MRIS Green MLS Adoption Study

1. Summary

The District of Columbia's District Department of the Environment (DDOE) commissioned this deliverable to encourage a more robust market for green homes. The goal of this project was to establish an initial framework for progress. The work was designed to follow a framework for market transformation as defined by Elevate Energy (formerly CNT Energy) and Home Performance Coalition (formerly National Home Performance Council) in the report "Unlocking the Value of an Energy Efficient Home: A Blueprint to Make Energy Efficiency Improvements Visible in the Real Estate Market. The report, which was published in August 2013, outlined seven steps to transformation:

1. **Consistently document energy efficiency improvements**
2. **Report on the growing inventories of energy-efficient homes**
3. Capitalize on existing education and training opportunities
4. **Work with the real estate community to reflect these improvements in local for-sale listings**
5. Ensure data is incorporated into the appraisal process
6. *Develop standardized IT solutions*
7. Work with partner financial institutions to ensure selection of qualified appraisers

Of these seven steps, the three steps listed in bold—Steps One, Two, and Four—are the focus of this deliverable. In addition, Step Six is addressed in a separate deliverable related to the feasibility of downloading utility usage data to the real estate industry.

Under Step One, data was collected to identify where green building is happening in the District of Columbia. For Step Two, data available from the U.S. Census, third-party green building programs working in the District, and the multiple listing service (MLS) covering the District was used to determine trends in how green homes are listed and sold.

This analysis indicates that the MLS offers a robust set of fields for green homes at or above the offerings that are standard to this industry. Usage of these fields has grown 53 percent since they were first introduced in 2009, with these fields being applied more than 5,600 times in 2013. Usage of key fields by MLS members represents just over 4 percent of eligible listings, which is in line with an industry usage benchmark of 3 percent to 5 percent.

The MLS is planning an update to its available field offerings, which creates an opportunity for an improved set of fields, a more streamlined data entry process, and increased awareness and usage of these fields beginning in 2015.

This adoption study, which is limited by the amount of inventory available, found that the majority of the third-party verified green homes in the District are focused in six residential zip codes. This creates the opportunity to target green MLS communications and resources to real estate professionals focusing in these select areas. This finding also raises opportunities for how the Government of the District of Columbia can encourage the growth of green homes throughout the District. Finally, the results of the study also establish a foundation for the development of the seven key steps identified above.

Programs verifying green home building are known and their data is accessible. Using this baseline data, the analytics subsidiary of the local MLS, Realestate Business Intelligence (RBI), has established a process for reporting how these homes are listed and sold. DDOE has an unprecedented opportunity to continue to support this process for identifying and reporting green home availability and sales in the District through the initial work that was done with verification programs and the MLS. Identification and reporting of green home inventories is the missing link to full real estate engagement and DDOE can use the deliverables from this grant to accelerate engagement.

The baseline reports on inventory data create a business case for the real estate community to engage around education and training. This baseline data also serves as the pre-work appraisers need to complete case study analysis of green home valuation in the District (Step 5).

This deliverable puts DDOE in a position of working with the real estate community on the ultimate prize– consistent sharing of data from builders to listing agents so that entering data in Green MLS fields becomes business-as-usual and transforms consumer expectations for the efficiency of homes sold in the District.

2. Overview

The team at Elevate Energy set out to understand a few basic questions about how the real estate market in the District of Columbia values green homes. This evaluation was run in partnership with the local multiple listing service, Metropolitan Regional Information Systems (MRIS), and its subsidiary, Realestate Business Intelligence (RBI). It is the first inventory of such homes performed in the District, and is the first known inventory of its kind in the nation.

The first step of this work was to answer: What is a green home? The team used the term "high-performance home" to reflect that the concept of "Green MLS" can go beyond energy efficiency and also reflect performance such as disaster resiliency or using fewer resources. Since available data in the District focused specifically on energy efficiency, this deliverable likewise focuses on high-performance homes providing energy efficiency features. The homes tracked in this research were listed or sold either as high-performance as certified by a third party or by utilizing at least one of five high-impact, easy-to-verify efficiency fields. This differs from the RBI market analysis report, which defined a high-performance home as one that uses at least one of any of possible energy efficiency fields and third-party verified fields.

The high-impact fields examined in this research are:

- ENERGY STAR Heating
- ENERGY STAR Cooling
- ENERGY STAR Appliances
- Tankless Hot Water
- Programmable Thermostat

The second broad research question of this research was: What is the number of high-performance homes and how is that number changing over time? The team used statistics provided through census data about residential housing trends in the District, as well as actual sales data from MRIS and RBI. In 2009, when

HPH fields were first made available to MRIS members, 2,641 listings utilized these fields. The number increased 53 percent over four years to a total of 5,633 listings utilizing these fields in 2013.

Finally, the research team sought the answer to the question: Are those who sell homes listing high-performance features in the process? We focused on answering this question in the case of third-party certified homes (such as ENERGY STAR homes or LEED-certified homes) where we could compare the local MLS data with other complete datasets. We found that approximately 4 percent of the 508 potential third-party certified high-performance homes had been listed in MRIS. As context, a national study by CoreLogic showed that MLSs across the United States were only capturing 3 percent to 5 percent of the third-party certified homes.

In general, there is a positive environment for Realtors to sell high-performance homes in the District. MRIS offers a robust selection of industry-standard fields, and the number of high-performance homes has been growing. MRIS is unique among its peers in that it has deep competency for real estate analytics within its RBI business unit and an effective offering of analytics tools available to its members.

We hope that awareness of baseline usage goals and actuals will create a great opportunity for interested stakeholders to collaborate with MRIS and promote further leadership on implementation of Green MLS fields. The commitment by MRIS to update its fields in Quarter 1 of 2015 and the market study completed by RBI provides a great deal of momentum. MRIS has established a framework for promoting and selling high-performance homes. We urge MRIS and other stakeholders such as DDOE and utilities to work together towards the logical next step of making sure fields are populated accurately. This deliverable makes that goal more feasible by identifying where high-performance home inventories exist in the District and establishing the upper limit parameters for usage expectations.

3. Scope

To reiterate, the scope of this Green MLS Adoption Study was to address four research goals: complete a baseline catalogue of high-performance home (HPH) fields implemented by MRIS, provide statistics on usage of each high-performance home field identified above, provide a baseline calculation of the inventory and density of high-performance homes (high-performance homes vs. code homes), provide a baseline to compare current usage of fields to potential usage (based on actual housing inventory levels in the District).

4. Key Findings

4.1 Baseline catalogue of HPH fields implemented by MRIS

Eighty-one percent of fields highlighted on the MRIS Eco-Friendly Residential Profile Sheet match the Real Estate Standards Organization's (RESO) Data Dictionary. See profile sheet samples in Appendix E. MRIS was an early adopter of high-performance home fields and as such, implemented fields before they were standardized by the industry.

The fields that address solar, third-party verified certifications, and third-party verified metrics were generally less aligned with the Data Dictionary. This is common among MLSs such as MRIS that implemented high-performance home fields as early adopters, prior to standardization in RESO Data Dictionary. MRIS will be using the gap analysis included in this report (Appendix C) as input to its planned upgrades to high performance home fields for Q1 2015.

An output of the development process for this deliverable was a discussion about how to group the fields highlighted on the MRIS Eco-Friendly Residential Profile Sheet as a related set of fields for statistical reporting by RBI.

There were two critical elements that emerged as criteria:

- Does the measure make a high impact on efficiency?
- Is it easy for a layperson to confirm?

Five fields emerged as the focus of the efficiency measures cluster that RBI used to calculate statistics. This High Impact/Low Error grouping of fields promotes high opportunities for savings to home owners, yet offers low risk of error by listing agents. These fields are as important to efficiency advocates as they are safe to real estate professionals. This is a cluster of property features that the industries can work together on to promote and advance:

- ENERGY STAR Heating
- ENERGY STAR Cooling
- ENERGY STAR Appliances
- Tankless Hot Water
- Programmable Thermostat

4.2 Statistics on usage of HPH fields implemented by MRIS

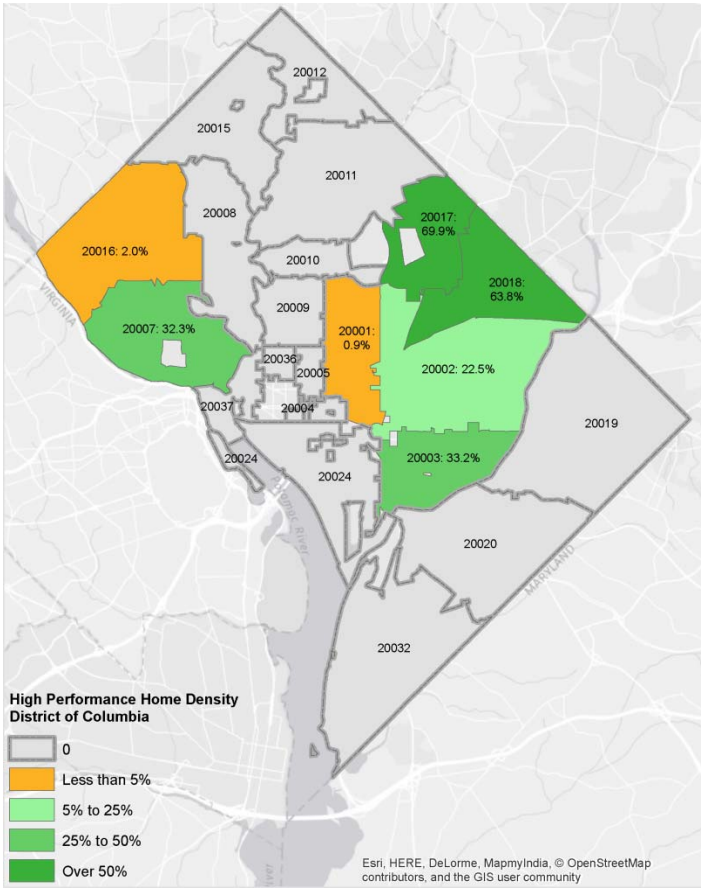
Location Efficiency fields are the most popular category of HPH fields. This is consistent with housing trends and consumer trends in the District.

The High-Impact/Low-Error cluster of five energy efficiency fields are the third most-used category of HPH fields.

Third-Party Verified fields are used the least. This is somewhat due to the limited number of units available. However, MRIS' expected upgrade to its HPH fields could be a catalyst for improved awareness and usage of fields. More information on this topic is provided in the baseline inventory findings below and in the suggested next steps.

4.3 Baseline inventory and density of high-performance homes vs. code homes

Three high-performance home verification programs provided data aggregated by zip code which identify high-performance home building occurring in the District. This data was compared against available census data to provide context on high-performance building "hot spots" where real estate professionals are more likely to encounter high-performance properties. Six hot spots emerged in the neighborhoods of Howard, Capitol Hill, Georgetown, Brookland, Catholic University, Brentwood, and Lincoln. While MRIS is equipped to manage high-performance home transactions via available fields, it is possible that limited supply confined to a few neighborhoods may be slowing interest and engagement with these fields among Realtors.



4.4 Baseline comparison of current field usage vs. actuals

Data available from third-party programs working in the District indicate there have been 625 high-performance home units available for sale since 2000. This includes detached residential and multi-family units in buildings with 50 or fewer units overall. Based on trends in sales that are available via MRIS, it is estimated that 182 high-performance properties could have been listed in MRIS from 2009 to 2013. Instead, MRIS data indicates 27 unique units (14.8 percent of the total potential units) were listed using third-party verified HPH fields.

While this number may seem disappointing, it is above the range of the closest industry benchmark for MRIS and its MLS peers. The MLS database vendor CoreLogic has more than 140 MLS software installs and informally estimates that these clients implement high-performance home fields on only 3 percent to 5 percent of all listings.

Knowledge of this first baseline could help DDOE, MRIS, and its member boards such as Greater Capitol Area Association of REALTORs (GCAAR), the District Sustainable Energy Utility (DCSEU), and other stakeholders to look for other opportunities to improve usage, particularly among Realtors who sell in the six hot spot neighborhoods.

This project immediately precedes a commitment by MRIS to update HPH fields as a part of its overall product continuous improvement plan, and the timing of this report has prompted an early review of these findings by MRIS product development staff. While no specific plans or release date are available at this time, MRIS has committed to updating this set of fields and initial planning and design is underway. The product team welcomed the pre-work that was accessible to them as part of this deliverable and is planning to use the results as an input into the overall design process. The recommendations included in

this deliverable, if applied, would make HPH fields, in particular for third-party verifications, easier to find, enter, track, and report. The final release of the field updates can be expected in 2015 with the MRIS standard update rollout process that includes user communication and training. This would be a welcomed catalyst for additional support and awareness building, both internal to MRIS and its members, as well as from stakeholders who might applaud and enhance MRIS' efforts.

5. Research

5.1 Inventory of HPH fields implemented by MRIS

MRIS currently offers 43 fields which are highlighted on the Eco-Friendly Residential Profile Sheet (See Appendix E).

Table 1. Current fields highlighted on the MRIS Eco-Friendly Residential Profile Sheet.

Third-Party Verified Fields (9)	Location Efficiency Fields (5)	Efficiency Measures (23)	Additional Environmental Quality Fields (6)
ENERGY STAR Certification Third-Party Eco-friendly Certification Heating and Cooling—Geothermal Heat and Cool—Geothermal Heat Pump Solar On Grid Solar Photovoltaic Solar Act/Pass Solar Off Grid Solar Rough-In	1 mi-subway 1 mi-Metro Bus Adjacent to Shopping 1 mi-Commuter Rail Adjacent to Grocery	ENERGY STAR Appliances Programmable Thermostat FP Gas Insert High Efficiency Toilets Radiant (heat) ENERGY STAR windows/doors Instant hot water Dual Flush Toilets ENERGY STAR Heating System ENERGY STAR Cooling System 90% Forced Air Low-E windows Tankless Attic Fan Triple Pane Windows Solar Tubes FreshAirRecoverySys S/W Changeover Vegetated Roof Mod/Manuf (Modular/Manufactured home) Structural Insulated Panel Sys—SIPS Solar Attic Fan	Silestone Counters Recycling Area Fiber Cement Siding PaperStone Counters Recycled Content Countertops Rainwater Harvesting

5.2 Criteria for final three categories for field reporting:

In order to evaluate sales trends and statistics, properties sold within MRIS were evaluated within three final clustering of information:

- Location Efficiency fields
- Third-Party Verified fields
- High Impact/Low Error Efficiency Measures

Of the 21 efficiency measures in Table 1, only five items met the criteria of being easy to identify and contributing strongly to the efficiency of a home, as highlighted in the lower right section in blue in Figure 1. These five fields are the ones that will be tracked for usage.

- ENERGY STAR Heating
- ENERGY STAR Cooling
- ENERGY STAR Appliances
- Tankless Hot Water
- Programmable Thermostat

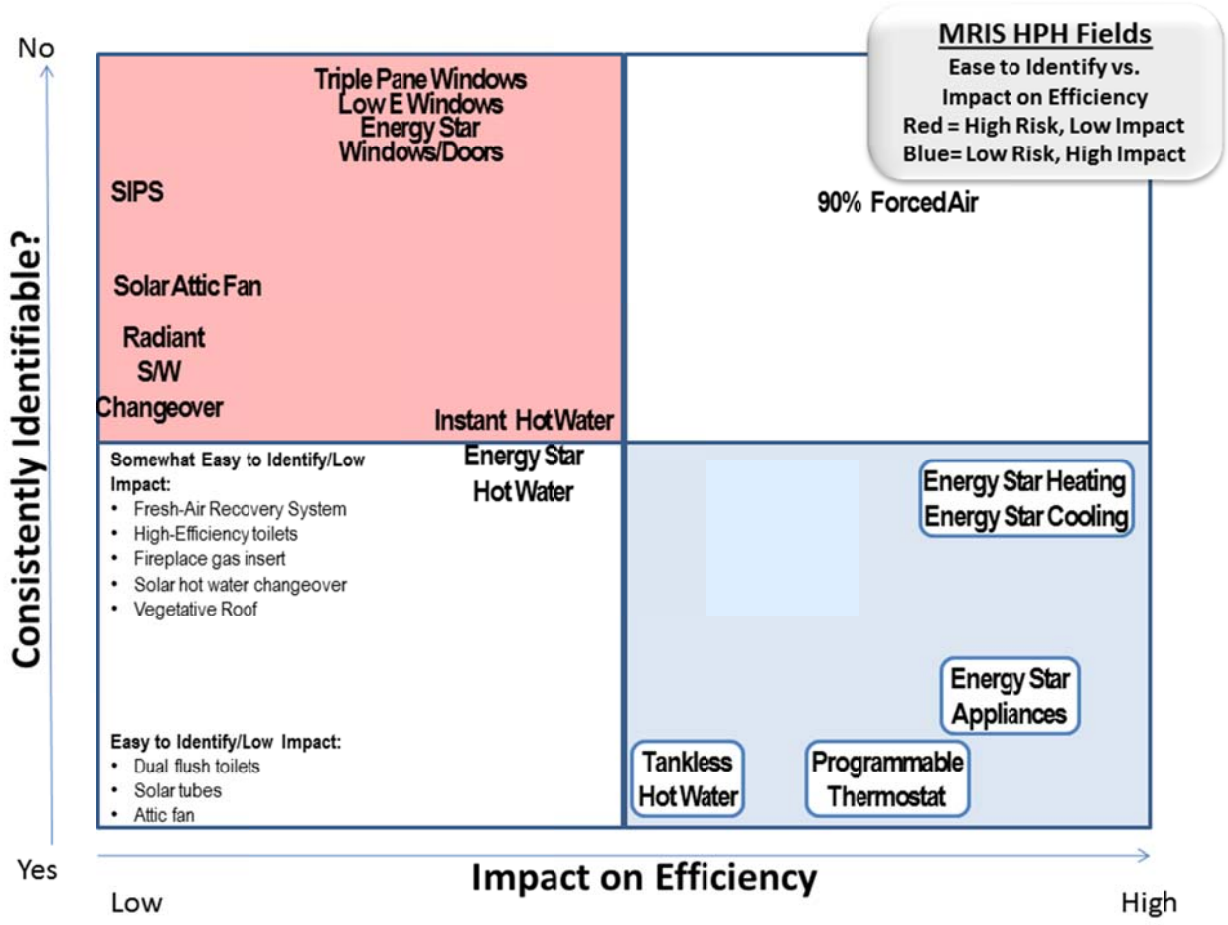


Figure 2. Criteria for tracking HPH fields

For the Third-Party Verified fields grouping, homes with certifications or solar or geothermal features that are supported with documentation meet the same criteria of having a high impact on the efficiency of a property while being easy to identify and verify.

5.3 Gap analysis results:

In July 2014, Elevate Energy compared the 43 fields highlighted on the MRIS Eco-Friendly Residential Profile Sheet against standard fields for high-performance homes documented in the Real Estate Standards Organization (RESO) Data Dictionary and also in the National Association of REALTORs (NAR) *Green MLS Implementation Guide*.

Both the Data Dictionary and *Green MLS Implementation Guide* are designed to define how selected fields can be implemented by an MLS. MLSs are not required to implement all fields in the Data Dictionary.

The gap analysis identified exact matches and matches using synonyms. The MRIS fields also include selections that go beyond the Data Dictionary and are not yet defined in the standard. There are also some important fields which MRIS implemented prior to definition in the Data Dictionary. This creates a conundrum common among early adopters of high-performance home whereby the fields are now non-compliant. Finally, there are several important fields included in the Data Dictionary and not currently offered by MRIS.

The summary of the gap analysis is shown in Table 2. Detailed description follows in Appendix C.

Table 2. MRIS/RESO Data Dictionary Gap Analysis

Matches/Synonym Matches (20)	Extensions Beyond Data Dictionary (15)
Dual Flush Toilet	PaperStone Counters
Programmable Thermostat	Recycled Content Countertops
Recycling Area	Silestone Counters
ENERGY STAR Appliances	FP Glass Insert
Structural Insulated Panel Sys—SIPS	Instant Hot Water
Storm Door	Low-E windows
ENERGY STAR	Triple Pane Windows
Grey Water	Instant Hot Water
ENERGY STAR Heating System	Solar Attic Fan
Geo-Thermal	Attic Fan
Geothermal Heat Pump	1 mi-subway
Fiber Cement Siding	1 mi-Metro Bus
Rainwater Harvesting	Adjacent to Shopping
FreshAirRecoverySys	1 mi-Comm Rail
Tankless	Adjacent to Grocery
Vegetated Roof	
High Efficiency Toilet	
Solar Tubes	
Radiant (Heating System)	
Solar (Hot Water)	

Revise (8)	Add (8)	Consider Adding (3)
ENERGY STAR Certification Third Party Eco-Friendly certification Trombe Wall Solar Solar Act/Pass Solar On Grid Solar Off Grid 90% Forced Air	GreenBuildingVerification Green[Type]YearVerified Green[Type]VerificationRating Green[Type]VerificationMetric Green[Type]VerificationURL WalkScore Tenant Responsible- Third Party HPH certification Architectural Style – Passive Solar	Foundation - Active Radon Mitigation Flooring - CRI Green Label Plus Certified Carpet, FloorScore® Certified, FSC or SFI Certified, Reclaimed Wood Walls/Ceilings - Low VOC paints/finishes, Advanced Framing, Low VOC Insulation, Recycled/Bio-based Insulation, Batt Insulation, Blown Insulation, Spray Foam, Rigid Insulation, Insulated Exterior Duct-Work

5.4 Usage of implemented HPH fields

Baseline measures for implemented HPH fields included usage on listings within 21 residential zip codes in the District on the following years:

- 2009: First year of HPH field implementation
- 2011: Mid-point since implementation
- 2013: Calendar year 2013

5.5 Summary: All fields

MRIS calculated usage of HPH fields based on data for the first year of field availability (2009), mid-point of availability (2011) and last full year available (2013).

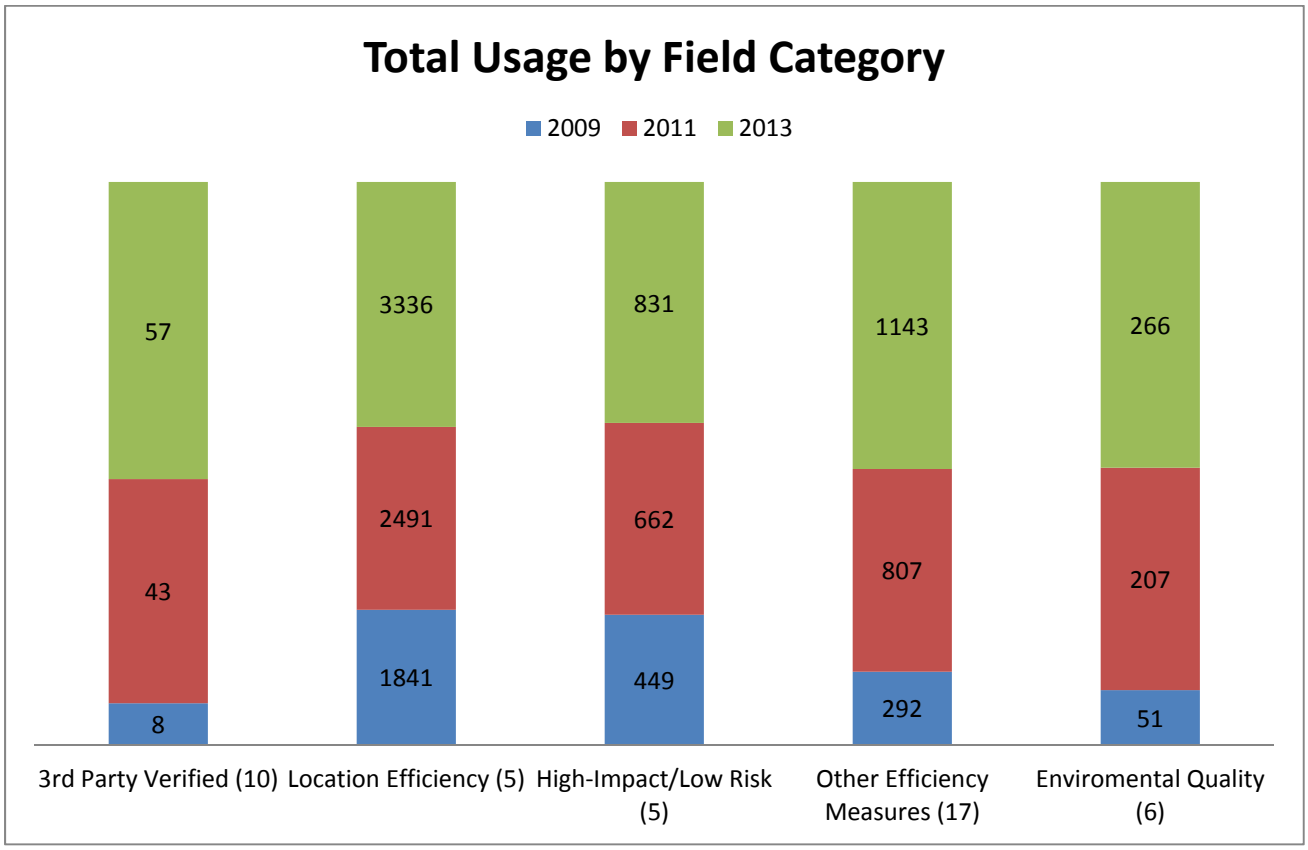


Figure 3. HPH field usage 2009, 2011, and 2013. Source: MRIS/RBI.

From 2009 to 2013, Location Efficiency fields have been the most popular, representing 61 percent of high-performance field usage. Other efficiency measures that are lower impact on efficiency, higher risk to verify correctly, or both represent 18 percent of field usage. The next popular is the set of five efficiency measures considered High Impact/Low Error (for efficiency and data entry risk respectively), at 16 percent. Usage of fields for Environmental Quality features such as eco-friendly countertop materials, rain harvesting, and a recycling center, was 4 percent. Usage of Third-Party Verification fields such as geothermal, solar and building certifications were 1 percent.

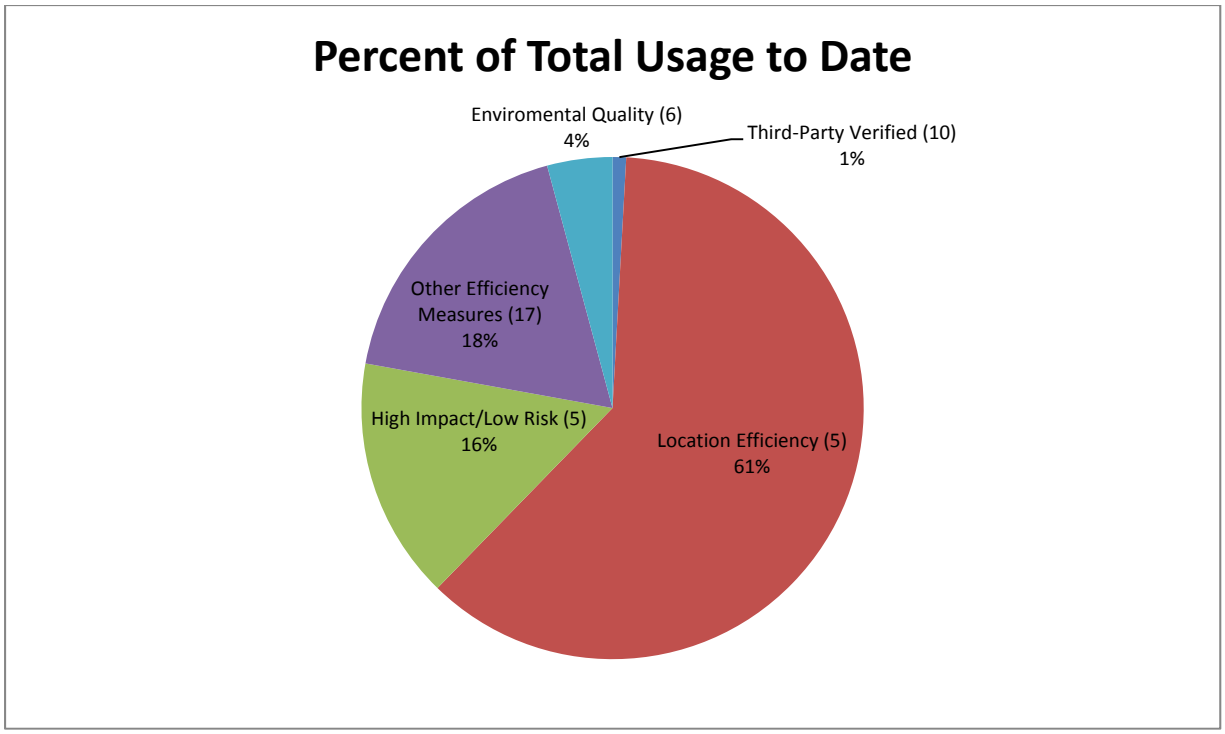


Figure 4. Usage of HPH fields by cluster, total usage from 2009 to 2013. Source: MRIS/RBI.

5.6 Additional information on usage of HPH fields

High-Performance Home Density Index

	Renter & Owner Occupied Housing[1]					USGBC – LEED			ENERGY STAR	Total 3rd Party Certified	HPH Densities
Type	*Total of All Housing Units*	*Total of All Housing Units*	*SF**	*MF**: 2-4 units "low rise"*	*MF: 5-49 units "mid rise"*	*SF*	*MF: 2-4 units "low rise"*	*MF: 5-49 units "mid rise"*	*SF**		
Age	*1999 or Earlier*	*2000 or later*				*2000 or later*					
Washington D.C.	241214	19964	3774	865	4173	2	67	340	216	625	7.1%
20001, Howard U./Shaw	13056	5722	201	204	940	-	-	-	12	12	0.9%
20002, Capitol Hill/North	22865	1050	179	178	202	-	39	82	5	126	22.5%
20003, Capitol Hill/South	9322	1539	208	57	109	-	-	113	11	124	33.2%
20007, Georgetown/Burleith	2186	181	161	0	0	-	-	44	8	52	32.3%
20016, Cathedral Hts/AU Pk	4773	240	131	8	9	2	-	-	1	3	2.0%
20017, Brookland/Catholicu	11201	516	73	10	146	-	28	101	31	160	69.9%
20018, Brentwood/Lincoln	8598	276	185	0	47	-	-	-	148	148	63.8%

Source: [1]ACS 2012 5-year Estimates (Table B25127), USGBC, RESNET

*SF includes detached homes and townhouses

**All MF includes condos, coops, and rentals

Table 3. High-Performance Homes by Zip

Baseline High-Performance Resale Rate (2008 to 2013)

	B – Total units built 2000 or later	C - Units 2000 or later Sold outside MRIS	D –Units 2000 or later Sold via MRIS	E – HPH MLS Eligible	F - # HPH home sales expected in MRIS	G - Actual Listed in MRIS	H -% Reported
	2008-13 Public Records	MRIS Estimate (FSBO/builder vs. MRIS member)		See Table 3	Formula: (E*D)	MRIS Data	Formula: (G/F)
Factor		18.70%	81.30%				
	7,157	1,338	5,819	224	182	27	14.8%

Table 4. High-Performance Homes, Expected/Actual. Source: MRIS

The maximum number of high-performance homes available for sale during the study period in the District is 625*. During the study period of 2008 to 2013, approximately 182 were estimated for sale via MRIS members based on overall sales patterns during this time. Table 3 shows that most of this inventory was available in just six out of the 21 residential zip codes. Actual entry of high performance homes utilizing Third-Party Verified fields during the study period was 27, or 14.8 percent.

For context, the MLS software vendor CoreLogic has HPH fields available in many of its 140 install locations. Where HPH fields are available, CoreLogic reports informally that between 3 percent to 5 percent of listings take advantage of these fields. The MRIS Third-Party Verified field usage is above this peer comparison.

**Due to constraints in using ACS data and the reporting process by HPH programs, this number includes both condominiums that are counted in MRIS stats and apartments that are out of scope. Therefore, the HPH MLS Eligible number is higher than actual as apartments cannot be removed from this count.*

6. Ideas for Next Steps

6.1 For DDOE

DDOE can advocate for the three major third-party programs working with builders in the District to regularly report HPH stats in a standard format and process (mid-year and year-end) to MRIS/RBI. If the major third-party certification organizations share this data, the tracking of high-performance home sales can be a regular, standardized occurrence. Third-party verified certifications are critical because they represent high savings opportunities for home owners and low risk of data entry for Realtors as defined in Figure 1.

Along that vein, DDOE can advocate for the three major third-party programs working with builders in the District to consistently make documentation available to MRIS members as a listing attachment. For example, builder rewards in the building code or permitting process could specify sharing data and documentation on third-party verifications in an MLS-friendly format.

Finally, DDOE can look for ways to encourage the availability of documentation for existing home-efficiency improvements (especially via Home Performance with ENERGY STAR, BPI standard 2101 for quality assurance of existing home-efficiency upgrade documentation). A strong relationship with RealEstate Business Intelligence (RBI) will ensure accurate tracking of high-performance home penetration into the market.

6.2 For MRIS/RBI

We recommend to MRIS and RBI to continue to use statistics and findings generated from this deliverable as input to continuous improvement process for future field offerings. Regular tracking will also allow MRIS to evaluate ways to communicate field improvements and training opportunities in target areas identified in this deliverable.

6.3 Joint Real Estate Outreach Work (in partnership TBD–MRIS, Greater Capital Area Association of REALTORs (GCAAR), DDOE, DCSEU, etc.)

We recommend that joint outreach and education on selling high-performance homes be first targeted at the six high density "hot spots" for HPH homes (i.e. Howard, Capitol Hill, Georgetown, Brookland, Catholic University, Brentwood, and Lincoln neighborhoods). Large brokerages that serve those six neighborhoods are primary partners in a joint outreach and education initiative. In addition, there is a need for supporting outreach for the Appraisal Institute Residential Green & Energy Efficiency Addendum and how to advocate for a "green" appraisal. It is fortunate that IMT is already working in this area for commercial buildings within the District.

7. Appendix A: Methodology

7.1 Catalogue of high-performance home fields implemented by MRIS

1. Review MRIS Eco-Friendly Residential Profile Sheet and document highlighted high-performance home (HPH) fields.
2. Compare MRIS HPH fields to *RESO Data Dictionary Version 1.3* HPH fields. Document if the MRIS fields are a direct match to Dictionary fields, a synonym match, do not match, or extend beyond the Dictionary.
3. Group fields by information type and record notes. (See Table 1)
4. Group fields by match status and record notes. (See Table 2)

7.2 Statistics on usage of each HPH field implemented by MRIS

1. Establish groupings of available MRIS HPH fields as documented in Catalogue of Green Fields activity (Step 3 above).
2. Consult with subject-matter experts to finalize groupings. Potential resources include:
    - Peter Swinton, District of Columbia Home Performance with ENERGY STAR Program Assistant, DC Sustainable Energy Utility (DCSEU)
    - Lisa A. Sturtevant, PhD, Executive Director, Center for Housing Policy; Vice President of Research, National Housing Conference
    - Brad O'Connor, PhD, Research Economist, Florida Association of Realtors
3. Agree to grouping criteria:
    - The field contributes significantly to energy efficiency for housing stock in the District.
    - The information in the field can be readily confirmed without extensive outside knowledge or resources, meaning that there is a low risk that the seller or listing agent will enter incorrect information in this field. The feature or equipment can be easily inspected visually or supporting documentation to clarify is readily available and easy to interpret.
    - See Figure 1.
4. Document final three categories for field reporting (See Table 1):
    - Location Efficiency fields
    - Third-Party Verified fields
    - High Impact/Low Error Efficiency Measures
5. Report usage stats for these three sets of fields. See Usage of implemented HPH fields section below.

7.3 Baseline calculation of the inventory and density of high-performance homes

1. Aggregate housing data from ACS 2012 five-year Estimate—Table B25127 from census tracts to the 21 residential zip code areas in the District . Report housing units built in 2000 or later in the following segments:
    - One-unit single-family, detached, or attached (single-family detached and townhouse/duplex)
    - Two-to-four unit multifamily (for this report, also considered "low-rise" multifamily; condos or apartments)
    - Five-to-19 and 20-to-49 unit multifamily (for this report, also considered mid-rise multifamily; condos or apartments)
    - More-than-50 unit multifamily (for this report, also considered high-rise multifamily; condos or apartments)
2. **HPH Inventory:** Request aggregate counts for high-performance units by zip code from the major high-performance new construction programs in the District:
    - USGBC reporting LEED for Homes units
    - Home Innovation Research Labs reporting ICC 700—National Green Building Standard units
    - RESNET reporting ENERGY STAR units four stories and below
    - EPA reporting ENERGY STAR units five or more stories
3. **Data Alignment:** Data was not consistently available for high-rise buildings of 50 units or more. Therefore, the final analysis only focuses on buildings up to 50 units.
4. **HPH Density**: Total the counts from all reporting programs and divide into ACS counts for the same housing types. This produces an HPH density for each zip code. See Table 3 and Appendix D.

7.4 Baseline to compare current usage of fields compares to potential usage of fields (*(Third-Party Certified fields only)*

1. Use public records (tax data) to estimate the total number of housing units built since 2000 that closed between 2008 and 13.
2. **MRIS Capture Rate:** Use public records (tax data) and MRIS data to calculate the number of units closed and reported within MRIS (sold by Realtor) and outside (sold FSBO, by builder, etc.).
3. **HPH Expected:** Use the HPH inventory from HPH Inventory activity (Step Two above) as the cap for high-performance housing units eligible for listing in MRIS. Apply the MRIS Capture Rate to HPH Expected to calculate the expected number of high-performance homes closed and reported through MRIS.
4. Divide the actual number from the expected number to determine the reported percentage.
5. Compare the MRIS HPH Actual percentage to the industry benchmark which is 3 percent to 5 percent, as reported by CoreLogic based on the installation of its MLS database software in approximately 140 markets.
6. See Table 4.

8. Appendix B – Usage of HPH Fields

8.1 Third-Party Verified fields (10 possible fields)

Third-party verifications are relatively new and while high-performance home building is growing, these above-code units are not extensively available for sale yet. This is reflected in the very low number of fields used from this category. Likewise, these fields mean a fairly significant investment has been made in the property and thus it is harder for homes to be eligible in this category of fields.

More information on potential vs. actual usage of fields in this category is provided in the next section on baseline high-performance home resale rate.

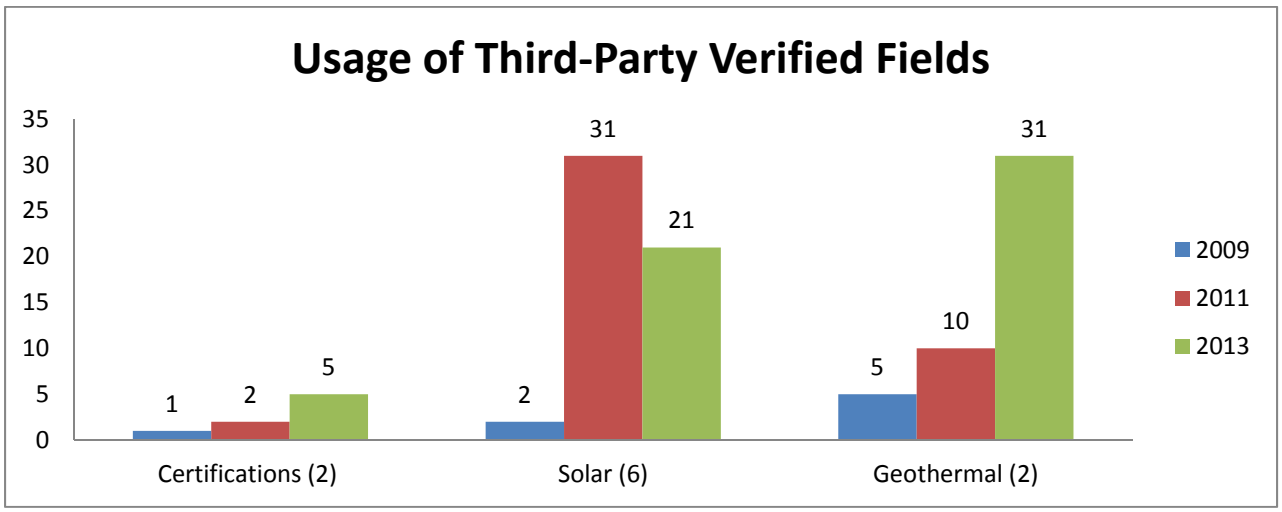


Figure 5. Third-Party Verified field usage, 2009, 2011, and 2013. Source: MRIS/RBI.

8.2 Location Efficiency fields (5 possible fields)

Usage trends reflect general housing trends in the District. Automobile costs are expensive, and location data is easy to verify, so Location Efficiency fields contain useful information and are easy to enter. This combines to make this category of fields the most frequently used in the District.

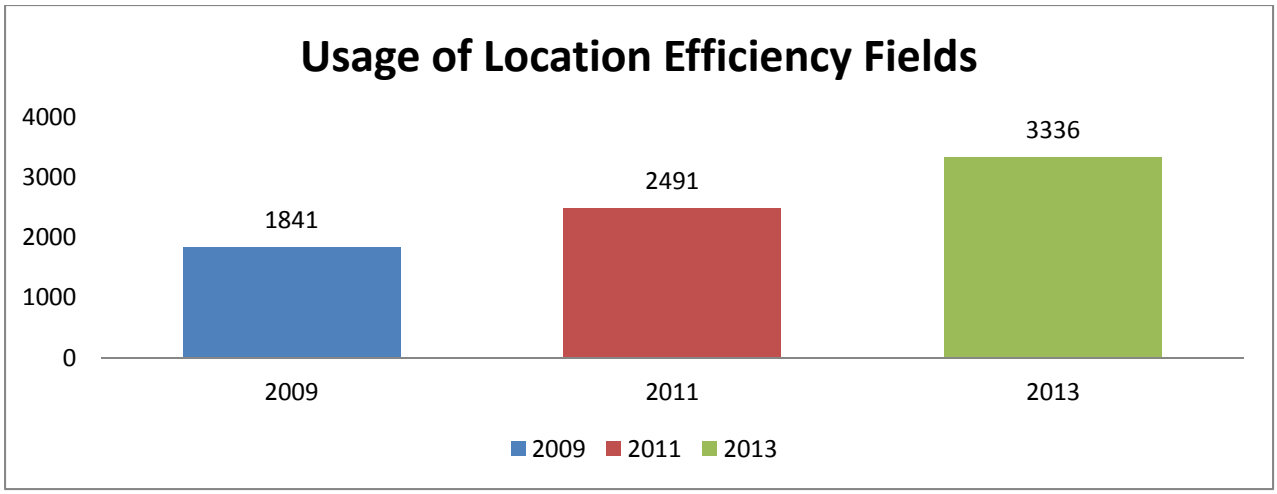


Figure 6. Location Efficiency field usage, 2009, 2011, and 2013. Source: MRIS/RBI.

8.3 High Impact/Low Risk Efficiency Measures (5 possible fields)

Figure 1 previously showed the criteria used to organize this category of fields into two clusters: those considered High Impact/Low Error (for efficiency and data entry risk respectively) and Other. Together, all efficiency measures make up 34 percent of field usage. The five fields shown in the lower right corner of Figure 1 are the High-Impact/Low-Risk fields highlighted in blue. These five fields represent 16 percent of all field usage as shown in Figure 7 below. This high rate of usage for a select-but-important set of fields is a good news indication that the measures that make a true impact on efficiency are of interest to consumers and easier for listing agents to handle during the sales process.

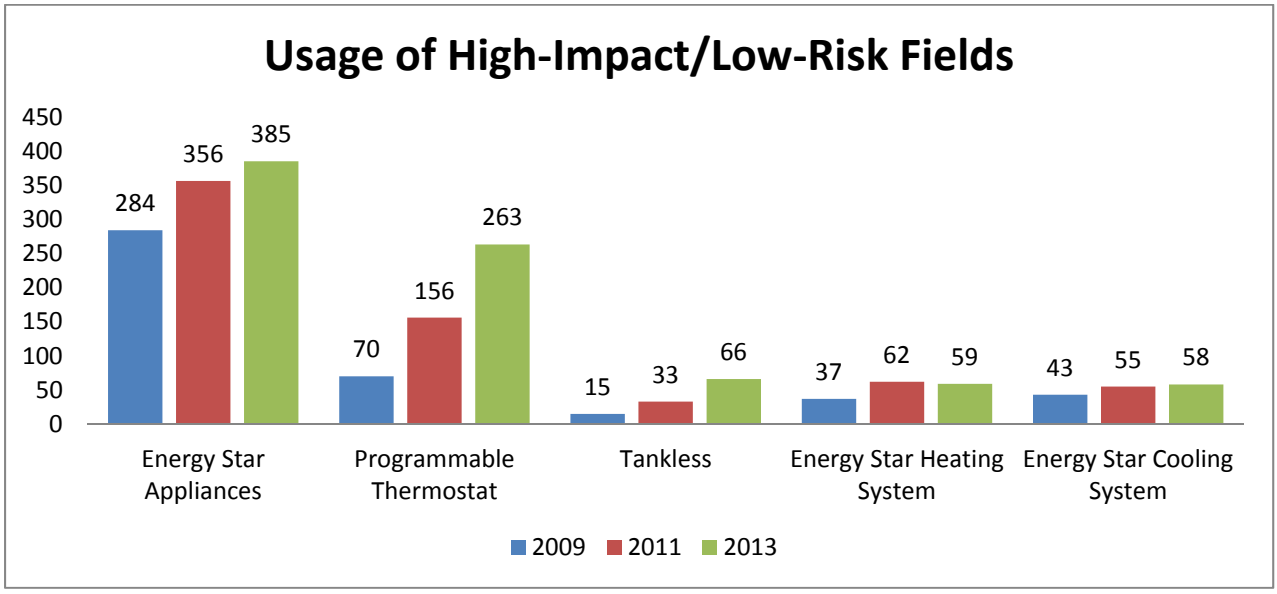


Figure 7. High-Impact/Low-Risk Efficiency Measures field usage, 2009, 2011, and 2013. Source: MRIS/RBI.

8.4 Other Efficiency Measures (17 possible fields)

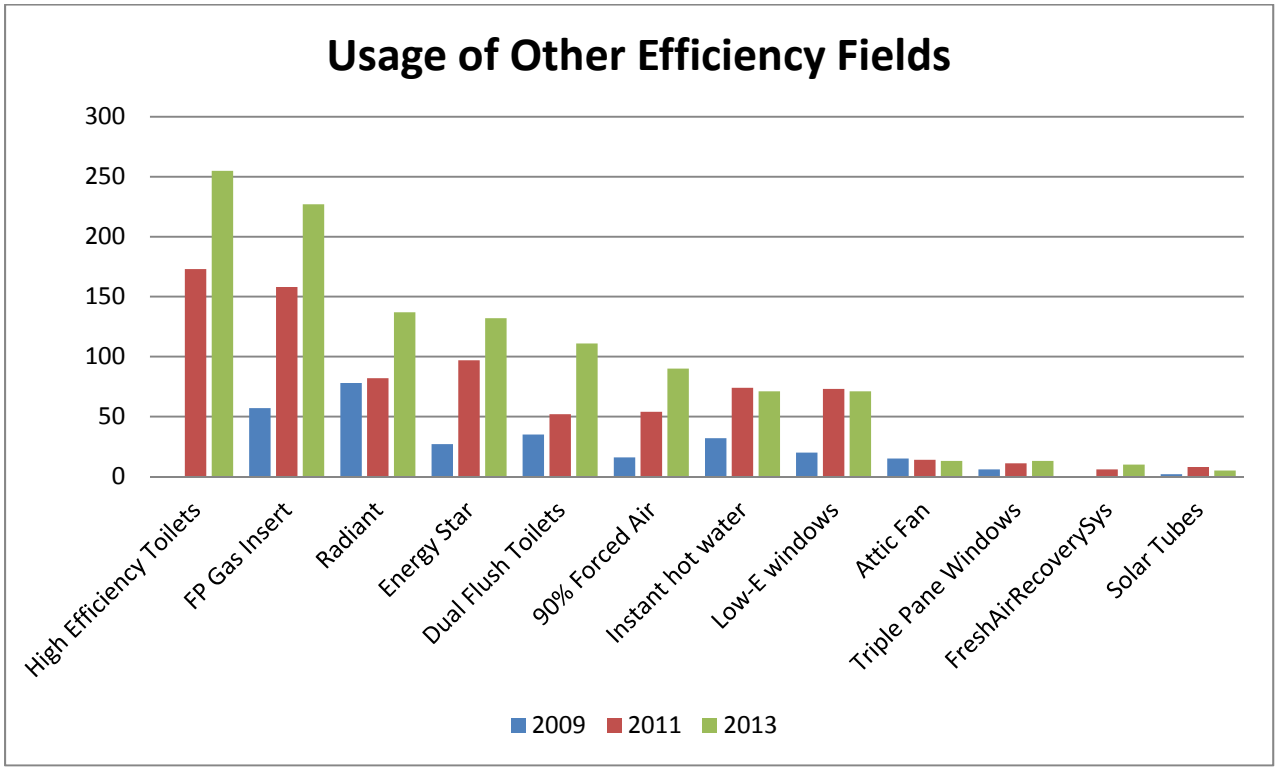


Figure 8. Other efficiency measures field usage, 2009, 2011, and 2013. Source: MRIS/RBI. Fields with fewer than 10 data entries since 2009 not shown: Vegetated Roof, Solar Hot Water Changeover, SIPS, Modular/Manufactured Housing, and Solar Attic Fan.

8.5 Environmental Quality Measures (6 possible fields)

Environmental Quality fields can be hard for real estate agents to verify, which may be leading to lower usage. This field cluster includes countertop materials (three choices), fiber cement siding, recycling area, and rainwater harvesting.

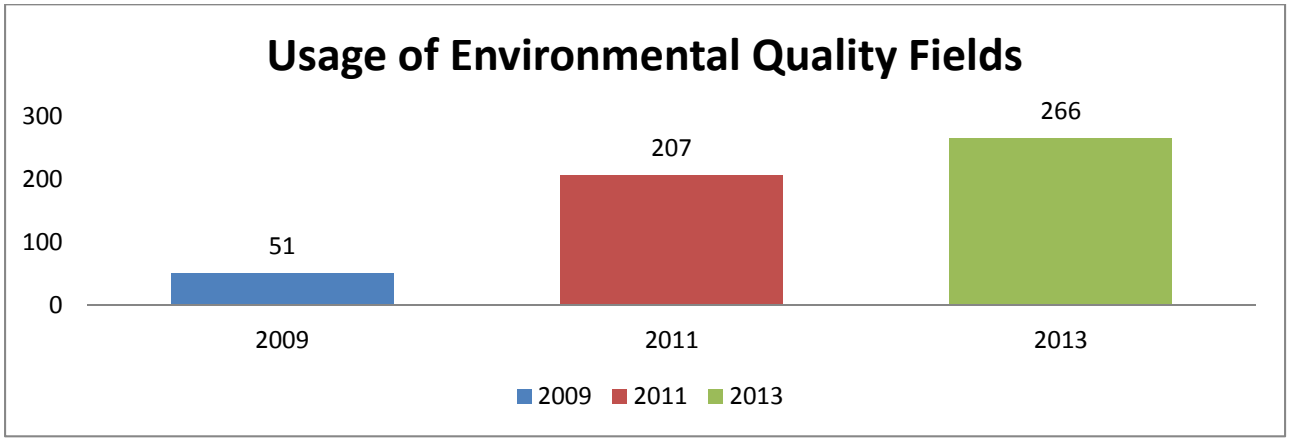


Figure 9. Environmental Quality Measures field usage, 2009, 2011, and 2013. Source: MRIS/RBI.

Prior to the start of this project, MRIS published a report on high-performance homes based on a survey to MRIS members. The April 2014 report, "MRIS Releases List of Green Home Trends Popular with Homebuyers This Spring.," highlighted similar findings that are reflected in the field usage described in this section, including the interest in geothermal and Location Efficiency.

9. Appendix C: Recommendations for MRIS High-Performance Home Fields– Strategy for Compliance with RESO Data Dictionary

In July 2014, Elevate Energy compared the 43 fields highlighted on the MRIS Eco-Friendly Residential Profile Sheet against standard fields for high-performance homes documented in the Real Estate Standards Organization Data Dictionary and also in the NAR *Green MLS Implementation Guide*.

The gap analysis identified several comparisons.

- Exact matches/synonym matches (20)
- Extensions Beyond Data Dictionary (15): Not yet defined in the RESO Data Dictionary
- Revise (8): Best Practices as defined in the RESO Data Dictionary warrant revisions to a handful of MRIS fields. This will ensure fewer data entry mistakes while reducing agent liability
- Add (8): Same as above. Additions are recommended to ensure fewer data entry mistakes while reducing agent liability
- Consider Adding (3): Additions could enhance the MRIS field offering but are not directly tied to data quality and agent liability

This appendix defines rationale and recommendations for revisions, additions and considerations.

Maintain As Is (35)

- Of the fields highlighted on the MRIS Eco-Friendly Residential Profile Sheet, 81.4 percent match RESO Data Dictionary or extend past the Dictionary (considered compliant as they allow for MRISs to implement fields that reflect current inventory or practices that are either locally specific or emerging and not yet reflected in the Dictionary)
- Exact matches/synonym matches (20)
- Extensions Beyond Data Dictionary (15)

Revise (8)

- 18.6% of current fields highlighted on the MRIS "Eco-Friendly Residential Profile Sheet"

Among early adopters of high-performance home fields, it is not uncommon to find that these MLSs implemented fields for energy generation and third-party verification programs that are now not aligned with the fields adopted by RESO in the Data Dictionary. As anticipated, the current "Eco-friendly" fields offered by MRIS fall into this category.

MRIS continues to show a strong commitment and leadership both related to continuous improvement of products and data available to MRIS members, as well as to data related specifically to high-performance homes. As such, the product development team at MRIS is currently using draft versions of this deliverable as input into an update rollout of high-performance home fields expected by Q1 2015. The revision recommendations listed below have been shared with the product development team.

RESO DD Enumeration (Field)	MRIS Enumeration (Field)	Notes
GreenBuildingVerification Green[Type]YearVerified Green[Type]VerificationRating Green[Type]VerificationURL	Documents <<AND>> ~~1.ENERGY STAR Certification~~ (Replace) ~~2.Third-Party Eco-Friendly Certification~~ (Replace)	Best practice is to have both a field to describe participation in a third-party verification as well as a way to indicate that supporting documentation is available. Maintain high performance home fields in "Documents" field and add verification fields. See *Green MLS Implementation Guide* Section 4a. Rules apply. Implemented in CRMLS as an example.
GreenBuildingVerification ▪ PHIUS/Passive Home Certification ▪ DOE Zero Energy Ready Home Certification	~~3.Trombe Wall~~ (Replace) ~~4.Solar Act/Pass~~ (Replace) ~~5.Solar (Heating Fuel)~~ (Replace) Recommendation is to remove the individual references and add choices for PHIUS/Passive Home and DOE Zero Energy Ready Home as an enumeration for GreenBuildingVerification	As above. True passive solar is created through complex interactions of overall home design and features. While Trombe Wall is a key component, data integrity of passive solar homes can be maintained if passive solar is reflected through participation in a third-party program rather than emphasizing specific elements in isolation. See Documents revision above. Also *Green MLS Implementation Guide* Section 4a.

On-Site Energy Generation • **Solar** • **Combined heat & power (CHP) – natural gas generator (steam)** • **Wind** • Diesel/Oil Backup • On Grid • Off Grid • Rough-In PV Solar/Wind Ownership ▪ 3rd-Party Owned ▪ Direct ownership ▪ Net-Metering Renewable Energy Credits Metering • Net meter • Time of use meter (Smart meters)	~~6.Solar On Grid~~ (Replace) 7.~~Solar Off Grid~~ (Replace) Recommendation: BUILDING – UTILITIES • Add – On-Site Energy Generation (4 choices out of 4 are highlighted "Eco-friendly" rest are neutral or NA) • Add PV Solar/Wind Ownership field • Revise - Metering field Note – Changes are for power and heat. Hot Water options remain as is in a separate field.	On-Site Energy Generation is power that is created on the end-user's side of the meter, not on the utility side of the meter. Solar is typically not a heating/cooling source, although it could be the electricity source for heating or cooling equipment. On the other hand, geothermal does belong to system and fuel fields for heating and cooling and does not relate to renewable power. Ownership of renewables is beginning to emerge as a key issue both in terms of disclosure requirements and valuation. It is important that MLSs provide a framework for whether renewables equipment is owned or leased. Likewise ongoing credits may be available to either the renewables lease-holder or transferred to the new property owner depending on owner or leased status. This is an emerging recommendation that extends past Data Dictionary as summarized in *Green MLS Implementation Guide* Section 4B - Energy Generation.
ENERGY STAR Qualified Equipment (Heating)	~~8.90% Forced Air~~ (Replace)	Since efficiency standards improve over time, better to reference ENERGY STAR rather than a level of efficiency.

Add (8)

RESO DD Enumeration (Field)	MRIS Enumeration (Field)	Notes
GreenBuildingVerification Green[Type]YearVerified Green[Type]VerificationRating Green[Type]VerificationURL	Documents <<AND>> 1. USGBC LEED 2. NAHB NGBS 3. Home Performance with ENERGY STAR Text fields	Best practice is to have both a field to describe participation in a third-party verification as well as a way to indicate that supporting documentation is available. Maintain high performance home fields in "Documents" field and add verification fields. See *Green MLS Implementation Guide* Section 4a. Rules apply. Implemented in CRMLS as an example.
Green[Type]VerificationMetric Green[Type]YearVerified Green[Type]VerificationURL	Documents <<AND>> 4. HERS 5. Home Energy Score Numeric fields.	Standard scores are available that allow consumers to consider the efficiency performance of the home against its features.
6. WalkScore	Property – Community, with Transportation Numeric field.	MRIS already offers an extensive list of Location Efficiency fields. WalkScore is part of the RESO DD and would offer context for available fields.
Note: This is an extension; not available in current RESO DD.	7. (Tennant Responsible) Third Party HPH certification	The Tennant Responsible field gives landlords an opportunity to promote efficiency certifications which may reduce monthly tenant costs on utilities.
Note: This is an extension; not available in current RESO DD.	8. Architectural Style – Passive Solar (Multiple selections allows)	True passive solar in a new home or as an existing home update involves advanced architectural details. It is not as simple as large south-facing windows. Offering passive solar choice in Architectural Style is best way to allow this design to be recognized, while limiting options for it to be used incorrectly in a stand-alone field. See Green Building Verification field recommended above.

Consider Adding (3)

RESO DD Enumeration (Field)	MRIS Enumeration (Field)	Notes
1. Foundation - Active Radon Mitigation	<<AND>> Documents RadTestResult	Recommendation is to include a field for Active Radon Mitigation in addition to the radon

		document field already implemented.
2. Flooring - CRI Green Label Plus Certified Carpet, FloorScore® Certified, FSC or SFI Certified, Reclaimed Wood	Building – Rooms – Flooring	
3. Walls/Ceilings - Low VOC paints/finishes, Advanced Framing, Low VOC Insulation, Recycled/Bio-based Insulation, Batt Insulation, Blown Insulation, Spray Foam, Rigid Insulation, Insulated Exterior Duct-Work	Building – Features – Walls/Ceilings	

Appendix D: High-Performance Home Density

	Renter & Owner Occupied Housing[1]					USGBC – LEED[1]			ENERGY STAR[1]	Total 3rd Party Certified Homes	HPH Densities
Type	*Total of All Housing Units*	*Total of All Housing Units*	*SF**	*MF**: 2-4 units "low rise"*	*MF: 5-49 units "mid rise"*	*SF*	*MF: 2-4 units "low rise"*	*MF: 5-49 units "mid rise"*	*SF**		
Age	*1999 or Earlier*	*2000 or later*				*2000 or later*					
Washington D.C.	241214	19964	3774	865	4173	2	79	342	218	641	7.3%
20001, Howard U./Shaw	13056	5722	201	204	940	-	-	-	12	12	0.9%
20002, Capitol Hill/North	22865	1050	179	178	202	-	39	82	5	126	22.5%
20003, Capitol Hill/South	9322	1539	208	57	109	-	-	113	11	124	33.2%
20004, Washington	N/A	N/A	N/A	N/A	N/A	-	-	-	-	0	N/A
20005, Logan Cir/Thomas Circle	4370	809	0	0	108	-	-	-	-	0	0.0%
20007, Georgetown/Burleith	2186	181	161	0	0	-	-	44	8	52	32.3%
20008, Woodley/Clvlnd Pk	13893	282	31	16	151	-	-	-	-	0	0.0%
20009, Dupont/Adams Morgan	16118	537	52	56	73	-	3	-	-	3	N/A
20010, Columbia Hts/Mt Plt	26557	2015	59	10	828	-	6	-	1	7	N/A
20011, 16th St Hts/Crstwd	12057	570	87	49	205	-	3	2	1	6	N/A
20012, Colonial Vlg/Takoma	24144	548	55	0	121	-	-	-	-	0	0.0%
20015, Friendship/Chevy Chase	3597	261	22	9	71	-	-	-	-	0	0.0%
20016, Cathedral Hts/AU Pk	4773	240	131	8	9	2	-	-	1	3	2.0%
20017, Brookland/Catholicu	11201	516	73	10	146	-	28	101	31	160	69.9%
20018, Brentwood/Lincoln	8598	276	185	0	47	-	-	-	148	148	63.8%
20019, Benning Hts/Deanwd	4713	957	710	110	0	-	-	-	-	0	0.0%
20020, Anacostia/Hillcrest	21475	1624	868	14	313	-	-	-	-	0	0.0%
20024, SW Waterfront	17152	500	85	20	345	-	-	-	-	0	0.0%
20032, Congress Heights	6490	1270	667	124	64	-	-	-	-	0	0.0%
20036, Downtown	11695	396			278	-	-	-	-	0	0.0%
20037, West End/Foggy Btm	6952	671	0	0	163	-	-	-	-	0	0.0%

Source: [1]ACS 2012 5-year Estimates (Table B25127), USGBC, RESNET

*SF includes detached homes and townhouses **All MF includes condos, coops, and rentals

See "Units in Structure: definitions here, page 36: http://www.census.gov/acs/www/Downloads/data_documentation/SubjectDefinitions/2010_ACSSubjectDefinitions.pdf

Appendix E: MRIS Eco-Friendly Profile Sheet

(Attached as a separate PDF named “MRIS_Eco_Friendly_Residential_Profile_Sheet”)