THE MARKET VALUATION OF ENERGY EFFICIENT AND GREEN CERTIFIED NORTHWEST HOMES

WITH SUPPORT FROM THE NORTHWEST ENERGY EFFICIENCY ALLIANCE

October 2015

PROJECT RESEARCH TEAM

PROJECT APPRAISERS

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Learn more at SEECsolutions.com

PROJECT MANAGEMENT

Earth Advantage is a Portland, Oregon based nonprofit whose mission is to accelerate the creation of better buildings. They provide knowledge to building professionals, and information to consumers through certification, research, education, and product development.

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WITH SUPPORT FROM THE NORTHWEST ENERGY EFFICIENCY ALLIANCE (NEEA)

The Northwest Energy Efficiency Alliance (NEEA) is an alliance of more than 140 utilities and energy efficiency organizations working on behalf of more than 13 million energy consumers. NEEA is dedicated to accelerating both electric and gas energy efficiency, leveraging its regional partnerships to advance the adoption of energyW efficient products, services and practices.

Since 1997, NEEA and its partners have saved enough energy to power more than 900,000 homes each year. As the second largest resource in the Northwest, energy efficiency can offset most of our new demand for energy, saving money and keeping the Northwest a healthy and vibrant place to live.

Learn more at neea.org

ADDITIONAL PROJECT PARTNERS

- **Jody Bolopue**: Idaho appraisal assistance
- **Martin John Brown**: Project statistician

PROPERTY DATA PROVIDERS

The project team would like to thank the following organizations for their assistance and support in providing and verifying information used in this study:

- CLEAResult (managing the Northwest ENERGY STAR® program)
- RMLS
- NWMLS
- Intermountain MLS
- Built Green
- CakeSystems / Earth Advantage

STUDY REVIEW PANEL

The project team would also like to thank the following appraisal industry leaders who peer-reviewed the study's methodology and final report:

- Danny K. Wiley SRA - Past member of Appraisal Standards Board
- Sandra Adomatis SRA- Adomatis Appraisal Service
- Michael Brunson MAA - Past President at National Association of Appraisers
- Gerard Mildner - Portland State University

Any errors found herein are the responsibility of the authors.

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Executive Summary

This Northwest Energy Efficiency Alliance (NEEA) commissioned study documents the market valuation associated with the predominant green and energy efficiency home certifications used in the Northwest[1]. Regional markets with a track record of including green building and energy efficiency information in MLS databases have lacked a recent, thorough, locally relevant analysis of the potential value of "higher performing" homes in current market conditions. Real property appraisers require a reliable, localized, granular analysis they can use in their home valuation calculations. The analysis contained in this report addresses this identified market need.

The project team, led by Certified Residential Appraisers with decades of appraisal experience in the Northwest, found a range of market responses that corresponded directly to each specific geographic area and certification type. In the course of collecting and analyzing property data to calculate the potential contributory value of third party certifications on residential property sales price, the project team also recorded several significant additional findings related to the users of Multiple Listing Services in the region and how they employ these services.

The primary outcomes of this study can be categorized as follows:

1. GEOGRAPHICALLY-SPECIFIC MARKET DATA

This study provides indications of residential real estate market reaction to verified third party green and energy efficiency certifications through the documentation of potential contributory value. Unlike prior valuation studies both within and outside the Northwest, this study generated results that correspond to specific localized geographic areas. Therefore, Northwest field appraisers are now able to include a consideration of value in their professional valuations within those applicable geographic boundaries. These results include:

- Several areas in western Washington showed a significant positive market reaction to ENERGY STAR and Built Green certifications. ENERGY STAR homes located in the west side of King County reported the highest contributory value, with a sales premium of 8%[2] over comparable noncertified properties. Perhaps surprisingly, ENERGY STAR homes located in Kitsap County had a 7.4% sales premium. Though there was a smaller sample size than optimal, Built Green homes located in the city of Seattle produced a statistically significant sales premium, with a 7.6% greater sales price in comparison to noncertified homes[3].
- Other areas of western Washington showed a marginal premium depending on the certification type. ENERGY STAR homes located on the eastside of King County showed a 4.5% contributory value. Built Green homes in the western and eastern suburban areas of King County had a statistically insignificant premium of 2.8%.
- ENERGY STAR homes in and around Boise, Idaho showed a statistically significant premium of 4.5%.

[1] For the purposes of this study, high performing homes are defined as ENERGY STAR®, Built Green®, and Earth Advantage®. Properties listed

[2] The potential contributory values conveyed in this study are estimates based on available data. References to price premiums represent the estimated mean premium with 90% confidence limits located between error band boundaries. Error band boundaries for each geographic location within the study area can be found in Appendix B.

[3] The Built Green homes in Seattle produced a statistically significant result, however because the sample size was lower than identified in study's power analysis, the error bands are wider (+/-5.3%) than for results in other geographic areas. See Appendix B for more detail on error bands by geographic area.

- Several areas showed little indication of a sales price premium associated with third party certifications. No statistically significant difference between certified and non-certified homes was found in Snohomish County (1.4%) for ENERGY STAR homes and in suburban King County (1.3%) for Built Green homes.
- There were similarly flat, statistically insignificant results in Portland, Oregon[4] for Earth Advantage (1.2%) and ENERGY STAR (-0.2%).

2. HOME PREMIUMS IMPACTED BY MARKET CONDITIONS

The study uncovered a vague, though noticeable potential trend indicating that home premiums are inversely related to positive real estate market conditions. Data generated on ENERGY STAR homes in western Washington suggests that premiums for homes with third party certifications are higher during depreciating or flat markets than in rapidly appreciating markets.

3. RESILIENCY OF HOME PREMIUMS

The study determined that within a subdivision in Renton, Washington, the contributory value of third party certification was found to carry over through the resale of those properties several years later. This finding indicates that original premiums associated with third party certifications may be resilient over time, especially if adequately marketed at time of home resale.

4. MLS DATA ACCURACY ISSUES

In the course of collecting and analyzing extensive property data to calculate the potential contributory value of third party certifications on residential sales price, the project team found limitations to available property data sources. One important aspect of professional residential appraisals relates to the verification of MLS data[5]. As part of this study, the project team verified the certification of all potential subject properties listed in the MLS against records of the various certifying bodies. The project team found that MLS systems in the Northwest are currently inaccurately documenting the prevalence of energy efficiency and green certifications. A high percentage of homes reported to have been third-party certified had not actually achieved certification[6]. This finding underscores the study's methodological approach and creates some uncertainty with regard to the results of valuation studies that rely on other methods of analysis using unverified datasets. The findings include:

- Error rates ranged from 29% - 99% depending on MLS system, geographic area, and certification type.
- Within the RMLS, 41% of homes listed with a third party certification (ENERGY STAR or Earth Advantage) did not actually achieve certification.
- Within the NWMLS, 90% of homes listed with a third party certification (ENERGY STAR or Built Green) did not actually achieve certification.
- Within the Intermountain MLS, 29% of homes listed with a third party certification (ENERGY STAR) did not actually achieve certification.

[4] A "sister" analysis conducted for Energy Trust of Oregon by Watkins & Associates showed that combined Earth Advantage and ENERGY STAR certifications in Portland, Oregon had contributory values of 4.1%. See Appendix H for details.
[5] See Principles of Appraisal Practice and Code of Ethics
[6] This finding raises the possibility that some homebuyers may be discounting the value of certifications because of questions as to their veracity. It is unclear what impact possible homebuyer perceptions had on the contributory values found in this study.

Introduction

A question exists amongst some real estate professionals, including homebuilders, brokers, appraisers, and lenders, about whether capital investments for increased energy efficiency or green certification can be recaptured when the home is sold. To address this market uncertainty, the Northwest Energy Efficiency Alliance (NEEA) commissioned a study to assess the market impacts of third-party certification on residential properties in key markets in Idaho, Oregon, and Washington[7].

In 2009, as part of a regional Green Building Value Initiative (GBVI), Earth Advantage, SEEC LLC, and Watkins & Associates issued a study assessing the market impacts of third-party certification on residential properties in two key markets in Washington and Oregon[8]. Conducted in collaboration with a broad array of stakeholder groups, the 2009 study represented a first step in examining the market performance of higher performing homes. That initial study also informed other valuation research efforts around the country, including subsequent national and localized studies that have garnered considerable attention.

This initial attempt to quantify the market value of third-party certification led to increased interest and activity around this central issue in the proliferation of energy efficient construction in the US. Several relevant studies have been recently published, mostly suggesting that certifications are associated with modest premiums in price:

- A study of three U.S. cities, including Portland, Oregon, using a regression model, found a premium of about 3%[9].
- In North Carolina in the declining market of 2009-10, Pfleger et al. (2011) reported premiums ~2% for one brand of certification (ENERGY STAR)[10].
- In California, Kahn and Kok (2013) reported a premium of about 5% for certified homes, using a regression model[11].

Despite these studies, it remains unclear how energy efficiency features and third-party certifications are currently being valued in localized Northwest real estate markets. Not only is there a need to confirm whether contributory value exists in key Northwest markets, but as market conditions change and environmentally-focused certifications mature there is a need to update prior findings to match a current reality. Northwest markets with a track record of including green building and energy efficiency information in MLS databases have lacked a more recent, locally relevant analysis of the potential value of "higher performing" homes in current market conditions. A 2014 NEEA commissioned *Northwest ENERGY STAR Homes Retrospective Report*[12] found that "appraisers and other market actors cite a lack of consistent and credible data (such as comparable properties) to support the increased assigned value to (Northwest ENERGY STAR homes)." This study addresses the need of field appraisers for a reliable, localized, granular analysis that can be used in their valuation calculations, as well as providing an initial investigation of several other relevant market considerations.

[7] Homes located in Montana were not included in the study due to the lack of MLS data for green certified or ENERGY STAR® properties.
[8] The 2009 study reported that certified homes sold for price premiums of about 9% in Seattle and 3-5% in Portland, compared to similar noncertified homes.
[9] Walls, Margaret, Palmer, Karen, Gerarden, Todd, 2013, Is Energy Efficiency Capitalized into Home Prices?, Resources for the Future.
[10] Pfleger, William, Perry, Chuck, Hurst, Nicholas, Tiller, Jeff, 2011, Market Impacts of ENERGY STAR® Qualification for New Homes, Appalachian State University.
[11] Kahn, Matthew, Kok, Nils, 2012, The Capitalization of Green Certifications in the California Residential Housing Market.
[12] TRC Energy Services, 2014, Northwest ENERGY STAR Homes Retrospective Report, pg. 10

This study is separated into two main areas of focus:

1. The study's primary investigation includes two levels of quantitative analysis:
    - **Evidence of Market Trends:** This component of the study identifies the general market trends of third party certifications using macro-level market data. This preliminary analysis provides an understanding of general trends and market indicators of third-party certified homes in comparison to non-third party certified homes, but is not meant for use by real property appraisers in developing a contributory value[13].
    - **Analysis of Contributory Value:** This component is the core of the study and undertakes a statistical analysis using a comparison sales approach to analyze the contributory value, if any, of home certifications. The analysis uses observed sales prices and other real estate listing and transaction characteristics to determine the presence of contributory values. The study includes an evaluation of the most predominant third-party certifications in the Northwest, including ENERGY STAR®, Built Green (4 and 5 Star), and Earth Advantage.

2. The study's second section examines two separate questions that are both addressed through a more constrained analysis using a much smaller amount of available market data:
    - **Resiliency of Premiums:** This component of the study reviews whether premiums associated with third party certifications are resilient over time. This analysis reviews the trends associated with third party certified homes that are re-sold several years after their original certification was established.
    - **Energy Scores:** This component of the study reviews whether the Energy Performance Score (EPS) metric is being used in Washington state real estate market transactions and, if so, whether there are any "observable" contributory values associated with the score[14]. The EPS is a relatively new metric to the Washington real estate market. Despite its fairly recent introduction to the market, several thousand scores have been issued on existing homes.

[13] See Appendix C.
[14] See Appendix F

Section 1

EVIDENCE OF MARKET TRENDS AND ANALYSIS OF CONTRIBUTORY VALUE

Real estate professionals through the entire real estate transaction chain - from builders and real estate agents to appraisers and lenders - are all parties in need of data that provides a window into the relative value of green and energy efficient certified homes. In particular, appraisers seek specific MLS area statistics and valid data on energy efficient and green homes in order to guide them in making valuations decisions. Without this data, appraisers are professionally constrained from valuing higher performing homes any differently than other comparable non-high performing homes.

This section of the study determines general market trends in relation to the value of higher performing homes and then analyzes the presence of specific contributory values, if any, of ENERGY STAR®, Built Green (4 and 5 star), and Earth Advantage homes in key real estate markets in Idaho, Oregon, and Washington.

RESEARCH STEPS AND METHODOLOGY

To determine the contributory value, if any, of ENERGY STAR, Built Green, and Earth Advantage homes in key Northwest markets, the project team constructed a research methodology based on one developed by Watkins & Associates and statistician Martin John Brown for the 2014-5 Energy Trust of Oregon valuation study[15]. This statistical methodology[16] is based on a comparable sales approach based on observed sales prices and other real estate listing and transaction characteristics, as found in the Multiple Listing Services (MLS) systems serving the cities within the study area. These MLS systems include RMLS (Oregon), NWMLS (Washington), and Intermountain MLS (Idaho). Prior to the initiation of this study, a panel of appraisal industry leaders[17] reviewed and approved the study methodology.

The project team's intent was to develop a study with a methodology acceptable to practicing Northwest appraisers. The goals of the study were that it be granular, localized, and dependable, so that its results could be used as supporting information in real property valuations. The comparable sales approach, based on observed sales prices and other real estate listing and transaction characteristics, is standard practice in field appraisals. Yet, this approach has not been used in the handful of prior national and regional appraisal valuation studies. This project and the "sister" study conducted for Energy Trust by Watkins & Associates are therefore, to our knowledge, unique in approach[18]. In short: this study was designed and conducted *by* Northwest real estate appraisers *for* Northwest real estate appraisers.

Although this property comparison process can be a labor-intensive approach even for the most experienced and knowledgeable of appraisers, it provides a significant level of rigor and validity to the findings. This attention to producing a dependable result of relevance to professional field appraisers was of paramount importance to the project team. The team established several key methodological principles in order to achieve that outcome:

[15] In 2014, Energy Trust of Oregon commissioned A Study on the Residential Market Valuation of EPS and Solar PV in the Greater Portland and Bend, Oregon Markets led by Watkins & Associates with statistical analysis by Martin John Brown and research assistance from Earth Advantage.
[16] See Appendix A for complete description of the project methodology.
[17] The project review panel included: Danny K. Wiley, Stephen O'Connor, Sandra Adomatis, and Gerald Mildner.
[18] An analysis by Lisa Desmarais, *An Early Look at Energy Efficiency and Contributory Value: Case Studies of Residential Properties in the Greater Denver Metro Area*, uses a comparable sales approach. However, a statistically significant data set was not used in that analysis.

- **Normalize:** The project team attempted to "normalize" the pool of subject properties as much as was feasible. Subject properties were a maximum of 20% greater than or less than the median Gross Living Area (GLA) of certified homes in area. Removing properties from the study that contained anomalies ensured that price adjustments applied by the project statistician were limited to time of sale, Gross Living Area (GLA) range adjustments, and bedroom and bathroom adjustments[19] only when necessary. This helped to mitigate subjectivity from the analysis and reduce the likelihood that the market data would be inappropriately skewed by unusual property characteristics or circumstances. Any price adjustments made based on specific property characteristics were determined by the project appraisers based on prior regression analyses conducted in each of subject markets by the local appraiser[20].

- **Verify:** Importantly, the project team verified the accuracy of the listing of *each* subject property used in the analysis. By cross-checking the list of properties marketed on the various MLS systems as having an energy efficiency or green certification with the administrators of those programs, the project team discovered an unintentional, yet crucially important finding: energy efficiency and green certifications are frequently misidentified on MLS listings in the Northwest. This finding has ramifications for energy programs seeking to disseminate accurate energy information, for prior and future valuation studies, and, of course, for MLS systems themselves. These findings are discussed in more detail below[21].

- **Adjustment for Time:** The methodology also makes time of sale adjustments developed from neighborhoods or MLS areas. This mimics the process that appraisers actually undertake, instead of applying the results of large regression analyses using a less precise method, such as quarterly market increases or decreases.

The project team undertook these methodological principles in order to improve the integrity of the data. To ensure the accuracy and validity of the data used for analyzing market trends and calculating contributory value, the team took the following steps:

- Reviewed MLS listings for applicable subject properties.
- Verified subject properties were valid - obtained validation that the properties were officially certified by the respective oversight entity.
- Removed invalid properties from pool of potential subject properties.
- Scrubbed those remaining properties in the overall pool of eligible subject properties for anomalous conditions.

The project appraisers then manually reviewed and excluded the following property types from the pool of approved subject properties based on these anomalous conditions:

- Homes with unique qualities relative to location and/or view.
- Homes with basements.
- Locations where multiple certified properties occurred on the same street, unless the sale dates were significantly different.
- Homes that were not newly built (e.g. resold homes).

[19] See Appendix A for a complete description of the project methodology.
[20] Ibid
[21] See Section 1A

Properties with anomalous conditions were removed from the pool of potential subject properties for the following reasons:

- Homes with unique qualities: These properties were removed to limit the number and size of pricing adjustments. Substantial adjustments related to waterside location, views, etc. are potentially subjective calculations.
- Homes with basements*:* These properties were removed due to the fact that Gross Living Areas (GLA) are often listed inaccurately in homes with basements. Also, the utility of the basement is often difficult to ascertain purely from MLS listing data.
- Locations with multiple certified properties: These properties were removed to avoid the over-weighting of one subdivision to the market.
- Homes that were not newly built (e.g. resold homes)*:* These properties were removed to ensure that data comparisons were consistent.

DETERMINING CONTRIBUTORY VALUE

To determine the contributory value of a given green and energy efficiency certification, the project used an appraisal-style calculation that compares market data on sold properties that *have* the feature (the "subjects") to similar sold properties that *lack* the feature (the "comparables"). The project team obtained the market data from MLS listings and defined the parameters for correcting prices of the comparables (as described in the next section).

In general, the valuation model is:

$$V_e = S - C$$

where

V_e = Contributory value of environmental feature
S = Sold price of subject property
C = Sold price of comparable property (incorporating details and corrections described below)

Because using a single comparable property might be deceptive, in this study, as well as much residential appraisal work, each subject property has at least three comparables. Accordingly the valuation equation actually compares the price of each subject property to the *mean* price of those comparables.

$$V_e = S - \bar{C}$$

It was, of course, not always possible to find comparable properties that were exactly similar to a given subject property. Comparables were allowed to diverge from subject in several ways commonly acknowledged to affect purchase prices, notably, square footage, bedroom count, bathroom count, and time of sale. To narrow the range of differences between a subject property and its comparables, the comparables had to meet several criteria. These criteria can be found in a complete description of the study methodology located in Appendix A of this report.

A. EVIDENCE OF MARKET TRENDS

The project team of appraisers first sought to determine the availability of any evidence of clear market trends or reaction to energy and green certifications. This macro-level analysis gathered, organized, verified, and examined overall market statistics from MLS systems for homes with energy or green certifications. The appraisers then compared those results against overall market performance datasets for non-certified homes within the study areas.

This macro-level analysis determined the availability and credibility of property data meeting eligibility criteria and identified any general market trends through a comparison of whole data sets of potential subject homes with whole data sets of potential comparison homes. This was undertaken in the following geographic areas:

- King County, WA (including Seattle)
- Seattle, WA (only)
- Thurston County, WA
- Kitsap County, WA
- Snohomish County, WA
- Portland Metro, OR
- Boise, ID

FINDINGS

1. **MLS Data Inaccuracy:** A significant finding in this component of the study was the unexpectedly large amount of inaccurate energy efficiency and green home certification data contained within the major MLS systems in Idaho, Oregon, and Washington. In the analyses of available regional data, a significant percentage of these properties were inaccurately portrayed on the local MLS system as having received a valid certification.

   While it could be the case that the high number of erroneous MLS entries indicates greater market interest in green and energy efficiency certifications, it is worth considering that erroneous listings may also be having a negative affect on the marketability, and therefore value, of certified homes. Homes incorrectly identified in the MLS as being green certified or having an ENERGY STAR certification could, because of their under performance, be diminishing the perceived value of those designations. At the very least, trust in the veracity of these certifications could be damaged[22].

   What are the potential explanations for the significant level of erroneous MLS listings? We consider three primary reasons:

   - The certification process, especially for ENERGY STAR homes, is being abandoned before a final inspection was completed. Builders could be "coattail riding", whereby they build to the specifications of the certification but bypass the actual certification process to avoid the associated additional costs.
   - Real estate brokers are mistakenly mis-listing the property in the local MLS system. This could occur in instances where, for example, a broker does not realize that a home with

[22] It should be noted that NWMLS began requiring the uploading of certification documents in 2014. NWMLS also appears to be "spot checking" this new requirement to ensure that any home listed as having an energy efficiency or green home certification also provides a supporting certification document in the listing. NWMLS staff "uncheck" the relevant box if documentation is not shown. This action could potentially improve the accuracy of listings.

only ENERGY STAR appliances is not considered an actual ENERGY STAR home. There could also be a misunderstanding of what the "ENERGY STAR home" check box on the MLS listing input page actually refers to.

- Real estate brokers are potentially intentionally misrepresenting properties[23] in the local MLS system. Because some brokers may perceive a market interest in a third-party rated home, they may have knowingly completed the listing with inaccurate information to bolster the attractiveness of the home. Because uploading of verification documentation was not required or not frequently policed in most MLS systems[24], verification of inaccurate information by the MLS, other brokers, and the general public, is currently extremely difficult[25].

The extent of the errors can be seen both by certification type and geographic location in the tables below:

Table 1: Error rates of ENERGY STAR listings, by location

State	Area	ENERGY STAR Listed on MLS	ENERGY STAR Verified	Error rate
WA	King County (including Seattle)	3619	294	92%
WA	Seattle-Only	280	2	99%
WA	Snohomish County	1356	121	91%
WA	Thurston County	482	23	95%
WA	Kitsap County	308	56	82%
ID	Ada County	376	269	29%
OR	Portland-metro	287	127	56%

[23] Realtors® who are "intentionally misrepresenting properties" are violating the National Association of Realtors Code of Ethics.
[24] Except as noted above in the case of NWMLS "spot check" efforts.
[25] Efforts are underway in several states, including with RMLS in Oregon, to "auto-populate" home performance information into the MLS. This automated data transfer would be a significant step in ensuring that all energy rating and green certification information reaches the MLS and is accurately represented in listings. See US Department of Energy's Home Energy Information Accelerator for more information.

Table 2: Error rates of Built Green listings, by location

State	Area	Built Green Listed on MLS	Built Green Verified	Error rate
WA	King County (including Seattle)	2711	447	84%
WA	Seattle-Only	693	237	66%
WA	Snohomish County	454	9	98%
WA	Thurston County	179	0	100%
WA	Kitsap County	249	0	100%

Table 3: Error rates of Earth Advantage listings

State	Area	Earth Advantage Listed on MLS	Earth Advantage Verified	Error rate
OR	Portland-metro	1042	785	25%

Table 4: Average Error Rates, by MLS area

MLS	Service Area	Average Error Rate
RMLS	Oregon	41%
NW MLS	Washington	90%
Intermountain MLS	Idaho	29%

While it is clear that this trend occurs in all three states and across metro areas, as noted above, there were significant difference between MLS systems, with NWMLS having greater error rates than RMLS and Intermountain MLS. While this is valuable information to help address market barriers to the accurate listing of homes with these green or energy efficiency certifications, for the purposes of this study it made usable data much more challenging to locate. It also raises a concern about the results of prior valuation studies that relied on datasets of unverified subject "certified" properties.

These findings, though surprising and unexpected in the prevalence of the inaccuracies, support this study's methodological approach. The project team's chosen methodology allowed for data to be vetted and "cleaned" prior to use in the analysis.

2. **Market trend data**[26]**:** Prior to a detailed analysis of contributory value, the project team sought to understand general market trends for qualified properties sold between January 1, 2010 and June 1, 2014, by certification type and market area. These calculations were done using bulk market data of verified certified homes and all other homes falling within the project's Gross Living Area (GLA) range[27]. For the major urban centers of the Northwest, the analysis showed that:
    - In King County, Washington 104 ENERGY STAR homes within the study GLA range had higher average list prices (+4.6%) and higher median list prices (+2.2%) than the overall market of non-certified homes. Average sale prices (+2.7%) and median sales prices were also higher (1.4%) for certified homes.
    - In the city of Seattle, 85 Built Green homes within the study GLA range had higher average list prices (+8.3%) and higher median list prices (+5.5%) than the overall market of non-certified homes. Average sale prices (+8.0%) and median sales prices were also higher (1.7%).
    - In the city of Portland, 80 ENERGY STAR homes within the study GLA range had higher average list prices (+7.6%) and higher median list prices (+5.2%) than the overall market of non-certified homes. Average sale prices (+6.4%) and median sales prices were also higher (2.6%).
    - In the city of Portland, 416 Earth Advantage homes within the study GLA range had higher average list prices (+17.6%) and higher median list prices (+14.4%) than the overall market of non-certified homes. Average sale prices (+15.5%) and median sales prices were also higher (15%).
    - In Ada County, Idaho, 202 ENERGY STAR homes within the study GLA range had higher average list prices (2.2%) and higher median list prices (+2.0%) than the overall market of non-certified homes. Average sale prices (+4.8%) and median sales prices were also higher (2.7%).

    This preliminary analysis was meant to provide an overarching view into general markets conditions and observable trends in key Northwest locations. The results contained in this component of the study are a general overview and are not meant for use by real property appraisers in their professional valuations or to signal actual contributory value. Section B below provides data most relevant to real property appraisers and other real estate professionals, particularly those practicing in the Northwest.

B. ANALYSIS OF CONTRIBUTORY VALUE

While indications of overall market trends are helpful to many real estate and energy efficiency professionals in understanding the prevalence and market perception of energy and green certifications, for real property appraisers a more granular and specific analysis of contributory value is of considerably more use and relevance. An analysis of contributory value, using the methodology described in section 1 and provided in more detail in Appendix A, provides the field appraiser with dependable data that can be used in developing actual property valuations for homes located within the study areas.

[26] The complete Evidence of Market Trends findings are contained in Appendix C of this report.
[27] It should also be noted that the project team found inaccurate notations for Days on Market (DOM) within some MLS systems, making Consecutive Days on Market (CDOM) results suspect in some cases. Properties were sometimes listed as being "zero" DOM in cases in which they were builder-sold and/or pre-sold. Because of this, CDOM results are not emphasized in the study. CDOM results can be found in Appendix C and D.

Like the assessment to determine overall evidence of market trends, the analysis of contributory value was conducted in the Boise, Idaho metropolitan region, the Portland, Oregon metropolitan region, and western Washington, including King County, Kitsap County, Snohomish County, and Thurston County. A summary of the analysis is contained in table 5:

Table 5. Mean premiums by geographic area

Geographic area	Certification	Number of subject properties	Mean premium ($)	Mean premium (%)	Significant at p<0.05? (t-test)	Significant at p<0.05? (Wilcoxon test)
Washington						
Western WA All areas	ENERGY STAR	124	16,138	4.8	Yes	Yes
King County – All areas	ENERGY STAR	54	25,276	6.3	Yes	Yes
King County – Suburban westside	ENERGY STAR	27	23,447	8.0	Yes	Yes
King County - Suburban eastside	ENERGY STAR	27	27,175	4.5	Yes	Yes
Kitsap County	ENERGY STAR	26	16,821	7.4	Yes	Yes
Snohomish County	ENERGY STAR	28	4,752	1.4	No	No
Thurston County	ENERGY STAR	16*	2,813	1.4	No	No
King County – All areas	Built Green	51	19,192	4.7	Yes	Yes
King County – Suburban westside and eastside	Built Green	31	12,652	2.8	No	No
King County – Suburban eastside	Built Green	26	6322	1.3	No	No
King County – Seattle only	Built Green	20*	29,327	7.6	Yes	Yes
Oregon						
Portland, OR	ENERGY STAR	26	-2	-0.2	No	No

Portland, OR	Earth Advantage	26	3240	1.2	No	No
Idaho						
Boise & Ada County, ID	ENERGY STAR	25	11,206**	4.5**	Yes	Yes

**Indicates that the sample size is lower than the minimum suggested by the power analysis; results may be less reliable*
*** A median premium is used for results from Ada County, Idaho. The mean premium was calculated at $15,179 and 6.2%. However, the mean premium for Ada County could be slightly exaggerated due to several unusually high premiums in the results. Therefore, the median price premium provides a more likely size of effect.*

Understanding the significance tests – a nontechnical explanation

As with any statistical analysis, a key consideration is the reliability of calculated average differences as shown above in percentage terms. No two sets of data drawn from real world events, such as sales prices, will ever be exactly the same. The differences between the groups could simply be the result of circumstance, for example which properties were chosen for inclusion in the study. With a properly controlled study that has an adequate sample size, it becomes more likely that the differences truly reflect some consistent difference in the real world. The statistical tests in the two columns at the right of the table provide an idea of how likely the observed differences are the result of uncontrolled circumstances (e.g. "luck")[28]. The study uses a definition of "significant" in cases where there is a less than 5% chance that the differences came about through uncontrolled circumstances.

For King County ENERGY STAR properties, the sales price difference between the groups of subject properties and the groups of comparable properties are significant and, given current information, a certification premium can be said to exist[29]. In contrast, for Snohomish County ENERGY STAR properties, the mean premium between certified and noncertified homes was $4,752, or 1.4%. A small premium may in fact exist, but we can't say so with much certainty because the statistical tests indicate there was a fairly significant chance (greater than 5%) that the observed difference was due to uncontrolled circumstances.

In reviewing the specific graphical results by geographic area below, it is important to deemphasize any premium associated with any single specific property. The graphs below include a point for each eligible subject property. Those properties that have a premium for certification are shown as a point located above the dotted line. When the point falls below the dotted line, it suggests certification has a potential negative premium – that is, a discount. The graphs provided for each specific geographic analysis provides a visual representation of a pattern of the entire set of results, not any one point on the graph. The premise of this study, as with any study involving sampling, is that the sample is large enough that the variations and errors associated with individual subjects will be effectively random, allowing for the detection of general effects in the form of summary statistics such as the mean and median. If there was no difference in price between the subject properties and their comparables, we would expect there to be an equal number of points above and below the line of equivalence.

[28] The project statistician assessed the significance of any mean percentage difference that was significantly greater than zero ($p<0.0001$) in a one sample t-test. Because it is possible the distribution of differences is not normally distributed (as is assumed by the t-test), the project statistician also performed a Wilcoxon test, which, while less powerful, does not assume anything about the distribution. It gave very similar results ($p<0.0001$).

[29] Note that the premiums provided in the body of the study are mean premiums. A margin of error (or error band) has been calculated for each geographic area and is included in Appendix B.

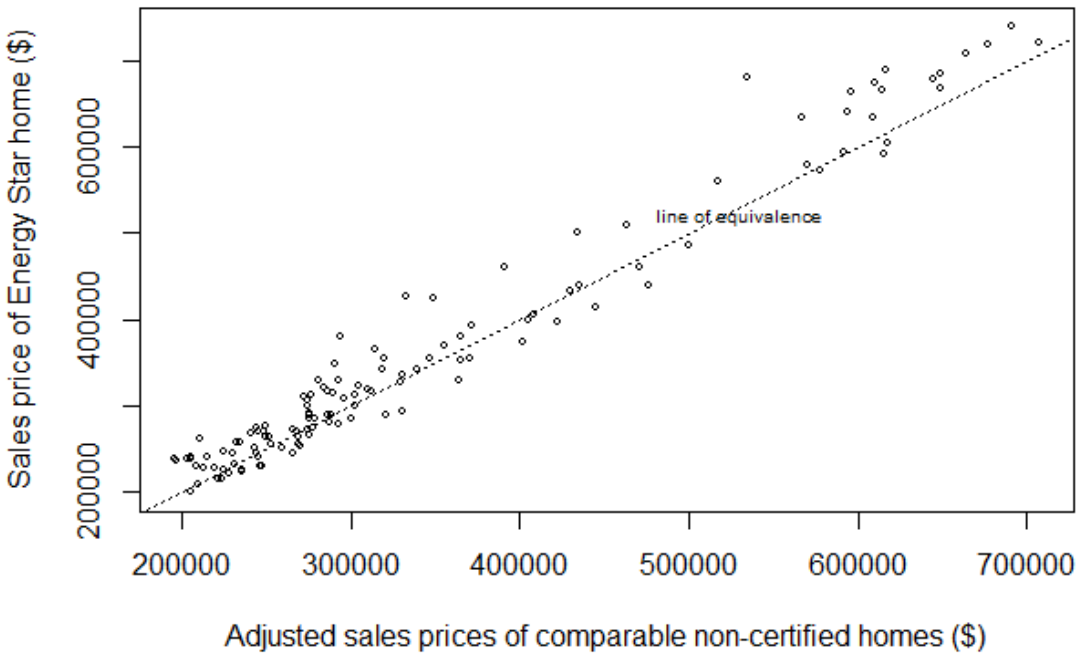
Detailed Results: Analysis of Contributory Value

All Western WA: ENERGY STAR

In western Washington, which includes all of King County, Kitsap County, Snohomish County, and Thurston County, there were 124 sold certified ENEGY STAR properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 4.8%, or $16,138.

Relevant NWMLS areas: 100 110 140 141 146 165 166 170 310 320 330 340 350 443 449 453 500 540 550 560 600 610 715 730 740 760 770

Figure 1: Sales prices for ENERGY STAR homes in western Washington

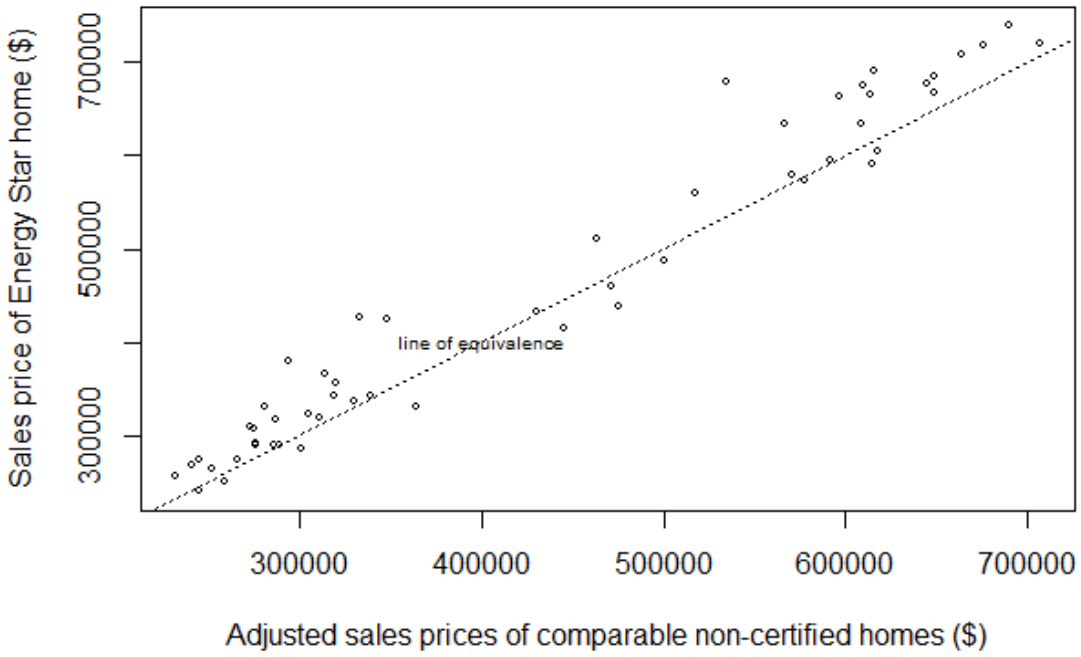


King County – All areas: ENERGY STAR

In King County, there were 54 sold certified ENEGY STAR properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 6.3%, or $25,276.

Relevant NWMLS areas: 100 110 140 310 320 330 340 350 500 540 550 560 600 715

Figure 2: Sales prices for ENERGY STAR homes in King County (all areas)

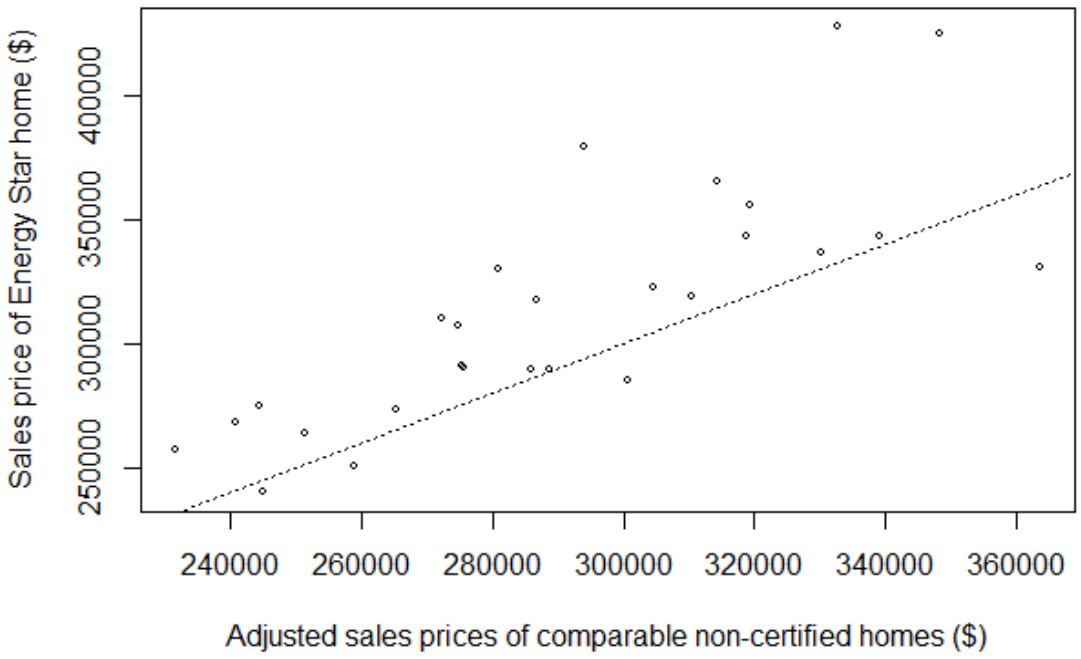


King County – Westside: ENERGY STAR

In King County-westside, there were 27 sold certified ENEGY STAR properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 8.0%, or $23,447.

Relevant NWMLS areas: 100 110 140 310 320 330 340 350 715

Figure 3: Sales prices for ENERGY STAR homes in King County – Westside

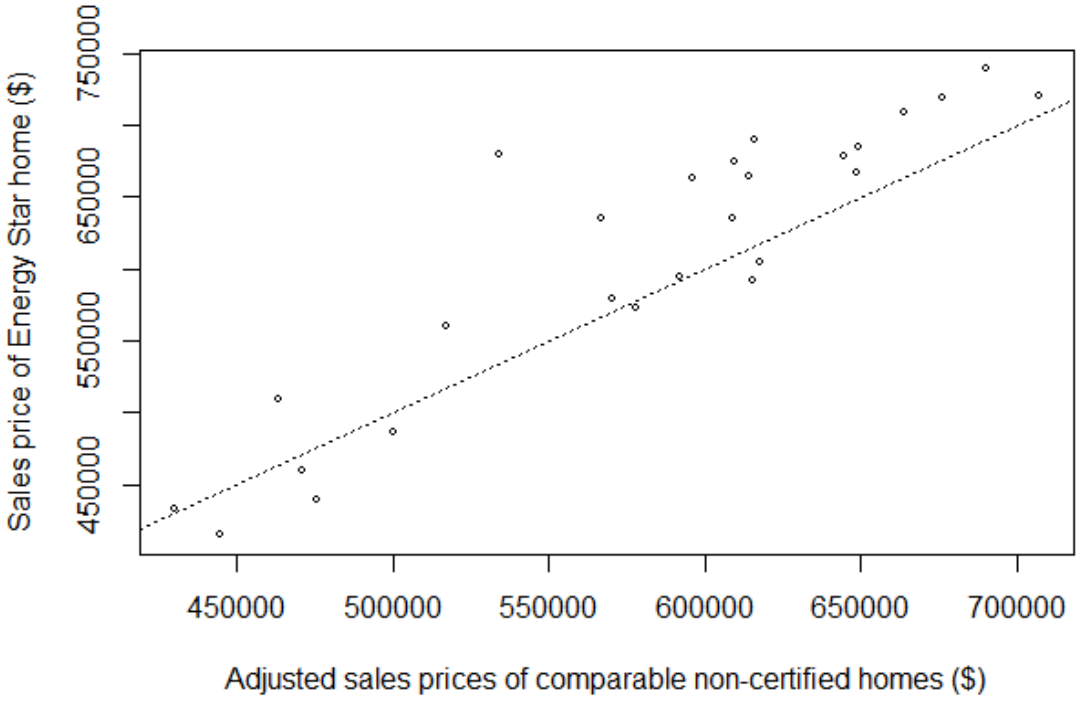


King County Eastside: ENERGY STAR

In King County-eastside, there were 27 sold certified ENEGY STAR properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 4.5%, or $27,175.

Relevant NWMLS areas: 500 540 550 560 600

Figure 4: Sales prices for ENERGY STAR homes in King County - Eastside

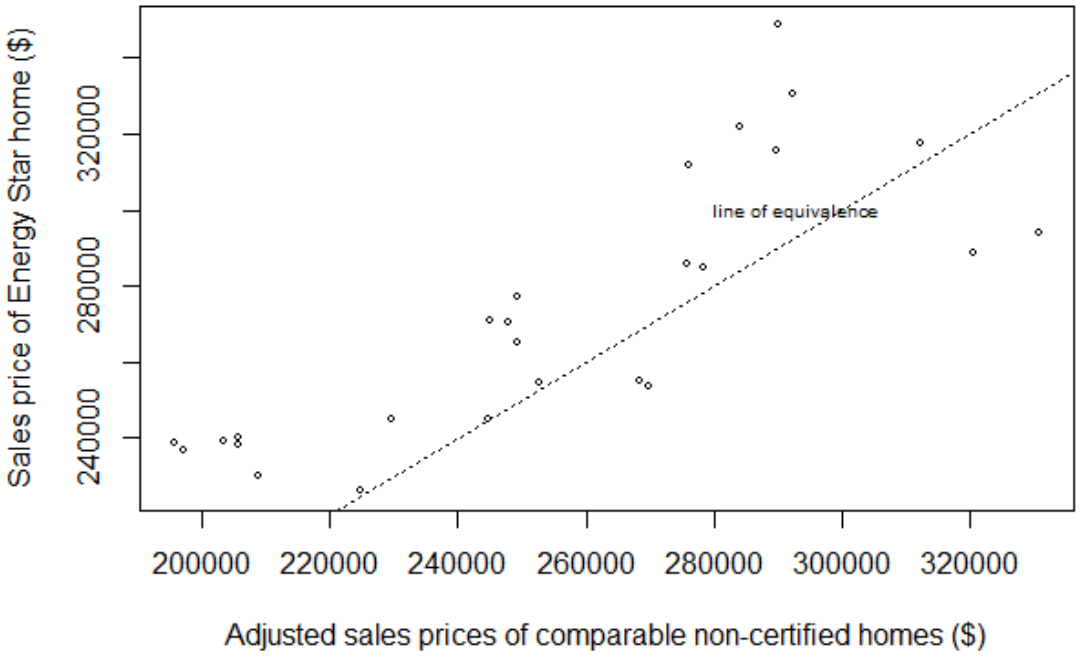


Kitsap County: ENERGY STAR

In Kitsap County, there were 26 sold certified ENEGY STAR properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 7.4%, or $16,821.

Relevant NWMLS areas: 141 146 165 166 170

Figure 5: Sales prices for ENERGY STAR homes in Kitsap County

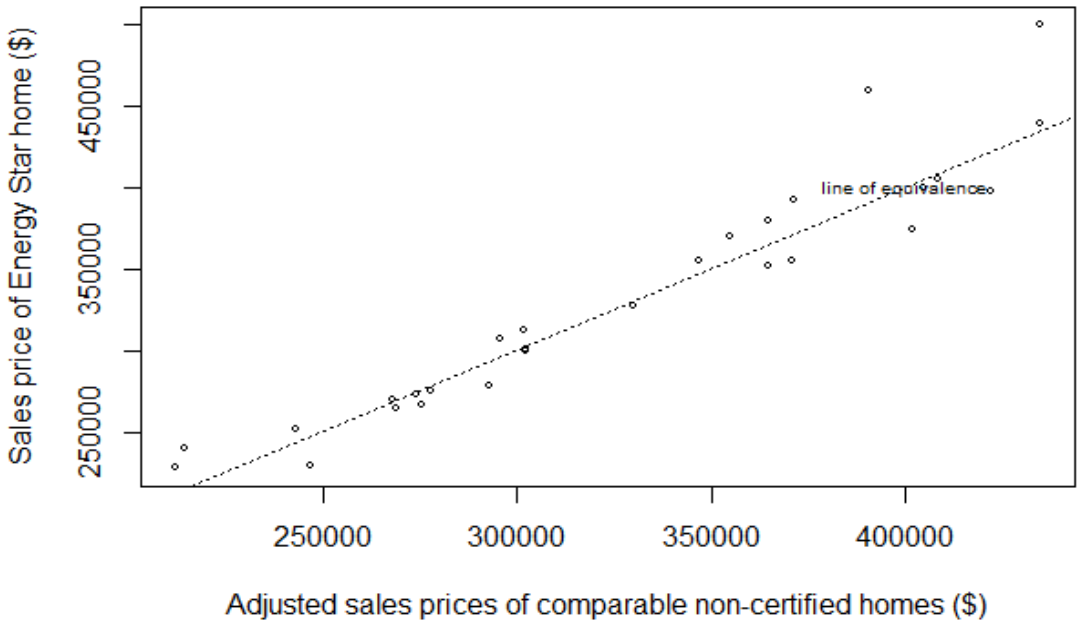


Snohomish County: ENERGY STAR

In Snohomish County, there were 28 sold certified ENEGY STAR properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 1.4%, or $4,752.

Relevant NWMLS areas: 610 730 740 760 770

Figure 6: Sales prices for ENERGY STAR homes in Snohomish County

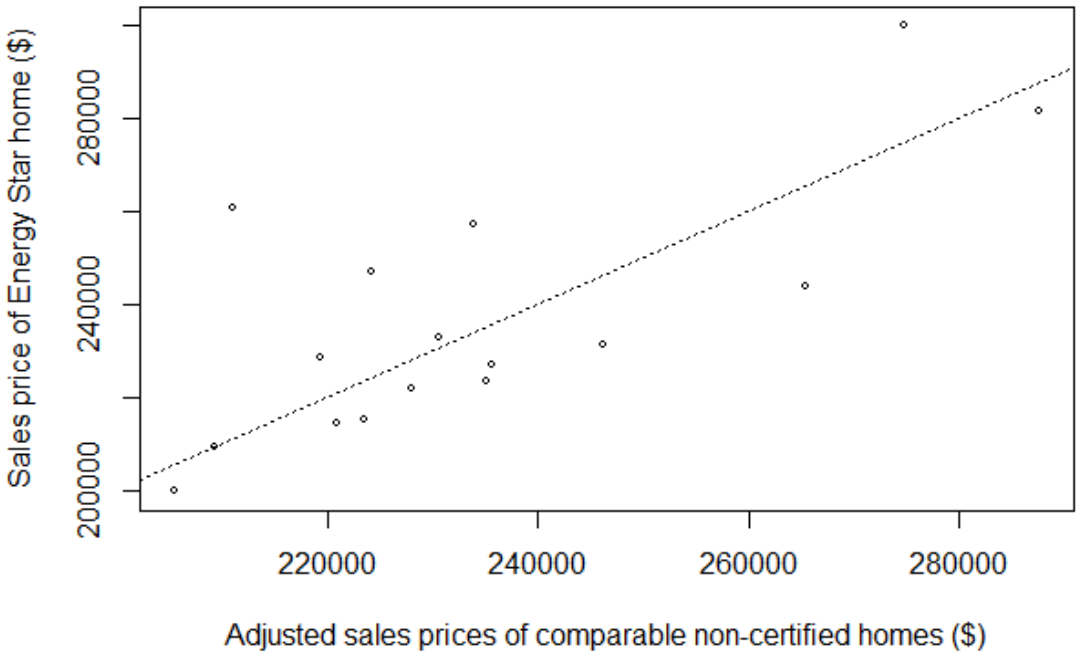


Thurston County: ENERGY STAR

In Thurston County, there were 16 sold certified ENEGY STAR properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 1.4%, or $2,813.

Relevant NWMLS areas: 443 449 453

Figure 7: Sales prices for ENERGY STAR homes in Thurston County

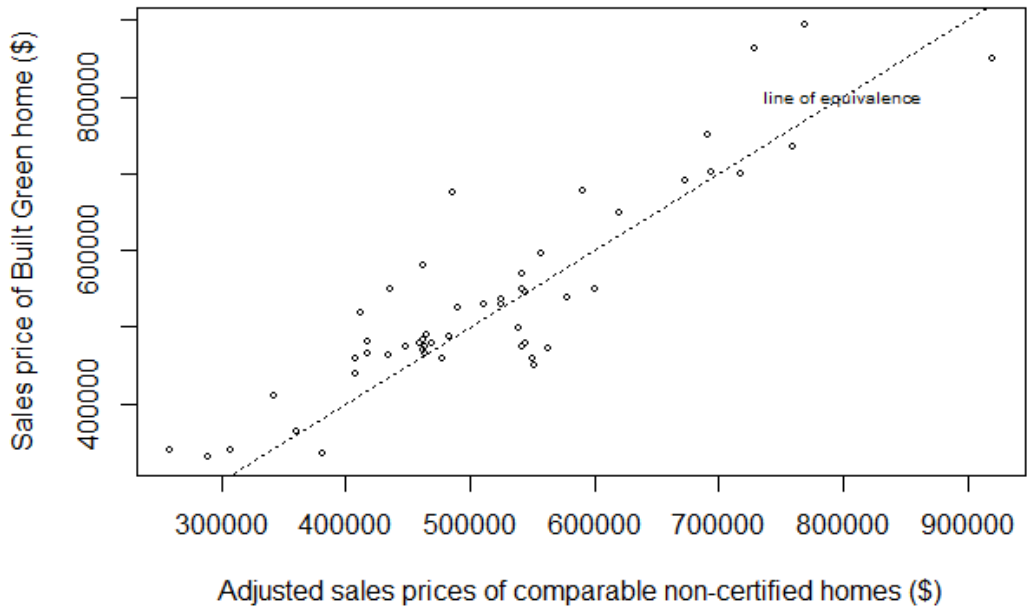


King County – All areas: Built Green

In King County – all areas, there were 51 sold certified Built Green properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 4.7%, or $19,192.

Relevant NWMLS areas: 140 350 380 385 390 500 540 550 600 700 705 710 715

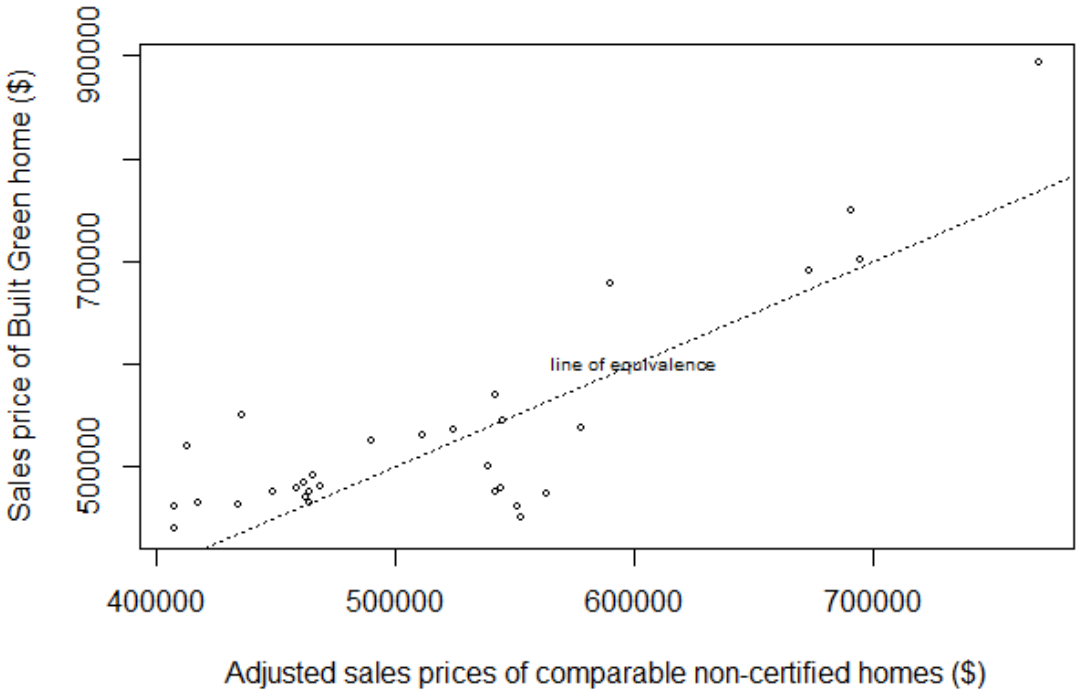
Figure 8: Sales prices for Built Green homes in King County – all areas



King County –Suburban areas (westside and eastside): Built Green
In the suburban areas of King County, including both westside and eastside, there were 31 sold certified Built Green properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 2.8%, or $12,652.

Relevant NWMLS areas: 140 350 500 540 550 600 715

Figure 9: Sales prices for Built Green homes in King County –suburban areas

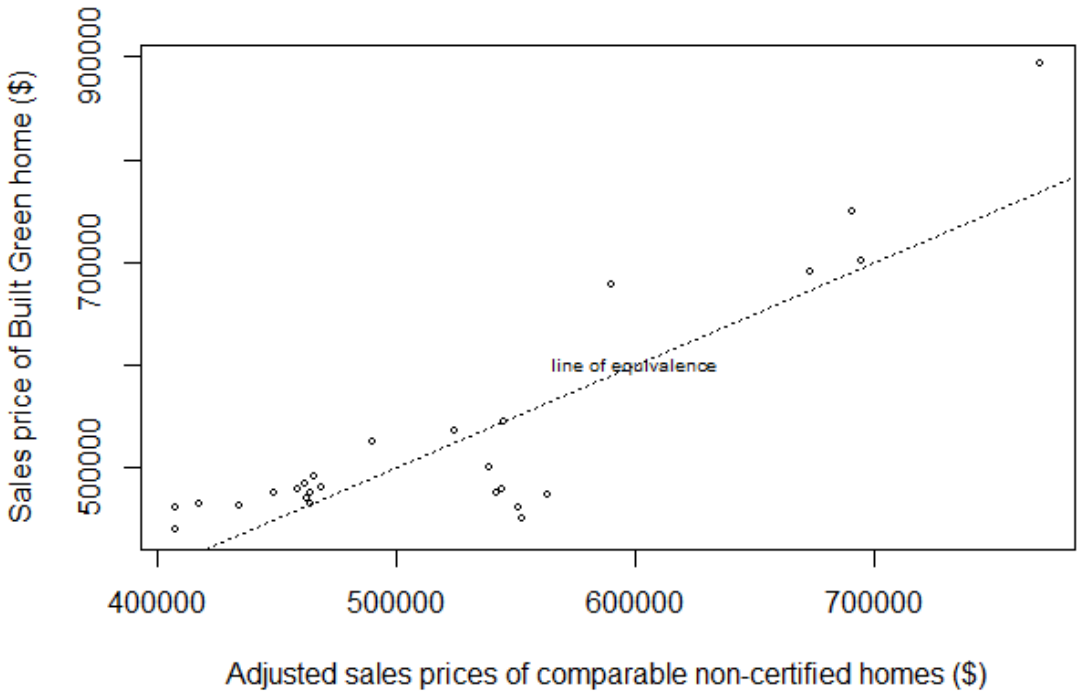


King County – Suburban areas eastside only Built Green

In King County – suburban areas (eastside), there were 26 sold certified Built Green properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 1.3%, or $6,322.

Relevant NWMLS areas: 350 500 540 550 600

Figure 10: Sales prices for Built Green homes in King County – eastside

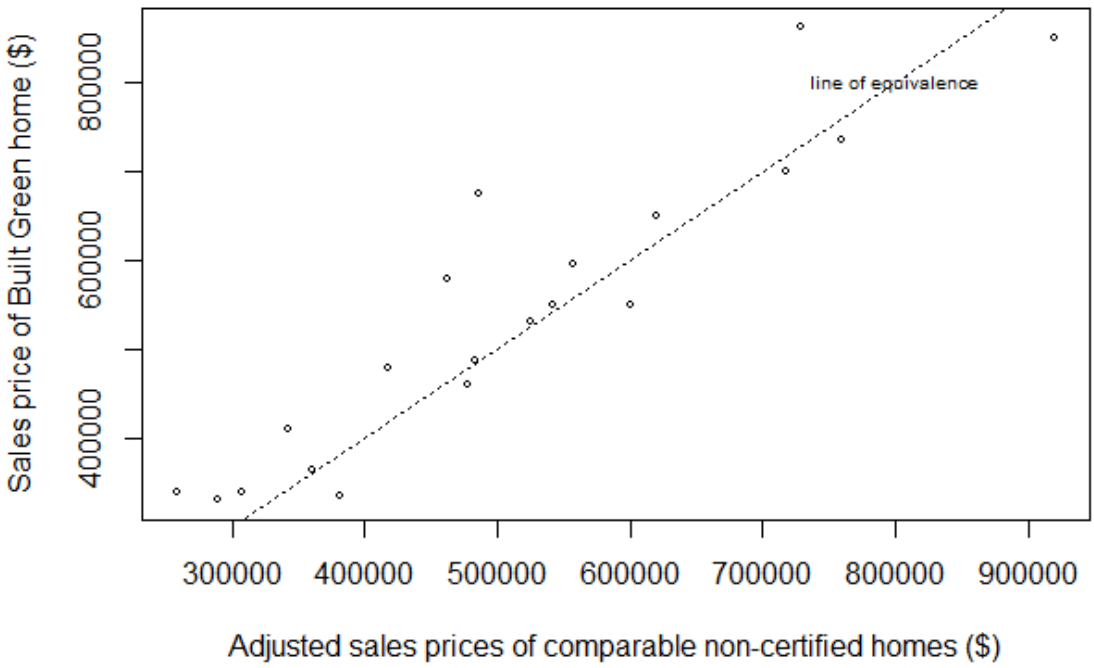


King County – Seattle only: Built Green

In King County –Seattle only, there were 20 sold certified Built Green properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 7.6%, or $29,327.

Relevant NWMLS areas: 380 385 390 700 705 710

Figure 11: Sales prices for Built Green homes in King County –Seattle only



Interpretations of Washington Results

There is a noticeable difference in certification premiums across multiple Washington markets. Given the bulk of evidence from Washington, and other studies in the literature, we consider it highly likely there are local geographic differences in the willingness to pay a premium. Based on these results, real property appraisers now have the opportunity to apply premiums based on a more specific location of the certified home.

As an example: Built Green certification averaged a significant 7.6% premium in the urban area of Seattle, but no statistically significant result was found for Built Green in neighboring suburban areas. This difference is large enough to suggest that there are true differences between buyers in these two markets, and that "urban" buyers in Washington value certification more highly. This geographically granular quantitative result could be useful to appraisers as a means of confirming their professional experiences and applying a range of values for homes depending on their location and certification type.

There are differences in premiums between geographic areas that do run counter to some expectations. Perhaps the most notable is the 7.4% premium for ENERGY STAR homes in Kitsap County. Kitsap County is a more rural area than the other parts of Western Washington that were included in the study. Residents in Kitsap County are on the whole older and with lower levels of education than Washington averages. However, Kitsap County residents do have a slightly higher income and home value than other Washington state residents. Kitsap County residents also are more politically "liberal" than other parts of the state, though less so than residents of King County and especially Seattle[30]. Nonetheless, this is not an area that appraisers would generally expect to see a 7.4% premium for a certified home. A potential explanation for this result is that a large majority of the ENERGY STAR home sales in Kitsap County occurred in the slump year of 2011. As we note in Time Sensitivity of Contributory Values section of this study, premiums associated with home certifications appear to be stronger in depreciating markets. It is possible that the 7.4% premium found in Kitsap County will be significantly lower in a strongly appreciating market. Additionally, Washington State University-Energy Program made investments in real estate broker and appraiser education in Kitsap County in 2010 – 2015. These professional trainings may have helped to ensure that both selling and buying brokers were aware of the benefits of energy efficiency and conveyed those attributes to their clients.

It is also interesting to compare premiums between the suburban westside of King County (Burien, Kent, Renton, Everett etc.) and the suburban eastside of King County (Bellevue, Redmond, Kirkland, Issaquah etc.). Westside suburbs show a willingness to pay a larger premium for ENERGY STAR homes (8.0%) than the eastside suburbs (4.5%). Like the results from Kitsap County, there appears to be a higher contributory value found in a geographic area with comparatively lower levels of income and education[31].

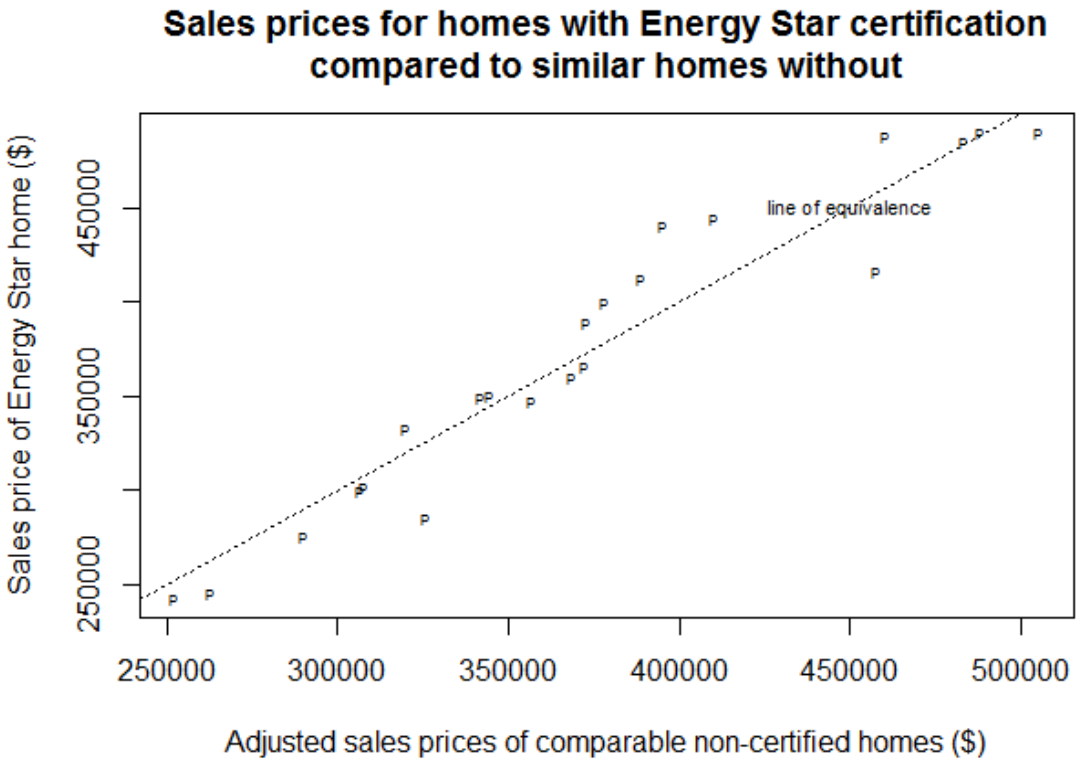
[30] US Census data for Kitsap County, WA
[31] US Census data for Burien, WA, US Census data for Bellevue, WA

Portland, OR: ENERGY STAR

In Portland, there were 26 sold certified ENERGY STAR properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was -0.2%, or $-2.

Relevant RMLS areas: 141 142 143 144 145 146 147 148 149 150 151 152

Figure 12: Sales prices for ENERGY STAR homes in Portland

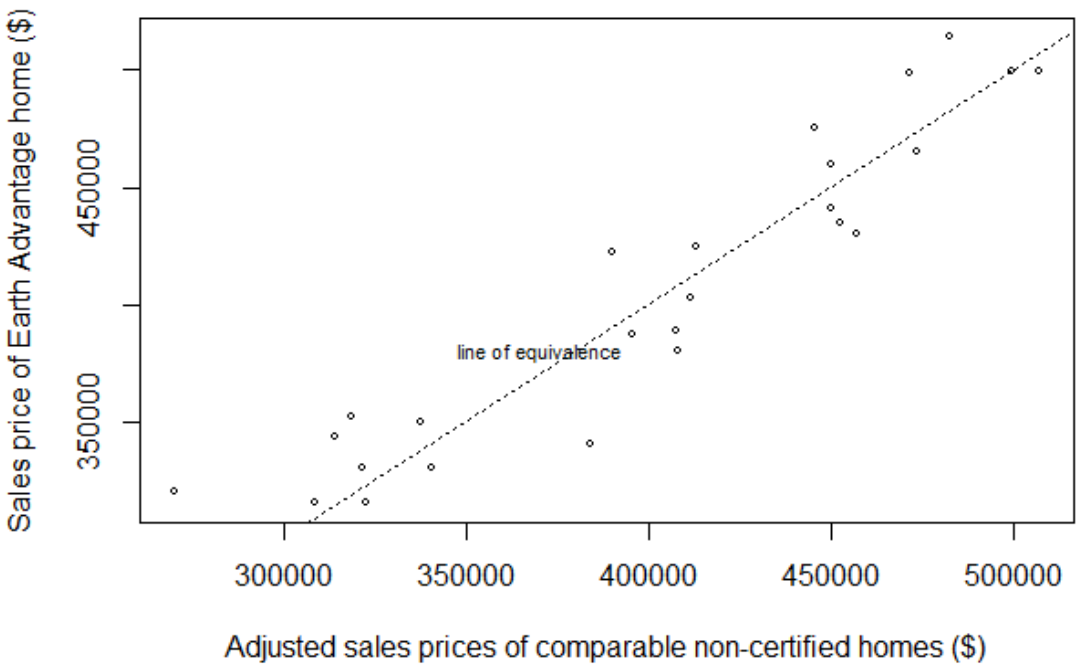


Portland, OR: Earth Advantage certification

In Portland, there were 26 sold certified Earth Advantage properties for use in the study. The mean difference between observed sales prices and their matched comparables in this data set was 1.2%, or $3,240.

Relevant RMLS areas: 141 142 143 144 145 146 147 148 149 150 151 152

Figure 13: Sales prices for Earth Advantage homes in Portland



Interpretations of Portland-metro Results

The results for Portland are somewhat surprising when compared to the most demographically similar areas of Washington, such as Seattle or the westside of King County. The fairly insignificant premium for Earth Advantage and the lack of a premium for ENERGY STAR run counter to the results of a "sister" study completed several months prior to this study and which used an almost identical methodological approach[32]. The Energy Trust "sister" study used an almost identical methodology, but combined both ENERGY STAR and Earth Advantage homes into one statistical sample of "certified homes". That being the case, the project appraiser and statistician conclude that there are three primary interpretations for the results found in Portland:

1. *Small effects are difficult to detect with small sample sizes:* This may be the simplest explanation for results for Earth Advantage homes in Portland, where this study found a comparatively smaller certification premiums that were not statistically significant. In comparison, the Energy Trust "sister" study found a slightly larger premium (+4.1%) for certified homes that was deemed statistically significant.
2. *An unusual sample:* It is possible that the current study had a slightly unusual sample of subject properties that produced a result that diverges somewhat from prior studies. The sample included enough homes (26) to be deemed a large enough sample size, yet it is possible that the homes qualifying for inclusion in the data set were unusual in some way.
3. *Higher quality data:* The verification of the homes' certifications could have made the data used in this analysis more reliable than the data in previous studies and samples. This project methodology required a slightly more rigorous evaluation of the "qualifying characteristics" of the homes for inclusion in the analysis. Therefore, the quality of the data can be deemed of comparatively higher quality than data used in prior studies.

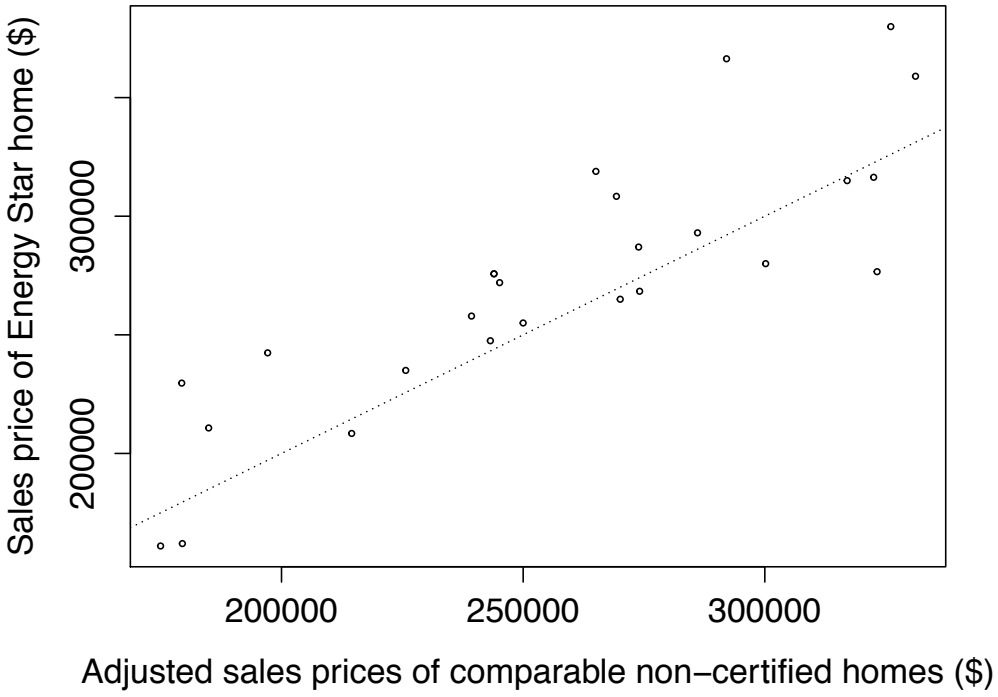
[32] See Appendix H and Watkins, Taylor, 2015, *A Study on the Residential Market Valuation of EPS and Solar PV in the Greater Portland and Bend, Oregon Markets*, Energy Trust of Oregon.

Ada County, Idaho: ENERGY STAR

In and around Boise, Idaho there were 25 sold certified ENERGY STAR properties for use in the study. The median difference between observed sales prices and their matched comparables in this data set was 4.5%, or $11,206.

Relevant IMLS areas: 200 300 550 650 700 800 900 950 1000 1020 1030 1100

Figure 15: Sales prices for ENERGY STAR homes in Ada County, ID



Interpretations of Ada County, Idaho Results

The data from homes located in and around Boise, Idaho produced a result of a mean premium for Energy Star properties was $15,179, or 6.2%. However, these results could be slightly exaggerated due to several abnormally high premiums. According to the project statistician, the median price premium provides a more likely size of effect. Accordingly, the project appraiser recommends that real property appraisers consider the median price premium of $11,206 or 4.5% as supporting a valuation calculation for ENERGY STAR homes in Ada County.

The Ada County results fall in the general range of results that have been documented in prior studies and in other geographic areas included as part of this study. For example, data points for ENERGY STAR in the suburban eastside of King County have a similar premium of 4.5%. This is not a surprising result, as the suburban eastside of King County and Ada County, Idaho share some similar demographic traits. Both areas have a fairly affluent, more educated, slightly more politically conservative population in comparison to other study areas[33].

A question remains whether ENERGY STAR homes in Boise produce a higher price premium than those located outside Boise, but within Ada County. More home data is needed in order to produce a statistically significant sample that allows comparison of homes both within and outside of Boise. As was noted in the Portland-metro interpretation of findings, further future analysis would be helpful in providing real property appraisers in Ada County with even greater geographically specificity in support of their valuation calculations.

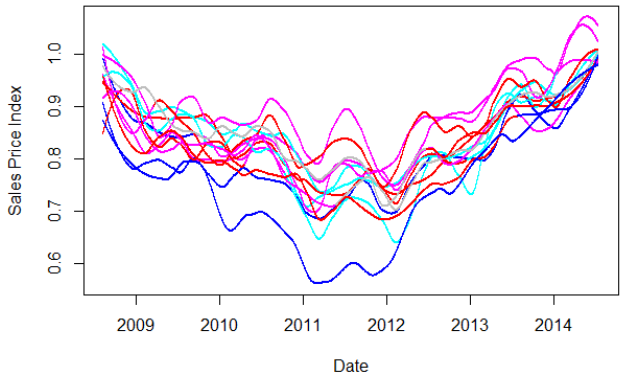
[33] US Census data for Redmond, WA, US Census data for Ada County, US Census Data for Seattle, WA

Time Sensitivity of Contributory Values

While analyzing the results of contributory values of energy and green certifications, the project team saw the opportunity to investigate the potential relationship of the certification premium to market conditions. Because the western Washington ENERGY STAR sample was the biggest one available, it was used to overlay trends in premiums found in western Washington with general market sales price trends.

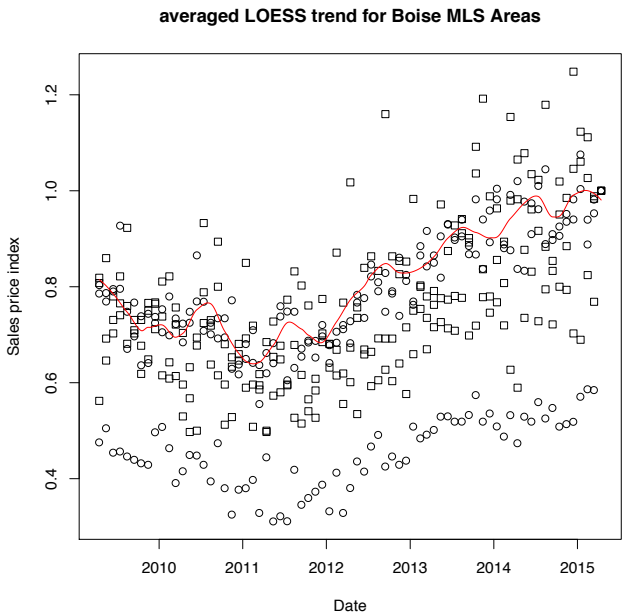
There is some suggestion that time itself has an influence on the size of the premium. General market trends in housing prices show both slump and boom periods as well as seasonal dynamics – for example, consider the slump in 2011, visible in the graph of local regression (LOESS) time trends where each colored line in Figure 16 represents an MLS area within Western Washington.

Figure 16: Local regression (LOESS) time trends for Western Washington



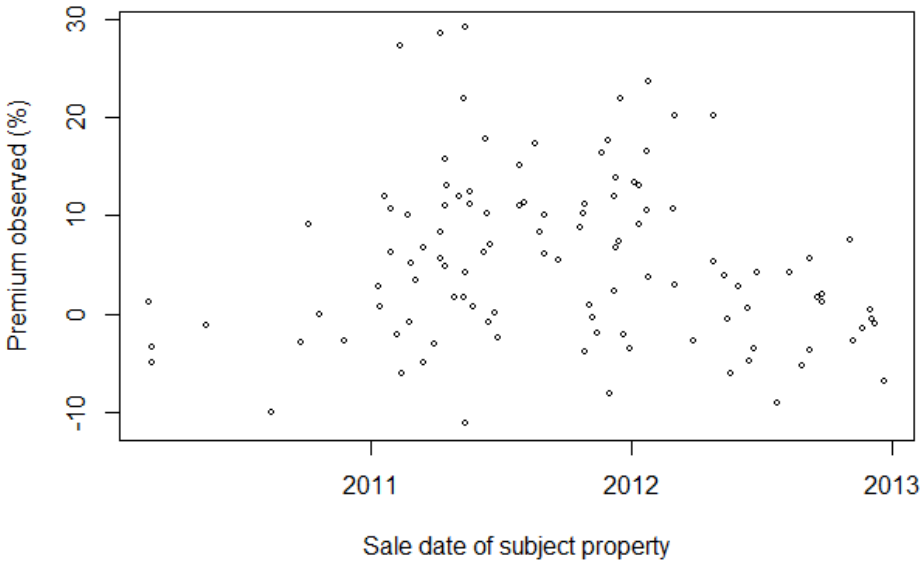
LOESS trends in market sales vs. time for Western WA MLS areas

Figure 17: Similar local regression (LOESS) time trend for Boise, ID



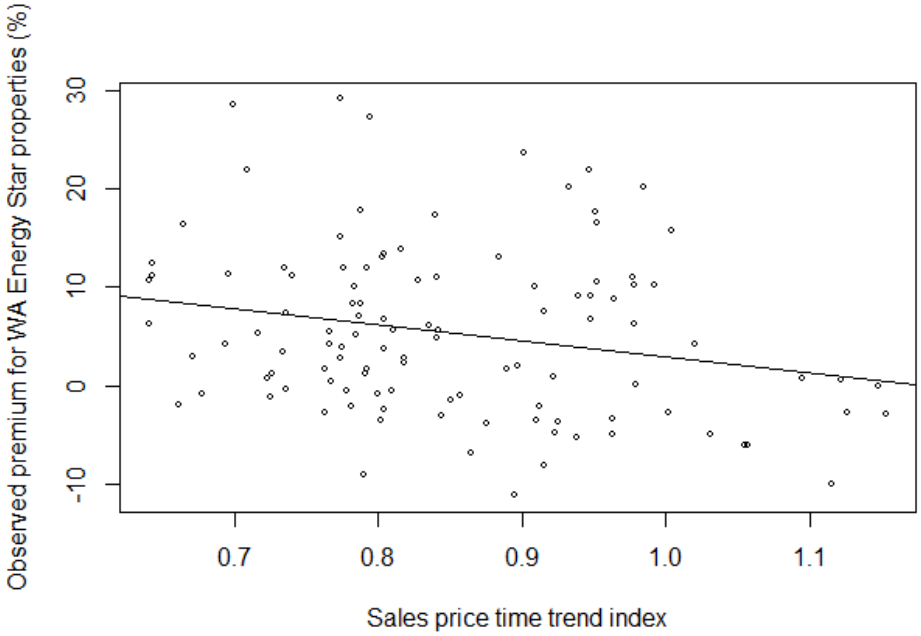
When the observed premiums for western Washington ENERGY STAR properties are plotted against date, there is a vague hill-shaped pattern with the highest parts of the hill occurring in 2011. This time of heightened premiums coincides with market conditions that were depreciating.

Figure 18: Observed premiums for ENERGY STAR properties (western Washington)



The project team tested this more precisely by graphing the premiums against the sales price indexes used for time corrections. The sales price indexes incorporate seasonal as well as yearly trends in the market.

Figure 19: Premiums vs. the sales price indexes



The premiums in Figure 19 (fitted with a linear regression) decline as market prices for housing increase. While the complete assumptions of the linear regression model are not met here in this initial

exploration, it is nonetheless fairly clear there is a trend. It is not a powerful trend, as the trend only explains about 5% of the variation in the data in the graph. Nonetheless, it is a statistically significant trend as the slope is significantly less than zero, with $p<0.02$.

Many factors contribute to the exact prices of individual real estate transactions, and most of them are unknowable to researchers working after the fact. It is possible that markets place a fixed dollar of premium for certification, which becomes a higher percentage when prices are lower in depreciating markets. Other factors such as energy costs may have had some impact on homebuyer behavior. However, overall, it may be that in more appreciating markets, buyers are either less able or less willing to pay premiums for certification. The psychology of a homebuyer changes in different market conditions, with buyers willing to overlook certain considerations (e.g. a home not possessing an energy or green certification) when competition for the home is fierce. Likewise, the psychology of the builder or selling agent is different in a rapidly appreciating market, meaning that the marketing of certifications may be of less a priority for these professionals.

In contrast, in depreciating or flat markets, certification may provide a reason to invest in a home that has dependable, third party verified credentials. Certifications may be more valuable in markets where buyers are cautious and are considering the home for longer-term occupancy. This trend may provide an explanation for some of the variation in premiums observed between geographical areas. For example, Kitsap County had a relatively high mean premium of 7.4% for ENERGY STAR homes, but a large majority of its ENERGY STAR sales occurred in 2011 during a depreciating market.

Section 2

RESILIENCY OF PREMIUMS AND EPS SCORES

This portion of study focused on two new questions: 1) Do premiums associated with energy certifications and green building certifications hold over time? 2) Are Energy Performance Scores (EPS) being used in real estate transactions and, if so, are they showing any observable contributory value? While the analysis completed in Section 1 of this study relied on a quantitative analysis of all available, eligible, market data, this portion of the study was by necessity less quantitative. As detailed below, because there was limited evidence of resold third-party certified properties in the major metropolitan areas within the study, the project team assessed and interpreted what data was available to describe current market conditions. Results of the EPS analysis can be found in Appendix F.

RESILIENCY OF PREMIUMS

In the 2009 Green Building Value Initiative study, real property appraisers with SEEC LLC and Watkins & Associates analyzed two subdivisions in order to document the sales of Built Green (Washington) and Earth Advantage (Oregon) homes. The intent of this portion of the study was envisioned as a means of addressing the potential of premiums for green certified homes having resiliency over time through the resales of those originally certified homes. The project team was able to address this specific question in the analysis of Shamrock Heights, a community in Renton, Washington, where premium resiliency was discovered and reported. In the communities that were analyzed in Eugene, Oregon (Charleston Place), Portland, Oregon (Renaissance Pointe), and Meridian, Idaho (Charter Pointe), scant data was available to review and therefore a muddier picture of the resiliency of sales price premiums was reported.

WASHINGTON: SHAMROCK HEIGHTS, RENTON

In 2009, the Green Building Value Initiative case study was completed to analyze the market reaction to green certifications on the sale price of new homes. Shamrock Heights in the Highlands neighborhood of the City of Renton was part of the focus of this study.

Shamrock Heights is a subdivision of 117 homes developed by CamWest Development in the Highlands neighborhood of the City of Renton. All of the homes are built to ENEGY STAR standards and certified Built Green 4 Star. The community was the first demonstration project to come under the King County's Smart Growth Initiative and received the 2005 King County Earth Hero Award for creative and effective environmental stewardship.

In 2009, 109 of the lots had been developed, with the remaining built out in 2010 and 2011. For the Green Building Value Initiative case study, the project appraiser randomly selected 53 homes, providing a paired sales analysis for each. The comparable properties used in the analysis were:

- Non-certified homes
- Located within a 1 mile radius of the subject property
- The most recent closed sales dates to the subject sale
- Most similar to the subject property in style, square footage, bedroom, bathroom and garage count
- Of similar quality of construction.

The homes in the project vary in style and have a Gross Living Area (GLA) range of 2 story homes of 1,950 square feet to 3,030 square feet and 2 story homes over basements of 2,900 square feet to 3,725

square feet, with a price range at the time of the original sale of between approximately $480,000 and $660,000. The results from this 2009 case study identified a premium for the Shamrock Heights properties of between $7.50 and $12.50 per square foot over the comparable properties, depending on the size and style of the home.

For this case study, the project team re-visited the Shamrock Heights community to examine the resilience of the premiums associated with the green certification in the re-sale market. During the timeframe of January 1, 2010 to June 1, 2014, the project's appraiser identified 21 sales of previously owned homes in the Shamrock Heights community. Further analysis showed that only 10 of those were advertised as having a green certification. These sales became the focus of this review.

Of the 10 homes identified, 1 of the properties was sold as an REO (real estate owned or bank owned) property. This home was eliminated from the study due to its adverse sale. The project team conducted the study in the same manner as the original 2009 study, using paired sale analysis as the methodology. The same parameters were also used.

Table 6: Summary Findings at Shamrock Heights

Year Resold	Number of Resales	Median[34] Premium ($/sq. ft.)	Median Difference – Sale Price to Original List Price (%)
2010	2	4.40	+ 17
2011	2	6.77	-2
2012	2	15.16	+2.8
2013	3	21.58	+2.6
TOTALS	**9**	**11.9**	**+5.1**

Detailed Findings

2010: The research identified 2 homes that re-sold in 2010, a 2-story home of 2,920 square feet and a 2-story home over a basement of 3,260 square feet. The subject properties sold for an average of $138.04 per square foot, while the comparable properties average an adjusted sales price of $136.58 per square foot. This resulted in an average premium of $3.50 per square foot, and a median premium of $4.40 per square foot. The percent of sale price to original list price averaged 110.39%, with a median of the same. This was compared to the comparable properties with an average of 92.27% and a median of 93.04%.

2011: The project team identified 2 re-sales, a 2-story home of 2,510 square feet and a 2-story home over a basement of 2,880 square feet. On average, the subject properties sold for $162.15 per square foot, with the comparable properties selling for an adjusted average of $148.84 per square foot. This

[34] The assessment of the resiliency of premiums does not include a statistically significant sample of properties. Therefore, the project team could not apply elements of the study methodology, including the time trend analysis. Therefore, these findings should be considered as potential observable trends but not indications of potential contributory value. The findings are provided as median premiums, an accepted standard for real property appraisers.

resulted in an average premium of $8.64 per square foot, and a median premium of $6.77 per square foot. The percent of sale price to original list price averaged 88.8% for the subject, with a median of the same. The comparable properties averaged a percent of sale price to list price of 91.17%, with a median of 90.22%. The subject properties were on the market for an average of 41 days, with a median of the same. Compared to the comparable properties that were on the market an average of 72 days, with a median of 79 days.

2012: The project team identified 2 re-sale properties during 2012, both were 2 story homes with a square foot of 2,526 and 2,732 square feet. The subject properties sold for an average of $162.34 per square foot, compared to the comparable properties at an adjusted average of $139.95 per square foot. This resulted in an average premium of $12.11 per square foot, and a median premium of $15.16 per square foot. The percent of sale price to original list price for the subject averaged 100%, with the median the same. The comparable properties average 99.90% of the sale to list price, with a median of 97.22%. The average CDOM for the subject were 12, with a median of the same. The comparable properties were on the market an average of 51 days, with a median of 70 days.

2013: During 2013, there were 3 re-sales of previously owned homes in Shamrock Heights, a 2 story home with 2,220 square feet and 2 - 2 story homes over a basements of 3,154 and 3,725 square feet. The subject properties sold for an average of $179.44 per square foot, with the comparable properties selling for an adjusted average of $162.38 per square foot. This resulted in an average premium of $19.92 per square foot, and a median premium of $21.58 per square foot. The subject's list to sale price percentage was 101.25%, with a median of 102.58%. This was compared to the comparable properties with an average list to sale price of 100.12% and a median of 100%. The CDOM averaged 6 for the subject, with a median of 5. The CDOM for the comparable properties averaged 30, with a median of 17.

All years: The overall summary for the re-sale properties in the Shamrock Heights neighborhood resulted in the subject properties selling for an average premium of $6.51 per square foot, and a median of $8.27 per square foot over the comparable properties. They averaged a slightly higher list to sale price percentage (100.46%, with a median of 100.1%), over the comparable properties at an average of 96.56%, and a median of 95.53%. The subject properties averaged 32 CDOM, with a median of 20 days, compared to the comparable properties at an average of 92 days, and a median of 54 days.

Further analysis was done to compare those properties in Shamrock Heights that were not advertised as having a green certification. Of the 11 homes, 3 re-sold in 2010, 2 in 2011, 2 in 2012 and 4 in 2013. Out of these, 3 were REO properties and 3 were short sales. Again, the project appraiser eliminated these properties from the study, due to their adverse sale condition. The project appraiser noted that the average sale price per square foot of those properties without the green certification check box was an average of $151.97, and a median of $152.87. This was compared to those properties identified with the green certification at an average of $160.49 per square foot, and a median of $162.37 per square foot. Further, those properties not identified with a green certification had an average list to sale price of 93.48%, and a median of 94.22%, and an average CDOM of 91, and a median of 74.

Interpretation of Washington Results

While not a statistically significant result, the market reaction to a green certification appears identifiable in the re-sale of homes in this community, when properly advertised. Additionally, those homes marketed with a certification appear to command a slightly greater list to sale price percentage

over the non-certified comparable homes in this market area, and those homes with a certification, but not advertised as such, in this neighborhood.

The project appraiser interviewed five out of the ten Real Estate Brokers who chose to utilize the green check box on the NWMLS form when advertising the re-sale home. Of those, four had previously taken a green building education course and recognized the importance of the certification in the selling process of the home. The fifth Broker was instructed by a colleague (a broker who had taken a green building education class previously) to utilize the check box. All were give information on the green/energy certifications by the seller of the home.

The project appraiser also interviewed seven out of the eleven Real Estate Brokers who did not choose to advertise the re-sale home using the MLS "Built Green" or ENERGY STAR" check box. Of these, two said that they were aware of the home's certifications, but were not aware of the MLS check box. The four who listed the properties during 2013 were aware of the certifications, but did not have and were not aware of how to get the supporting documentation to upload to the MLS, per the new regulations. The remaining broker was not aware that the home had a green or energy certification. Only two out of the seven had previously taken a green building education course. This speaks to the need for further education for Real Estate Brokers around green building, certifications and the MLS.

OREGON

In 2009, the Green Building Value Initiative analyzed the Charleston Place subdivision in Portland, Oregon to determine if there were any premiums associated with the green certified homes built within that community. The original 2009 case study of Charleston Place found that there appeared to be an average additional value associated with certified homes of $7,262 or $5.17 per square foot.
The project team sought to assess this same development for any premiums associated with homes sold since that first analysis in order to determine if the premiums that were noticed in the past carried through the resale (and remarketing) of these properties.

Since the properties were first built, the Charleston Place subdivision had a total of eleven resales. Of those eleven, eight were either Real Estate Owned (REO) or short sales. The former is a bank-owned, or repossessed, property, and the latter is in or near the foreclosure process and more is owed to the lender than the property is worth. These types of distressed properties are typically not considered to be reliable indicators of market value of a property due to the atypical motivations of the sellers. So for Charleston Place, there was not enough resale data on which to develop a conclusion of the resiliency of certification premiums.

The project team then sought to locate larger, older developments that might provide both original and resale data over time. Several were researched, with the Renaissance Pointe subdivision in Portland identified as a potential candidate. Renaissance Pointe had over 130 original sales of homes built between 2004 and 2008, so the data pool for original sales was large. Further research revealed 17 resales of these properties. These resales were then analyzed for comparable market data, with the result that only two of these properties had comparable sales that were non-certified homes. Thus, it was not possible to obtain price resiliency information from this dataset.

After assessing the situation for resales on a subdivision level, the project team assessed the entire Portland Metro area for resales of all certified homes in order to determine the total number and locations of the resales. The intent was to locate resold certified properties and to establish a set of

subject properties that would be more likely to have comparables available. Therefore, the data search was set up with the following parameters:

- Built between 2004 and 2010
- Green Certified
- Detached
- Sold between 6/1/2012 and 6/1/2014
- In all MLS areas around Portland (areas 141-152)

The project appraiser searched sold dates between 6/1/2012 and 6/1/2014 because the market in the area was generally stable or increasing during those times and thus would be more likely to provide comparable sales. Because there was a two-year gap between the most recent build date of 2010 and the earliest sold date of 6/1/2012, all of the sales would be resales.

The results of this data research in Oregon showed that there were:

- 6 resales of ENERGY STAR homes
- 18 resales of dual certified Earth Advantage/ENERGY STAR homes
- 67 resales of Earth Advantage homes

The project appraiser reviewed the 85 resold dual-certified and Earth Advantage properties against the certification program administrator's master list of certified homes to verify their certification. Of these 85 properties, 31 were verified as being certified. This 64% accuracy of the listings in RMLS is in the same range as the accuracy of the listings found in the research conducted throughout this study. Because the 31 eligible resold subject properties were spread out across the metro Portland area, an analysis of the resiliency of price premiums unfeasible.

IDAHO

Based on the difficulty locating adequate data on resales in the Portland, Oregon area, the project team anticipated that resale data for the Boise, Idaho area would prove similarly challenging to obtain. The project team therefore applied the same methodology to Boise that had proved most fruitful in Portland.

After assessing the situation for resales on a subdivision level, an area-wide search of all of Boise was made through Intermountain MLS. The project appraiser searched for resales of all certified homes in order to get an idea of the total number and the locations of the resales. The appraiser sought resale properties and, specifically, a group of subject properties that would be more likely to have comparables available. Therefore, the appraiser established the following search parameters:

- Built between 2004 and 2010
- ENERGY STAR certified
- Detached
- Sold between 6/1/2012 and 6/1/2014
- In all MLS areas around Boise

The appraiser searched for sold dates between 6/1/2012 and 6/1/2014 because the market in the area was generally stable or increasing during those times and thus would be more likely to provide comparable sales. Because there was a two-year gap between the most recent build date of 2010 and the earliest sold date of 6/1/2012, all of the sales would be resales. The only modification for the Boise area in the parameters above was to narrow the build date range from 2004-2010 to 2010-2012. This

was because the Intermountain MLS in the area did not note homes as being certified until 2010. This significantly narrowed the number of properties that will be available. The results were:

- 3 resales of ENERGY STAR homes

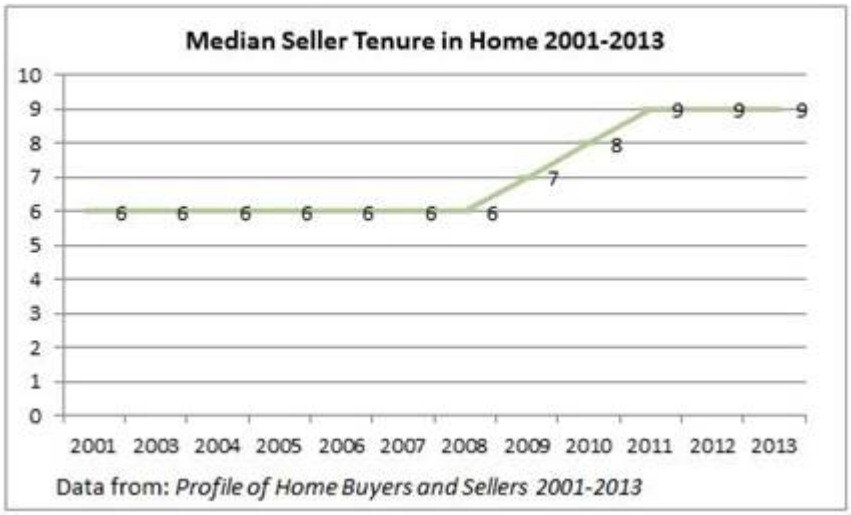
Therefore, a complete analysis of the resiliency of price premiums proved unfeasible given this limited dataset of resale properties.

Interpretation of Oregon and Idaho Results

In Oregon it was not possible to establish an original sales baseline from a subdivision or community development and then locate enough resold homes from that same development. Despite the lack of resold properties (indeed *because* of this fact), some interesting questions arise from this analysis. Why is it so difficult to find resales of certified homes? Is this phenomenon directly connected to the certified homes or is it a function of overall market behavior?

Clearly, the average length of time that homeowners stay in their properties is one reason. In general, residential real estate thought indicates that homeowners stay in their properties for an average of five to eight years. However, National Association of Realtors research shows that timespan has recently increased to ten years on average. So if a home is built in 2008-2010, it may not be reasonable to expect that a large number of those properties will have sold again before 2014. Therefore, it is not incongruous that resale data for homes that were built in 2008-2009 was scant. The inaccuracy of the listings of homes on the MLS, as noted elsewhere in this study, exacerbates the problem.

Figure 20: National Association of Realtor's Seller Tenure Data



Further evidence that may relate to a shortage of resale data is the notion that the certified home market may be made up of a different kind of homeowner, one that not only stays in his or her home longer, but much longer. These homeowners may stay in their homes longer than a typical homeowner because of the quality of the home, lower operating costs, overall satisfaction with the home, and/or a plan for longer-term home ownership when the home was purchased.

An Institute of Market Transformation-funded study[35] by the University of North Carolina finds that default risks are on average 32 percent lower in energy-efficient homes, controlling for other loan determinants. This finding is robust, significant, and consistent across several model specifications. A borrower in an ENERGY STAR residence is also one-quarter less likely to prepay the mortgage. So it may be that certified home buyers are a large sub-market with different interests concerning real estate than the typical homebuyer, which leads to a shortage in resales of these properties.

The question of price premium resiliency for certified homes is an interesting one. As further accurate listing data becomes available, particularly in the Portland-area, a review of price premium resiliency is warranted.

Summary

This appraiser-led study undertaken for the Northwest Energy Efficiency Alliance (NEEA) used a project methodology that was created and implemented by experienced real property appraisal professionals based in the Northwest. National leaders in the appraisal industry reviewed the methodology and subsequent results. The project has produced results that offer useful insights for Northwest real property appraisers, real estate industry professionals, and energy efficiency programs.

The results from the analyses conducted for this study has:

1. Shown the importance of verifying certification validity when establishing property values.
2. Identified imperfections in the way energy and green data is conveyed and portrayed during real estate transactions.
3. Identified that some level of premiums for energy efficiency and green certifications exist in most key Northwest markets.
4. Clearly indicated that premiums for energy efficiency and green certifications are geographically sensitive.
5. Identified a correlation between price premiums for energy efficiency and green certifications and real estate market trends.
6. Found that in at least one test-market, price premiums for green certified homes appear resilient and appear to remain in existence during the re-sale of those homes.
7. Provided real property appraisers and real estate professionals with a valuation methodology - developed by appraisers and statisticians – that can be used in additional markets as data is available. The methodological structure can also be used to provide future updates to the findings contained within this report.

The findings in this report are a picture in time. Northwest appraisers can, at their professional discretion, apply the findings in their development of real property valuations. This kind of analysis will need to be conducted at regular intervals in order to remain relevant and applicable. The project team offers the study's methodology, and other insights discovered in the research, as a means to more easily and frequently assess the market reaction to energy efficiency and green certifications in the Northwest. As more data becomes available in the key markets included in this study, results with even greater geographic granularity can be produced. With fairly minor modifications, the study

[35] "Home Energy Efficiency and Mortgage Risks", 2013, UNC Center for Community Capital & Institute for Market Transformation.

methodology can also be applied by knowledgeable appraisers to areas outside of the geographic area covered in this study.

Based on the findings, it is clear that there are additional actions that must take place in order to ensure that data for future valuation studies is dependable. Real estate professionals must become more aware of what energy efficiency and green certifications mean and what documentation is required to validate their legitimacy. This can be ensured through education and training. Education and training of real estate professionals has been provided for several years in the Northwest, yet these efforts have been somewhat episodic and with limited external funding and support. Data quality can also be addressed through information technology solutions. There are promising steps being taken in the development of automated population (e.g. "auto-pop") of home certification or energy rating information into MLS feeds through data transfer. This automated data transfer can happen directly between certification providers and MLS systems or their data aggregator partners. Ideally, a central data repository of *all* energy efficiency certifications, green building certifications, and energy scoring or rating systems for a given state or region will allow this data transfer to occur more easily and with greater quality controls.

As publically available data on energy efficiency and green certifications becomes a more frequent part of real estate transactions, the need for real property appraisers to have timely and reliable information on market-based contributory values will only increase. This study is, we believe, a significant step toward creating greater understanding of how real estate markets value these certifications in the Northwest. We hope that the findings contained in this study are both a useful tool for real property appraisers and a call to action for the real estate industry as a whole.

APPENDIX A: Study Methodology

INTRODUCTION

To determine the contributory value, if any, of ENERGY STAR, Built Green, and Earth Advantage homes in key Northwest markets, the project team utilized a research methodology developed by Watkins & Associates and Martin Brown for the 2014-5 Energy Trust of Oregon valuation study[36]. This statistical methodology is based on a comparative sales approach based on observed sales prices and other real estate listing and transaction characteristics, as found in the Multiple Listing Services (MLS) systems serving the cities and counties within the study area. These MLS systems include RMLS (Oregon), NWMLS (Washington), and Intermountain MLS (Idaho). Prior to the initiation of this study, a panel of appraisal industry leaders[37] reviewed and approved the study methodology.

The intent behind the project's methodological approach was to ensure that Northwest field appraisers would find it granular, localized, and dependable for integration into their future valuation calculations. The comparative sales approach, based on observed sales prices and other real estate listing and transaction characteristics, is standard practice in field appraisals. Yet, this approach has generally not been used in the handful of prior national and regional appraisal valuation studies. In those analyses that do use a comparative sales approach[38], a statistically significant data set was not available. Therefore, this project and the "sister" study conducted for Energy Trust are, to our knowledge, unique in its approach. In short: *this study was designed by Northwest real property appraisers, for Northwest real property appraisers*.

TREND MODEL PROCEDURE

Although this property comparison process is a more labor-intensive approach even for the most experienced and knowledgeable of appraisers, it provides a significant level of rigor and validity to the findings. This attention to producing a dependable result of utility to field appraisers was of paramount concern to the project team. The team established several key methodological principles in order to achieve that outcome:

- **Normalize:** The project team attempted to "normalize" the pool of subject properties as much as possible. Subject properties had to be +/- 20% of the median Gross Living Area (GLA) for certified homes in the geographic area. Removing properties from the study that contained anomalies ensured that price adjustments made by the project appraisers were limited to GLA range adjustments and bedroom and bathroom adjustments. This helped to mitigate subjectivity from the analysis and ensure that the market data would not be inappropriately skewed by unusual property characteristics or circumstances.
- **Verify:** Importantly, the project team verified the accuracy of the listing of *each* subject property used in the analysis. By cross-checking the list of properties marketed on the various MLS systems as having an energy or third-party green certification with the administrators of those programs, the project team discovered an unintentional, yet crucially important finding: energy efficiency and green certifications are frequently misidentified on MLS listings in the Northwest. This finding has ramifications for energy programs seeking to disseminate accurate

[36] In 2014, Energy Trust of Oregon commissioned a study led by Watkins & Associates with research assistance from Earth Advantage, to analyze the contributory value, if any, of Energy Performance Scores (EPS).
[37] Danny K. Wiley, Stephen O'Connor, Sandra Adomatis, Michael Brunson, Gerald Mildner
[38] Desmarais, Lisa, 2015, An Early Look at Energy Efficiency and Contributory Value: Case Studies of Residential Properties in the Greater Denver Metro Area.

energy information, for prior and future valuation studies, and, of course, for MLS systems themselves. These findings are discussed in more detail below.

- **Adjustment for Time:** The methodology also makes time of sale adjustments developed from neighborhoods or MLS areas. This mimics the process that appraisers actually undertake, instead of applying the results of large regressions that take quarterly market increases or decreases.

The project team utilized these methodological principles in order to improve the integrity of the data. To ensure the accuracy and validity of the data used for analyzing market trends and calculating contributory value, the team took the following steps:

- Reviewed MLS listings for applicable subject properties.
- Verified subject properties were valid - obtained validation that the properties were officially certified by the respective oversight entity.
- Removed invalid properties from pool of potential subject properties.
- Scrubbed those remaining properties in the overall pool of eligible subject properties for "anomalous conditions".

The project appraisers manually reviewed and excluded the following property types from the pool of approved subject properties:

- Homes with unique qualities relative to location and/or views.
- Homes with basements.
- Locations where multiple certified properties occurred on the same street, unless the sale dates were significantly different.
- Homes that were not newly built (e.g. resold homes).

Why where properties with anomalous conditions removed from the pool of potential subject properties?

- Homes with unique qualities: These properties were removed to limit the number and size of pricing adjustments. Substantial adjustments related to waterside location, views, etc. could be viewed as more subjective calculations and could
- Homes with basements: These properties were removed due to the fact that Gross Living Areas (GLA) are often listed inaccurately in homes with basements.
- Street locations with multiple certified properties: These properties were removed to avoid the over-weighting of one subdivision to the market.
- Homes that were not newly built: These properties were removed to ensure that data comparisons were consistent.

Overall, this vetting helps to ensure that the subject pool of sales would include homes that were as "typical" as possible and did not include amenities that are generally harder to account for.

VALUATION MODEL AND HYPOTHESIS

The subject properties used in the analysis of possible contributory values were originally to be determined through proportional random sampling of all potential subject properties. This was to be completed to ensure that the sample of subject properties was representative of the population as possible while still allowing for random selection and a time-effective analysis. The study had planned to establish parameters for the random sampling (for example: Built Green certified homes between

1800sf and 3000sf) and eliminate properties with unique features (e.g. waterfront location, views, etc.). The project team anticipated randomly selecting between 26-50 subject properties.

However, due to the limited number of eligible subject properties that could be selected for use in the analysis, random sampling was not needed. Each subject property that was eligible for inclusion in the analysis was used in the analysis. Once the pool of representative subject properties was identified, the comparable sale analysis could be initiated, using a minimum of three comparables for each selected subject property.

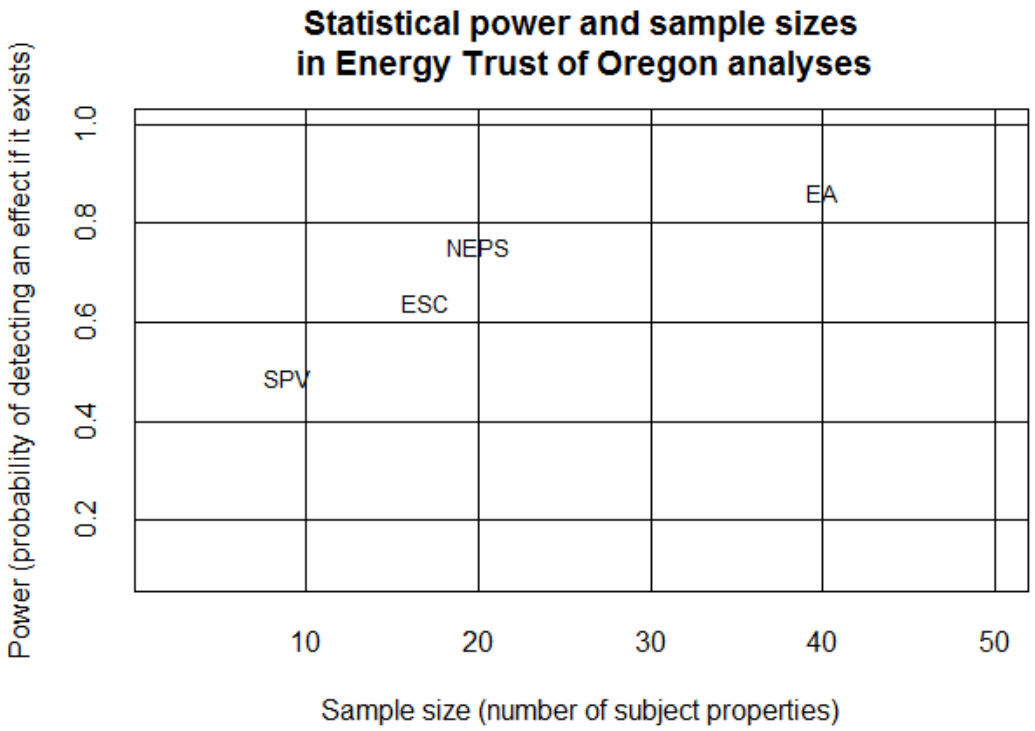
SAMPLE SIZE

The project team established the parameters for sample size based on several prior valuation analyses in the Portland area for the Energy Trust of Oregon. The prior analyses were done for solar photovoltaic (SPV), ENERGY STAR certification (ESC), Earth Advantage certification (EA), and ENERGY STAR or Earth Advantage certification but lacking an Energy Performance Score (NEPS).

These four analyses provide a clear indication of how statistical power played out in a very similar study that has already been undertaken in the region. As noted in Figure 1 below, power - the probability of determining an effect if it exists - goes up as sample size goes up. The conventional power desired for experimental designs is 0.8 or more, although this is not a requirement.

The Energy Trust study found statistically significant results in the ESC, NEPS, and EA analyses, despite the fact that only the EA analysis had a power of >= 0.8. The ESC analysis' power was near 0.6 and therefore the statistical significance of that analysis was less compelling though still plausible.

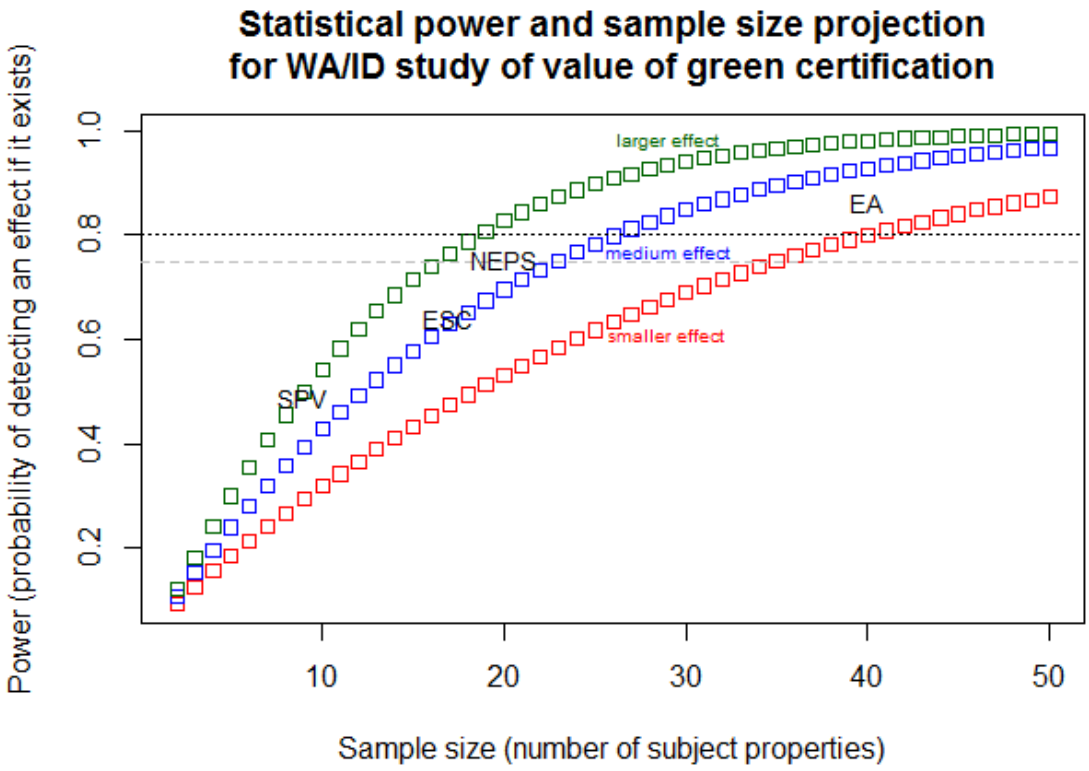
Figure 1: Statistical power and sample sizes in Energy Trust of Oregon analyses



The four analyses labeled on the graph above do not line up in a neat curve because of the magnitude of the difference between the groups. Each analysis above had a different magnitude of difference, also called the "effect size". Bigger effect sizes are easier for samples to find, and so the SPV analysis (which involved a relatively large price premium) actually had higher statistical power than it otherwise might have had given its small sample size.

When applying the results from the Energy Trust study in Oregon to a range of possible sample sizes and effect sizes for Washington and Idaho, the project statistician found that 26 subject properties was the minimum needed to determine a medium effect:

Figure 2: Statistical power and sample size projection for Washington and Idaho



The four Portland analyses were plotted along with the projected numbers to show that the projected numbers span a realistic range of effect sizes.

Smaller effects are more difficult to identify, as the red line shows. To detect a small effect with a power of 0.8 the study required almost 40 subject properties. Fortunately the effects observed in Portland were mostly medium-sized (shown by the blue line). For a medium sized effect, the study would need a sample of 26 subject properties to hit the power standard of 0.8. The project statistician assumed that Washington and Idaho have similarly scaled effects to Portland, and therefore 26 subject properties was determined to be an acceptable number of subject properties. If the effects of green certification are more dramatic (the dark green symbols), the study could use a sample of 18 subject

properties and the study would still reach the power standard of 0.8.[39] As noted above, the project team anticipated selecting approximately 26-50 subject properties to ensure statistical significance and acceptance of the study results.

DETERMINING CONTRIBUTORY VALUE

To determine the contributory value of a given energy certification and green certification, the project team used an appraisal-style calculation that compares market data on sold properties that have the feature (the "subjects") to similar sold properties that lack the feature (the "comparables"). The project team obtained the market data from MLS sources and defined the parameters for correcting prices of the comparables.

In general, the valuation model is:

$$V_e = S - C$$

where

Ve = Contributory value of environmental feature
S = Sold price of subject property
C= Sold price of comparable property (incorporating details and corrections described below)

The formal hypothesis is that the mean Ve , across all the subjects in the study, and expressed either in dollars or as a percentage of the comparable's price, will be significantly more than zero.

METHODOLOGICAL DETAILS

Because using a single comparable property might be deceptive, in this study, as well as much residential appraisal work, each subject property has at least 3 comparables. Accordingly the valuation equation actually compares the price of each subject property to the mean price of those comparables.

$$V_e = S - \bar{C}$$

It is not always possible to find comparable properties that are exactly similar to a given subject property. Comparables may diverge from subject in several ways commonly acknowledged to affect purchase prices, notably, square footage, bathroom count, and time of sale. To narrow the range of differences between a subject property and its comparables, the comparables met the following criteria:

- Sold with a closing date no more than 6 months prior to the closing date of the subject property.
- Located within the same neighborhood or sub-neighborhood.
- Constructed in a similar style based on photographs and staff determination.
- Constructed to the same degree of quality (e.g., design and materials).
- Having the same age range (built within 3 years prior and 3 years after the subject home).
- Having approximately the same size (within a range from 20% smaller to 20% larger in square feet).
- Built with no distinguishing green features, certifications, or EPS score.

Additionally, the collected comparables bracketed the Gross Living Area (GLA) and age of the subject property. This means that some comparables had less GLA than the subject, and some had more GLA; some comparables were newer, and some were older than the subject. In some cases, full bracketing

[39] This projection assumes a paired t-test on the percentage difference in price between certified and comparable noncertified homes. It is a one-tailed test of a "premium" in price because it is incredibly unlikely that an environmental certification could make a property *less* valuable. The significance level is set at 0.05.

was not be possible, but in these cases if a comparable was within 50 square feet of GLA of the subject or was the same age as the subject, then it was considered bracketed for the purposes of this study.

To make each comparable a more precise "control" for the subject property, the project team altered the sales price of the comparable according to the following rules:

- Square footage differences between the subject and comparable are valued at $50 per foot for subject properties that sold for under $400,000 and $60 per foot for properties that sold for over $400,000. This was done because higher-value properties generally sell for more per foot and generally have higher construction qualities. The team believed that some distinction should be made for this, and due to the number of total properties involved, this means of distinction was deemed the most prudent. For example, if the comparable had 100 fewer square feet than the subject, $5000-$6000 was added to the comparable's price.
- Bathroom count differences between the subject and the comparable were valued at $4000 per half-bath and $8000 per full bath. For example, if the comparable had three full baths and the subject two full baths, $8000 was subtracted from the comparable's price.
- Bedroom count differences were valued at $4,000 per room, but only for one-bedroom differences in homes that had a minimum of three bedrooms (e.g. no two bedroom homes were compared to three bedroom homes or higher). Three bedroom homes were only compared to three or four bedrooms homes, and four bedrooms homes were only compared to four or five bedroom homes.

These price adjustments were determined by the project appraisers based on prior regression analyses conducted in each of subject markets by the local appraiser.

TIME TREND ANALYSIS

Date-of-sale corrections require a more complex calculation. Sale dates of subject properties and their comparable properties were set at less than 6 months apart, yet the study period spans some notable swings in the real-estate market. It was therefore necessary to create a price-time trend to use as a standard reference.

Because conditions will likely differ among the MLS Areas, the project team created one trend line for each MLS area, which was applied to the different market areas in the study. This was completed with the following method, using Portland as an example:

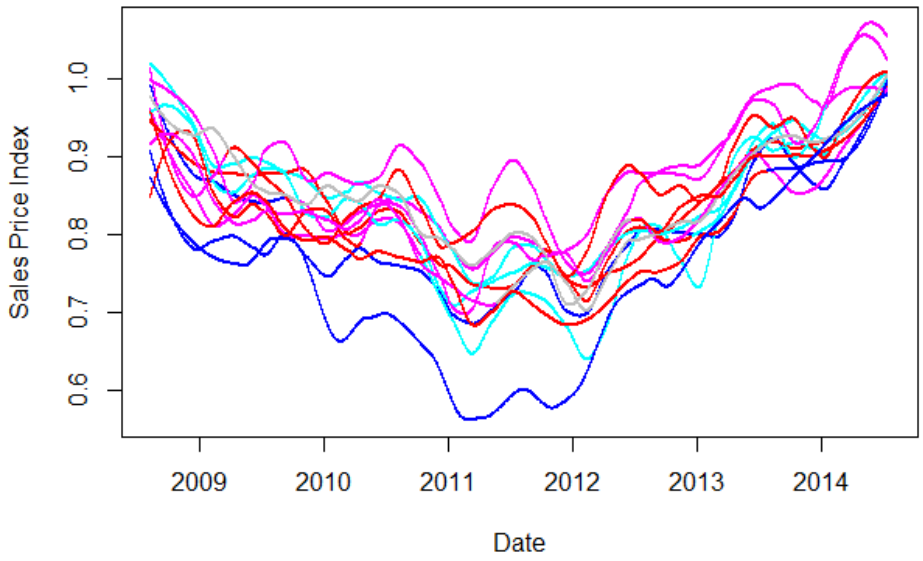
- The project team obtained the monthly median sales prices of all single-family-home sales in each Portland MLS Area, from August 2008 to July 2014 from RMLS.
- Because prices varied considerably among MLS Areas and were interested in making areas comparable, the project team converted the absolute median values (in dollars) to relative values (proportions) by dividing each monthly median into the July 2014 monthly median for that MLS Area.
- The monthly median value was assigned a specific date (the 15th of the month).
- Combining these two conventions, the sales price index for July 15, 2014 was always exactly 1.0.
- Graphed trend lines assisted in expressing specific phenomena. For example, in Portland there was a general bowl-shaped trend, with higher values in 2008 and 2014, and a dip in 2011-2012. There is also a weak but noticeable trend with season. Price indexes were higher in summers than in winters, with July differing from February by about 0.06 on the index scale.

The project team drew trend lines for each MLS area using localized regression (LOESS), a statistical technique that makes no assumptions about the inherent shape of the data. Because trends are likely

to be too irregular and too unique to each MLS area, the project team did not support expressing them with a single preconceived functional form (for example, a polynomial, or sine wave).

The resulting trends look like this (MLS areas are distinguished by different color lines):

Figure 3: Trend lines, by MLS area



These lines give each date in each MLS area a specific index value. The date-of-sale correction is applied to each comparable by utilizing the relevant index values for the date of sale of the subject, and the date of sale of the comparable.

The correction is:

$$\left(\frac{index\ value\ on\ subject\ sale\ date}{index\ value\ on\ comparable\ sale\ date}\ \mathrm{X}\ sales\ price\ of\ comparable\right) - sales\ price\ of\ comparable$$

For example, if the index on the subject sale date was 0.9, and the index on the comparable sale date was 1.0, and the sales price of the comparable was $100,000, then $10,000 was subtracted from the comparable's price. This trend and resulting correction was applied to each MLS area in the study to finalize the adjustments to the sold prices of the comparable sales in order to arrive at the final average price differences, if any, between the subject properties

APPENDIX B: Contributory Values with Error Bands

Location	Certification Type	Mean Premium*	Low Premium	High Premium	Significant at p<0.05? (t-test)	Significant at p<0.05? (Wilcoxon test)
Washington						
Western WA - All areas	ENERGY STAR	4.8%	3.5%	6.1%	Yes	Yes
King County – All areas	ENERGY STAR	6.3%	4.3%	8.3%	Yes	Yes
King County – Suburban westside	ENERGY STAR	8.0%	4.9%	11.1%	Yes	Yes
King County - Suburban eastside	ENERGY STAR	4.5%	1.9%	7.1%	Yes	Yes
Kitsap County	ENERGY STAR	7.4%	4.3%	10.5%	Yes	Yes
Snohomish County	ENERGY STAR	1.4%	-0.6%	3.4%	No	No
Thurston County**	ENERGY STAR	1.4%	-2.1%	4.9%	No	No
King County –All areas	Built Green	4.7%	1.9%	7.5%	Yes	Yes
King County –Suburban westside and eastside	Built Green	2.8%	-0.6%	6.2%	No	No
King County – Suburban eastside	Built Green	1.3%	-1.9%	4.5%	No	No
King County –Seattle only	Built Green	7.6%	2.3%	12.9%	Yes	Yes
Oregon						
Portland, OR	ENERGY STAR	-0.2%	-2.15%	1.7%	No	No
Portland, OR	Earth Advantage	1.2%	-1%	3.4%	No	No
Idaho						
Ada County	ENERGY STAR	4.5%	0.7%	8.3%	Yes	Yes

**Estimated mean premium with 90% confidence limits*

***Indicates that the sample size is lower than the minimum suggested by the power analysis; results may be less reliable*

APPENDIX C: Evidence of Market Trends Data

King County, WA (Built Green)

*A review of 39 newly-built detached **Built Green** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
2711	447	39	3

Built Green

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2301	$499,281	$498,240	99.7	111
MEDIAN	2264	$467,599	$465,112	99.4	63

Non-Built Green

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2263	$470,696	$469,304	99.7	92
MEDIAN	2254	$443,682	$437,534	98.6	64

Observations and Conclusions:

- Built Green properties within the study GLA range had higher average list prices (+5.7%) and higher median list prices (+5.1%). Average sale prices (+5.8%) and median sales prices were also higher (+5.9%) for certified homes.
- Built Green properties were on the market for an average of 19 day longer and a median of 1 fewer days than non -certified homes.
- Built Green properties sold to list price ratios were slightly higher than for the group of comparable properties.

King County, WA (ENERGY STAR)

*A review of 104 newly-built detached **ENERGY STAR** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
3619	294	104	8.8

ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2888	$540,740	$527,989	97.6	76
MEDIAN	2722	$523,121	$516,219	98.7	59

NON-ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2741	$516,741	$514,301	99.5	75
MEDIAN	2711	$512,071	$509,336	99.5	68

Observations and Conclusions:

- ENERGY STAR properties within the study GLA range had higher average list prices (+4.6%) and higher median list prices (+2.2%). Average sale prices (+2.7%) and median sales prices were also higher (+1.4%) for certified homes.
- ENERGY STAR properties were on the market for an average of 1 day longer and a median of 9 fewer days than non -certified homes.
- ENERGY STAR properties sold to list price ratios were slightly lower than for the group of comparable properties.

City of Seattle, WA (ENERGY STAR)

*There were only 2 verified **ENERGY STAR** new homes found in NWMLS for the City of Seattle, making a data review unfeasible.*

City of Seattle, WA (Built Green)

*A review of 86 newly built detached **Built Green** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
693	237	86	13

Built Green

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2301	$601,994	$586,779	97.5	31
MEDIAN	2887	$608,442	$591,244	97.2	26

Non-Built Green

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2246	$556,077	$543,286	97.7	38
MEDIAN	2251	$576,980	$581,285	100.7	27

Observations and Conclusions:

- Built Green properties within the study GLA range had higher average list prices (+8.3%) and higher median list prices (+5.5%). Average sale prices (+8%) and median sales prices were also higher (+1.7%).
- Built Green properties were on the market for an average of 7 fewer days and a median of 1 day less than non-certified homes.
- Built Green properties sold to list price ratios were slightly lower than for the group of comparable properties.

Kitsap County, WA (Built Green)

*There were no verified **Built Green** new homes found in NWMLS for Thurston County, making data analysis unfeasible.*

Kitsap County, WA (ENERGY STAR)

*A review of 23 newly built detached **ENERGY STAR** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
482	23	23	3.0

ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2169	$257,288	$253,808	98.6	179
MEDIAN	2222	$251,340	$251,900	100.2	163

Non-ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2132	$266,960	$261,908	98.1	101
MEDIAN	2120	$256,265	$253,963	99.1	78

Observations and Conclusions:

- In Kitsap County, Washington, 13 ENERGY STAR homes within the study GLA range had lower average list prices (-3.8%) and lower median list prices (-2.0%). Average sale prices (-3.2%) and median sales prices were also lower (-0.8%).
- ENERGY STAR properties were on the market for an average of 78 days longer and median 85 days longer than non-certified homes.
- ENERGY STAR properties sold to list price ratios were slightly higher (median) than for the group of comparable properties.

Thurston County, WA (Built Green)

*There were no verified **Built Green** new homes found within the GLA range in NWMLS for Thurston County, making data analysis unfeasible.*

Thurston County, WA (ENERGY STAR)

*A review of 13 newly built detached **ENERGY STAR** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
482	23	13	3.0

ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2169	$257,288	$253,808	98.6	179
MEDIAN	2222	$251,340	$251,900	100.2	163

Non- ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2132	$266,960	$261,908	98.1	101
MEDIAN	2120	$256,265	$253,963	99.1	78

Observations and Conclusions:

- In Thurston County, Washington, 13 ENERGY STAR homes within the study GLA range had lower average list prices (-3.8%) and lower median list prices (-2.0%). Average sale prices (-3.2%) and median sales prices were also lower (-.8%).
- ENERGY STAR properties were on the market for an average of 78 day longer and median 85 days longer than non-certified homes.
- ENERGY STAR properties sold to list price ratios were slightly higher (median) than for the group of comparable properties.

Snohomish County, WA (Built Green)

*There were no verified **Built Green** new homes found within the GLA range in NWMLS for Snohomish County, making data analysis unfeasible.*

Snohomish County, WA (ENERGY STAR)

*A review of 31 newly built detached **ENERGY STAR** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
1356	121	31	3.9

ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2002	$325,406	$324,387	99.7	113
MEDIAN	2023	$324,900	$319,990	98.5	85

Non-ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2130	$353,696	$336,239	95.1	112
MEDIAN	2132	$335,878	$335,170	99.8	53

Observations and Conclusions:

- In Snohomish County, Washington, 31 ENERGY STAR homes within the study GLA range had lower average list prices (-8.7%) and lower median list prices (-3.4%). Average sale prices (-3.7%) and median sales prices were also lower (-4.7%).
- ENERGY STAR properties were on the market for an average of 1 day longer and median 32 days longer than non-certified homes.
- ENERGY STAR properties sold to list price ratios were higher than for the group of comparable properties.

Ada County, ID (ENERGY STAR)

*A review of 202 newly built detached **ENERGY STAR** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
561	400	202	7.2

ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2273	$274,146	$274,146	100	58
MEDIAN	2205	$275,723	$275,723	100	37

Non-ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2275	$268,144	$261,600	97.6	52
MEDIAN	2216	$270,298	$268,400	99.3	31

Observations and Conclusions:

- In Ada County, Idaho, 202 ENERGY STAR homes within the study GLA range had higher average list prices (+2.2%) and higher median list prices (+2.0%). Average sale prices (+4.8%) and median sales prices were also higher (+2.7%).
- ENERGY STAR properties were on the market for an average of 6 days longer and median 6 days longer than non-certified homes.
- ENERGY STAR properties sold to list price ratios were higher than for the group of comparable properties.

City of Portland, OR (ENERGY STAR)

*A review of 127 newly built detached **ENERGY STAR** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
287	127	80	5.7

ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2397	$410,859	$399,429	97.21	153
MEDIAN	2289	$379,900	$365,900	96.31	82

Non-ENERGY STAR

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2544	$379,394	$373,832	98.53	159
MEDIAN	2539	$359,950	$356,539	99.05	9

Observations and Conclusions:

- In the city of Portland, 80 ENERGY STAR homes within the study GLA range had higher average list prices (+7.6%) and higher median list prices (+5.2%). Average sale prices (+6.4%) and median sales prices were also higher (2.6%).
- ENERGY STAR properties were on the market for an average of 6 days less and a median of 73 days longer. As noted previously, the relatively low median CDOM for the Non-ENERGY STAR properties is due to many properties having been listed as "zero" DOM in RMLS. The prevalence of the listing of "zero" DOM is due to many properties being builder-sold and/or pre-sold. Therefore inaccurate notations for DOM were used in RMLS, making these CDOM results suspect.
- ENERGY STAR properties had significantly higher list and sold prices (7% list and 6.5% sold and similar % for median prices).
- ENERGY STAR properties sold to list price ratios were slightly lower than for the group of comparable properties.

City of Portland, OR (Earth Advantage)

*A review of 416 newly built detached **Earth Advantage** homes meeting the average/median gross living area (GLA) range produced the following results:*

TOTAL # OF CERTIFIED HOMES ON MLS	TOTAL # HOMES VERIFIED AS CERTIFIED	TOTAL # HOMES IN GLA RANGE	MARKET SHARE: IN GLA RANGE (%)
1042	785	416	28

Earth Advantage

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2406	$421,657	$404,691	95.98	74
MEDIAN	2352	$389,900	$384,900	98.72	38

Non-Earth Advantage

	Gross Living Area (sq. ft.)	List Price	Sale Price	Sale Price to List Price Ratio (%)	Cumulative Days on Market (days)
AVERAGE	2369	$347,484	$341,962	97.22	80
MEDIAN	2356	$333,784	$327,500	98.11	50

Observations and Conclusions:

Based upon this final set of EA properties, it is noted that:

- In the city of Portland, 416 Earth Advantage homes within the study GLA range had higher average list prices (+17.6%) and higher median list prices (+14.4%). Average sale prices (+15.5%) and median sales prices were also higher (15%).
- Earth Advantage properties were on the market for an average of 6 days and a median of 12 days less than non-certified homes.
- As noted previously, the relatively low median CDOM for the Non-ENERGY STAR properties is due to many properties having been listed as "zero" DOM in RMLS. The prevalence of the listing of "zero" DOM is due to many properties being builder-sold and/or pre-sold. Therefore inaccurate notations for DOM were used in RMLS, making these results suspect.
- Earth Advantage properties had significantly higher median and average list and sold prices (17.6% average list price, 16.5% average sold price and similar % for median prices)
- Their sold to list price ratios were very similar.

APPENDIX D: Days on Market Data

The project team found inaccurate notations for Days on Market (DOM) within some MLS systems, making Consecutive Days on Market (CDOM) results suspect in some cases. Properties were sometimes listed as being "zero" DOM in cases in which they were builder-sold and/or pre-sold. Because of this, CDOM results are not emphasized in the study. They are included here for reference purposes only. The CDOM figures below are for the original listing date to the contract date.

King County – Westside: ENERGY STAR

- The median Consecutive Days on Market (CDOM) was -57 for the subject properties.

King County Eastside: ENERGY STAR

- The median Consecutive Days on Market (CDOM) was -25 for the subject properties.

Kitsap County: ENERGY STAR

- The median Consecutive Days on Market (CDOM) was -38 for the subject properties.

Thurston County: ENERGY STAR

- The median Consecutive Days on Market (CDOM) was -3 for the subject properties.

Snohomish County: ENERGY STAR

- The median Consecutive Days on Market (CDOM) was -7 for the subject properties.

King County – Suburban areas eastside only Built Green

- The median Consecutive Days on Market (CDOM) was -57 for the subject properties.

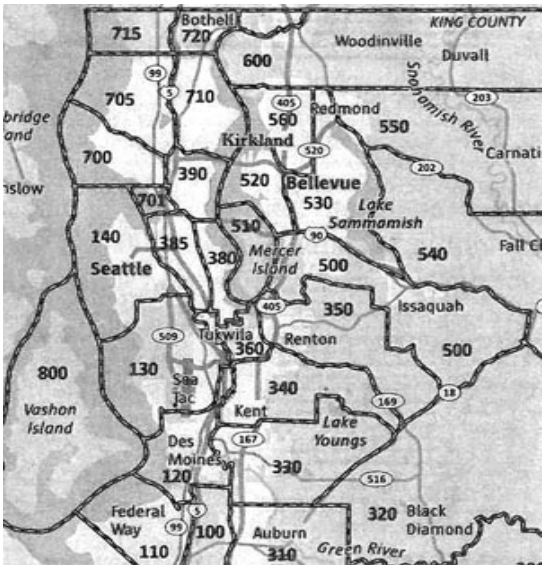
Portland, Oregon ENERGY STAR

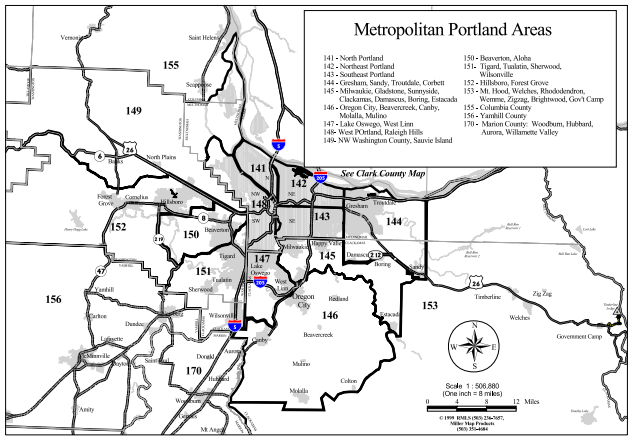
- The median Consecutive Days on Market (CDOM) was +63 for the subject properties.

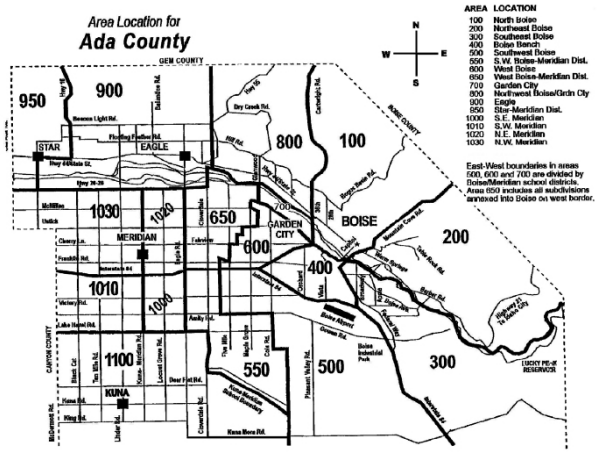
Portland, Oregon Earth Advantage

- The median Consecutive Days on Market (CDOM) was -21 for the subject properties.

APPENDIX E – MLS AREAS



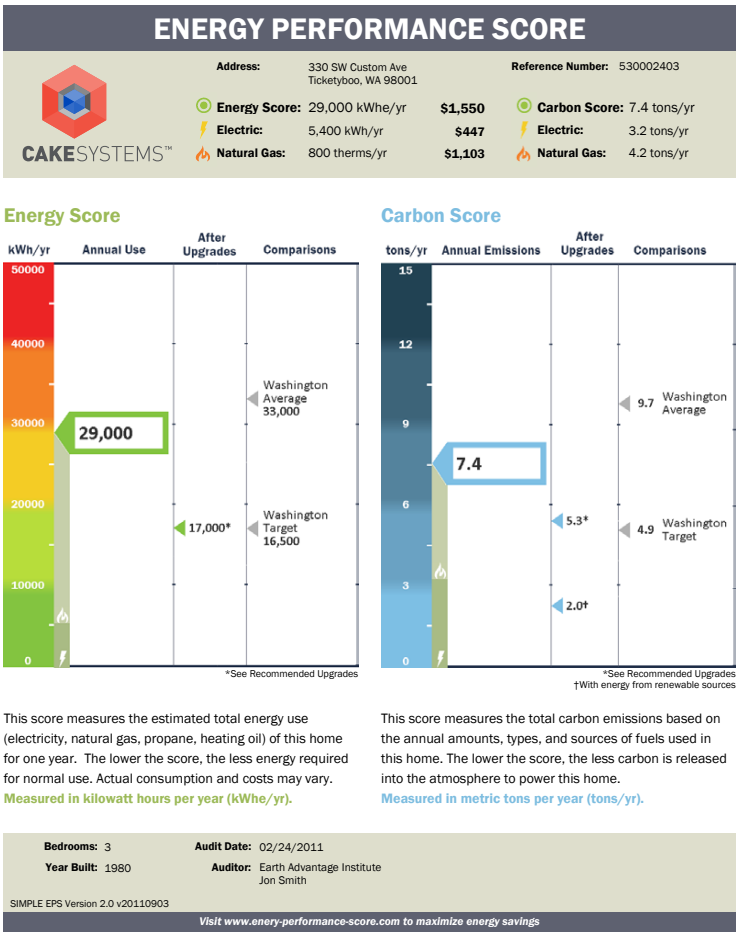




APPENDIX F – EPS Case Studies

INTRODUCTION

This component of the Northwest Energy Efficiency Alliance (NEEA) Market Valuation of Energy Efficiency and Green Certification of Pacific Northwest Homes study reviews whether the Energy Performance Score (EPS) metric is being used in Washington state real estate market transactions. Knowing that very few EPS scores had made it onto the Northwest Multiple Listing Service (NWMLS), the project team was not seeking to determine a conclusive contributory value of the score. However, the project appraisers were interested in whether there are any "observable" contributory values associated with the score in the several markets in which the score had been provided to homeowners over the course of several years.



The EPS is a miles-per-gallon type rating for homes. It is a label that represents a home's energy use and associated carbon emissions. The EPS is a relatively new product in use in the Washington real estate market. Several thousand scores have been issued on existing homes since its introduction in 2008-9. An EPS scorecard was included in existing homes retrofit programs implemented and supported by Seattle City Light, the Washington State University Energy Program, and the Community Energy Challenge program. Through these programs, EPS scorecards have been delivered to homes throughout the greater Seattle area, Kitsap County, Whatcom County, and Thurston County. Depending on the format of the program, the EPS was provided to homeowners by either program energy assessors or home performance contractors who provide an energy assessment as part of their services.

Although future EPS scorecards may look differently, the scorecard used between 2008 and 2015 in numerous locations throughout Washington resembles the one above.

When delivered to the market by energy assessors or home performance contractors, the scorecard is almost always accompanied by a report of upgrade recommendations that can be made to reduce energy consumption in a home. Similar to how a consumer can compare the

MPG rating of a vehicle when considering a purchase, the EPS provides consumers information that allows them to compare the energy use and associated costs with living in one home as opposed to another.

The EPS provides a graphic that shows homeowners the effects of recommended upgrades in both energy and dollars. The score is an "asset-rating", which means it is calculated based on the physical attributes of the home, the different types of equipment and appliances in the home, and the climate. This means that the score is determined independent of homeowner behavior, so it shows what the energy use of the home would be with "average" occupants living in it. In Washington, a Kilowatt-hour equivalent (kWhe) metric is used for the score, which portrays the total energy use of the home. All energy forms, whether natural gas, propane, or heating oil, are converted to their electrical energy equivalents (kWhe).

Since it's introduction, the EPS has been included as topic of green building educational courses offered to real estate professional in several parts of state. This review sought to determine whether there were any signs of real estate broker awareness of EPS, whether EPS was being used in listings, and whether any real or perceived value was attached to the use of the EPS during the sale of a home.

As expected, the project team found that of the fairly large number of scores issued between 2009 and 2014, very few had been used in the listings of homes being marketed for sale.

Table 1: Prevalence of verified Energy Performance Scores in Washington, on NWMLS

Area	Number of Homes that received EPS	Number of EPS listings on NWMLS
Seattle	1968	7
Whatcom County (Bellingham)	540	2
Thurston County (Olympia)	646	0
Kitsap County	851	0

Clearly, very few EPS are currently being included in the marketing or sale of a home. This is not a significantly surprising result, and could be explained by the following presumed market conditions:

- A field for EPS was not included in the NWMLS database until 2013.
- After 2013, most brokers are unaware that a field exists for EPS on the NWMLS.
- Most brokers have not received training or information about EPS.
- Most brokers have not received training or information on how EPS can be used on the NWMLS.
- Most brokers do not know to ask their client whether they have ever received an EPS.
- Most homeowners who received an EPS were contemplating some kind of energy upgrade to their home and were not likely to have been planning on selling their home.

- Many homeowners who received an EPS from an energy assessor, did not understand what the EPS meant or what it could be used for.

Beyond the limited use of EPS on the NWMLS, a further challenge persists. For those limited number of homes that did in fact include information in the EPS Score field on NWMLS, the information contained provides little context or background as to the meaning of the number that was entered. There is no information on what units or metric the number represents. There is also no information in the field regarding what a score on a comparable home would be. While this information is contained in the actual scorecard, there is currently not a requirement by NWMLS that brokers upload a copy of the EPS scorecard for reference. Therefore, of the limited number of EPS scores contained on the NWMLS, buyers are dependent almost solely on a broker proactively discussing the meaning and use of the score.

Despite these headwinds, research supports the notion that there is interest amongst consumers for clear, accessible, transparent energy performance information. A 2012 survey of Washington residents shows that 64% of respondents thought a numeric scorecard that explained a home's current energy use would be useful[40]. Indeed, there are several individual brokers, remodelers and/or builders that recognize the potential benefit of EPS and have begun to integrate the use of the score into the home sale process. For those who do see market opportunity in energy efficiency, many view energy scoring as a critical tool in supporting their business model. For example, Sam Hagerman of Portland and Seattle's Hammer and Hand believes that "some sort of energy (rating) is crucial to support increased valuation of high performance homes.[41]"

The most prominent user of Washington EPS' in the marketing of their homes is Green Canopy, a Seattle-based homebuilding and remodeling firm. Green Canopy has made it standard practice to use energy scoring to verify the effectiveness of the energy efficiency work it does on homes they remodel or build. The owners of the company believe that a score informs prospective buyers - as well as the company employees themselves - that they were successful in increasing the efficiency of the home. "We want to push the envelope in the building sector" says Aaron Fairchild, President of Green Canopy. "We believe the real estate market will benefit from homebuyers knowing how efficient a given home is - especially when they can then relate the score to another home for an apples to apples comparison."

Green Canopy believes that an energy score is just another valid piece of information that buyers deserve as they make a major purchase decision. An energy score may help to tease out some important information about the quality of the home. Green Canopy believes that as valuable data such as energy scoring becomes more commonplace in the residential market, consumers will come to demand this sort of information–and the efficiency measures that drive the scores upwards.

[40] The Cadmus Group. National Association of State Energy Officials (NASEO)Multi-State Residential Retrofit Program Baseline Survey Results – Washington, 2012.

[41] Phone interview. See http://www.earthadvantage.org/assets/documents/RegionalEnergyRatingDisclosure-130502-FNL.pdf

FINDINGS

The following five Seattle and two Whatcom County homes were marketed on the Northwest Multiple Listing Service (NWMLS) and sold as having an EPS. These properties offer a glimpse into how the score can be used to highlight energy improvements to an existing home, the overall energy performance of a new home, and the impact it can have in the sale process.

The project appraiser used a paired sale analysis to determine whether homes with EPS were considered more valuable than other similar homes without an EPS. To create a more precise control for the EPS subject property, the project appraiser adjusted the sales price of comparable non-EPS properties based on several variables. These adjustments were calculated based on square footage, bathroom, bedroom, and garage differences. The follow adjustment assumptions were made:

- Square footage differences between the subject and comparable are valued at $50 per foot for above grade living area in Whatcom County. For properties that sold in the City of Seattle, square footage differences between the subject and comparable are valued at $60 per foot for above grade living area and at $40 per square foot for basement living area.
- Bathroom count differences between the subject and the comparable were valued at $4,000 per half-bath and $8,000 per full bath for Whatcom County, and $5,000 per half-bath and $10,000 per full bath for the City of Seattle.
- Bedroom count differences were valued at $2,000 per bedroom in Whatcom County and $5,000 per bedroom count in Seattle.
- Any garage count differences were adjusted using a value per garage bay of $8,000 per stall for Whatcom County and $10,000 per stall for Seattle.

These appraisal adjustments reflect the market reaction for these specific geographic areas. Additional adjustments were made for lot size/view and EPS score. The lot adjustment was based on the extraction of the improvements. The EPS score adjustment was based on the capitalization of the energy savings based on the EPS score.

Table 2: Paired sales analysis results

Subject or Comparable Property	Address	Sold Price	Adjusted Sales Price
SEATTLE			
EPS Subject Property 1	**5542 Wallingford Ave N Seattle 98103**	**$1,007,000**	**+$40,100 (+3.9%) *Difference between Subject and Comparable**
Non-EPS Comparable	Comparable 1	$710,000	$926,569
Non-EPS Comparable	Comparable 2	$725,000	$930,720
Non-EPS Comparable	Comparable 3	$899,999	$1,043,411

EPS Subject Property 2	**4521 Corliss Ave N Seattle 98103**	**$890,000**	**+$16,910 (avg) (+1.9%) *Difference between Subject and Comparable**
Non-EPS Comparable	Comparable 1	$810,000	$873,964
Non-EPS Comparable	Comparable 2	$768,250	$875,080
Non-EPS Comparable	Comparable 3	$867,650	$870,226
EPS Subject Property 3	**711 N 97th St Seattle 98103**	**$730,000**	**+$17,750 (avg) (+2.4%) *Difference between Subject and Comparable**
Non-EPS Comparable	Comparable 1	$725,000	$763,689
Non-EPS Comparable	Comparable 2	$725,000	$660,811
EPS Subject Property 4	**8050 14th Ave NW, Seattle 98117**	**$545,000**	**+$16,575 (avg) (+3.0%) *Difference between Subject and Comparable**
Non-EPS Comparable	Comparable 1	$499,000	**$517,474**
Non-EPS Comparable	Comparable 2	$529,950	**$465,188**
Non-EPS Comparable	Comparable 3	$480,000	**$602,683**
EPS Subject Property 5	**3210 24th Ave W Seattle 98119**	**$770,000**	**-$21,313 (avg) (-2.8%) *Difference between Subject and Comparable**
Non-EPS Comparable	Comparable 1	$865,000	$758,950

Non-EPS Comparable	Comparable 2	$1,075,929	$772,797
Non-EPS Comparable	Comparable 3	$1,150,000	$842,240
WHATCOM			
EPS Subject Property 6	**5923 Shannon Ave Ferndale 98248**	**$285,000**	**-$43,300 (avg) (-15.2%) *Difference between Subject and Comparable**
Non-EPS Comparable	Comparable 1	$305,000	$322,500
Non-EPS Comparable	Comparable 2	$305,000	$334,400
Non-EPS Comparable	Comparable 3	$305,000	$328,000
EPS Subject Property 7	**3903 York St, Bellingham 98229**	**$464,500**	**+$77,998 (avg) (+16.8%) *Difference between Subject and Comparable**
Non-EPS Comparable	Comparable 1	$274,000	$377,035
Non-EPS Comparable	Comparable 2	$319,000	$420,415
Non-EPS Comparable	Comparable 3	$386,000	$362,055

Seattle EPS Homes

EPS HOME: WALLINGFORD

5524 Wallingford Ave N, Seattle 98103 (MLS 501722)

This property was originally built in 1921 and remodeled in 2013 by Green Canopy homes. The subject property is a newly constructed two-story home over a walk-out basement in the Wallingford neighborhood of the City of Seattle. The home has a sleek modern design that includes a roof top deck with a partial view of Green Lake. The basic home features include four bedrooms, four bathrooms and a total square footage of 2,670.

This home achieved an EPS of 14,000 kWhe with a carbon score of 4.7 tons/year. The Seattle reference home has an EPS of 28,000; significantly less energy efficient than this home. To achieve this better-than-average EPS, the project included the following energy efficiency components:

- Reducing air leakage by 2726 cfm50
- Installing a heat recovery ventilation system
- Upgrading to high efficiency windows
- Installing attic (R38-R49) insulation
- Installing wall (R19-R23) insulation
- Upgraded an old inefficient furnace to an efficient ductless mini-split heat pump

Kris Murphy, of Keller Williams Greater Seattle Realty, represented the builder, Green Canopy Homes and served as the main agent for this home. Murphy works very closely with the Green Canopy Homes staff and she has become quite familiar with EPS through a combination of taking green real estate coursework and through her working history with Green Canopy Homes.

Green Canopy Homes supported the marketing of the energy performance of the home by taking an active and visible approach. The company created a kiosk that describes the EPS and the important energy efficiency features of each of their homes. Additionally, they have provided their brokers with guidance on entering the relevant information into the EPS field on the NWMLS system.

WAC:	**City of Seattle**	SD:	**Seattle**	EL:	**Green Lake**
SWC:	**City of Seattle**	JH:	**Eckstein Mid**	SH:	**Roosevelt High**
POC:	**Seattle City Light**	BUS:	**Yes**	BUS RTE:	**16, 82**
Zoning Code:		3rd Party Aprvl Req:	**None**	Bank/REO Owned Y/N:	**No**
HERS Score:		EPS Score:	**14,000**	LEED:	
Cnstrct Mthds:	**Advanced Wall**				

Murphy did in fact include information in the EPS Score field on NWMLS, however the field provides little context or background as to the meaning of the number that is entered. There is no information on the units the number represents, or information on what a score on a comparable home would be.

According to Murphy, the reaction from potential homebuyers was diverse, with some exhibiting stronger interest in the green features and EPS than others. In most cases, Murphy said that she needed to strike up a conversation regarding EPS in order to engage homebuyers. Murphy pointed out that "what we find is that people appreciate green as an add on, but value, location, layout, and other home attributes come first, energy and green being secondary." For Murphy, it was unclear whether any observable contributory value could be attributed to the energy efficiency components of the home that were portrayed on the EPS. For her, the green features are a great selling point that will influence a demographic that is concerned about the environment and desires to improve the energy efficiency of their home. However, in her view, appraisers are "not quite there yet in terms of correctly valuing all positive features of an EPS home." Murphy and Green Canopy go the extra mile to "make (appraisers) aware of all the features, even behind the walls."

The Wallingford home sold for $1,007,000. Comparable homes selected by this project's Certified Residential Appraiser (CRA) showed that non-EPS, non-certified comparable properties sold for approximately $40,100 less on average. The paired sale analysis for this home reveled that it achieved a premium of 3.9% over the non-certified comparables.

Comparable properties:

Comparable	Year Built	Sq. Ft	Bdrms	Bthrms	Sales Price	Adjusted Sales Price
Comparable 1	2013	2320	3	3.5	$710,000	$926,569
Comparable 2	2013	2320	4	3.5	$725,000	$930,730
Comparable 3	2012	2804	4	3.5	$899,999	$1,043,411

EPS HOME: CORLISS

4521 Corliss Ave N, Seattle 98103 (MLS 553114)

This attractive craftsman home was originally built in 1906, and was significantly remodeled by Green Canopy in 2013. The home is located in the urban neighborhood of Wallingford in North Seattle. The home boasts 4 bedrooms, 3.5 bathrooms and a total square footage of 2,790. The property also includes a new one-stall carport. The home was on the market for 27 days and sold for 99% of the list price.

The home possesses a 3 star, Built Green certification and has an EPS of 18,000 kWhe with a carbon score of 6.0 tons/year. This compared favorably to the average Seattle home with an EPS of 28,000 kWhe. To increase the energy performance, improvements were made to the original home that included:

- Upgrading to high efficiency windows.
- Insulating walls (R19-R23)/basement/attic (R23-R37).
- Upgraded standard oil furnace to an efficient ductless mini-split heat pump and electric wall heaters.
- Switched to high efficiency washing machine and light fixtures.

Daniela Dombrowski, of Keller Williams Greater Seattle Realty served as the main agent for this property and worked closely with Green Canopy Homes. Because of prior educational green building coursework and through her experience directly with Green Canopy, she feels relatively equipped to discuss the EPS and is generally confident in her knowledge when communicating the score to homebuyers. She praises Green Canopy in explaining the features of the score to her, making her sales efforts much more fruitful.

For this particular home, Dombrowski provided EPS score flyers that were discussed with potential homebuyers. The flyers provide a good amount of information regarding the actual numerical EPS score, as well as a description of the methods and metrics used to attain the score. The discussion with potential homebuyers is imperative in her experience as, according to Dombrowski , the score is challenging to market because so few people are familiar with EPS.

"It really requires a conversation to explain what it is and put it in context, trying to convey value to potential homebuyers", says Dombrowski. The EPS drew a mostly positive reaction from the eventual homebuyer, as the EPS for this particular home was excellent given the size and vintage of the home.

WAC:	**City of Seattle**	SD:	**Seattle**	EL:	**Mc Donald Elem**
SWC:	**City of Seattle**	JH:	**Hamilton Mid**	SH:	**Roosevelt High**
POC:	**Seattle City Light**	BUS:	**Yes**	BUS RTE:	**16, 26, 44**
Zoning Code:		3rd Party Aprvl Req:	**None**	Bank/REO Owned Y/N:	**No**
HERS Score:		EPS Score:	**17,000**	LEED:	
Cnstrct Mthds:					

Dombrowski included the EPS score in the NWMLS, however no context is given to what the score represents or in what units the score is calculated. There is also no comparison drawn between this home's score and the average Seattle home's score. Dombrowski believes that "providing this information would emphasize the score for this home and provide buyers with a good understanding of where it stands in regards to other EPS scored homes."

Dombrowski also worked closely with the appraiser to ensure that they understood the value of the EPS. For her, how and whether the score is actually factored into the appraisal is difficult to discern. She states: "It's a great tool for new construction or retrofitted homes that have a good score, but unfortunately, the majority of homes we sell in Seattle are older homes that typically don't test out favorably."

Comparable Properties:

Comparable	Year Built	Sq. Ft	Bdrms	Bthrms	Sales Price	Adjusted Sales Price
Comparable 1	1912	2860*	3	1.75	$786,250	$879,640
Comparable 2	1910	1876*	4	1.75	$810,000	$875,080
Comparable 3	1906	2570*	3	2.5	$899,000	$870,226

*Basement 1 = 970 sq. ft.
*Basement 2 = 1040 sq. ft.
*Basement 3 = 930 sq. ft.

In this specific example, the Corliss home sold for $890,000. Comparable homes selected by a local Certified Residential Appraiser (CRA) showed that non-EPS, non-certified comparable properties sold for approximately $16,910 less on average. The paired sales analysis conducted on this home showed that it achieved a premium of 1.9% over the non-certified comparables.

EPS HOME: N. 97TH

711 N 97th St., Seattle 98103 (MLS 698338)

This property was originally built in 1924 and remodeled in 2014 by Green Canopy Homes. It is a tri-level home with a modern design. The basic features of this home include 3 bedrooms, 2.5 bathrooms, and a total square footage of 2,300. Also included is a detached studio ready for an office, shop or gym. This home resides in the Greenwood neighborhood located in Northwest Seattle. This Green Canopy home is enrolled in the Built Green 4 star program and has an EPS of 15,000 kWhe. The home was on the market for 18 days and sold for 97.34% of the list price.

Craig Brooke-Weiss of Windermere RE/Greenwood was the main agent that listed this home. He was aware Green Canopy Homes specialized in remodeling homes to a higher energy performance and using energy scoring to verify the effectiveness of the energy efficiency work. Because Green Canopy often does gut remodels of homes that they later sell, they see a tremendous value in portraying the performance of the older home to the gut-remodeled home. Despite his work with Green Canopy, however, Brooke-Weiss did not do any marketing around the EPS results, with the exception of including the information on the NWMLS listing.

WAC:	**Seattle Public Utilit**	SD:	**Seattle**	EL:	**Viewlands**
SWC:	**Seattle Public Utilit**	JH:	**Whitman Mid**	SH:	**Ingraham High**
POC:	**Puget Sound Energ**	BUS:	**Yes**	BUS RTE:	**Rapid E to Dntn**
Zoning Code:	**SFR**	3rd Party Aprvl Req:	**None**	Bank/REO Owned Y/N:	**No**
HERS Score:		EPS Score:	**15,000**	LEED:	
Cnstrct Mthds:	**Advanced Wall**				

According to Brooke-Weiss, the homeowner purchased this home due to the aesthetic layout. He is not aware if the homebuyer had an interest in the environmental features the property possessed and which were conveyed and marketed on the NWMLS listing.

Brooke-Weiss believes that the environmental impact of a house, as well as the reduced utility costs associated with higher energy efficiency, is appealing. However, in his view, the EPS homes are not necessarily going to fetch a higher price, as "homebuyers are not going to pay more for a home unless thoroughly educated about the environmental features." Brooke-Weiss believes that "the responsibility of educating the public, real estate agents, and appraisers on the EPS is up to the builders, since they have the most knowledge of the EPS."

Comparable properties:

Comparable	Year Built	Sq. Ft	Bdrms	Bthrms	Sales Price	Adjusted Sales Price
Comparable 1	2013	1346*	2	2.5	$725,000	$763,689
Comparable 2	2013	2790*	4	3.5	$725,000	$660,811

*Basement 1 = 620 sq. ft.
*Basement 2 = 560 sq. ft.

The N. 97th St. home sold for $730,000. Comparable homes selected by a local Certified Residential Appraiser (CRA) showed that non-EPS, non-certified comparable properties sold for approximately $17,750 less on average. Paired Sales analysis completed on this property revealed that the home achieved a premium of 2.4% over the non-certified comparables.

EPS HOME: 14TH AVE NW

8050 14th Ave NW, Seattle 98117 (MLS 638716)

This subject property was originally built in 1948 and remodeled in 2014 by Green Canopy Homes. The basic features include 3 bedrooms, 2.25 bathrooms and a total square footage of 1,494. The property is located in the urban neighborhood of Whittier in Northwest Seattle.

The home achieved an excellent EPS of 10,875 kWhe in comparison to the Seattle average of 28,000 kWhe, and includes a 4 star Built Green builder warranty and energy performance guarantee.

Jon Bergerson of RE/MAX Metro Realty, Inc. was the main agent for this property. He was well prepared and thoroughly versed on the subject of EPS and green home features due to special educational courses for brokers that Green Canopy Homes provided. For marketing this home, Bergerson had signs and pamphlets in the open house to communicate the environmental benefits, and the EPS field in the NWMLS listing was used.

WAC:	**Seattle Public Utilit**	SD:	**Seattle**	EL:	
SWC:	**Seattle Public Utilit**	JH:		SH:	
POC:	**Seattle City Light**	BUS:	**Yes**	BUS RTE:	
Zoning Code:		3rd Party Aprvl Req:	**None**	Bank/REO Owned Y/N:	**No**
HERS Score:		EPS Score:	**10,875**	LEED:	
Cnstrct Mthds:					

According to Bergerson, the eventual homebuyer arrived at the buying process with substantial knowledge as they had done copious research on energy efficient homes. This home received a

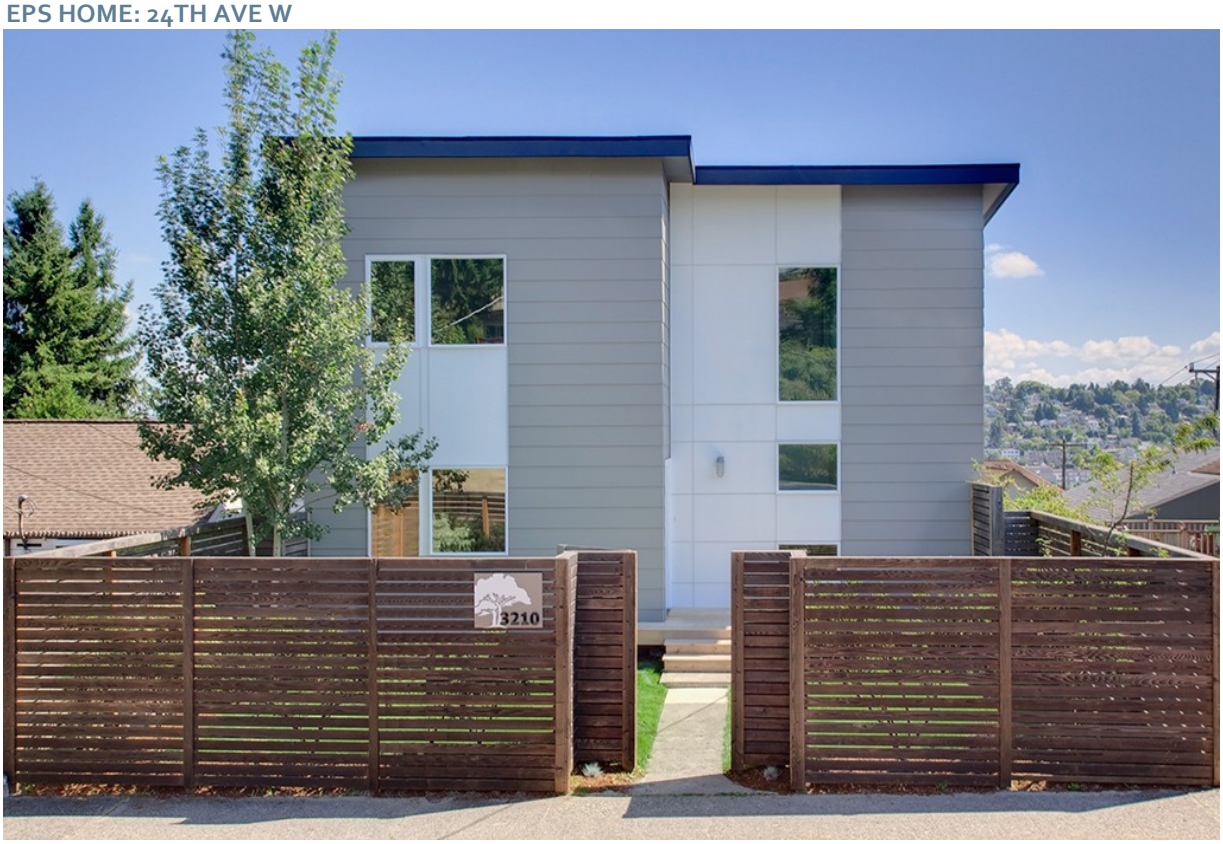
significantly positive response from the homebuyer due to the environmental certifications and the presence of an EPS.

Bergerson noted that he believed there to be a significant value associated with the EPS and the green certifications. The home was listed and expected to sell for $530,000, but ultimately sold for $545,000. Bergersom stated that he was confident the EPS score influenced the home price by approximately $10,000. In fact, comparable homes selected by the project's Certified Residential Appraiser (CRA) showed that non-EPS, non-certified comparable properties sold for approximately $16,575 less on average. The paired sales for this property showed that the home achieved a premium of 3.0% over the non-certified comparables.

Comparable Properties:

Comparable	Year Built	Sq. Ft	Bdrms	Bthrms	Sales Price	Adjusted Sales Price
Comparable 1	2012	2045	4	3.5	$499,000	$517,474
Comparable 2	2012	2088	3	2.5	$529,950	$465,188
Comparable 3	2013	1412	2	2.5	$480,000	$602,683

EPS HOME: 24TH AVE W



3210 24th Ave W, Seattle 98119 (MLS 545930)

This subject property was originally built in 1953 and remodeled in 2013 by Green Canopy Homes. The basic features include 4 bedrooms, 2.5 bathrooms and a total square footage of 2,858. This home is located in the neighborhood of Magnolia, one of the larger and most affluent neighborhoods in Seattle.

The home possesses a 3 star, Built Green certification and an EPS of 15,000 kWhe with a carbon score of 5.1 tons/year. The average home in Seattle has an EPS of 28,000; significantly higher than this home. To achieve this better-than-average EPS, the project team included the following energy efficiency components:

- Reducing air leakage by 4470 cfm50.
- Installing a heat recovery ventilation system.
- Upgrading to high efficiency windows.
- Insulation to walls (R19-R23)/basement/attic (R38-R49).
- Upgraded old oil furnace to an efficient ductless mini-split heat pump and electric wall heaters.
- Upgraded to high efficiency washing machine and light fixtures.

Dustin Van Wyck of Windermere RE/Capitol Hill, Inc. was the main agent for this property. Van Wyck felt he was well prepared on the topic of the energy efficient attributes of the home and its EPS. He received information from the builder on the green features and certifications and therefore felt confident in discussing the EPS with homebuyers. While Van Wyck had some knowledge of the score, he had not previously enrolled in any training classes provided by educational providers or the builder, Green Canopy Homes. But despite this lack of training, the general information provided by the builder was, in his opinion, enough to at least basically explain what an EPS was to prospective buyers. The EPS

for this home was marketed through both the MLS listing and poster size version of the EPS scorecard that described the score and its benefit. This poster was featured prominently inside the home.

WAC:	SD:	**Seattle**		EL:	**Lawton**
SWC:	JH:	**Mc Clure Mid**		SH:	**Ballard High**
POC:	BUS:	**Yes**		BUS RTE:	
Zoning Code:	3rd Party Aprvl Req:		**None**	Bank/REO Owned Y/N:	**No**
HERS Score:	EPS Score:	**15,000**		LEED:	
Cnstrct Mthds:					

According to Van Wyck, the homebuyer's response to the score was mostly indifferent, as he felt certification or EPS scores were not a priority to the homebuyers. Perhaps because of the lack of prior education, Van Wyck did not communicate the added value and savings associated with the EPS score. The eventual homebuyer did not, it seems, obtain any additional information about the improved energy performance of the home.

In Van Wyck's view, there was no observable contributory value of the score for this home. In addition, Van Wyck states that the EPS "played no factor at all" in determining the home's listing price. According to Van Wyck the appraiser was also not knowledgeable about the score and did not seek to clarify the meaning of the score.

Comparable Properties:

Comparable	Year Built	Sq. Ft	Bdrms	Bthrms	Sales Price	Adjusted Sales Price
Comparable 1	2013	1610*	3	2.5	$865,000	$758,950
Comparable 2	2013	2800*	4	3.5	$107,929	$772,979
Comparable 3	2013	2630*	4	4.5	$1,150,000	$842,240

*Basement 1 = 480 sq. ft.
*Basement 2 = 490 sq. ft.
*Basement 3 = 720 sq. ft.

The 24th Ave home sold for $770,000. Comparable homes selected by a local Certified Residential Appraiser (CRA) showed that non-EPS, non-certified comparable properties sold for approximately

21,313 (avg) more on average. The paired sales for this property showed that the home sold for 2.8% less than non-certified comparables.

Whatcom County EPS Homes

EPS HOME: FERNDALE

5923 Shannon Ave, Ferndale 98248 (MLS 555613)

This subject property was new construction built in 2013 and sold in 2014. The basic features of this home include 4 bedrooms, 3 bathrooms and a total square footage of 2,500. This home resides in the middle-income neighborhood of Laurel, which is located in east Ferndale.

Comparable properties:

Comparable	Year Built	Sq. Ft	Bdrms	Bthrms	Sales Price	Adjusted Sales Price
Comparable 1	2013	2390*	4	2.5	$305,000	$322,500
Comparable 2	2013	2212*	3	2.5	$305,000	$334,400
Comparable 3	2013	2320*	3	2.5	$305,000	$328,000

The Ferndale home had been on the market for 203 days and sold for $285,000, or 86.39% of the original list price. This indicates that the market for homes in this price range had not yet rebound from the recession. This is supported by the days on the market of comparable sales, which averaged 267 days. The comparable sales did experience a higher list to sales price ratio than the subject with an average of 99.11%. The paired sales analysis indicates that the subject property did not receive a premium for the EPS score. In fact, it sold for an average of 15.2% below the comparable sales or $29.83 per square foot less. It is unclear if this property had any adverse conditions associated with the sale or if there were any circumstances that could explain the lower than typical sale price. Additionally, the appraiser could not adjust for the EPS score, as the agent input the wrong information in the MLS listing. While an adjustment could not be made in the appraisal, the home was nonetheless marketed as possessing an EPS score and therefore an analysis of market reaction to that score is possible.

EPS HOME: BELLINGHAM

3903 York St, Bellingham 98229 (MLS 647281)

This subject property was a re-sale, built in 1999 and sold in 2014. The basic features of this home include 4 bedrooms, 2 bathrooms and a total square footage of 1,825. This property resides in the neighborhood of Geneva.

Comparable properties:

Comparable	Year Built	Sq. Ft	Bdrms	Bthrms	Sales Price	Adjusted Sales Price
Comparable 1	1996	1655	3	2	$274,000	$377,035
Comparable 2	2001	1792	3	2.5	$319,000	$420,415
Comparable 3	2009	2000	3	2.5	$386,000	$362,055

This Bellingham home had been on the market for 11 days and sold for $464,500, or 97.38% of the original list price. The market time for the comparable sales ranged from 3 days to 360 days. Therefore, this indicator is not reliable. The list to sales price ratio for the comparable sales was slightly higher than the subject at an average of 99.55%. The paired sales analysis indicated that the subject property did sell for a premium, which averaged 16.8% or $40.03 per square foot. However, the subject property is situated on .43 acres, includes passive solar and a tankless H2O heater. The comparable sales are situated on smaller parcels of land, which range from .17 acres to .22 acres. This required an adjustment, which was based on allocation. The land adjustments along with the adjustments for the energy efficiency amenities, dilutes the results from this paired sales analysis to the degree that the information cannot be relied upon for adjustments for EPS scores.

The specific reasons for this higher than expected sales price are not known. The EPS score's value is undetermined in this situation as there are likely other factors contributing. With the lower than typical sale price of the Ferndale home and the higher than typical sale price of the Bellingham home, the influence of the EPS score on the market is inconclusive. Without further information on the conditions of both sales, and in particular the specific driver for the Bellingham home's sale price, a conclusion as to the presence of a premium for EPS score cannot be determined at this time.

Conclusion

The research conducted to compile these seven case studies demonstrates that EPS is not currently prevalently used on Northwest MLS (NWMLS) listings in Washington. The case studies do, however, provide insight into how the EPS metric is being used by market leaders to potentially financially benefit their residential home sales. These case study homes are instructive in how the EPS is being - or could be - used in the remodeling, construction, and home sale/purchase process. While the analysis does not demonstrate definitive contributory value that could be assigned to a home based on its EPS, the Seattle case studies collectively show a potential *observable* contributory value of EPS in Seattle, with an average premium across the five properties of 1.7%. As larger numbers of EPS are included in MLS listings in Seattle and elsewhere, a comprehensive analysis with a statistically significant data sample size should be undertaken to determine if this potential *observed* contributory value is in fact an accurate representation of *actual* market reactions.

EPS are needed in a greater number of MLS listings to ensure that sufficient home energy information is contained in real estate transactions. In the short term, more emphasis on broker education is warranted to assist in increasing awareness of EPS and its benefits in the marketing and listing of a home. Greater availability of specialized training provided to brokers could address broker knowledge and communication deficiencies discovered in researching these case study. As an example of the kind of education that could be delivered, RMLS, the MLS system serving a majority of Oregon, has invested in specialized "EPS on the MLS trainings" for its members.

A second barrier to greater prevalence of EPS in MLS listings is the systematic reliance on the broker to be the primary "advocate" for EPS. Current systems rely on the broker to request EPS information from a home seller – whether a builder or existing home owner – and then manually upload that information into the listing. However, in actual practice, a motivated builder or home seller is usually providing this EPS information to the broker. Very rarely is a broker proactively asking whether EPS information is available when they are creating a new listing. The automated transfer of EPS data from energy efficiency programs to the MLS would greatly aid in removing the onus on brokers to seek this information. This automation would also help in ensuring that brokers become more aware of the EPS itself and that accurate energy information becomes a more frequent part of the real estate transaction.

APPENDIX G: Median Sales-to-List-Price Ratios for Subject Properties in Select Locations

Location	Certification Type	Subject Property Median Sales-To-List-Price Ratio
Washington		
King County – Suburban westside	ENERGY STAR	+0.1%
King County - Suburban eastside	ENERGY STAR	+0.3%
Kitsap County	ENERGY STAR	+4.4%
Snohomish County	ENERGY STAR	+3.3%
Thurston County	ENERGY STAR	+0.9%
King County –Suburban westside and eastside	Built Green	+1.1%

APPENDIX H: Energy Trust of Oregon "Sister" Study

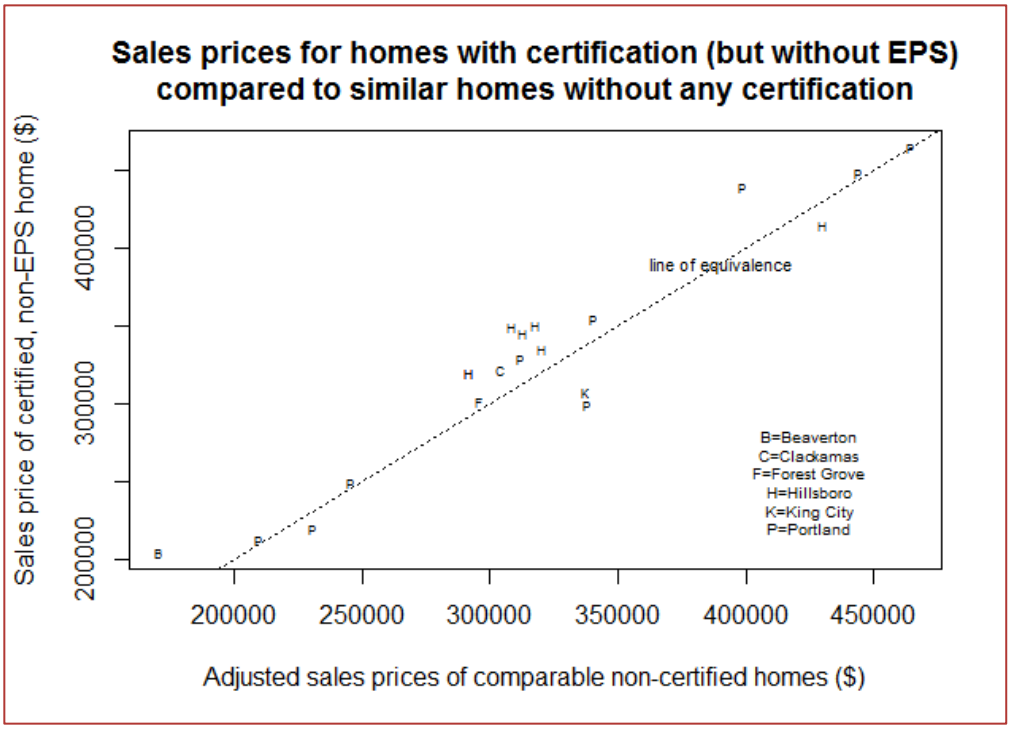
The Portland-metro Results in Context: Energy Trust of Oregon "Sister" Study

In 2014-15 Watkins & Associates analyzed the contributory value of Energy Performance Scores (EPS) for Energy Trust of Oregon[42]. A significant number of homes that are energy performance tested in Oregon, whether new or existing, receive an EPS. The metric is thus an integral part of the single-family energy efficient construction marketplace, which also includes residences with solar Photovoltaic (PV) systems and green certified homes. Because EPS is the primary metric with which new home energy performance is measured, it is closely tied to new ENERGY STAR and Earth Advantage homes. Thus, an analysis of EPS in Portland required consideration of ENERGY STAR and Earth Advantage homes. Results of the analysis applied in this study concluded that there was a statistically significant price premium for certified over non-certified homes in the Portland-metro study area.

Portland, OR: Energy Star or Earth Advantage certification (without EPS)

Properties with a certification (ENERGY STAR or Earth Advantage) but without an EPS in the listing or marketing materials had a statistically significant, but modest, price premium. The mean price premium (Ve) was $11471, or 4.1%. This is statistically significant, with p values around 0.03.

Figure 14: Sales prices for energy and green certified homes in Portland



[42] Watkins, Taylor, 2015, A Study on the Residential Market Valuation of EPS and Solar PV in the Greater Portland and Bend, Oregon Markets, Energy Trust of Oregon.

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