HOW LOW CAN YOU GO?
AN INSIDE LOOK INTO HERS SCORES

The Home Energy Rating System—known best as HERS—is helping to provide a competitive advantage, improve quality assurance, and drive energy efficiency in U.S. housing stock.

By Lydia Lee
When Nick Blue of Blue Sky Homes, a builder and developer in Phoenix, decided to focus on “future-proofing” his company’s homes and increasing their energy efficiency, his first step was to get a HERS (Home Energy Rating System) score. “We thought, “Let’s take a test to see how we’re doing,’ and we saw that we had a lot of room for improvement,” he says.

At the time, the company was simply building to code and the HERS score it received, in the mid-70s, reflected that. After working with a HERS rater as well as a third-party energy auditor on improvements such as passive solar orientation, spray-foam insulation, and LED lighting, Blue Sky’s homes are now all Energy Star–certified and have an average HERS score under 50. “HERS is fantastic—it's really hard to hit a goal if you can’t hold your contractors accountable,” says Blue.

Today, nearly one out of every four new homes built in the U.S. is HERS rated, and the homes are produced by both small custom builders and large production builders, including major names like Lennar, KB Home, and Pulte. Initially developed in 1995, HERS is the original energy-efficiency rating system and is well on its way to becoming mainstream. By quantifying a home’s operational carbon footprint, it supplies a critical metric to help move homes toward greater sustainability.

“You would never buy a car without test-driving it or knowing how many miles per gallon it gets, yet we make the largest investment in our lives without either—that’s a ‘lightbulb’ moment,” says Sandra Adomatis, a Punta Gorda, Fla.–based appraiser and author of Residential Green Valuation Tools. “HERS is helping to move the public to a low-carbon residential market.”

**Energizing the Market**

While getting a HERS rating is voluntary, the third-party-verified program dovetails nicely with increasingly tough energy code requirements. Fifteen states—those that have adopted the 2015–18 *International Energy Conservation Code* (IECC)—accept HERS scores that meet Energy Rating Index (ERI) targets as a performance path to code compliance, in lieu of the traditional prescriptive approach. (Admittedly, there is an alternative performance path to code compliance that is more cost-effective than HERS, but HERS’ benefits include consumer-friendly documentation that can serve as a useful marketing tool.)
Reaching a certain HERS score is also a prerequisite for Energy Star for Homes, so HERS is a way to test the waters before plunging into Energy Star, Zero Energy Ready, LEED, Passive House, or other green building programs. The rating system now covers low-rise and high-rise multifamily buildings, and the nonprofit Residential Energy Services Network (RESNET) has released a complementary water-efficiency rating, HERS H2O. HERS also has great potential for rating existing homes, which the Department of Energy’s Home Energy Score addresses, but in a less robust fashion.

Interestingly, HERS was not an effort led by the building industry. Instead, it was the financial industry—a group of mortgage bankers who came together in the early 1980s—who wanted to be able to determine the utility-bill savings of energy-efficient homes in mortgage calculations. Eventually, RESNET set up a rating system, which relies on certified HERS raters to independently verify performance. In essence, a HERS rater acts as an energy-efficiency expert. “The first step is to seek out a qualified HERS rater, and use them as a consultant to help you in the process,” says Steve Tapio, project manager and building science team leader at New Tradition Homes in Washington state, which ranked No. 149 on the latest Builder 100 list. “For those who are just starting out, it can be very daunting. But the HERS raters will tell you what will get you the most bang for the buck.”

A home’s HERS score shows how it compares to the reference home, a 2006 code-built house of the same size, shape, and climate zone, which is scored at 100. The lower the score, the better. A home with a HERS score of 110 is 10% more inefficient than the reference home, and a home with a HERS score of 30 is 70% more efficient. (A net zero home would have a HERS score of 0.) Since the reference home reflects 2006 code, a home built to be code compliant today should automatically score around 70. The average HERS score for homes nationwide is 61, according to RESNET. But in Arizona, where 63% of new-construction homes are HERS rated, the average score is 59—which indicates that competition among builders and the ability to “compare apples to apples” is driving energy efficiency in that market.

A HERS rater’s additional scrutiny provides homes with an extra level of quality assurance. “Builders that are rating 15,000 homes a year have done the math and see it’s a benefit,” says Ryan Meres, HERS program director at RESNET since 2017. “It’s an extra set of eyes that is looking for any potential energy-related issues, and this can save the builder on callbacks, which cost a lot of time and money.” Raters use an accredited software program to model the energy performance of the house pre-construction, make recommendations for modifications based on the builder’s
HERS goals, conduct two inspections (pre-drywall and final inspection), and perform leak
detection tests on the ductwork (ideally pre-drywall) and a whole-house blower door test.
HERS rater Stephen Mogowski of Desert Skies Energy, who works with more than 200 custom
home builders in Phoenix and Scottsdale, Ariz., says he sees some sort of problem with
ductwork or insulation in about one in every two homes he tests.

“You cannot believe the problems in modern construction,” says Mogowski. “Everything can
look like it’s installed great, but if you’re not doing due diligence, things will get missed.” The
cost of getting a HERS rating varies depending on production volume and other factors, but
expect to pay $400 to $800 and up.

Beyond Curb Appeal
Builders are typically motivated to get HERS ratings to gain an edge or keep up with the
competition. According to the 2019 Realtors and Sustainability Report, 69% of surveyed
realtors said that energy-efficiency promotion in listings was very or somewhat valuable, and
59% said clients were at least somewhat interested in sustainability. While consumer interest
in healthy, energy-efficient homes is growing, their willingness to pay a premium for them
varies. On the positive side, a 2017 report from the North Carolina Building Performance
Association found a strong correlation between lower HERS scores and higher sale price and
price per square foot. Looking at the sales of 3,900 high-performance homes over a two-year
period, the analysis showed that they sold for an average 9.5% premium in three metro
markets in North Carolina. But each local market is different.

How Low Can You Go?
Custom home builder Tony Fiore, who started to test passive solar construction in the
1970s, wanted to create a model home that would be the culmination of his experience in
energy-efficient building. Completed in 2017, the home (shown below) has a -58 HERS
score and is certified Zero Energy Ready. “We wanted the house to be a thermos,” says
Fiore of Fiore Construction, based in Englewood, Fla.

He designed the 1,700-square-foot, three-bedroom, two-bath house as an adobe-style
home with a seemingly flat roof. This strategic choice allowed the solar hot water system
and 8kW solar array, along with the white, highly reflective Polyfresko roofing membrane,
to be hidden from view behind the parapet walls. He used R-30 Icynene spray foam
insulation for the roof and engineered the walls to have high thermal mass, pouring
concrete on-site to make solid reinforced concrete block walls. He used the StoTherm
continuous insulation exterior insulation and finish system, which includes 2-inch-thick rigid
foam panels, a drainage channel between the foam and the concrete, and an acrylic
exterior finish. The interior walls are covered with only a thin plaster coat to allow the
concrete walls to modulate the temperature.
In our area, we have to try to meet the prices of similarly sized homes with similar amenities, but energy efficiency is a key differentiator for us,” says Tapio of New Tradition Homes, whose homes typically have HERS scores of 50 to 52. “We have consistently held on to a larger market share over our competitors in volume and dollar amounts. Our margin isn’t as large, but we make up for it in volume.”

A HERS score does help builders quantify their energy-efficient improvements to buyers. “Anyone can say they build an energy-efficient house, but having third-party certification makes a huge difference,” says Jason McAllister of McAllister Construction, a custom home builder in Amherst, Ohio, who is currently working on a subdivision of 27 townhomes that will all be HERS-rated. “The buyer knows that you’re not just trying to blow smoke.”

A HERS score is easily understood as the equivalent of a miles-per-gallon rating for a home. And the HERS certificate spells out projected energy savings per year, so buyers can better understand the total cost of homeownership. Buyers may also benefit from special mortgages that credit the energy savings in the mortgage itself. “With an energy-efficient mortgage that has a lower interest rate, buyers can afford to buy a more expensive home,” says appraiser Adomatis. “When you add the numbers up, including the reduced utility bills, it may actually cost you more to buy the cheaper home than the energy-efficient one.”

However, 40 years after those mortgage bankers first met, it’s fair to say that the housing market still has trouble valuing HERS and energy efficiency improvements in general. Many home appraisers are not trained in how to do this, and mortgage bankers aren’t always aware of or willing to offer government-sponsored energy-efficient mortgage products, thus putting the onus on the builder to educate the buyer. To assist in an accurate appraisal, a HERS rater or a knowledgeable builder can fill out the Appraisal Institute’s Residential Green and Energy Efficient Addendum to the appraisal report. RESNET is also working on a programming interface so that real-estate listings on the MLS (Multiple Listing Service) can automatically include HERS scores, which should do a lot to boost general awareness.

How Low...(continued)
The air-conditioning system is a high-efficiency unit with a variable speed compressor with a maximum capacity of 2 tons that rarely needs to run at more than half capacity. It is complemented with a fresh air intake system that filters the air. The home also has LED lighting, Energy Star appliances, and a high-efficiency pool circulation pump.

In retrospect, the 8Kw system was overkill for the home’s needs. “It could probably be net zero with a 3 or 4kW system,” says Fiore. “But it was an experiment for us. We wanted to see what would happen if we did all the good things we like to do in one house.”
How to Lower Scores
There are many ways to cut down a home’s energy usage, from shading the southern exposure to adding solar panels, but some strategies are much more cost-effective than others.

Even in more moderate climates, insulation and air sealing are important for maintaining consistent, comfortable temperatures. Careful air sealing in the proper locations is the “low-hanging fruit,” says Matt Gingrich, director of quality assurance and training at Energy Diagnostics, which does HERS ratings for builders in Indiana, Illinois, and Michigan. A close second in priority is insulation.

“Your insulation package is what adds cost and increases comfort, so you want to make sure that the building shell is done really well,” says Mogowski of Desert Skies Energy. He recommends spray foam insulation, which expands to create an airtight fit without the voids and gaps that occur with fiberglass batts, particularly for attic spaces with ductwork. “In the summertime, an unconditioned attic can get up to 130 to 150 degrees in our area. By using spray foam and relocating the thermal barrier to the roof deck, all the heat gain is off the duct system,” he says.

For those who are concerned about the cost, Mogowski value-engineers it so the R-value is lower but still vastly outperforms conventional insulation. Custom builder Tony Fiore of Fiore Construction, who works in Florida’s Charlotte and Sarasota counties, built a model home with a -58 HERS score using R-30 spray foam for the roof (see sidebar, opposite page). Spray foam can also be deployed selectively to deal with tricky jobs like insulating rim and band joists.

Advanced framing, with 2x6 framing spaced 24 inches on center, reduces the amount of lumber needed and allows a home to have more insulation. “We’re able to add 30% more insulation by using advanced framing,” says McAllister, who got certified as a Passive House builder in 2014. He is choosing to do homes with HERS scores in the mid-40s instead of
Passive House in order to bring the “overall energy usage as low as we can get it without breaking the bank, with off-the-shelf products and locally purchased materials, with the goal of doing this at a production builder level.” He makes sure to fully insulate all the exterior headers to avoid thermal bridging.

Another way to increase R-value is to build staggered-stud walls, which creates a thermal break between the exterior and interior of the wall assembly. “We’ve found that the most cost-effective way to build the envelope is to do 2x6 walls with 2x4 studs staggered at 24 inches on center at the interior and exterior edge of the plate, combined with cellulose insulation,” says Luis Imery, whose Atlanta-based company does both construction of custom homes and HERS ratings (of other builders’ projects). “The construction technique increases the wall’s R-value by 20% without adding cost—it gives you the same performance as adding rigid foam insulation.” The Imery Group also uses the AeroBarrier aerosol sealing system to ensure homes are airtight. Its custom homes, which typically have HERS scores in the mid-50s, include energy recovery ventilators to circulate fresh air and ducted and ductless mini-splits for heating and cooling.

“The important thing to keep in mind is that every component affects everything in the house, so you can move dollars around in order to pay for things,” adds Imery. “For example, you might spend more on insulation but then save on smaller heating and cooling units. The house ends up costing about the same, but you’re building a better house.”

Nick Blue of Blue Star Homes agrees, noting that it’s “helpful for any builder to know where they stand initially, and then they can make their own determination about the cost-benefit tradeoffs. But every builder should know how efficient their homes are.”
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