

ZERO ENERGY HOME PROJECT

ZEH Preliminary Market Analysis General Investigation of the Residential Appraisal Industry

Prepared for

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INTRODUCTION

In discussions with builders on their potential to incorporate Zero Energy Home (ZEH) designs into their product offering, a recurrent issue emerges, both from the builders and from the consumers. For builders, the issue is framed in the context of the appropriate valuation of the ZEH given the higher cost of the new house compared with similar houses nearby and the ability of the consumer to obtain a loan value that recognizes the economic advantage of the ZEH. For the consumer, the issue is framed in the overall cost of the new home and the potential to resell the home given its energy features, that represent a larger portion of the house cost than those of “typical” homes.

A market analysis of the builder’s opportunity to sell a ZEH must at least approach the issue of the appraised value of the ZEH since this value dictates the down payment, loan amount, property tax level, and insurance requirements. This report considers the issues of marketing a ZEH as it relates to the appraised value of the ZEH.

COMPONENTS OF A ZEH

A Zero Energy Home relies on two basic elements:

- *Energy-efficient performance* which includes the building envelope, mechanical systems, lighting, and appliances; and
- *Renewable energy technologies*, which typically include a combination of solar thermal, photovoltaics, and/or wind power. Other renewable energy technologies may be incorporated in future ZEH designs such as small-scale hydro, fuel cells, or biogas generation.

The goal of a ZEH is to attain net-zero use of non-renewable energy sources over the course of a year. The design approach involves reducing the energy load of the home and offsetting the use of non-renewable energy sources with renewable sources. The ZEH is always developed with a high level of sensitivity to the cost/benefit economics as well as the market acceptance. While these energy improvements add value to the ZEH by reducing operating costs and increasing comfort, they also increase the initial cost of the home. Energy upgrades to the building shell and standard components of a home may add approximately three to five percent to the construction cost; however, even a small (2.0 kWac) photovoltaic and solar thermal systems will add about \$25,000 to the base price of a home.

Recognition of the added value of a Zero Energy Home in the marketplace is a key element to widespread acceptance of the ZEH concept. An important aspect of this process pertains to the property appraisal. Because a lender requires some type of appraisal on every real estate loan and relies heavily on this document when determining a borrower’s eligibility for a particular loan amount, the appraisal can be an important tool to increase recognition of the added value of a ZEH. A study performed by the NAHB Research Center investigated housing innovation, and the following appraisal process aptly describes the issue as it applies to energy efficiency and renewable energy technologies:

“One roadblock to the rapid adoption of technology is the valuation of technology. Newer technologies typically add to the first cost of a home. Home builders are reticent to adopt

technologies that increase the cost of their product and reduce their market. Homebuyers are often unwilling to purchase technologies that are not reflected in the appraised value of the home, thus forcing the purchaser to cover the cost upfront in the down payment rather than financing the technology over the life of a mortgage. Lenders are unwilling to provide financing for structures where the value of the property is unknown in the event of foreclosure.”¹

This report will identify some of the barriers that currently characterize the appraisal process with respect to assigning value to the energy efficiency enhancements and the renewable energy features of a ZEH. It will also describe some of the efforts that are currently underway to enhance this process so that a property appraisal more accurately reflects the benefits of a ZEH to the borrower as well as the lender.

THE APPRAISAL PROCESS

An appraiser is an agent hired to assign a value to property – both the land and the structures on it. Usually, appraisers are contracted by a lender in order to determine the value of a property as part of the lender’s risk analysis. The lender’s concerns are that the:

- 1) Borrower has adequate income and cash flow to be able meet mortgage payments (principle and interest) as well as property taxes and monthly expenses;
- 2) Property value is reasonably concurrent with the purchase price; and
- 3) Property is marketable, e.g., there would be demand in the marketplace if the property needed to be sold in the future.

With prescribed federal and state requirements regarding the education, qualifications, and classification for certification, appraisers follow a uniform and standardized process in obtaining a license and maintaining their certification through continuing education courses. The methodology used to appraise a home is also relatively standardized with a prescribed set of procedures and commonly accepted standard practices. The “Uniform Residential Appraisal Report,” developed by Freddie Mac and Fannie Mae is representative of procedures typically followed. The form requires information about the:

- Neighborhood and its market characteristics and potential;
- Site, including size, type of utilities, and off-site improvements such as sidewalks or paved streets;
- Property description, (e.g., foundation type, type of construction, exterior features, interior details, type of heating and cooling system, appliances);
- Additional features, specifically mentioning “special energy efficient items;”
- Adverse environmental conditions (e.g., hazardous wastes); and
- Condition of the improvements.

¹“Housing Innovation and the Appraisal Process,” NAHB Research Center, December 2001. Findings of a Building Industry Roundtable sponsored by the Department of Housing and Urban Development.

The reporting form offers three different methods for appraising the value of the home, although the Comparison Analysis is the most commonly accepted and widely used.

- *Cost Approach* – the estimated cost to replace or reproduce the improvements at the time of the appraisal, with a depreciation percentage factored into the final value. This value is added to the value of the land.
- *Comparison Analysis* – the estimated value of the land and improvements based upon the recent sale price of other properties of similar size, features, quality, and location.
- *Income Approach* – the estimate of what a knowledgeable investor would pay for such a property based upon the net income that could be generated from the property. Typically, this approach pertains to rental income from commercial property and is not often used for single-family homes.

Although the form does have a line item for “Additional Features” and specifically cites energy efficiency as an example, appraisers with whom we spoke acknowledged that such improvements are rarely highlighted. This is further indicated by the sample Uniform Residential Appraisal Report posted on the website of the Appraisal Institute.

- Under the “Additional Features” line item where energy efficiency is called out, the listed improvements are “[An] entertainment center with a wet bar, 75-gallon water heater, 20’ granite bath with sauna and spa tub.” ***This is potentially one formal place where “ENERGY STAR® labeled” or “photovoltaic system” could be noted and valued.***
- Although the type of heating and cooling system are requested, the sample response provided is simply “hot water” and “central air conditioning”. Likewise for appliances, boxes are simply checked verifying that the home has a refrigerator, dishwasher, microwave, range, and/or washer/dryer. ***Here again, “high efficiency,” “ENERGY STAR® labeled appliances and equipment,” or an estimated performance rating like 16 SEER could be noted.***
- Under the section, “Cost Approach,” features like swimming pools, saunas, and patios are highlighted and valued. ***Under this section, energy efficiency upgrades like low-E windows or renewable energy equipment like photovoltaic panels could be listed with their replacement costs indicated. These could then be added to the square foot value of the dwelling.***
- Finally, the *Income Approach* is not particularly appropriate for owner-occupied homes because it is an accounting and economic valuation method related to income producing property such as rental units. ***An additional means of valuing a property according to this method could be to estimate the utility bill savings that accrue from the energy-efficient features or the on-site energy provided by a photovoltaic system or a solar water heating system.***

Based on review of such information available to appraisers as well as focus groups and conversations with some appraisers, there are few readily available guidelines for recognizing the value of energy-efficient features or renewable energy technologies in homes. The standardized processes that have been developed around the appraisal industry in order to assure “fair, equitable, and unbiased valuation” of property have

contributed to a procedure that ignores the added value of new technologies—particularly those that cannot be seen. More specifically, the process hinders acknowledgement of the market benefits of energy efficiency and renewable energy technologies. Appraisers are not inclined to highlight such features because there is little encouragement from their own industry as well as from the industry that typically employs them—lenders and mortgage companies. Nor are there clearly defined methods for valuing the savings from energy conservation or the energy produced from renewable sources. In addition, the industry trend is toward faster, more automated appraisal procedures such as electronic valuation where information contained in existing databases is used to assign value. Such trends may not easily facilitate market recognition of new technologies.

DISCUSSIONS WITH APPRAISERS

In order to clarify some of the energy efficiency valuation issues in particular areas, appraisers working with builders known to have used energy efficiency and renewable energy systems were solicited for their approach to the problem.

First on the Block

Information gained from several residential property appraisers in different parts of the country have highlighted some of the issues that arise in attempting to identify and demonstrate the value of improved energy efficiency features and renewable energy technologies. One common denominator that the appraisers mentioned is the strict guidelines that mortgage underwriters require in order to assure that a home has resale value within the range for which it is mortgaged. If a primary mortgage holder (the local lender) is to be able to sell the mortgage to a secondary lender such as Fannie Mae, they must prove that the home has value in the market and they must quantify how much value it actually has. The best and easiest way to do this according to the lending and appraisal industry is through the sales price of comparable properties in the same vicinity within a relatively recent time frame, usually about six months. The bottom line for the lender is assurance that he/she will be able to sell the home in the event that the current borrower defaults. Therefore, the one-of-a-kind home, whether it is a geodesic dome or a home with a photovoltaic system, does not fit well within this process.

Ward Guffey, an appraiser for Carl Franklin Homes in Dallas, Texas notes, “Getting the first few homes sold is the biggest hurdle. Once several homes with a particular feature have turned over, this provides the needed proof that there is in fact a market for that type of home.” Guffey identified several ways in which this has been accomplished in the Dallas market. He referred to the first as “the deep-pockets method of creating comparables.” When homebuyers are able to make a larger down payment, the loan-to-value ratio is reduced, thus making the loan more attractive to the lender. Therefore, a higher priced home of similar size in the same neighborhood becomes a benchmark. Typically, the maximum allowable loan-to-value ratio is about 95 percent. Once multiple loans are made through “borrower subsidies,” the “comparables” exist and can be used for future appraisals. Third-party subsidies for energy improvements are another means of establishing first-time technologies as benchmarks in the marketplace. Even though a grant or incentive may have subsidized the energy upgrade and the purchase price remained what it would have been without the new feature, the appraiser can add the value of this grant to the purchase price of the home—if he is willing to take what many appraisers consider a risk of rejection. In the appraisal and loan process, the “grant”

shows up as either a larger down payment or a higher valued home with the grant written in as “an improvement.”

How Can High Performance Homes Be Found?

Another issue from the appraiser’s perspective is the difficulty in identifying other ENERGY STAR or Zero Energy homes in the area. Usually, an appraiser will use the Multiple Listing Service (MLS) to find similar properties that have sold within a recent time frame. Because features such as ENERGY STAR labeled or photovoltaic system are not noted, these features would not show up in the listing. Consequently, even when there may be several homes in a given area that have particular energy features, for instance a photovoltaic system, it can be hard for an appraiser to know that they exist. Typically, substantial lead-time is required for awareness of new technologies to develop in the marketplace.

How Much Is It Worth?

A related issue that appraisers recognized is how to determine the value of an energy efficiency improvement, such as the ENERGY STAR label or a photovoltaic system. Even when one has acknowledged that such features hold greater value, the next question is “How much greater?” Again, the easiest answer from the lender’s or appraiser’s perspective is, “The additional amount that people will pay for the upgraded home versus a similar home without the feature.” This approach, however, is typically problematic for both the builder and the prospective buyer. First, there may not be many homes in similar neighborhoods with these features. Secondly, Ward Guffey stated that from his experience in the Dallas market, people are only willing to pay about 60-70 percent of the cost of the energy improvement. The builder frequently subsidizes the energy upgrades by reducing his profit. Guffey further emphasized that this especially holds true for the affordable housing market. As the price of the home increases, buyers are more willing to invest in energy efficiency even though those with more modest incomes stand to achieve a greater benefit from lower, more stable monthly utility bills. Although this perspective is slowly changing with increased utility prices and promotion of programs such as ENERGY STAR, the typical homebuyer does not perceive value equivalent to the cost of installing the feature. In effect, this situation perpetuates the lack of acknowledgement of the value of energy efficiency and renewables. Because homebuyers don’t recognize the added value and typically will not pay for its true cost (or savings), lenders are not encouraged to approve higher loan amounts for such features. Consequently, appraisers do not include it in their reports, and this further reinforces continued lack of valuation in the marketplace.

Robert Coffey, an appraiser in Rochester, New York emphasizes the dilemma by pointing out that if such energy features are in fact highlighted in the appraisal as a “line adjustment,” this may actually reduce the likelihood that a loan will be approved. When a lender or underwriter sees a line adjustment, their attention is drawn to the fact that there are no comparables for that particular feature. To the underwriter, this is an indication that the feature, and by extension the home, have not been proven to be saleable. Therefore, they may consider it a risky investment. Currently, the accepted residential appraisal and mortgage procedures discourage special features from being highlighted or valued. “Rather,” Mr. Coffey said, “the standard practices encourage one to simply roll such features into the purchase price of the home whenever possible. In this way, the process is streamlined and can be completed more quickly.”

For energy efficiency and renewable energy features, this perspective is particularly complicated since these features differ from other amenities such as hardwood flooring or solid-surface countertops that do have perceived value in the marketplace. Unlike such aesthetic features, energy upgrades are, essentially, a source of income in that they reduce the homeowners' out-of-pocket monthly expenses. While a higher efficiency heating system or a photovoltaic system pays for itself over time, one cannot necessarily say the same thing about the upgraded countertop.

STEPS TOWARDS RESOLVING THE ISSUES

From the appraiser's or lender's standpoint, these issues raise the more specific question of the "appropriate" method for valuing the energy feature. Should the value be based on the cost to install the feature or the estimated energy savings? Should one look at the savings over the expected life of the particular feature or over the average length of time people are expected to stay in the home? The following efforts are examples of current attempts to recognize the value of energy efficiency features and renewable energy technologies in the appraised value of the home.

The West Coast Experience

Based on reports from several builders on the West Coast, part of the answer to the above questions may depend upon the increased presence of ZEH's and renewable energy technologies in the marketplace. Of course, to some extent, this is a "chicken-or-the-egg" situation since market penetration partly depends upon recognition of increased value by appraisers and lenders.

For Shea Homes in Southern California, solar hot water and 1 kW photovoltaic systems were available as options on homes in several of their San Diego subdivisions. These features typically added anywhere from \$7,000 to \$15,000 to the cost of the homes where prices start in the low \$400's. The sales manager for Shea reported that there has never been an issue regarding the valuation of the solar features. She simply lists the solar features and the dollar value on the list of amenities that is given to the appraiser. "The homes are valued accordingly by the appraiser. We have never been questioned about the price of these homes relative to other homes that may not have the solar," she said.

Jacklyn Delgado, principal of On-Time Appraisal in Tucson, Arizona reports similar experiences, yet she goes a step further. Ms. Delgado actually highlights the solar and energy-efficient features of John Wesley Miller's homes on a separate "Comment Page" that is attached to the appraisal. They are listed as some of the primary "outstanding features and upgrades" of the homes. Although these features increase the cost of the home somewhat, she emphasizes the added value to the customer in the form of lower energy bills and a more comfortable home. In her experience, lenders have acknowledged the increased value as well. "We have an obligation to the builder and to the home buyer to highlight the solar and energy features of new homes. John Wesley Miller is an award-winning builder because of such features, and should be acknowledged for moving the industry forward," Ms. Delgado believes. Although John Wesley Miller is one of the few builders in the Tucson market to offer solar, he has now built enough homes that the solar panels are familiar and there are sufficient properties to serve as comparables.

The fact that solar and Zero Energy Homes are more easily incorporated into the mainstream residential construction industry in the west is not surprising. Generally, the solar resource in California and Arizona is considered much greater than other areas of the country (although many Central and East Coast regions also have abundant sunshine and often higher cost electricity); innovative practices may be more readily embraced; and costs for the solar systems are not quite as high on the West Coast—especially relative to the cost of a similar standard home (where the cost of the solar and energy efficiency upgrades may only be from 3 to 10 percent of the cost of the home). As more and more systems are installed, they become familiar and readily accepted by all parties in the real estate transaction process.

Energy Efficient Mortgages

Many of the large secondary lenders such as the Farmers' Home Administration, Freddie Mac, and Fannie Mae offer energy efficient mortgages (EEMs) to the lending industry. The characteristics of each are similar and therefore, only one is described here. For a Fannie Mae EEM, a HERS rating is used to estimate the energy savings due to the energy efficiency measures or the market value of the energy produced in the case of a photovoltaic system. The Present Value of these savings is calculated over the life of the feature(s) or the life of the mortgage, whichever is less and this amount is added to the purchase price or appraised value of the home. In essence, this reduces the loan-to-value ratio and a more expensive property can be purchased with a lesser down payment. This adjustment is typically capped at five percent of the value of the property. For a \$300,000 property, the value of a property could be increased by \$15,000. In the case of a ZEH, this amount could fall short of the savings achieved by the energy efficiency and renewable energy upgrades over the life of the features—at least 20 to 25 years. Fannie Mae has recognized this issue and is considering a seven percent cap for some cases. Furthermore, if energy prices rise, the estimated savings are too conservative. Despite some possible shortcomings, this as well as other EEMs available to the lending industry are a first step in recognizing the unique value afforded by energy improvements and renewable energy sources.

EEMs have not been widely used in the residential market. Reasons cited for this include:

- Need for a knowledgeable lender who is willing to become a Fannie Mae partner and provide the required documentation and paperwork.
- Need for a HERS rater who can substantiate the energy features of the home and estimate the expected cost savings.
- Active residential real estate market with extremely low interest rates.
- Predicted cost savings are sufficiently low for a residential property that this may not make a large difference in eligibility for a given loan amount. In commercial properties, these savings can be much larger and such loans are more prevalent for these buildings.

Training

The Environmental Protection Agency (EPA) with cooperation from the Appraisal Institute is currently developing a seminar to educate appraisers about the benefits and added value of ENERGY STAR homes. The course demonstrates ways in which the higher initial cost of an ENERGY STAR home may be offset by lower monthly utility bills.

A tax benefit is also realized since the interest paid on the mortgage amount is not taxed. Utility expenses do not receive the same exemption. In addition to the quantifiable economic benefits, appraisers are also made aware of the qualitative advantages related to the energy-efficiency improvements such as increased comfort, more uniform temperatures, and often better humidity control—all of which should increase the desirability of such homes. Pilots have been conducted in Minnesota and Texas and will be conducted nationwide in the coming year.

Several appraisers who attended the three-hour pilot seminar were contacted to obtain their views about the training and the extent to which they might be able to change some of their current appraisal practices. Generally, the appraisers found the information very useful. Given the growing number of ENERGY STAR homes, they noted that comparable properties are easier to find. However, one of the appraisers appeared to come away from the training with a slightly skewed perception of the advantages of an ENERGY STAR home relative to a conventional home built to code:

“Energy efficiency is causing mold problems. ENERGY STAR certifies that a home is built correctly with proper materials, flashing, and workmanship so that it will dry out if/when it gets wet. Moisture will not become trapped in the wall cavity and one won’t have mold problems.”

Such perceptions indicate the difficulties that can arise when introducing new information and the potential for misunderstanding. Introducing new technologies such as photovoltaics or incorporating existing technologies such as energy efficiency into new arenas can take quite some time to be accurately understood. Often misinformation or incorrect conclusions result in exaggerated expectations. When such expectations are not met, sometimes the entire technology is discounted and the educational process must be restarted.

The Dallas appraiser described a similar situation with respect to Energy Efficient Mortgages. “When the first EEMs came out, they were too optimistic about the projected energy savings. They estimated that the savings would be much greater than they actually proved to be. Consequently, many people purchased homes that they really could not afford.” With a number of defaults on such loans, lenders shied away from EEMs. This may be one reason for the slow adoption of the new EEMs that are now available.

CONCLUSIONS

As a result of interviews with several appraisers and lenders and a general review of the appraisal process, a barrier to the adoption of the ZEH concept lies in the residential appraisal and lending process itself. This aspect, and not the technology of the ZEH, has proven to be a significant obstacle for builders who otherwise would consider the ZEH approach. New technologies such as renewable energy are inherently discouraged because the risk adverse nature of the mortgage industry encourages appraisers to rely almost entirely upon “comparables” as the basis of their property valuation. In fact, deviation from the status quo (e.g., “line adjustments” vs. “comps”) often becomes a red flag to the lending agency calling into question the desirability of the property in the marketplace. Efforts to streamline and automate the appraisal process further exacerbate this problem.

Some residential real estate markets such as those in parts of California and Arizona are more receptive to “new” solar technologies as well as features that reduce energy use, in part due to the energy efficiency education process that has already begun. While certain cultural or socio-economic factors may play a role in this, it is evident that acceptance by such integral parties as appraisers and lenders certainly facilitates increased market penetration. In a sense, this then has a snowball effect because as more solar or Zero Energy Homes become features in new homes, the more their value is recognized in the market, and the greater the increase in demand for such amenities.

However, it should be noted that the structured organization and standardization of the appraisal industry could be used to facilitate the actual valuation of innovations such as energy improvements or the Zero Energy Home. If the current regulating agencies acted to devise accepted methods for valuation of these features, this practice could be adopted fairly quickly throughout the appraisal industry. Energy Efficient Mortgages and the training seminars currently being planned by EPA’s ENERGY STAR program for appraisers are efforts in this direction.