Study:

Green Homes Sales Prices in Northern California

An appraiser-led study that analyzes the price premium of green home features and explores barriers to mainstreaming green real estate

By Sandra Adomatis, SRA, LEED Green Associate, Adomatis Appraisal Service

January 2018

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Executive Summary

California has long been at the forefront of green building through its energy efficiency, green labeling, and code programs. Statewide, tens of thousands of greener homes provide impressive benefits for their residents: They can save money, conserve natural resources, provide greater comfort, and improve indoor air quality. But what about the financial return on investment (ROI)? Do green home improvements translate into a higher resale value?

This is a pivotal question for the real estate industry, and for green building thought leaders like the nonprofits Elevate Energy, Build It Green, and the U.S. Green Building Council. If evidence showed that green homes sell for more, it could drive a new level of investment in green remodeling and energy efficiency upgrades in the existing home market. In the new home market, homebuilders would respond to increased demand for healthy and efficient homes that far exceed the minimum standards of building codes. Overall, this new value stream would accelerate the adoption of green building and green real estate practices by a wide range of stakeholders.

This 2017 study, the first of its kind in California, provides encouraging results: Homes with a green certification did indeed fetch a higher sales price, with an average price premium of 2.19%. The study results add to a growing body of similar findings across the country.

About the Study

This study examines the question of how green certifications/labels can affect a home's value and sale price. This is the first appraiser-driven study using paired sales analysis in California. The study area focused on Northern California, initially identifying 1,386 GreenPoint Rated– and LEED-labeled single-family homes in the region. Five Multiple Listing Services (MLSs) were searched in Northern California for sales of homes with those green labels. Since no data could be found on green-labeled home sales in three of the systems, the study focus narrowed to the counties of Alameda and Santa Clara.

Growing Evidence Nationwide

This study adds to mounting evidence across the country that green-certified homes have greater value at time of sale than non-certified homes. A 2013 California study, using regression analysis rather than

paired sales analysis, found that certified homes sell for 2.1% to 5.3% more[1]. In 2015 a Washington D.C. study using paired-sales analysis found a mean green premium of 3.46%[2]. And a 2017 study in Austin, Texas, using regression methodology, indicated a price premium of roughly 6% for green-certified homes[3]. Similar results indicating added value have been found from the Midwest to the South to the Rockies.

Challenges: Green Is Invisible

But green home labels and features are often invisible at time of sale, hindering the ability of the real estate industry to capture this green premium for their clients (and making studies such as this one more difficult). This is due to several interrelated challenges discovered during the course of the study. Green label information for each sale used in this analysis was rarely anything more than a comment in the listing's narrative description; MLS "green fields" were either unused or improperly used. This prevents REALTORS® from easily searching for green homes on behalf of their clients, and prevents appraisers from finding comps to properly value those homes. Many real estate professionals are also unfamiliar with the properties of green homes; this lack of knowledge makes it difficult for them to recognize and communicate the value-add features of those homes. Finally, green-labeled homes are a relatively small percentage of the overall housing stock, reducing the frequency by which such data could appear in listings.

Results & Recommendations of This Study

The study identified eight green transactions. While the authors had hoped to identify more green transaction, each green transaction was matched against multiple no-green comparable transactions to develop a reasonable estimate of a green premium. The authors identified 20 non-green comparable transactions over the past two years. Each green sale was compared to two or more non-green sales to create 23 pairs. The study clearly identifies a price premium for green homes, with a 2.19% mean premium. The mean closed sale price for the green labeled homes in the study was $1,192,250. The

[1] Kahn, Matthew E., Kok, Nils. (2013). The capitalization of green labels in the California housing market. Regional Science and Urban Economics.

[2] Adomatis, Sandra. (2015). What is Green Worth?: Unveiling High-Performance Home Premiums in Washington, D.C.

[3] Hallman, Greg. (2017). The Value of LEED Homes in the Texas Real Estate Market: A Statistical Analysis of Resale Premiums for Green Certification

mean premium multiplied by the mean closed sale price estimates an added value of $26,110 from the green label.

As this study shows, green homes command a price premium despite challenges. That premium could potentially be much higher if barriers were removed. Based on the analysis of these study findings, the author recommends the following solutions to support the real estate industry:

- Auto-populate MLS green fields, pulling from a database that documents every home's green certifications or scores. Consistent and credible data would nearly eliminate the misuse of those fields, making it easier for real estate agents and appraisers to find green homes.
- Provide certification training to all agents and appraisers, educating them on how to identify, market, and value green homes.
- Score or certify thousands more existing homes to increase the data available for the real estate industry. This can be accomplished by supporting and proliferating more easily accessible home scores and labels such as the U.S. Department of Energy's Home Energy Score.

Green Building: Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as a sustainable or **high performance** building.

Source: U. S. Environmental Protection Agency

http://archive.epa.gov/greenbuilding/web/html/about.html

Six Elements of Green Building

1. Site
2. Water
3. Energy
4. Indoor Air Quality
5. Materials
6. Operations & Maintenance

Background

Defining and Quantifying Green Homes

What is a "green" home? The definition can vary, and this lack of a standard definition contributes to the problem of accurately valuing green features. The definition in the sidebar is widely used, and cites six elements of green building that are typically found in the score sheets of most independent green home certification and rating systems.

Of the six elements of green building, the energy and water elements are quantifiable. If a feature is quantifiable, marketing the savings benefits should enhance marketing and provide data to quantify premiums in the appraisal process. This is not to say the remaining elements have no value, but it is more difficult to identify the market's reaction to them when they cannot be quantified. The paired green sales used in this study did not have energy reports or scores listed in the MLS. The listings used the term "LEED, GreenPoint Rated, or Green" and assumed buyers have full knowledge of the benefits of those terms. Full details of quantified elements such as energy and water savings are essential to developing the income approach in an appraisal to support an energy efficient adjustment. Without sales, quantifiable savings, and cost of these additional features, the three valuation methods[4] to valuing features cannot be used.

Green Home Priorities and Perceptions

Recent research indicates that homebuyers are interested in green homes. A 2015 study by Dodge Data & Analytics found that 69% of home builders and 78% of remodelers have found that their customers are willing to pay more for a green home. There is even greater interest in healthy homes, with 80% of home buyers/owners willing to pay more.[5] A healthier home is a benefit of a green home, particularly in regards to improved indoor air quality. The National Association of REALTORS® has found similar interest by their members' clients' perceptions of sustainability. In the *REALTORS® and Sustainability 2017 Report,* more than half of the REALTORS® surveyed reported that their clients are interested in real estate sustainability issues and practices[6]. A comfortable living space topped the list of important home features for clients[7]. Comfort may have different meanings to different clients, but it is often identified with a house having even temperatures throughout the living area, healthy indoor quality, and good lighting. Green home features help create a comfortable home through a sealed building envelope, good mechanical systems, and ample day- and energy-efficient lighting.

As market players become more knowledgeable about green building features and their benefits, the sales prices will more clearly reveal the knowledgeable buyer's reaction to these features and the sales price premium they are willing to pay. The market needs real estate professionals with knowledge of

[4] Cost Approach, Sales Comparison Approach, and Income Capitalization Approach

[5] Steve A. Jones and Donna Laquidara-Carr, *Green and Healthier Homes: Engaging Consumers of all Ages in Sustainable Living* (Maryland: Dodge Data & Analytics, 2015), 11, 37.

[6] REALTORS® and Sustainability 2017 Report, National Association of REALTORS®, 2017, 16.

[7] REALTORS® and Sustainability 2017 Report, National Association of REALTORS®, 2017, 11.

the green elements and sustainable practices to market, manage, and/or appraise green buildings. Real estate agents must market the green benefits of a unit in a way that relates value to a potential buyer.

Green Certifications

This study focused on homes that received either the GreenPoint Rated or Leadership in Energy and Environmental Design (LEED) certification. LEED-Certified Homes must also meet the ENERGY STAR Certification standards but are not required to obtain the label. Below are brief descriptions of each of the certification programs used in the study.

Table 1. Summary of Certification Programs

Program Defined	Sponsor	New or Existing
GreenPoint Rated– GreenPoint Rated provides third-party verification of green homes. It acts as an independent seal of approval that reassures homeowners that a home is healthier, more comfortable, durable, and resource-efficient. The rating includes the following five categories: Energy Efficiency, Water Conservation, Indoor Air Quality, Resource Conservation, and Community.	Build It Green https://builditgreen.org	Both
Leadership in Energy and Environmental Design (LEED®): As an internationally recognized mark of excellence, LEED provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations, and maintenance solutions. Homes earning the LEED® Certification must meet the requirements of ENERGY STAR for Homes, Version 3 but they are not required to seek the label.	U.S. Green Building Council http://www.usgbc.org	New

The Study Area

The initial study area captured approximately 1,380 GreenPoint Rated and LEED-certified homes in Northern California. The area covers 10 counties and includes homes in the San Francisco Bay Area as well as the Sacramento Area. The below table lists the number of addresses in the study area that were identified as a certified green home. These homes were in a large area covering 90 cities, some in remote locations. The data used for the direct comparisons were located in Alameda and Santa Clara counties. During the period covered by the study, the general market conditions are best described as increasing. Marketing times are typically below 60 days and multiple offers are not uncommon.

Table 2. Summary of Certified Homes

Green Certified Single-Family Home Inventory Identified by Address		
	GreenPoint Rated	**LEED® Certified**
Total Count	833	553
Years Certified	2008-2016	2008-2016
Number of Cities	90	
Number of Zip Codes	155	
	Total Inventory	**1,386**

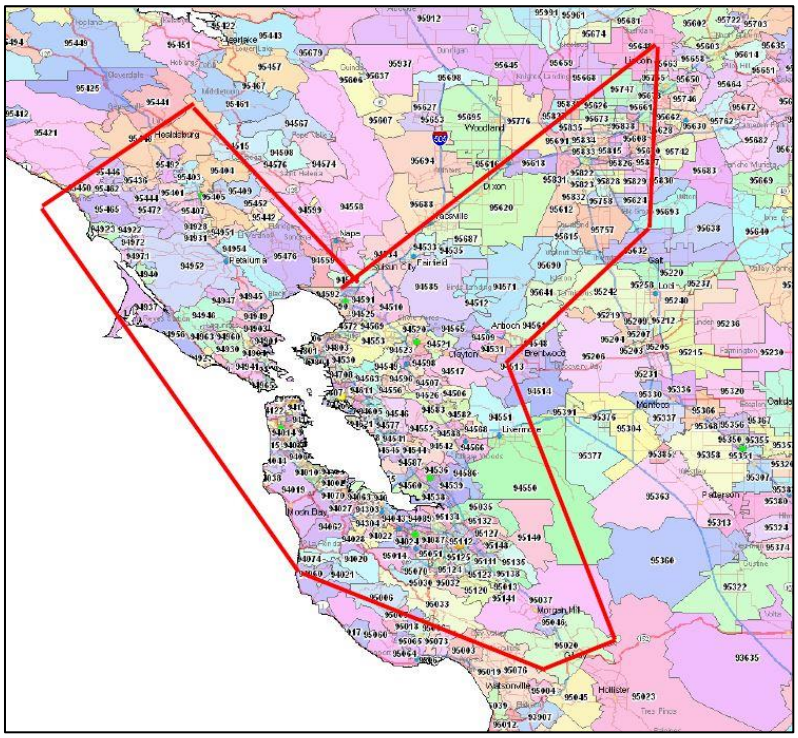
Alameda County is located on the east side of the San Francisco Bay with the county seat located in Oakland. The county has 589,858 total housing units. The three largest employers by industry are educational/health care/social services, professional services, and manufacturing. The mean household income is $101,953.[8] According to the California Association of REALTORS®, as of July 2017 the median single-family home sales price was $875,500. There has been significant residential development in the eastern parts of the county as home prices have skyrocketed and become unaffordable for many in the more urban and higher density markets like San Francisco, Oakland, and Berkeley. Oakland and other cities along the County's western boundary are also experiencing a high level of redevelopment of previously commercial and industrial use land, being repurposed to mid- to high-density residential projects.

The County of Santa Clara is located to the south of Alameda County, with the city of San Jose as its county seat. The county has 646,190 total housing units. The three largest employers by industry are similarly professional services, educational/healthcare/social services, and manufacturing. The mean household income is $128,243.[9] According to the California Association of REALTORS® as of July 2017 the median single-family home sales price was $1,165,000. This area, commonly known as "Silicon Valley," has a diverse economic base, but its high-tech industry (including such firms as Apple, Intel, and Tesla Motors) has given this community its name. Amid a booming economy, Santa Clara County faces a significant affordable housing shortage. This shortage has spurred much individual-site redevelopment, converting older residences into newer and larger homes.

[8] American Community Survey 2011-2015 5-Year Estimates

[9] American Community Survey 2011-2015 5-Year Estimates

Figure 1. Map of Study Area



MLS Systems

Originally five MLS systems were searched for green property sales. However, all the study data came from two MLS systems:

- MLSListings Inc. MLS system services Santa Clara, San Mateo, Santa Cruz, San Benito, and Monterey counties. Of these counties, only Santa Clara and San Mateo were selected for the survey based on data available for pairing.

- Paragon MLS system operated by the Bay East Association of REALTORS® services Alameda and Contra Costa counties.

MLS systems servicing San Francisco, Marin, Sacramento, and San Joaquin counties were also searched, but no data was found. This may be because the number of certified homes for which data was available is small compared to the size of the total housing stock and/or certified homes are not being properly listed on MLSs at time of sale.

The MLS searches presented challenges in discovering sales that were green-certified. The following overview of the two main MLS system searches offered valuable insight into the difficulty for appraisers in the market seeking to value green-certified homes. It also implies that potential buyers seeking

green-certified homes may have difficulty finding them in the MLS systems. This work provides a good basis for turning the challenges into steps forward to a better MLS system that will work more efficiently for real estate professionals and their homebuyer and seller clients.

The following tables show recent MLS search results for listings specified as having a GreenPoint Rated or LEED certification. In addition to the properties noted in the table, many more listings and sold properties have one or more green features mentioned. The data shows that green features remain an active part of the total residential market.

Table 3. MLSListing Service Sample Search

Study target area: Santa Clara & San Mateo counties **Price point under $3,000,000, lot sizes less than 1-acre**	
Certification or Label	**Number of Properties Identified**
Active, contingent, and pending with "green rated-Yes" (total active, contingent, and pending is 2,500+; MLS maxes out at 2,500)	26
Sold homes with "green rated- Yes" (over 2,500+ sold; MLS maxes out at 2500)	188
Active, contingent and under contract properties with the word "Green/Resource Efficient Features" in a pick list field.	0
Sold properties with the word "Green/Resource Efficient Features" in a pick list field.	145
Homes current active and under contract listings with the word LEED® in the remarks section of the MLS listing	0
Number of sold properties with the word LEED® in the remarks section	7
Dates searched: 1/01/2015 to 4/25/2017. Search criteria: residential, single-unit properties only.	

Table 4. Paragon MLS Service Sample Search

Study target area: Alameda & Contra Costa counties **Price point: under $3,000,000; lot size: less than 1 acre**	
Certification or Label	**Number of Properties Identified**
Active, contingent, and pending homes with "GreenPoint or green point" in Public Remarks field (total active, contingent, and pending is 4,864)	0
Homes with "GreenPoint or green point" in Public Remarks field (over 49,608 sold)	13
Active, contingent and under contract properties with the word "Green/Resource Efficient Features" in a pick list field.	12
Sold properties with the word "Green/Resource Efficient Features" in a pick list field.	8
Current active and under contract listings with the word LEED® in the remarks section of the MLS listing	0
Sold properties with the word LEED® in the remarks section	4
Dates searched: 1/01/2015 to 4/25/2017. Search criteria: residential, single-unit properties only.	

What we found in our initial search is a lot of false-positives. We were looking for significant green features that were highlighted in the marketing comments. Searching "green" returned extraneous results. What was returned were many profiles with minor green features (appliances) or non-related terms (e.g. greenbelt).

Data Limitations

In a market value appraisal, the appraiser seeks to use sales that meet the definition of market value as defined in the sidebar. The most probable selling price assumes the property to be marketed under all conditions requisite to a fair sale. This definition implies the marketing is focused on the property type and benefits associated with the property characteristics.

The MLS is the platform used by real estate agents belonging to the National Association of REALTORS® (NAR). It is considered the best database appraisers have in most markets and in this study area as well.

The limited number of MLS-identifiable green sales coupled with a lack of documentation about the features creates difficulty for appraisers when quantifying the market's reaction to green features. This study points to the marketing as a potential reason green homes did not sell for more than the premiums found in this study.

Just because an MLS has green data fields does not mean they are populated or that the information is correct if they are populated. The study area presented the same difficulties this author found in other study areas; the MLS data search limited the ability to identify sales that were green certified. The MLS search made it very difficult to establish the number of green-certified home sales or listings. To overcome this difficulty in uncovering green-certified sales, the appraiser team resorted to word searches of the comment field to find energy and green feature comments.

Market Value is defined as the most probable price that a property should bring in a competitive and open market. This includes all conditions requisite to a fair sale, such as the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition are the consummation of a sale as of a specified date, and the passing of title from seller to buyer under conditions whereby:

- Buyer and seller are typically motivated;
- Both parties are well informed or well advised, and acting in what they consider their own best interests;
- A reasonable time is allowed for exposure in the open market;
- Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and,
- The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale."

Source: Federal Register/Interagency Appraisal and Evaluation Guidelines

In addition, even when the MLS includes green features in the search fields, the data available is often incomplete or absent. For example, in the identified green homes used in the pairing, none had attachments showing the green certification and score sheet or an energy report. Attaching the full green reports or score sheets provides users with a view of features that otherwise may be invisible;

these features may translate to measurable value. If an energy score had been attached in its entirety, it would give users a way to consistently compare homes' relative energy efficiency. The energy score can also be a good marketing tool and a data point appraisers can use in developing the value of energy and green features. The green certification score sheets and energy reports made accessible to appraisers may result in better comparable selection and adjustment decisions that reflect a more accurate appraised value.

Appraisers need enough details on the property appraised and the comparable sales used to analyze feature differences that need adjustment to result in a credible value opinion. Lender underwriting guidelines and appraisal standards emphasize the importance of sales verification and accurate data. Appraising a home with green features demands more research time to conclude a credible value opinion than an appraisal on a home without green features. The extended time needed is usually three to five days more than time required for a non-green home based on the author's experience and the local appraisal team's experience in this study.

The MLS is the best data source to which appraisers have access. As this study revealed, even a state with a large volume of green homes has MLSs without green fields or, when those fields are present, they are populated incompletely or inaccurately.

Data Limitation Impacts

Residential units with green features are often given no green feature value for a variety of reasons that may be attributed to inaccurate or missing green features identified in the MLS. A reason often given for the lack of green feature value in the appraisal process is that no sale like the subject was found with green features: "No sale no value." This concept is not a proven appraisal method and suggests an appraisal using only one tool from the toolbox. Appraisal standards suggest that attributing no value to a feature implies the appraiser has analyzed the feature and concluded no value or a zero adjustment. Even a zero value needs support and should only be applied with adequate support for the conclusion.

In the lender's underwriting process, appraisers often report they are told they must have a sale with the same or similar green feature in the sales comparison approach before value can be applied for the feature. This underwriting request is not a secondary mortgage market guideline[10] but an individual lender underwriting guideline.

[10] Fannie Mae, Freddie Mac, FHA, or VA guidelines for lending

Lending underwriters' preferred method to support the value of green features is the paired-data analysis. Some underwriters require that at least one sale used in the sales comparison approach must have green features. Pairing sales is difficult for the following reasons:

- It is rare that two properties are identical in all features except one given feature such as a green certification.
- Data reporting in public record and the MLS is incomplete.
- True property conditions are rarely reported in a database
- True motivations of the seller or buyer often affect prices paid and are not reported.
- Extreme differences in views can materially affect the sales prices
- Sales may not truly reflect the definition of market value.

Methodology

This study uses paired-data analysis to analyze sales of units with green features and/or certifications compared to non-green home sales that have similar characteristics except for green features to understand if premiums were paid.

In the past 10 years, green features have become a growing trend in the market. A limited number of studies of green features exist. Real estate appraisers author even fewer studies using standard appraisal methods. This is the first study of its kind in California.

Appraiser-driven studies, using paired-data analysis in a specific market area are preferred by appraisers and their lending clients. While this method usually has limited data from which to draw conclusions, the results reveal direct market reaction to a given feature. Academic studies that are based on hedonic modeling use robust datasets but have limited use in the residential valuation process because the hedonic methodology is not a widespread practice used by residential appraisers and not all residential appraisers would have sufficient data or the knowledge to explain the hedonic model. Appraisal standards require appraisers to understand the work of others and deem it credible prior to relying on it in an appraisal.

This section describes each of the methodologies available for analysis, including the paired-data analysis (sales comparison approach), cost approach, and income approach. If all three approaches are used, they provide a means to test reasonableness ensuring a more credible value opinion.

Test of Reasonableness

Valuation methods employ the use of imperfect market data and some subjective judgment in each method. Therefore, when data allows the use of more than one method, the test of reasonableness is applied for a more credible opinion. The authors found it difficult to obtain sufficient data on each green sale to develop all three approaches. The cost of green features over the typical cost of building the same product to the building code is a good measure of the overall reasonableness of the paired data. It is reasonable to assume that the market would not be willing to pay more for a product than it would cost new.

The study author and co-author applied the test of reasonableness for this study. Mr. DeSaix, MAI, SRA lives and works in the study area. Ms. Adomatis reviewed all pairs and the supporting data used by Mr. DeSaix to establish the opinions and created the tables and summaries in this study.

Paired-Data Analysis

Paired-data analysis is a comparison of the sale price of a property with the study feature being analyzed (e.g., green certification) with the sale price of a recently sold similar property that does not have the study feature. After first adjusting for characteristic differences between the sales paired (e.g., size, age, view, and condition), the difference in the sales prices attributed to the study feature is isolated. Therefore, if properly applied, results of a paired-data analysis can reflect the market's reaction to a given feature. In this analysis, the study feature was homes with a green certification from GreenPoint Rated or LEED.

The reliability of the paired-data analysis is based on the quantity and quality of the pairs. In most appraisal reports, appraisers are fortunate to find one good pair to support an adjustment in the sales comparison approach. In this study, Mr. DeSaix paired each of the green sales with two or more non-green sales resulting in 23 pairs that form a range that deserves credibility. Further, comparing more than one non-green sale to each green property adds credibility to the result for the green sale. All pairs are not expected to result in the same number because the market is not perfect and market participants vary in the price premiums they may be willing to pay.

A study that reveals a wide range of premiums may reveal inconclusive results. A wide range happens for a variety of reasons and is most often attributed to weaknesses in the paired dataset such as when the paired homes show wide differences that are more difficult to quantify resulting in a less than credible opinion. However, when several pairs result in a tight range of premiums, the result is most

convincing and more readily accepted in the valuation profession. The difficulty of developing paired-data analysis was discussed previously in this report.

Cost Approach

The cost approach involves estimating the installed cost of the green features. A typical buyer would consider the replacement cost of green features as of the date they are considering the house purchase. The cost amount represents the cost incurred for green features over the cost of the code-built home. Some builders break down the green cost premium more clearly than others. Some building jurisdictions have higher building codes that already implement green features accounting for differences in the cost of green features nationwide.

Identifying the costs of the green features is difficult for a specific property and especially for existing homes. The green cost premium is a test of reasonableness when comparing the cost to paired-data analysis or income approach results. The Dodge Data & Analytics "Green and Healthier Homes: Engaging Consumers of all Ages in Sustainable Living" SmartMarket Report 2015[11] has data on how much green features cost over the cost of building the property to code. The report polled builders, developers and remodelers nationally and reported the following statistics regarding the incremental cost of incorporating green features and practices:

- New home builders reported an average of 10% additional cost.
- Remodelers reported an average of 12% additional cost.

Income Approach

The income approach[12] is a useful tool in valuing properties or specific house features that have a quantifiable income stream by discounting that stream over a period back to today's dollars as a present value. The approach is most relevant in valuing rental property, or other assets that have a positive cash flow. Properties with energy-efficient features (one of the six elements of green building) often have Home Energy Rating System (HERS) or Title 24 Reports that show the estimated energy savings that can be used to develop the income approach supporting the value for energy features. This approach requires that the appraiser has access to the entire energy report to measure the energy savings of the property. Ideally, the appraiser would compare the energy use of the property under appraisal to the

[11] Steve A. Jones and Donna Laquidara-Carr, *Green and Healthier Homes: Engaging Consumers of all Ages in Sustainable Living* (Maryland: Dodge Data & Analytics, 2015), 9.

[12] Also known as the Income Capitalization Approach

energy use of the sales used in the sales comparison approach of the appraisal. The difference in energy savings between the appraisal property and the comparable sales can be developed into a contributory value using the income approach.

The secondary market's most preferred method of applying the income approach to develop an energy-efficient adjustment is to use the difference in monthly rent between a green rental to a non-green rental (assuming the green monthly rent is greater than the non-green monthly rent). This resulting monthly rental premium for the green home can then be multiplied by a monthly gross rent multiplier (GRM)[13] to arrive at a contributory value of the energy features: GRM X Rental Premium for Green Home = Contributory Value of Green Features. Once developed, the result should be compared to depreciated cost and/or paired data, if available, to form an opinion of the contributory value for the green features.

Given the essential nature of obtaining energy use and cost data for this preferred method of analysis, one can easily appreciate the challenge appraisers have in using this approach when the MLS data does not provide this type of information. In a market of custom or higher priced homes, rentals may not be readily available to produce a credible value opinion.

Data Collection

This study uses long-standing appraisal methodology to develop an opinion of how green sales prices compared to similar non-green sales prices in the defined study area. The appraisers were provided a spreadsheet that identified green-certified homes by address and certification type. This list was the starting point to identify recent green certified homes that may have sold since they were built and certified (2008-2016). The task sounds like an easy task considering there were 1,386 green-certified homes covering the last eight years located in the study area. In theory, running an MLS search of certified green home sales, downloading the results in an Excel format, and matching it with the certified list using data sort should take little time and effort. It was realized this was just a theory due to the limitations of the MLS data.

The sales search included sales between **January 2015 and April 2017**. The most recent sales dates were chosen rather than sales more than two years old since they may not reflect the most recent data. Using recent data should provide results that would apply to the market today. The search resulted in

[13] The gross rent multiplier is a relationship between the monthly rental amount and the sales price: GRM = Sale price/monthly rent.

eight sales that met these criteria. These sales comprised the dataset for this study. Mr. DeSaix, as an appraiser that specializes in residential valuation in the study area, was challenged to do the following:

1. Research the MLS sales to identify GreenPoint Rated and LEED certified homes that meet the definition of market value, meaning that they were not a short sale, bank-owned, or seller forced to sell;
2. Review MLS data and public record data to identify the physical characteristics;
3. Provide the MLS listing sheets and public record data secured to support the paired-sales analysis tables;
4. Develop credible paired-sales analysis to arrive at an estimate for any difference in value between the sales with green features and comparable sales without green features;
5. Collect the days on the market for all transactions;
6. Identify those sales with green certifications that were not marketed in the MLS listing as green certified. Understanding how well the green features were marketed may explain the variances found in the premiums;
7. Obtain the green rating sheets and energy ratings where possible; and
8. Verify each sale used in the study using a variety of sources and provide a few excellent quality photographs of homes studied.

Most markets offer limited data that is needed for perfect paired-data analysis because of feature differences. The most comparable non-green sales were identified and adjusted for differences for everything except green features. The adjustments are based on the local market's reaction to feature differences. After adjustments for all differences except the green features are made the green home sale price is compared to the non-green adjusted sale price to extract the sales price premium attributed to the green features. This process mirrors the appraisal process. The features requiring adjustment in the pairing included the following features:

1. Site size
2. View

3. Age
4. Bath count
5. Living area
6. Basement finish/size
7. Amenities such as porches, patio, decks
8. Parking
9. Location

Every pair did not have adjustments for all these differences. The list is a compilation of all feature differences requiring adjustment in one or more pairs. Overall, the pairs have minimal gross and net adjustments indicating the data are comparable. The gross adjustment is the sum of all adjustments in a paired-sale regardless of the direction of the adjustment (positive or negative).

Table 5. Summary of Adjustments

Summary of Gross Adjustments for Pairings	
Range	1% to 25.2%
Mean	11.93%
Median	11.37%

Data Summary

The complete dataset for this analysis consisted of eight green transactions and 20 non-green (comparable) transactions. These data are listed in the below tables.

Table 6. Green Sales Used in Pairing

No.	City	Type	Closed Date	Closed Price	$/SF LA	Living Area	Green Cert or Features	DOM (Days on Market)	Age
1	San Jose	Detached	1/26/2017	$ 1,285,000	$574.17	2238	GreenPoint	12	3
2	San Lorenzo	Townhouse	9/12/2016	$ 540,000	$355.26	1520	LEED	5	8
3	Dublin	Detached	3/31/2017	$ 1,100,000	$385.83	2851	Features	32	6
4	Santa Clara	Detached	8/2/2016	$ 1,600,000	$735.63	2175	Features	7	1
5	San Jose	Detached	2/12/2016	$ 1,015,000	$490.58	2069	Features	14	16
6	Livermore	Detached	4/22/2016	$ 1,350,000	$426.68	3164	GreenPoint	4	4
7	Livermore	Detached	7/12/2016	$ 1,400,000	$442.48	3164	GreenPoint	75	7
8	San Jose	Detached	2/11/2016	$ 1,248,000	$521.96	2391	LEED	9	6
			Mean	**$1,192,250**	**$492**	**2,447**		**20**	**6**
			Median	**$1,266,500**	**$467**	**2,315**		**11**	**6**

Table 7. Non-Green Sales Used in Pairing

No.	Paired-Sale No.	City	Type	Closed Date	Sold Price	$/SF	Living Area	DOM	Age
1	Pair 1-1	Santa Clara	Detached	8/4/2016	$1,750,000	$615.11	2,845	20	70
2	Pair 1-2	Santa Clara	Detached	8/27/2015	$1,600,000	$559.83	2,858	10	8
3	Pair 2-1	Dublin	Detached	2/21/2017	$1,100,000	$421.29	2,611	10	7
4	Pair 2-2	Dublin	Detached	7/6/2016	$1,020,000	$376.94	2,706	35	3
5	Pair 2-3	Dublin	Detached	3/25/2016	$1,070,000	$370.63	2,887	5	6
6	Pair 2-4	Dublin	Detached	3/25/2016	$989,900	$391.73	2,527	8	4
7	Pair 3-1	San Lorenzo	Townhouse	4/2/2015	$465,000	$292.45	1,590	9	11
8	Pair 3-2	San Lorenzo	Townhouse	6/15/2015	$475,000	$298.74	1,590	4	11
9	Pair 3-3	Lorenzo	Townhouse	12/1/2016	$535,000	$336.48	1,590	34	12
10	Pair 4-1	San Jose	Detached	11/16/2016	$1,200,000	$555.81	2,159	26	3
11	Pair 4-2	San Jose	Detached	1/26/2017	$1,170,000	$541.17	2,162	70	12
12	Pair 5-1	San Jose	Detached	4/4/2016	$1,001,000	$483.81	2069	9	16
13	Pair 5-2	San Jose	Detached	4/7/2016	$1,048,000	$477.67	2194	1	17
14	Pair 5-3	San Jose	Detached	9/1/2015	$935,550	$426.41	2194	24	15
15	Pair 5-4	San Jose	Detached	5/27/2016	$1,025,000	$467.18	2194	25	16
16	Pair 6-1	Livermore	Detached	5/2/2016	$1,183,000	$341.61	3,463	15	12
17	Pair 6-2	Livermore	Detached	5/25/2016	$1,140,000	$379.62	3,003	6	12
18	Pair 6-3	Livermore	Detached	6/8/2016	$1,308,000	$439.96	2,973	17	7
19	Pair 7-1	Livermore	Detached	5/2/2016	$1,183,000	$341.61	3,463	15	12
20	Pair 7-2	Livermore	Detached	5/25/2016	$1,140,000	$379.62	3,003	6	12
21	Pair 7-3	Livermore	Detached	6/8/2016	$1,308,000	$439.96	2,973	17	7
22	Pair 8-1	San Jose	Detached	7/31/2015	$1,260,000	$524.13	2,404	20	4
23	Pair 8-2	San Jose	Detached	8/10/2015	$1,129,900	$581.82	1,942	13	7
				Mean	**$1,088,537**	**$437**	**2496**	**17**	**12**
				Median	**$1,129,900**	**$426**	**2527**	**15**	**11**
				Mode	**$1,183,000**	**$342**	**1590**	**20**	**12**

Results

A note to readers: The sales price premiums identified in this study are based on a specific date (date of sale) and for a given geographical location (San Francisco Bay Area). Applying the sales price premiums revealed in this study to other areas or periods should be done *only* if the geographical areas have similar demographics, climate, and market conditions. Just like stocks in the stock market fluctuate, so do the prices of real estate and its features. This study dataset includes sales occurring between 2015 and 2017, and it may not be proper to apply these premiums to sales outside this timeframe.

Paired Sales Analysis

Eight green sales could be paired with similar non-green sales to develop credible results without excessive adjustments for feature differences. Each green sale was paired with two or more non-green sales that were similar in all aspects except green features. The differences in the adjusted sales prices are attributed to the market's reaction to green features or a green sales price premium. It is difficult to pull apart the premium and assign value to each of the green components.

In the paired-data analysis exhibited on the following pages, the green sale is also identified as the subject of the pairing analysis. The non-green sale is compared to sales of similar properties that compare except green features. When other features are present requiring adjustment, the appraiser developed adjustments based on market trends. The difference between the green sale price and the adjusted sale price of each paired sale is attributed to the green features.

Table 8. Summary of Sales Price Premiums based on the 23 pairs

No.	Paired-Sale No.	City	Style	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age
1	Pair 1-1	Santa Clara	Detached	8/4/2016	20	$1,750,000	$1,570,200	2,845	$29,800	1.86%	70
2	Pair 1-2	Santa Clara	Detached	8/27/2015	10	$1,600,000	$1,610,230	2,858	-$10,230	-0.64%	8
3	Pair 2-1	Dublin	Detached	2/21/2017	7	$1,100,000	$1,081,000	2,611	$19,000	1.73%	10
4	Pair 2-2	Dublin	Detached	7/6/2016	35	$1,020,000	$1,077,750	2,706	$22,250	2.02%	3
5	Pair 2-3	Dublin	Detached	3/25/2016	5	$1,070,000	$1,078,000	2,887	$22,000	2.00%	6
6	Pair 2-4	Dublin	Detached	3/25/2016	8	$989,900	$1,082,500	2,527	$17,500	1.59%	4
7	Pair 3-1	San Lorenzo	Townhouse	4/2/2015	9	$465,000	$521,500	1,590	$18,500	3.43%	11
8	Pair 3-2	San Lorenzo	Townhouse	6/15/2015	4	$475,000	$529,500	1,590	$10,500	1.94%	11
9	Pair 3-3	San Lorenzo	Townhouse	12/1/2016	34	$535,000	$511,500	1,590	$28,500	5.28%	12
10	Pair 4-1	San Jose	Detached	11/16/2016	26	$1,200,000	$1,238,070	2,159	$46,930	3.65%	3
11	Pair 4-2	San Jose	Detached	1/26/2017	70	$1,170,000	$1,235,080	2,162	$49,920	3.88%	12
12	Pair 5-1	San Jose	Detached	4/4/2016	9	$1,001,000	$991,000	2,069	$24,000	2.36%	16
13	Pair 5-2	San Jose	Detached	4/7/2016	1	$1,048,000	$988,000	2,194	$27,000	2.66%	17
14	Pair 5-3	San Jose	Detached	9/1/2015	24	$935,550	$1,003,550	2,194	$11,450	1.13%	15
15	Pair 5-4	San Jose	Detached	5/27/2016	25	$1,025,000	$994,500	2,194	$20,500	2.02%	16
16	Pair 6-1	Livermore	Detached	5/2/2016	15	$1,183,000	$1,313,200	3,463	$36,800	2.73%	12
17	Pair 6-2	Livermore	Detached	5/25/2016	6	$1,140,000	$1,312,200	3,003	$37,800	2.80%	12
18	Pair 6-3	Livermore	Detached	6/8/2016	17	$1,308,000	$1,318,200	2,973	$31,800	2.36%	7
19	Pair 7-1	Livermore	Detached	5/2/2016	15	$1,183,000	$1,361,900	3,463	$38,100	2.72%	12
20	Pair 7-2	Livermore	Detached	5/25/2016	6	$1,140,000	$1,360,000	3,003	$40,000	2.86%	12
21	Pair 7-3	Livermore	Detached	6/8/2016	17	$1,308,000	$1,356,200	2,973	$43,800	3.13%	7
22	Pair 8-1	San Jose	Detached	7/31/2015	20	$1,260,000	$1,255,000	2,404	-$7,000	-0.56%	7
23	Pair 8-2	San Jose	Detached	8/10/2015	13	$1,129,900	$1,253,925	1,942	-$5,925	-0.47%	7
				Mean	**17**	**$1,088,537**	**$1,132,305**	**2496**	**$24,043**	**2.19%**	**13**
				Median	**15**	**$1,129,900**	**$1,235,080**	**2527**	**$24,000**	**2.36%**	**11**

Paired Sale 1

Table 9. Paired Sale 1

Paired-Sale No.	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Gross Adjustment (Sum of all adjustments regardless of direction of adjustment)	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age Yrs
Santa Clara									
Paired Sale 1		**Solar PV 2.6 kW, Electric Car Charger, Gray Water Sys, Radiant Heat**					**Detached**		
P-1	**8/2/2016**	**7**	**$1,600,000**			**2,175**			**1**
S-1	8/4/2016	20	$1,750,000	$1,570,200	10.27%	2,845	$29,800	1.86%	70
S-2	8/27/2015	10	$1,600,000	$1,610,230	19.36%	2,858	-$10,230	-0.64%	8
Pair 1 - Premium Results									
Subject - Green Features		**7**	**$1,600,000**			**2,175**			**1**
Mean		**15**	**$1,675,000**	**$1,590,215**	**14.82%**	**2852**	**$9,785**	**0.61%**	**39**

Summary: This property was originally listed for $1,498,000 and sold for $1,600,000. It was newly constructed (one year old) and located in an existing residential neighborhood. There is rebuild and significant remodel activity in this market. The MLS listed the home as "...newly constructed, tech-

savvy, green home!" and MLS cited a 2.6 kW photovoltaic system, electric car charger, gray water system, radiant heat, and multi-zoned cooling. It was assumed this solar PV system was owned; an owned system would be of greater value than a leased system. Unfortunately, this information is not consistently available. The overall interior finish and quality of the home was good.

Paired Sale 2

Table 10. Paired Sale 2

Paired-Sale No.	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Gross Adjustment (Sum of all adjustments regardless of direction of adjustment)	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age Yrs
Dublin									
Paired Sale 2	**Green Features - Solar PV, Elec Chargers**				**Detached**				
P-2	**3/31/2017**	**32**	**$1,100,000**			**2,851**			**6**
S-1	2/21/2017	7	$1,100,000	$1,081,000	8.27%	2,611	$19,000	1.73%	10
S-2	7/6/2016	35	$1,020,000	$1,077,750	5.66%	2,706	$22,250	2.02%	3
S-3	3/25/2016	5	$1,070,000	$1,078,000	13.08%	2,887	$22,000	2.00%	6
S-4	3/25/2016	8	$989,900	$1,082,500	11.37%	2,527	$17,500	1.59%	4
Pair 2 - Premium Results									
Subject - Green Features		**32**	**$1,100,000**			**2,851**			**6**
Mean		**16**	**$1,044,975**	**$1,079,813**	**9.60%**	**2,683**	**$20,188**	**1.84%**	**6**

Summary: This home with green features originally listed for $1,098,000 and sold for $1,100,000. This property is located in a large development where all homes came with PV systems and garage chargers. The MLS notes "green home w/embedded solar roof & electric car charger." The overall condition of the home was good with updated kitchen and bath finishes. Based on review of the data, this developer's homes sell at the upper end of the price range over the last two years; they are also at the higher end of the size range. These pairings have gross adjustments well under the 25% upper limit that the secondary mortgage market once considered the largest acceptable. All four pairings are supportive of the 2% more or less premium.

Paired Sale 3

Table 11. Paired Sale 3

Paired-Sale No.	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Gross Adjustment (Sum of all adjustments regardless of direction of adjustment)	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age Yrs
San Lorenzo									
Paired Sale 3		**LEED Certified**		Townhouse					
P-3	**9/12/2016**	**5**	**$540,000**			**1,520**			**8**
S-1	4/2/2015	9	$465,000	$521,500	22.90%	1,590	$18,500	3.43%	11
S-2	6/15/2015	4	$475,000	$529,500	17.79%	1,590	$10,500	1.94%	11
S-3	12/1/2016	34	$535,000	$511,500	5.33%	1,590	$28,500	5.28%	12
Pair 3 - Premium Results									
Subject - LEED Sale		**5**	**$540,000**			**1,520**			**8**
Mean		**16**	**$491,667**	**$520,833**	**15.34%**	**1,590**	**$19,167**	**3.55%**	**11**

Summary: This LEED-certified home originally listed for $528,000 and sold for $540,000. The subject is part of a four-building, 28-unit townhouse style project. This project was built in 2008-2009 and all units were LEED certified at time of construction. The MLS stated "EcoGreen Townhouse is 'LEED Certified' w/solar panels, tankless water heater, electric car charger, NEST system, low VOC paint, reclaimed hardwood floors." In researching this project, at resale all units have been marketed with the LEED certification prominently labeled in the MLS. The size or ownership of the solar panels is not identified in the MLS. The results of these three pairings are wider than the results from other pairings in this study. The pairings have higher gross adjustments than desired and results that bracket the overall study results excluding the negative results.

Paired Sale 4

Table 12. Paired Sale 4

Paired-Sale No.	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Gross Adjustment (Sum of all adjustments regardless of direction of adjustment)	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age Yrs
San Jose									
Paired Sale 4	**GreenPoint Rated**				**Detached**				
P-4	**1/26/2017**	**12**	**$1,285,000**			**2,238**			**3**
S-1	11/16/2016	26	$1,200,000	$1,238,070	3.17%	2,159	$46,930	3.65%	3
S-2	1/26/2017	70	$1,170,000	$1,235,080	5.56%	2,162	$49,920	3.88%	12
Pair 4 - Premium Results									
Subject - GreenPoint Rated		**12**	**$1,285,000**			**2,238**			**3**
Mean		**48**	**$1,185,000**	**$1,236,575**	**4.37%**	**2161**	**$48,425**	**3.77%**	**8**

Summary: This home originally listed for $1,298,888 and sold for $1,295,000. The property was marketed "GreenPoint Rated Home" on MLS and noted LED lighting, Nest thermostats, dual zone heating and A/C, Belkin WeMo light switches, and double pane windows. No Solar PV system was listed. In addition to the green features, the kitchen appliances and interior finish were upgraded from the standard model.

Paired Sale 5

Table 13. Paired Sale 5

Paired-Sale No.	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Gross Adjustment (Sum of all adjustments regardless of direction of adjustment)	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age Yrs
San Jose									
Paired Sale 5	**Solar PV/Garage charger/Nest**								
P-5	**2/12/2016**	**14**	**$1,015,000**			**2,069**			**16**
S-1	4/4/2016	9	$1,001,000	$991,000	1.00%	2,069	$24,000	2.36%	16
S-2	4/7/2016	1	$1,048,000	$988,000	5.73%	2,194	$27,000	2.66%	17
S-3	9/1/2016	24	$935,550	$1,003,550	14.70%	2,194	$11,450	1.13%	15
S-4	5/27/2016	25	$1,025,000	$994,500	7.85%	2,194	$20,500	2.02%	16
Pair 5 Premium Results									
Subject -Green Features		**14**	**$1,015,000**			**2,069**			**16**
Mean		14.75	$1,002,388	$994,263	7.32%	2163	$20,738	2.04%	16

Summary: This property was originally listed for $939,000 and sold for $1,015,000. The MLS states "State of the Art Smart home includes Nest thermostat controls, solar power panels…electronic car

charging outlet." The subject and all comparables are in the same immediate area (2 to 3 block radius). There was another sale considered; it was listed for $938,000 and sold for $1,070,000, closing on 03/11/2016; it was the 2,292 square-foot model but had one of the bedrooms reconfigured as a custom office. It was the outlier/high sale, and therefore not included in the analysis. These pairings have minimal adjustments showing very comparable comparisons rendering strong results for the sales price premiums.

Paired Sale 6

Table 14. Paired Sale 6

Paired-Sale No.	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Gross Adjustment (Sum of all adjustments regardless of direction of adjustment)	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age Yrs
Livermore									
Pair Sale 6	GreenPoint Rated 86					3,164			4
P-6			$1,350,000						
S-1	5/2/2016	15	$1,183,000	$1,313,200	21.12%	3,463	$36,800	2.73%	12
S-2	5/26/2016	6	$1,140,000	$1,312,200	15.10%	3,003	$37,800	2.88%	12
S-3	6/8/2016	17	$1,308,000	$1,318,200	12.70%	2,973	$31,800	2.41%	7
Pair 6 Premium Results									
Subject - GreenPoint Rated		**4**	**$1,350,000**			**3,164**			**4**
Mean		13	$1,210,333	$1,314,533	16.31%	3146	$35,467	2.67%	10

Summary: This home was originally listed for $1,325,000 and sold for $1,350,000. Subject is in part of a development that has some significant vineyard views and the subject backs to vineyard with an unobstructed view. Interior finish/updates are good and other updates (built in patio amenities) are in the rear yard to take advantage of the views. This home is GreenPoint Rated with a score of 86. The MLS did not indicate the rating but noted "This fabulous GREEN home is situated on 1/4 acre lot, backing to views of vineyards from its stunning rear yard." All homes in this development are similar Craftsman homes, but there are some differences in the location and lot size between sections. The significant difference is in the newer section. Many of the homes have vineyard views. The feature and view differences are analyzed and accounted for in the pairing adjustments. These pairs have slightly higher gross adjustments that are mainly attributed to the views. While the pairings are more complicated because of heavier adjustments, they still lend support to the weight of the data.

Paired Sale 7

Table 15. Paired Sale 7

Paired-Sale No.	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Gross Adjustment (Sum of all adjustments regardless of direction of adjustment)	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age Yrs
Paired Sale 7	**GreenPoint Rated 86**								
P-7	**7/12/2016**	**75**	**$1,400,000**			**3,164**			**75**
S-1	5/2/2016	15	$1,183,000	$1,361,900	25.20%	3,463	$38,100	2.72%	12
S-2	5/26/2016	6	$1,140,000	$1,360,000	19.30%	3,003	$40,000	2.86%	12
S-3	6/8/2016	17	$1,308,000	$1,356,200	13.60%	2,973	$43,800	3.13%	7
Pair 7 Premium Results									
Subject - HPH Sale		**75**	**$1,400,000**			**3,164**			**75**
Mean		12.666667	$1,210,333	$1,359,367	19.37%	3146	$40,633	2.90%	10.33333

Summary: The sale is a similar GreenPoint Rated home with a score of 86. Per MLS, this property has had $400k in upgrades which include the solar PV system for the home and pool, as well as the extensive yard amenity upgrades. Of interest in this pair compared to the parings of Paired Sale #6 is that the sales price premiums are very similar even though the green home in this Pair has a solar PV system. The addition of the solar PV did not affect the sales price premium when contrasting this sale with Paired Sale #6. The gross adjustments were heavy on these pairings due to view differences. The overall results lend further support to the weight of the study results.

Paired Sale 8

Table 16. Paired Sale 8

Paired-Sale No.	Closed Date	Days on Market	Sold Price	Adjusted Sale Price	Gross Adjustment (Sum of all adjustments regardless of direction of adjustment)	Living Area	Sales Price Premium (Green Sale Price-Adjusted Non Green Sale Price)	Premium as % of Sale Price (Premium/Green Sale Price)	Age Yrs
Paired Sale 8		**LEED Certified**							
P-8	**2/11/2016**	**6**	**$1,248,000**			**2,391**			**9**
S-1	7/31/2015		$1,260,000	$1,255,000	4.4%	2,404	-$7,000	-0.56%	20
S-2	8/10/2015		$1,129,900	$1,253,925	11.0%	1,942	-$5,925	-0.47%	13
Paired 8 Premium Results									
Subject - Green Sale		**6**	**$1,248,000**			**2,391**			**9**
Mean		#DIV/0!	1194950	$1,254,463	7.70%	2173	-$6,463	-0.52%	16.5

Summary: This green home was originally listed for $1,199,000 and sold for $1,248,000. This home is within a 19-unit small-lot development; all the homes are marketed as "LEED Certified." This home had kitchen appliance, finish, and interior finish (flooring, wall covering) upgrades. MLS notes, "LEED certified, designer energy-efficient home. Well lit, open floor plan....gourmet kitchen with espresso cabinetry, Bosch stainless appl..." The two sales paired with the green sale were very similar requiring minor adjustments. The results are insignificant due to the small results that show a negative premium.

Paired Sales Study Results

Based on the data pairings in this study, the average premium in this study area is 2.2**%** of the sale price. Of the 23 pairs, 20 pairs support a green premium and three pairs are inconclusive because the results are less than 0.65%, a number too small to be meaningful in this price range of housing.

Most paired sales agree that green homes command a sales price premium.

- The study dataset consisted of eight green sales and 20 non-green sales or 28 total sales that form the basis for the 23 paired-data analysis.
- The dataset of 28 sales range between $465,000 and $1,750,000. The mean closed price of the green sales was $1,192,250.
- Of the eight green sales paired, all were existing homes and ranged in age from one year old to 16 years old. This study supports the resale sales price premiums of green homes.
- The sales price premium developed from the paired data is converted into a percentage of the overall sale price:
    - The sales price premiums ranged between **1.59% and 3.88%** once the outlier and inconclusive pairs were removed. This range is tight adding reliability to conclusions.
    - The mean premium percentage is **2.19%.**
    - The median premium is **2.36%** of the sales price and close to the mean.
    - Ten pairs support **2% to 2.86%** premiums.
    - Four pairs support **3.3% to 3.88%.**
    - Five pairs support **1.13% to 1.94%.**
    - Three pairs were inconclusive resulting in negative premiums of **-0.47 to -0.64%.** These small amounts are well within the margin of error and inconclusive.
- The mean premium multiplied by the mean closed green sales price estimates an added value of $26,110.

- Days on the market results are inconclusive and are the result of an active market with limited competition. Most sales sold over the list price due to multiple offers in a short period of listing.
- **The average premium of 2.19% is less than cost new and passes the test of reasonableness.**

Conclusions

Even though the secondary mortgage market does not require it[14], underwriters or lending guidelines often use the "no sale no value" concept when reviewing appraisal reports. To this end, some underwriters require appraisers to use a green sale in the sales comparison approach, or they will not accept premiums[15] for the green features. This study reveals most of the data support a positive view of green features in the San Francisco Bay Area Region. The data provided the ideal sales comparison approach that lenders and the secondary mortgage market prefer but is not always possible.

Key Findings

- It is very difficult for green homes to be found because of the limitations in the MLS and loss of information on the green features after the home is built.
- Appraised values of these homes will continue to be a complex assignment that will take extended market research and time to complete. The complexity of the assignment requires an appraiser with good knowledge of green building concepts and willingness to do the extra research. Clients must be willing to pay fees commensurate with the time involved in these assignments.
- Green homes command a price premium despite these challenges. There is potential for an even greater premium if the real estate industry had additional support with MLS infrastructure, professional training, and consumer education.

Recommendations

In this study, several hindrances were met and are worth mentioning along with steps forward to improve the valuation process.

Challenge: The MLS listing of each green sale used in this analysis rarely included more than a comment in the narrative description that showed the property was certified. Green fields were either unused or

[14] Secondary mortgage market parties include Fannie Mae, Freddie Mac, FHA, or VA.

[15] A premium is also known as an adjustment in the sales comparison grid of an appraisal.

improperly used even when available. Verifiable documentation of houses or units with green third-party certifications and/or solar photovoltaic systems and their characteristics must be made available to improve the marketing and valuation challenges presented in this study.

Recommendations to resolve this challenge:

- Auto-populate the green MLS fields from a trusted source.
- Include the green certification and AI Residential Green and Energy Efficient Addendum as an attachment in the MLS.
- Label the electrical box onsite showing the certification, score, and date rated.
- Put the green and/or energy certificate as a jpg in the MLS photograph gallery.
- Include green feature details and their benefits in the MLS searchable fields to result good marketing techniques and maximize the sales price for these features.
- Recognize that improper marketing of green home listings can be a liability for agents and proper marketing can mean higher prices and larger commissions.

Challenge: Few real estate professionals can recognize and communicate green home features. This hinders the proper marketing of green homes by sales agents, the ability of buyer's agents to find green homes for their clients, and the inclusion of green home features by appraisers in a home's valuation.

Recommendations to resolve this challenge:

- REALTORS® have a competency requirement in their Code of Professional Ethics – Article 11. REALTORS® that work in areas with a high concentration of green homes would benefit from earning the NAR GREEN designation. The two-day certification training provides an overview of green real estate concepts, principles, practices, and benefits.
- Appraisers are required to have competency prior to accepting the assignment according to FHA, Fannie Mae, and Freddie Mac guidelines. An appraiser signing the Appraiser Certification without the competency is setting themselves up for liability issues if the report is found to be less than credible. Appraisers would benefit from training focused on the proper valuation of green home and solar features.

Challenge: It is difficult to find homes with energy scores and/or green certifications. Certification programs have largely focused on new home construction since their introduction in the real estate market. Energy and green certified homes are a relatively small percentage of the overall housing stock.

This limits availability of these homes for realtors and their clients as well as the ability of appraisers to find comps for proper valuations.

Recommendations to resolve this challenge:

- Provide access to accessible and credible scoring and certification programs to REALTORS®, home inspectors, and contractors that target the existing housing stock.
- Integrate energy and green certification as a free value add in publically funded energy efficiency retrofit programs.
- Assist public agencies with integrating energy and green certification into voluntary reach codes for remodeling and time of home sale.

Challenge: The secondary mortgage market has developed a robust dataset of residential properties through their mortgage portal that does allow them to make decisions on values, risk-analysis, and other real estate related decisions. However, to date they have not shared this data. Their data may not be able to clearly identify energy efficient or green homes since the uniform appraisal dataset does not have a special coding for green or energy efficient features.

Recommendations to resolve this challenge:

- It would be extremely beneficial to implement uniform appraisal coding for the green features if the mortgage market expects to understand this growing green market's influence on value and maybe even default rates.

Appendix: Resources for Valuing and Marketing Residential Properties with Green Labels

Below are listed some resources to assist real estate and other professionals with understanding, valuing, and marketing green homes.

Build It Green. Build It Green is a California leader in working with the real estate industry to green the MLS. Build It Green has provided education to thousands of industry professionals on the benefits of green homes for their clients. They provide a wide range of services to REALTORS®, appraisers, lenders, and other market actors including outreach, training, and marketing support. You can learn more about their resources at www.builditgreen.org.

Database of State Incentives for Renewables & Efficiency (DSIRE). Operated by the N.C. Clean Energy Technology Center at N.C. State University and funded by the U.S. Department of Energy, this website and associated database of incentive information houses the most up-to-date information on incentives associated with green features. It provides information on federal, state, local and utility incentives. This website is useful to all types of properties both existing and new construction. Incentives and rebates are listed that can be most helpful in replacing items in existing homes or offsetting costs of new construction. This website also has a solar section that address rebates, incentives, and solar legislation. The website is located at www.dsireusa.org.

Fannie Mae Selling Guide (Fannie Mae, April 2017). The most recent selling guide by Fannie Mae was released on April 25, 2017. The selling guide can be accessed online at www.fanniemae.com/content/guide/selling/.

Home Energy Score, U.S. Department of Energy Office of Energy Efficiency & Renewable Energy. The Home Energy Score is a national system that allows homes to receive an energy rating, like the MPG rating available for cars. The Home Energy Score uses a 10-point scale to reflect how much energy a home is expected to use under standard operating conditions. The Home Energy Score uses a standard calculation method and considers the home's structure and envelope (walls, windows, foundation) and its heating, cooling, and hot water systems. It helps homeowners and buyers understand how much energy a home is expected to use and provides suggestions for improving energy efficiency. More information can be found at www.HomeEnergyScore.gov.

Pacific Gas and Electric Company (PG&E). PG&E has long been a pioneer in advancing energy efficiency and green building; it was one of the first utilities in the nation to offer energy efficiency programs to its customers. PG&E continues to provide a robust array of data, rebates, and other resources to help customers save energy. These resources can be accessed at www.pge.com.

PV Value®. PV Value is a free discounted cash flow and cost approach program that was designed specifically for appraisers' use in valuing solar photovoltaic systems as well as other related professionals. The program requires specific inputs based on the solar system and inverter size in watts, age and of system, azimuth and tilt of panels, discount rate, warranty term of the system and inverter(s), current net and gross cost of the system, and verification of utility and utility escalation rate. PV Value® provides some defaults but allows the user to input custom numbers. It is important that the user understand the discounted cash flow and importance of accuracy of the inputs to arrive at a credible value opinion. The program can be accessed at www.pvvalue.com.

***Residential Green Valuation Tools*.** Authored by Sandra K. Adomatis, SRA, LEED Green Associate (Appraisal Institute, 2014). A publication by the Appraisal Institute and authored by Sandra K. Adomatis, author of this study, offers valuation guidance for appraisers, builders, real estate agents, home owners, and lenders. It can ordered online at www.appraisalinstitute.org/residential-green-valuation-tools/.

U.S. Green Building Council (USGBC) LEED Project Directory. An address (or even a partial address) can be entered into the "Search projects" field. After linking to a project, the project scorecard can be downloaded by clicking on the "Download Scorecard" link. The scorecard reviews the points attained in each of the LEED project categories. Note: the project scorecard may not be available for earlier versions of LEED. The directory can be accessed at www.usgbc.org/projects.

Zero Energy Ready Home, U.S. Department of Energy Office of Energy Efficiency & Renewable Energy. A Zero Energy Ready Home is a high-performance home which is so energy efficient that a renewable energy system can offset all or most of its annual energy consumption. The resources on this site provide webinars, fact sheets, and building science details that can be extremely helpful in understanding high-performance buildings. These resources can be accessed at energy.gov/eere/buildings/zero-energy-ready-home.

About the Authors and Contributors

Sandra K Adomatis is a real estate appraiser, instructor, author, and appraisal course developer. She is the author of *Residential Green Valuation Tools,* published April 2014, by the Appraisal Institute. Sandra spearheaded the development of the Appraisal Institute Residential and Commercial Green and Energy Efficient Addendums.

Her knowledge and experience is sought by consulting clients including builders, governmental agencies, utility companies, and energy organizations. She has spoken at events such as GreenBuild, International Builders Show (IBS), Energy and Environmental Building Alliance (EEBA), Affordable Comfort, Inc. (ACI), The White House Conference Center, Residential Energy System Network (RESNET), National Association of Realtors, and Appraisal Institute Conferences.

As a nationally recognized expert, news columnists often quote Sandra on the valuation of high-performance buildings. The *New York Times* interviewed her regarding her involvement in the Lawrence Berkeley National Laboratory study, "Selling into the Sun: Price Premium Analysis of a Multi-State Dataset of Solar Homes." Sandra can be contacted at adomatis@hotmail.com or through her website at http://www.adomatisappraisalservice.com.

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David Myers, MBA, is Director of Business Development for Build It Green, and provided extensive review and support for this study. David has over eight years' experience with programs to green the real estate industry. David is currently managing Build It Green's efforts to auto-populate green home information into Multiple Listing Services at time of sale. His previous experience with green real estate

includes workforce development, research, and green home labeling programs. David represents Build It Green on the U.S. Department of Energy's Home Energy Information Accelerator and Photovoltaic Auto-population Learning Network groups.

Pacific Gas and Electric Company (PG&E), incorporated in California in 1905, is one of the largest combined natural gas and electric energy companies in United States. The company provides natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area in Northern and central California. PG&E strives to be an environmental leader by pledging to increase use of clean and renewable energy, reduce the impacts of their business, protect sensitive habitats, and work locally with customers to use energy more efficiently. Learn more at www.pge.com.

Build It Green is a nonprofit with a mission to create a world of healthy and sustainable homes for all people. We are driven by the recognition that housing is foundational to our health and safety—and to our clean energy future. We are passionate about bringing innovation to market, and inspired to support consumers, professionals, private companies and public agencies. Together, our vision is for all people to thrive in homes that enhance our well-being, protect our environment, and ensure a stable and prosperous future for our children. Learn more about www.BuildItGreen.org.