trouble with Older Homes

In historic neighborhoods and so-called first-ring suburbs across the country, older homes place a disproportionate burden on the energy grid and are a disproportionate source of CO<sub>2</sub> emissions. Although many of these communities are commuter-friendly, visually charming, neighborly, and were built to last, we need to consider whether their massive energy consumption renders them obsolete, good only to be torn down, or whether they can be made over, as my client Jane attempted to do.

The home that Jane coveted was on the market for \$140,000, but she didn't have a whole lot of extra cash lying around for improvements. Her Realtor, Tim McDonald, an EcoBroker with Remax, suggested an energy audit and an alternative financing program.

Tim contacted me at Emotiv, and I conducted a detailed energy audit and HERS rating. We discovered that the anticipated utility bills could be reduced by \$260 a month, if insulation in the mostly uninsulated home was brought up to code, and if the aged mechanical equipment was replaced with high-efficiency models. Obviously, this would be expensive, but Jane's alternative was simply to pay high energy bills and live in an uncomfortable home.

### The Trade-offs

At first glance, the EIM seemed to offer a way to improve the performance of the home without demanding extra cash from

Table 3. The Perfect World Scenario

COST	MEASURES			
\$18,552	New high-performance windows			
	New dual-fuel heat pump, with variable-speed motor and set-back thermostat			
	New closed-combustion water heater			
	Air sealing and insulation reinstalled in attic			
	Stud cavities insulated with dense-pack cellulose			
	New rim joist air sealing and insulation			
	New bathroom exhaust fan			
	New access panel to knee wall, insulation, and air sealing at porch roof			
	BEFORE Improvements	AFTER Improvements	FINANCIAL SUMMARY	
Energy Bill	\$2,562/yr	\$1,132/yr	Finance cost	\$98/mo
HERS Score	160	87	Energy savings	\$119/mo
kBtu/ft²	95.8	34.8	Project cost	\$18,552
kBtu/h Heating	63	28	NPV of Improvements	\$22,197
kBtu/h Cooling	33	18		
ACH <sub>50</sub>	16	8		
Home Value	\$117,000	???		

Jane. The EIM eliminates the first-cost bias against energy efficiency. By wrapping home improvements into the mortgage, Jane could lower the overall cost of ownership. Sure, she would have a higher mortgage payment, but that would be offset by lower energy bills. However, Problem 1 for Jane was the EIM's humble \$8,000 cap on improvements. Eight thousand dollars would be only enough to cover Jane's HVAC system upgrades, and the home was going to need much more than that in the way of energy improvements—to say nothing of structural improvements. Solution 1 is bigger caps for basic improvements.

The home inspection and the energy audit helped us compile the wish list of home upgrades shown in Table 4.

The total added cost to the mortgage came to \$30,000. That meant Jane would need to find another \$22,000 somewhere or to come up with some compromises. Tim suggested that she consider the FHA 203k—an exciting alternative to the EIM. This home improvement loan program allows up to \$35,000 extra cash at the time of closing for all sorts of general improvements. But, Problem 2 for Jane was that the 203k requires a speculative appraisal and a 3.5% down payment of the value of the post-improvement home. Thus the more improvements Jane implemented, the bigger the down payment she would have to make, and the more she would drain her cash resources. Solution 2 was the fact that the EIM can work in conjunction with the 203k. Thus Jane could line-item-finance certain energy-saving improvements through the EIM, (which does not require a down



Table 4. Jane's Wish List

MEASURE	ESTIMATED COST
New roof and decking	\$7,000
Chimney repairs	\$1,000
Electrical modernization: knob-and-tube replacement and new service panel	\$5,000
HVAC: new dual-fuel heat pump and duct repairs	\$7,500
Water heater replacement: to new tankless model	\$2,200, but requires chimney repairs first
Insulated and air-sealed ceiling	\$1,600 but requires rewiring first, and new bathroom exhaust fan
Insulated walls in 2 x 4 stud cavities	\$4,300
Insulated foundation walls and air sealing rim joist cavities	\$1,700
<b>TOTAL Added Cost to Mortgage</b>	<b>Extra Monthly Finance Cost</b>
~\$30,000	\$140
	<b>Monthly Energy Savings</b>
	\$260
	<b>Monthly Cash Flow</b>
	\$120

payment), and pay for the cosmetic and structural improvements with the 203k.

Now let's forget about the hurdle of a larger down payment for a moment. By purchasing a \$140,000 home and financing an extra \$30,000 into it, Jane would increase her mortgage by only \$140 per month. From a monthly cash flow perspective, it's a no brainer—she saves \$260 per month in energy and pays only an extra \$140 per month on the mortgage, generating \$120 in relative cash flow. But now she runs into Problem 3—for each improvement Jane makes to the home, she improves its value beyond what the market would allow her to sell for, should she decide to move in three years or so. Based on neighborhood comps, the most we estimated she could sell the home for would be \$160,000. So for fear of owning a home with a \$170,000 mortgage that could not be sold for more than \$160,000, Jane gave up some of her home improvements. She butted up against the market's secondary bias against energy efficiency—the fact that inefficient homes depress the value of their efficient neighbors.

### The Outcome

Ultimately, Jane decided to secure \$20,000 worth of financing for her new roof, chimney repairs, electrical work, and new HVAC system. The 203k covered \$13,000 of that total, and the EIM covered the rest. Jane's improved home value is still in line with the neighborhood comps, so she won't have to worry about a short sale should she move suddenly.

Unfortunately, the home is still mostly uninsulated, and whole home air leakage is 12.5 ACH at 50 Pa. Had we been able to insulate and air seal the way we wanted, the home would have required a smaller HVAC

system, reducing that hefty expense and placing a smaller burden on the utility grid. Over time, Jane will—albeit reluctantly—do most of the insulation and air sealing herself, for a fraction of what it would cost to have the work done professionally. Nevertheless, we feel that the big fish got away, since we couldn't perform the whole makeover we thought was necessary. What would have allowed us to complete the project, would have been Solution 3—access to the Energy Efficient Mortgage (EEM), for Jane's prospective home buyers in years to come.

### Enter The EEM

The EEM is the nimble cousin to the clumsy EIM—the loan product for already-efficient homes NOT in need of improvements. Let's say Jane takes a job in Connecticut a year after buying and improving her home in Cincinnati. Now she is stuck with a home for which she paid \$170,000, of which she can recoup only \$160,000. Should she be penalized with a \$10,000 loss because she improved the neighborhood and the planet? Shouldn't she be rewarded? It's obvious to everyone that her home has a greater intrinsic value than her neighbors' inefficient homes. While her neighbors' homes, selling for \$160,000, have smaller mortgage payments, they have much higher utility bills and are not nearly as cozy.

But what if Jane's home were automatically prequalified for an EEM? What if the same home shoppers that tour her neighbors' open houses were automatically offered more-flexible financing in the form of an EEM to pay for Jane's home, which is actually less expensive and less risky? Wouldn't lenders and underwriters like these homes better? Don't homes with smaller utility bills make for a more stable investment as energy prices climb? The EEM could work because the bank regards utility savings as an extra income source for prospective home buyers.

The future of the energy loan industry and the role of the HERS rater depend on a delicate balance between operation expenses and emissions. But they also depend on a delicate balance among aesthetics, health, safety, durability, and neighborhood legacy. The existing-home makeover market is one where cutting-edge building science has not yet fully embraced the art of home improvement. Why? Because it has been handcuffed by the economics of the pre-2008 world. It's time for the energy financing programs to catch up with and even drive the new economy. If the industry can successfully build upon the three solutions described here—bigger loan caps for needed improvements; stackability with other loan programs; and more rewards for homes that prove themselves efficient—we will see the emergence of an extreme energy makeover movement. **RE**

#### >> For more information:

For more information about EmotivEnergy, go to [www.emotivenergy.com](http://www.emotivenergy.com).

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