If Home Energy Ratings are the Solution for Energy Efficient New Homes, What's the Problem?

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ABSTRACT

Home Energy Rating Systems (HERS) were initially developed as a verification tool that would enable the financing industry to approve energy efficient mortgages (EEMs) for existing homes. When the U.S. Environmental Protection Agency's (EPA) ENERGY STAR Homes Program was introduced in 1995, the HERS industry saw a major opportunity to bolster a decade of slow progress by expanding their focus to the new homes market. This paper will document lessons learned from implementing the ENERGY STAR Homes Program with a HERS-based technical verification requirement over the last five years. Although there are many observed cases where builders have had extremely satisfying experiences working with HERS raters, the overall experience has revealed five critical objections. This paper will discuss these objections and highlight one case study demonstrating how HERS-type services have been successfully configured to meet the business objectives of builder customers. The biggest lesson learned from the author's perspective is, in the absence of government mandates or incentive programs, energy efficiency services can be successfully marketed to builders as solutions to business problems.

ENERGY STAR Program Background

The ENERGY STAR Homes program started its development process at the end of 1994. At this time, EPA had already built a strong track record with its first voluntary energy efficiency programs. The flagship program, Green Lights, was a 'self-improvement' program that signed contracts with corporate partners to voluntary make cost-effective lighting upgrades based on impressive rates of return rather than rebates. By 1994, the program had already amassed commitments to upgrade billions of square feet of commercial buildings. ENERGY STAR Buildings was just getting started as a more comprehensive whole-building "self-improvement" program and has subsequently subsumed Green Lights.

EPA's first foray into product labeling began in 1991 with ENERGY STAR Computers. This program approved the use of the ENERGY STAR label on computers with automatic "sleep" devices that dramatically reduced energy consumption after a set period of inactivity. By 1994, this program was well on its way to transforming the office equipment market as well as establishing the ENERGY STAR "brand name". ENERGY STAR now represents a growing family of labeling programs for a wide variety of products ranging from home electronics to entire commercial and residential buildings.

There are several core principals behind ENERGY STAR labeling programs. First, they target "off-the-shelf" energy efficiency technologies that represent cost-effective investments for consumers, businesses and institutions. Once technologies are identified, performance thresholds are typically chosen based on established metrics. This helps reduce program costs while avoiding potential "show-stopping" issues that can easily surface during metric setting procedures. Within the available metrics, ENERGY STAR programs generally look to distinguish products in the top 25 percent of energy efficiency performance. However, specific thresholds

are typically tied to natural breaks in product performance levels. For example, in the ENERGY STAR HVAC program, 90 percent annualized fuel utilization efficiency (AFUE) associated with condensing furnaces served as a natural break above non-condensing furnaces generally limited to 85 percent AFUE.

Choosing a Metric for ENERGY STAR Homes

When developing the ENERGY STAR Homes Program in 1994, there was no nationally established performance metric associated with every new home built. The Home Energy Rating System (HERS) industry had already amassed about a decade of experience, but was operational in only six states. Moreover, based on informal input from industry members at this time, only about 30,000 ratings had been completed nationally and predominantly for existing homes. But momentum was building based on efforts by a national industry group assembled by the U.S. Department of Energy (DOE), the HERS Council. The primary activity of the HERS Council was to formulate national HERS guidelines for DOE approval that would effectively establish a national metric for housing. The HERS scoring method uses a 1 - 100 rating scale with a A1" essentially representing an open tent, and a A100" representing a home that did not require any utility power or fossil fuel for heating, cooling and hot water. In addition, there was a more simplified 5-star rating scale. A score of 80 (or 4-stars) was roughly equivalent to a national Model Energy Code (MEC) home, and each point above 80 represented a 5 percent incremental improvement above MEC.

A decision was made to base ENERGY STAR Homes on the HERS metric using a score of 86, or 30 percent above MEC as the minimum performance threshold. The natural break associated with this decision was that a score of 86 also aligned with a HERS 5-star score. More importantly, EPA analysis indicated that this performance level could be cost-effectively achieved throughout the country. Although DOE was never able to approve final HERS guidelines, ENERGY STAR Homes moved aggressively forward with HERS rating-based technical verification in early 1995.

Builders' Objections to Home Energy Ratings

Looking back on the past five years implementing ENERGY STAR Homes, HERS technical verification has proven to be one of the most difficult program requirements blocking builder participation. This is not because HERS ratings are ineffective or builders are unreasonable. Based on the author's experience, builder resistance can be attributed to the significant departure from business-as-usual imposed by the HERS technical verification process. Virtually all other ENERGY STAR product labeling initiatives use metrics included in the normal course of business. For instance, heating and cooling equipment manufacturers can use their SEER, HPSF and AFUE ratings; lighting fixture manufacturers can use their lumens/watt ratings; and video and stereo equipment manufacturers can use their power-ready module wattage ratings. Thus, other ENERGY STAR Program partners can simply apply the ENERGY STAR label based on existing product specifications. In contrast, HERS ratings introduce a new concept and whole new set of procedures to the home building industry. This has resulted in the following builder objections observed during the author's work with hundreds of builders in the ENERGY STAR Homes Program:

Builder Objection #1: I don't want a score for each home. Builders love external product differentiation from their competitors. However, builders don't like internal product differentiation that forces them to explain why one model is inferior to another. This is particularly true where the differentiation is associated with a secondary customer attribute like energy efficiency. Surveys suggesting energy efficiency can be the second or even the most important consideration for new home buyers (NAHB, 1999) don't pass the "laugh test" with most builders. This is because their everyday reality selling to consumers suggests energy efficiency's role in the "value equation" is far behind other more emotional factors like location, architectural appearance and layout, kitchens, master suites, storage and the list goes on. As a result, builders have indicated that they're not willing to explain energy efficiency variations that occur among different models and within a single model for different orientations. Builders also have indicated they do not want varying HERS scores to imply differences, large or small, in the quality of their homes. From some builders' point-of-view, this avoids energy efficiency details that could potentially distract prospective buyers away from the more emotional selling points. In contrast, builders appreciate the binary "yes/no" approach offered by ENERGY STAR where they can simply show their homes meet impressive energy efficiency criteria established by the EPA.

Builder Objection #2: I don't want increased cost. Builders will go to extreme measures to save a penny on a board foot of lumber. This is not a receptive audience to spending extra money for improvements that cannot be seen or easily conveyed to consumers. Since HERS ratings are not a business-as-usual procedure or requirement, this represents a voluntary additional expense. Given the price range from $250 to $450 per HERS rating, a builder with a hundred-unit subdivision is looking at a $25,000-$45,000 additional expense and significant lump sum off their bottom-line profit if it cannot be recovered in the home sale price. Beyond these direct increased costs for HERS, there is an even greater perceived cost for the resulting energy improvement recommendations. Thus, a key issue is how to make these "improvements" tangible to homeowners and builders confident they can sell them.

Builder Objection #3: I don't want increased risk. It's easy to appreciate why builders consider the new home business a risky proposition. They take enormous risks leveraging land holdings; securing regulatory approvals; finding, keeping and controlling qualified subcontractors and labor; minimizing worker exposure to injury; absorbing fluctuations in the availability and cost of materials; making the right decisions on designs and amenities that satisfy the latest consumer preferences; timing their projects so that interest rates don't increase when homes reach the market; and pulling all the pieces together without call-backs and litigation part-and-parcel to such a complex product. Thus, builders are highly reticent to take on the additional risks. And from many builders' perspectives, HERS represents added risk. We hear concerns about adding additional cost to their product for an intangible improvement without a proven market value. Often an immediate concern expressed is the risk associated with passing an unknown rating process. And this risk extends to concerns about any unforeseen costs and time delays that might occur to fix rater reported deficiencies. Larger production builders have also indicated that they are not willing to absorb any risk regarding costly construction delays possible

with new inspection and testing services. And all of these risks are exacerbated when the HERS services are provided by unknown partners, which leads to the next objection.

Builder Objection #4: I don't want to work with unknown partners. Builders consistently express their dislike for the unknown, and the industry as a result has a well-deserved reputation for reluctance to change. And that is just what a HERS rating represents to the building industry, change and the unknown. HERS ratings are a new process typically delivered by small entrepreneurs who are unknown entities to most builders. As just mentioned, large builders have expressed fear whether this unknown small player can deliver services and on-site inspections consistent with the demands of the highly pressurized schedules associated with production building. In addition, builders have observed that the rating infrastructure is much more fragile than the other trades and services that are part of their regular building industry operations. For instance, on numerous occasions builders have informed ENERGY STAR Homes staff that they have contacted raters on lists provided by accredited HERS providers only to find that they do not own the diagnostic equipment needed to perform ratings. Raters are typically certified after three to five-day training programs and don't necessarily have strong building industry backgrounds. Often, they come from a variety of weatherization and home inspection backgrounds unfamiliar to the builder construction managers.

Builder Objection #5. I don=t want to tack on quality control. Many energy efficient builders have made impressive strides incorporating quality control solutions into their home building process. And anecdotal data indicates quality improvements like tight construction have become ubiquitous in some markets. For instance, input from the Building Industry Institute field studies indicates that the prescriptive requirements for sealing and caulking included in California's Title-24 Energy Code consistently deliver tightly constructed homes (CEC). Where builders have effectively built quality control into their building processes, they have expressed frustration that the HERS rating requirement represents a redundant effort. And in fact, many of these builders have found effective ways to back up their energy efficiency claims without HERS ratings. For instance, Perry Bigelow in Chicago, Illinois has become famous for offering impressively low energy bill warranties ($200 annual heating cost warranty for town homes in Chicago); Bill Eiche Homes in Spirit Lake, Iowa uses what he calls a "wall-of-fame" to display large numbers of customer testimonials including impressively low actual utility bills; Michael Holligan visually demonstrates critical quality differences incorporated in his energy efficient building practices with an entertaining video shown to his customers and backed with the credibility of his syndicated television show; and Barbara Harwood of BBH Enterprises has documented her relentless efforts and passion for quality-built environmentally responsive homes in an impressive book shown to all of her customers. As a builder, you can make the good business decision to build quality and efficiency into your building processes rather than inspecting it in at the end. The question these builders ask, is how will HERS ratings add significant value to their product?

Builder Problems Addressed by HERS

As the home building industry continues to enjoy a booming market in most of the country, the industry still faces numerous challenges. In particular, it is increasingly difficult to

deliver a quality product due to the infamous shortage of skilled subcontractors and construction workers nationwide. Anecdotal evidence from numerous journal articles and conference presentations suggests that resulting quality defects are rapidly increasing building industry exposure to litigation and costly callbacks due to moisture damage and occupant comfort. Examples include exterior insulation finish system (EIFS) lawsuits that have been epidemic in the Southeast, increasing reports of ice-damming and mold problems in cold Northeast and Midwest climates, litigation for construction defects in California that effectively shut down multi-family construction in the state for a long period of time, and indoor air quality issues throughout the country evidenced by asthma and allergy rates that continue to set historic records.

Many of these performance problems can be linked to building science issues addressed with HERS ratings. Tightly constructed homes with sealed duct systems effectively block major sources of moisture and pollution from entering the home. Improved envelopes with energy efficient equipment deliver high-quality comfort consistently in every room of the house. High-performance windows avoid overheating in rooms exposed to harsh sunlight and winter condensation that can cause moisture problems. Thus, HERS raters provide services and benefits directly tied to builders' bottom line profit. The trick is how to sell and market these services.

Marketing HERS as a Builder Solution Case Study

There are many examples of building industry savvy HERS raters successfully offering traditional HERS ratings to builders. This case study is about one company, ConSol, located in California, whose success offering a variation on HERS services is particularly noteworthy. After initially focusing on Title-24 California Energy Code compliance, ConSol has increased their energy services and expanded their market territory to include five western states. Now after two decades of experience, ConSol performs HERS and mechanical engineering and energy code compliance on over 15,000 homes annually for over 75 large, production builders (Hodgson). The author attributes much of ConSol's success marketing HERS-type services to a business strategy that addresses the five major home builder objections to HERS ratings:

1. ***I don't want a score.*** The ability for HERS ratings to effectively deliver an Ampg@ equivalent score for homes is one of the most emphasized points in presentations by traditional HERS raters observed by the author. In contrast, ConSol chooses to focus their business strategy on risk reduction rather than a score. ConSol typically provides yes/no product differentiation using their own trademark name, ComfortWise, and/or verification for other utility or ENERGY STAR Homes programs.

2. I don't want more cost (unless it can be passed though to price). ConSol is in business to make money and certainly charges for their services. They address the builder aversion to the cost issue by marketing risk-reduction benefits that offset the additional cost (see paragraph below). ConSol delivers this benefit by offering many more services than provided with typical HERS ratings including HVAC equipment sizing, duct layout and duct sizing; detailed subcontractor bid specifications; more rigorous field quality inspections; marketing, advertising and sales support; and code compliance. Although many HERS raters could and some do offer similar services, they are generally not included. One explanation is that the cost structure of

$250 to $450 per rating, based on “what the market will bear”, doesn’t allow HERS raters to profitably provide additional services. However, ConSol is able to offer these additional services within the cost per home framework of HERS ratings by using a “batch testing” protocol. Their protocol involves rigorous field inspecting and testing of the models and first building phase, and then a minimum of 15 percent of the build out rather than every individual home. In contrast, most of the HERS industry have positioned themselves strongly against batch testing because they feel it compromises the integrity of the rating process. ConSol appears to have chosen this strategy based on their business assessment of what service benefits they needed to offer, what cost builders would be willing to spend, and confidence that batch testing could deliver comparable quality assurance.

3. I don’t want more risk. ConSol presentations to builders cite that up to 30 percent of all callbacks are due to comfort complaints (moisture problems are much less of a factor in the dry California and Nevada locations they service). As evidence, they point to the high incidence of class action suits against builders in California. ConSol also explains the tremendous challenge builders face trying to get the contracted services they paid for from their subcontractors. Thus, ConSol turns risk from a negative to the major benefit driving the value of the services they provide.

4. I don’t want to work with unknown partners. ConSol has made sustained, long-term commitments to be a known partner. Using relationships providing Title-24 and MEC compliance along with mechanical design, engineering and diagnostics to builder clients as a foundation, ConSol executives became extremely proactive working in a variety of home building industry venues. This includes serving on committees for the National Association of Home Builders (NAHB); actively participating in the state and local home builder associations; extensively networking with builders at social and business functions; and earning a reputation as quality experts through their work directly for builders as well as with utilities and state and local government contracts providing building industry training and research. In addition, a key vice president recently recruited has served as an executive for one of the largest home builders in the country. Thus, ConSol has a strategic emphasis on being a known and valued partner to builders.

5. I don’t want to tack on quality control. ConSol has made a critical business decision to expand their services beyond verification for code compliance or housing programs (i.e., utility or ENERGY STAR). As a result, they market builders a solution for integrating quality into the building process. Their services start with helping builders select the best building science solutions, engineering high-performance mechanical systems, providing subcontracts bid documents that protect builder interests, providing subcontractor oversight through field inspections and testing to assure quality assurance, and finally completing turn-key code compliance and verification for utility programs and ENERGY STAR Homes.

Conclusion

ENERGY STAR Homes is a national program that encourages home builders to provide and label energy efficient new housing and consumers to buy them. This paper is based substantially on

the author's interactions with hundreds of home builders while managing this program over the last five years. It is not the intent of this paper to criticize the HERS industry, nor endorse one energy consultant. Instead, observations are presented to offer potentially valuable lessons learned promoting energy efficiency initiatives such as HERS-based programs. The primary conclusion from this paper is that market-based program delivery addressing builder objections to individual home ratings rather than presumed solutions may offer energy efficiency programs such as HERS greater impact and long-term sustainability. The case study discussed highlights that success promoting HERS services to builders depends on several factors: being known and proactive; offering valuable, cost-effective services that addresses builders concerns with quality control; and effectively delivering market differentiation through energy efficiency. These lessons are highly applicable to any energy efficiency program working with business partners.

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