Hedonic Property Price Analysis:
Energy Home Labelling Program

Draft Report

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1 KEY MESSAGES

- Only nine detached single-family homes that participated in the "Know Our Homes YEG" program were listed and sold in the last 21 months (the study period); consequently, it was not possible to evaluate the impact of home energy labels on transactions prices and listing durations.

- The study instead focused on the relationship between (a) key energy efficiency and renewable energy terms in the realtor's description of homes and (b) transaction prices and listing durations.

- There is no noteworthy relationship between days-listed on the market and the main structural characteristics of detached single-family homes sold in Edmonton (e.g., size, number of garage parking spaces, number of bathrooms, etc.); for this reason, no meaningful relationship can be estimated between the days-listed and the presence of key terms of interest in the realtor's description of homes.

- There is a significant, positive relationship between the transaction price of detached single-family homes and the presence of specific energy efficiency and renewable energy terms in the realtor's description of homes.

- The presence of a high-efficiency furnace in a detached single-family home is estimated to increase a home's expected transaction price by 2.44%, all else being equal. This equates to a price premium on the average detached single-family home of $10,240 (Q1 2019 dollars).

- The presence of terminology in the realtor's home description related to "furnaces" in general is estimated to increase a home's expected transaction price by 1.48%, all else being equal. This equates to a price premium on the average detached single-family home of $6,210.

- The presence of terminology in the realtor's home description related to "windows" is estimated to increase a home's expected transaction price by 5.10%, all else being equal. This equates to a price premium on the average detached single-family home of $21,400.

- The presence of terminology in the realtor's home description related to "insulation" is estimated to increase a home's expected transaction price by 6.74%, all else being

equal. This equates to a price premium on the average detached single-family home of $28,285.

- The presence of any terminology in the realtor's home description related to energy efficient and renewable energy technologies is estimated to increase a home's expected transaction price by 2.66%, all else being equal. This equates to a price premium on the average detached single-family home of $11,160.

- The estimated transaction price premiums found in this study are within the range of values found in the literature.

- If one accepts that including key energy efficiency and renewable energy terms in the realtor's description of homes reflects the presence of corresponding technologies in those homes, then the positive price premiums found in this study suggest that investment in these technologies is capitalized into home values.

2 INTRODUCTION

2.1 Study context

A key market failure impeding investment in energy efficiency is imperfect information. That is, where parties to an economic transaction do not have all relevant information necessary to understand the costs and benefits of their choices. In a housing transaction, this would occur if either the buyer, the seller, or both, are less than 100 per cent certain about the attributes of the dwelling being bought and sold, or where one party (typically, the seller) knows much more than the other regarding that dwelling's qualities. In the latter context, the buyer faces a situation of asymmetric information.

Imperfect information complicates economic transactions, like buying and selling a house, and will lead to a sub-optimal allocation of resources to energy efficiency in the home. Homeowners will underinvest in energy efficiency if they do not expect to occupy their homes long enough for the annual energy cost savings to offset the up-front investment costs of energy saving technologies. If the energy saving technologies in a home are capitalized within the selling price, then homeowners could recover the up-front investment costs when selling their homes. However, sellers may not be able to convincingly signal buyers that they are selling an energy efficient home, and buyers may not be able to accurately determine the energy saving potential of a home's energy efficiency features—wall and attic insulation efficiencies are not readily observable. Hence, a buyer's offer will not accurately reflect the true operating costs associated with that home. Inadequate or asymmetric information in housing transactions can lead buyers to pay more (or less) than their purchase is truly worth to them when evaluated with perfect information, producing an inefficient outcome.

Home energy certification or labelling programs are designed to overcome these information failures in the residential housing market. They provide sellers with a means to inform potential buyers about the intrinsic energy performance of their homes, ensuring that energy efficiency investments are recognized at the time of sale. Equally, they provide buyers with a means to accurately assess the likely (energy) running costs of homes, as well as their exposure to energy price escalation over time. Home energy labels also reduce transaction (search) costs.

In 2017 the City of Edmonton launched such a program -- "Know Our Homes YEG" -- using EnerGuide for homes as the certification label. The EnerGuide label provides information on a home's rated annual energy use and energy intensity.[1]

[1] See https://www.edmonton.ca/city_government/urban_planning_and_design/energuide-rating-system.aspx and https://www.nrcan.gc.ca/energy/efficiency/homes/16654.

2.2 Study objective

The objective of this study is to inform an ex post, retrospective evaluation of the "Know Our Homes YEG" program, from its introduction through to the end of the first quarter (Q1) in 2019. A period covering about 21 months. Specifically, using econometric techniques, the study sought to address the following question:

Are energy labels or specific key words (e.g., high efficiency furnace, solar, triple glazed windows, etc.) in the marketing materials for homes on the MLS® associated with:

1. Higher transaction prices for **detached single-family** homes;[2]

2. Shorter listing durations on the market; or

3. Both.

Answers to these questions will shed light on the effectiveness of the home labelling program or the presence of energy efficiency-related words in home descriptions in capitalizing energy efficiency into house prices and reducing days on the market. Due to data limitations, however, it was not possible to evaluate the impact of energy labels (see Section 3). Only nine homes that participated in the "Know Our Homes YEG" program were listed and sold in the last 21 months. The evaluation thus focused on the relationship between key energy efficiency and renewable energy terms in the marketing materials and transaction prices and listing durations. The results of the study—despite being positive—should not be interpreted as passing judgement on the effectiveness of the home labelling program.

3 DATA

3.1 Data sources

Three primary data sets are used for the study:

1. A database with information on the energy performance of 273 existing residential dwellings that participated in the program (through Q1 2019) and have EnerGuide labels. This database was provided by the City of Edmonton.

[2] The scope of the study is limited to detached single-family homes. These homes account for about 65-85% of the total available observations for analysis across all home types; see Section 3.

2. An MLS® database with information relating to the listed price, sale price, transaction date, structural characteristics and neighbourhoods of 24,496 dwellings that sold between Q3 2017 and Q1 2019. About 65% (15,963) of these dwellings were classified as “detached single family”. This database was provided by the Realtor’s Association of Edmonton.

3. The MLS® Home Price Index (or MLS® HPI for short), which was used to convert all nominal price information in the MLS® database to constant Q1 2019 prices. The index was downloaded from https://www.crea.ca/housing-market-stats/mls-home-price-index/. Unless otherwise specified, all prices presented below are in Q1 2019 constant dollars.

To investigate the impact of home energy labels on transaction prices a sufficiently large sample of homes with labels need to have sold over the study period. However, exploration of the EnerGuide and MLS® databases revealed that only nine homes that obtained labels through the program sold during this period (and where thus in both databases). As a result, it was not possible at this stage in the program to evaluate the impact of energy labels on transaction prices or listing durations. Instead, we estimated relationships between these outcomes and key energy efficiency-related words in the marketing materials for homes on the MLS®.

Table 1: Key energy efficiency or renewable energy words in home descriptions on MLS® and aggregate groups

Group	Key words
Furnace	“Furnace”, “New furnace”, “High efficiency furnace”, “Updated furnace”
Water tank	“Hot water tank”, “New hot water tank”
Heat recovery	“HRC”, “HRV”, “Heat recovery”
Windows	“New windows”, “Updated windows”, “High efficiency windows”, “Triple pane”, “Triple glazed”
Insulation	“Insulation”
Others	“Solar”, “Greenbuilt”, “Energy efficiency”, “Energy efficient”, “High efficiency”, “EnerGuide”

The MLS® database provides descriptions of individual residential dwellings for sale. These descriptions were searched for key terms that would indicate recent investments by the homeowner in energy efficient or renewable energy technology. Table 1 (second column) shows the key terms found in the descriptions for detached single family dwellings across the MLS® database. For the purpose of the regression analysis the terms were grouped into higher-level

categories (first column, Table 1); each of the 'groups' is used as an independent variable in the regression models (see Section 4.2).

The MLS® database also indicated discretely for some homes (i.e., outside of the property's description) whether the furnace was "high-efficiency" (1,230 homes) or "mid-efficiency" (451 homes). The impact of these terms on transaction prices and days listed was also evaluated separately.

3.2 Descriptive statistics

There were 15,963 detached single family homes in the MLS® database. The average sale price was $433,535 [minimum = $10,000 and maximum = $3,399,748]. The average days listed was 57.2 days. To remove the impact of outliers on the results, homes with roughly the lowest and highest 2.5% of observed sale prices (i.e., <$150,000 and >$850,000) were excluded from the dataset. This results in a study sample of 15,193 homes, with an average sale price of $419,637.

Out of the study sample, about 31% (69%) of homes did (did not) contain at least one of the key terms listed in Table 1. Just over 0.2% of homes contained four of the terms (see Table 2).

Table 2: Distribution of homes by number of key energy efficiency or renewable energy words

Number of terms	Number of homes in study sample	Percentage of sample
0	10,434	68.7
1	2,828	18.6
2	1,536	10.1
3	361	2.4
4	34	0.2
Total	15,193	100.0

The distribution of at least one observation from each key word 'group' in the home descriptions of the study sample is shown in Table 3. The most frequently reported key words related to a home's furnace—with at least one of the following terms appearing in the descriptions of about 22% (3,395 homes) of the study sample: "Furnace", "New furnace", "High efficiency furnace", "Updated furnace". Just over 31% (4,759 homes) of the study sample contained *at least one* key energy efficiency or renewable energy word ("Any terms"). Note that "Any terms" includes "Others" from Table 1, in addition to terms for "Furnace", Water tank", "Heat recovery", "Windows" and "Insulation" groups.

Table 3: Number of homes in study sample per key word group

Group	Number of homes	Percentage of sample
Furnace	3,395	22.3
Water tank	1,663	10.9
Heat recovery	154	1.0
Windows	1,190	7.8
Insulation	608	4.0
Any terms	4,759	31.3
High-efficiency furnace	1,230	8.1
Mid-efficiency furnace	451	3.0

The average (median) transaction price of homes with and without key energy efficiency or renewable energy words was, respectively, $399,803 ($383,656) and $428,684 ($410,845) (see Table 4 and Figure 1). The average (median) transaction price of homes without key terms is 2.2% (2.5%) *above* the average (median) price for all homes; whereas, the average (median) transaction price of homes with key terms is 4.7% (4.3) *below* the average (median) price for all homes. There is slightly more price variability in the sample of homes with no key terms.

Homes with key energy efficiency or renewable energy words in the realtor's description were considerably older at the time of sale than those without key terms (42 years versus 25 years) (see Table 5). They were also smaller (127.4 m^2 versus 148.4 m^2 above grade). These factors might explain the lower transaction price, on average. The presence of key words in predominantly older homes might be explained by the installation of energy efficient or renewable energy technologies during a major property renewal prior to listing. Structurally, there is not much difference between both sets of homes.

Homes with key words of interest had shorter average listing durations (53 days on the market versus 58 days) but did sell at slightly higher average discounts than homes without key terms in the realtor's description (2.9% below the original listing price versus a reduction of 2.8%).

Table 4: Sale price distribution between homes in the study sample with and without key energy efficiency or renewable energy words

	Homes without key terms	Homes with key terms	All transactions
Count	10,434	4,759	15,193
Average	428,684	399,803	419,637
Standard Deviation	126,516	120,769	125,458
Minimum	150,288	150,038	150,038
25th Percentile	347,160	322,999	338,300
Median	410,845	383,656	400,965
75th Percentile	494,335	458,295	482,743
Maximum	848,875	849,937	849,937

Figure 1: Sale price distribution between homes in the study sample with and without key energy efficiency or renewable energy words

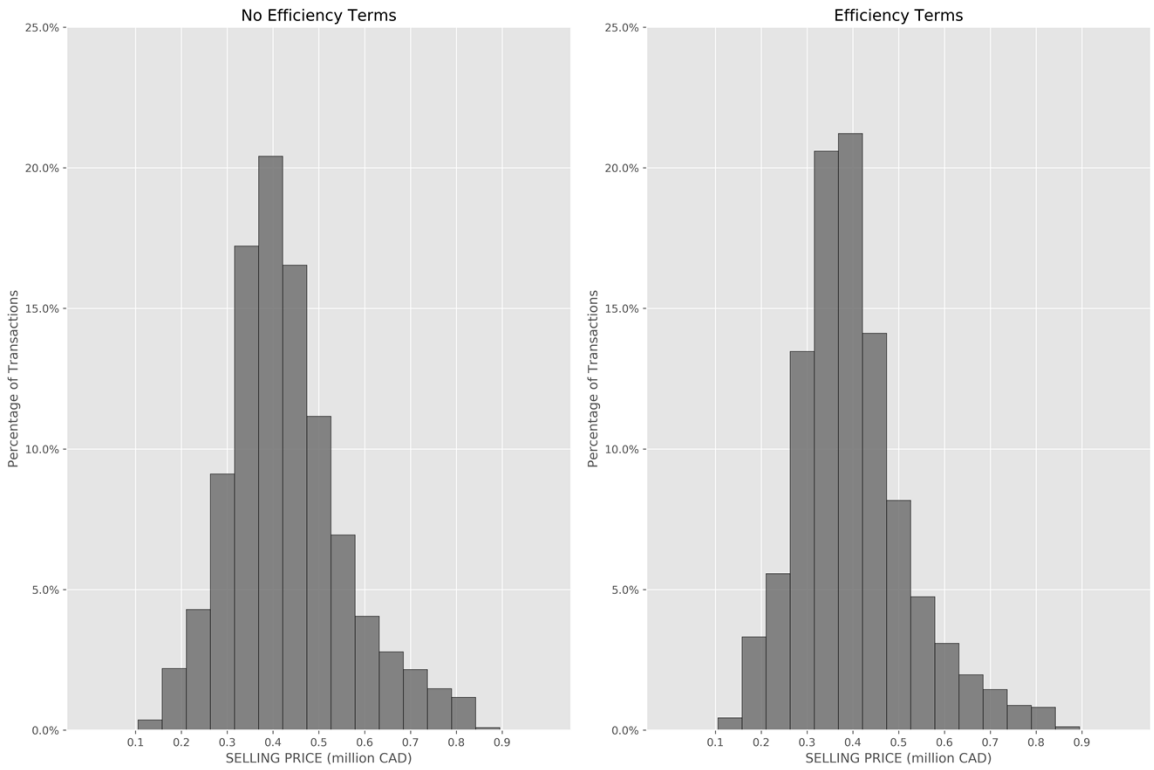


Table 5: Comparison of prices, day-listed and structural characteristics between homes in the study sample with and without key energy efficiency or renewable energy words

	Homes without key terms	Homes with key terms	All transactions
Total transactions	10,434	4,759	15,193
Average sale price ($)	428,684	399,803	419,637
Average days listed	58	53	56
Average building age (years at sale date)	25	42	30
Average number of bedrooms	3.7	3.8	3.7
Average number of bathrooms	2.3	2.2	2.3
Average number of finished levels	2.3	2.3	2.3
Average above-ground floor area (m^2)	148.4	127.4	141.8
Average garage size	1.8	1.7	1.8
Average discount (% change in original price)	-2.8	-2.9	-2.8

One might hypothesize that the longer a home is listed on the market, the more willing the seller is to accept a price reduction. However, this is not really supported by the data, with a range of deviations from the original list price being observed across short, medium and long listing durations (see Figure 2). Moreover, there is no discernible relationship between the transaction price of homes and days-listed on the market, regardless of the presence of key words of interest in the realtor's description (see Figure 3). For a given listing period, nevertheless, homes with key words of interest do appear to show less variance from the original price, relative to homes without key words in the descriptions (see Figure 2).

Figure 2: Price discount versus days-listed on market, homes in the study sample with and without key energy efficiency or renewable energy words

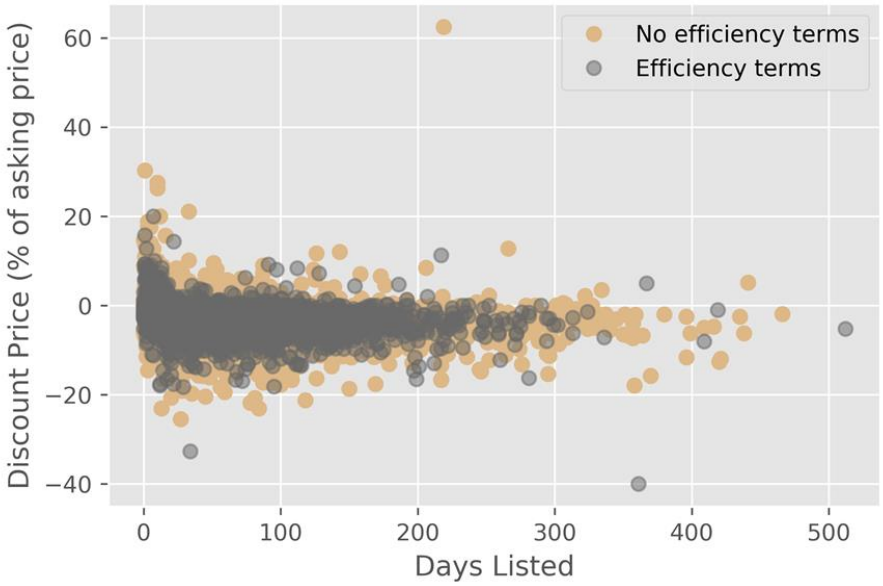
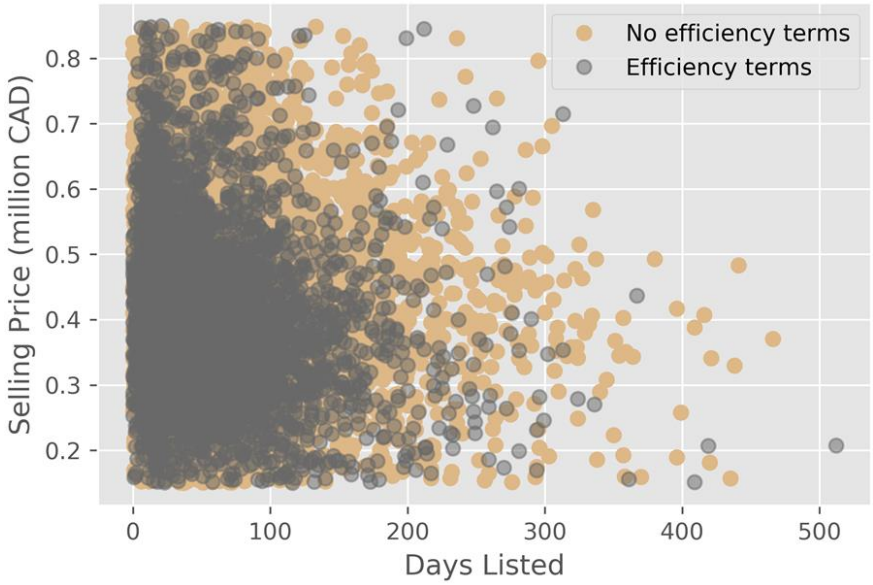


Figure 3: Transaction price versus days-listed on market, homes in the study sample with and without key energy efficiency or renewable energy words



In the regression models estimated in Section 4.2 the sales quarter is included as an independent variable to control for seasonal effects on transaction prices, as well as temporal effects such as changing economic and market conditions over the study period. Table 6 shows the average sales price and listing duration for all homes in the study sample. Clearly, the average values of both variables exhibit noteworthy differences from one quarter to another.

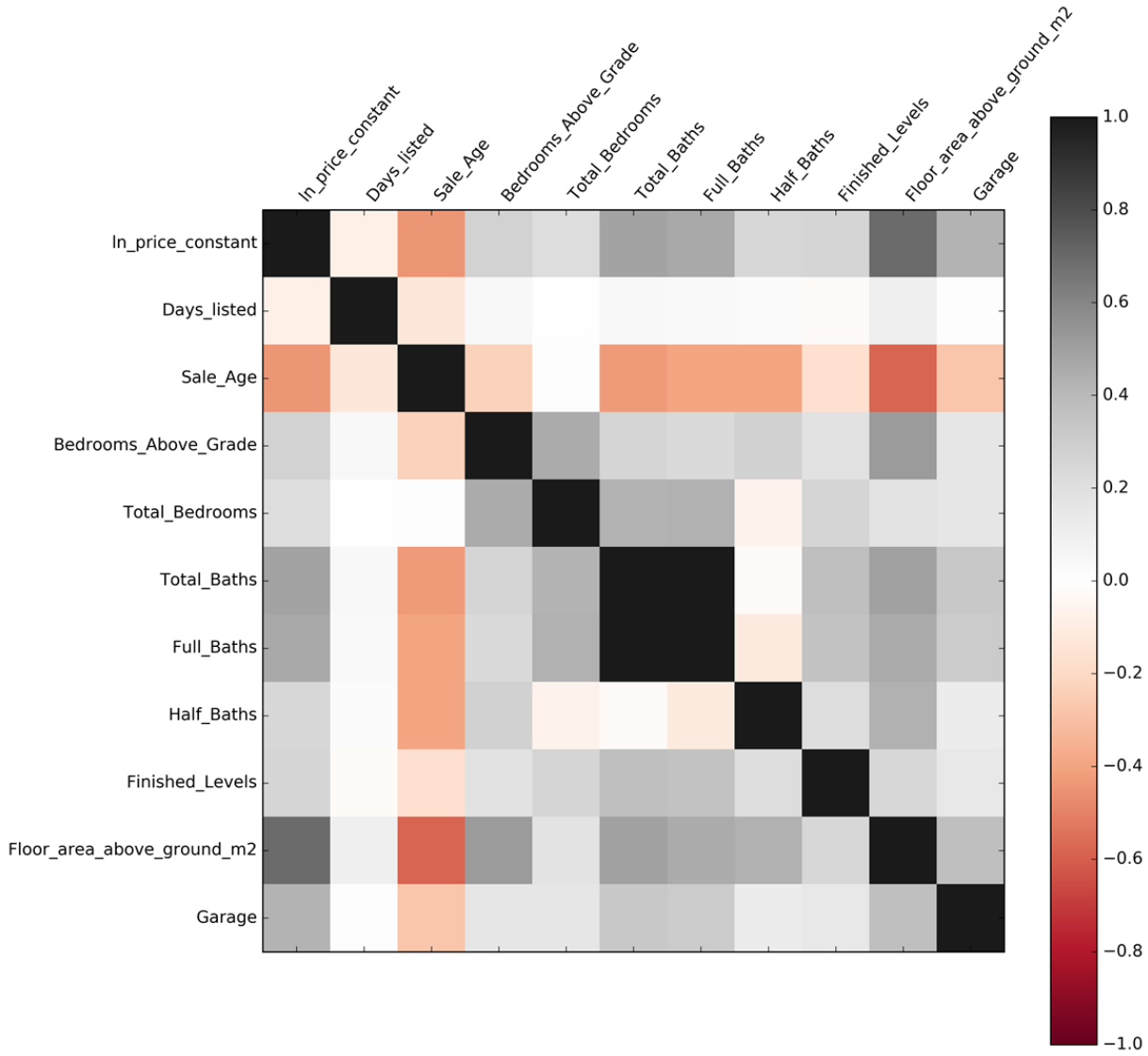
Table 6: All home sales in study sample, by quarter

Quarter	Number of transactions	Average transaction price	Average days-listed
3rd 2017	1,469	426,366	25.9
4th 2017	2,075	416,944	49.7
1st 2018	2,125	424,977	55.4
2nd 2018	3,540	432,670	49.5
3rd 2018	3,078	419,709	58.7
4th 2018	1,996	400,643	68.4
1st 2019	910	393,167	115.3
Total	15,193	419,637	56.4

Figure 4 shows a linear correlation matrix for the main home structural variables and the two dependent variables of interest—namely, the natural logarithm of the transaction price and days-listed on the market (see Section 4.2). A correlation coefficient shows how much one variable tends to change when another one does. The values of the correlation coefficient can range from -1 to +1 (as shown by the coloured scale on the righthand side of the figure). The closer the value is to +1 or -1 the more closely the two variables are related. A positive (negative) sign indicates the direction of the correlation—i.e., if one of the variables increases, the other variable is expected to increase (decrease). A value of zero signifies no relationship between two variables.

It is evident from Figure 4 that transaction price exhibits a moderate negative correlation with the age of the home and very slight negative correlation with the listing duration. The days-listed, however, shows no noticeable relationship with any of the main structural characteristics of homes—only a slight negative relationship with the age of the home. Transaction price is most influenced—in a positive direction—by the size of the home.

Figure 4: Linear correlation matrix for select variables of interest



4 METHODS

4.1 Hedonic price method

The hedonic price method relies on the proposition that the utility (or wellbeing) an individual derives from a good is based on the attributes that good possesses. In certain circumstances it may be possible to separate the effects of the various attributes a good possesses in a way which captures how changes in the level of each attribute impacts the individual's utility. In hedonic price analysis this is achieved by modeling an individual's willingness-to-pay (WTP) to

consume a good as a function of the level of that good's attributes. The most common application of hedonic price analysis is in relation to society's WTP for housing. In this case, each property is assumed to constitute a distinct combination of attributes which determine the price that a potential buyer is willing to pay. Consumer theory postulates that the purchase price a potential buyer is willing to pay is dependent upon the existence and level of a wide range of housing attributes including:

- Structural characteristics—e.g., the age of the home, the no. of bedrooms, the no. of bathrooms, the no. of garage parking spaces, the square footage of the home, quality of finishing, energy efficiency, etc.

- Location characteristics—e.g., housing density, quality of local schools, crime rates, access to public and transit services, walkability, socioeconomic conditions, etc.

- Environmental characteristics—e.g., green spaces, air quality, noise pollution, visual amenity, etc.

If market data is available for all attributes thought to determine the price of a house, a hedonic price function can be estimated using regression techniques including all relevant attributes as explanatory variables:

$$P_h = \mathrm{P}\left(\boldsymbol{S_i}, \boldsymbol{L_j}, \boldsymbol{E_k}\right) \; [i = 1, \dots, m; \; j = 1, \dots, n; \; k = 1, \dots, l]$$

Where houses prices P_h in an area depend on a vector of m structural attributes (S_i), a vector of n location characteristics (L_j) and a vector of l environmental attributes (E_k). The coefficients from the estimated hedonic price function reveal the implicit price for a small change in the level of a given attribute—specifically, both consumer's marginal WTP for the attribute and the marginal returns obtained by sellers for its supply.

The hedonic price function is very unlikely to be linear. A linear functional form can only happen if consumers can 're-package' attributes. Individual's cannot buy one attribute of a given house (say, lots size) and combine it with a different attribute of a second house (say, number of bedrooms) when making a purchase. Hence, the hedonic price function is expected to be non-linear, yielding implicit prices dependent upon the quantity of each attribute consumed (and not constants, as per a linear function). However, economic theory does not suggest which non-linear function form is preferred; most studies use a semi-log specification.

Typically, with applications of the hedonic price methods, the attributes and implicit prices of interest are environmental—e.g., the implicit price of a small change in noise levels. In the context of this study, interest lies with the energy performance on homes.

4.2 Estimated model

Like Pride et al. (2018), a semi-log model is estimated using (pooled) Ordinary Least Squares (OLS), relating the natural log of the transaction price of a home (in Q1 2019 dollars) to its structural characteristics, geographic location, time of sale, and presence of energy efficiency and renewable energy terms in the realtor's description:

$$Ln(P_i) = \alpha + \beta \mathbf{X}_i + \sum_{t=1}^{7} \gamma_t Q_t + \sum_{n=1}^{553} \delta_n L_n + \sum_{k=1}^{8} \varphi_k W_k + \omega D_i + \varepsilon_i \qquad \text{Eq. 1}$$

Where:

$Ln(P_i)$	=	Natural log of the transaction price for home i.
α	=	A constant.
$\mathbf{X}_i$	=	A vector of structural characteristics for home i such as age, number of bedrooms, floor area, etc. (see Table 7).
β	=	A vector of estimated coefficients corresponding to the structural characteristics in $\mathbf{X}_i$.
Q_t	=	A vector indicating the quarter in which the transaction (house sale) took place from Q3 2017 ($t = 1$) to Q1 2019 ($t = 7$). Note that Q_t is an indicator variable that takes a value of 1 if home i sold in Q3 2017 ($t = 1$) and zero otherwise, a value of 1 if home i sold in Q4 2017 ($t = 2$) and zero otherwise, and so on.
γ_t	=	A vector of estimated coefficients corresponding to transactions in quarter t.
L_n	=	A vector indicating a home's location to control for the attributes of the neighbourhood (n) in which the home is located, such as differences in the availability of public amenities and the varying quality of schools. Note that L_n is an indicator variable that takes a value of 1 if home i sold in neighbourhood $n = 1$ and zero otherwise, a value of 1 if home i sold in neighbourhood $n = 2$ and zero otherwise, and so on.
δ_n	=	A vector of estimated coefficients corresponding to transactions in neighbourhood n.
W_k	=	A vector of key energy efficiency and renewable energy terms (k) contained in the realtor's description on the MLS® (recall the 8 key word groups in column 1 of Table 3). Note that W_k is an indicator variable that takes a value of 1 if the realtor's description for home i contains a key word from group

		$k = 1$ and zero otherwise, a value of 1 if the realtor's description for home i contains a key word from group $k = 2$ and zero otherwise, and so on.
φ_k	=	A vector of estimated coefficients corresponding to each key word group (k).
D_i	=	A dummy variable that takes on a value of 1 if home i sold in fewer than 56 days; 56 days is used because it is the average selling time of a home in the study sample. Hence, the variable takes on a value of 1 if a home sells in below average time.
ω		An estimated coefficient for D.
ε_i	=	A random disturbance term for home i.

The parameter of interest, φ_k, is the average percentage transaction price premium estimated for the presence of key energy efficiency and renewable energy terms in the realtor's description on the MLS®. And by inference, the average percentage transaction price premium associated with the presence of such technologies in the sold home.

No model is estimated for days-listed on the market. As demonstrated in Figure 4, in the study sample days-listed has no noticeable relationship with any of the main structural characteristics of homes, and only a very slight negative relationship with the age of homes. Days-listed is instead included as an explanatory variable in the transaction price model (Eq. 1).

The regression model for transaction price is estimated in two stages: First, a baseline transaction price model is estimated using an optimized set of structural characteristics, as well as control variables for location, sale quarter (time), and days listed. Second, each key term group in Table 3 is added one at a time to the baseline model, to examine the incremental effect on transaction price. For example, a dummy variable (= 1) indicating the presence of (say) "high efficiency furnaces" is added to the baseline model to estimate the incremental impact of "high efficiency furnaces" on expected transaction prices for detached single family homes, all other things being equal.

Table 7: Variables for the structural characteristics of homes used to estimate Eq. 1

Variables	Comments
Sale_Age	Age of building in years at time of sale
Bedrooms_Above_Grade	Number of bedrooms (not including basement)
Total_Bedrooms	Total number of bedrooms
Total_Baths	Total number of baths, half-baths = 0.1
Full_Baths	Number of full bathrooms
Half_Baths	Number of half bathrooms
Finished_Levels	Number of finished floors in the building
Floor_area_above_ground_m2	Area of home above grade
Garage	Number of garage parking spaces [0,1,2,3]
Basement_Fully_Finished	Dummy variable, 1=fully finished basement
Basement_Partly_Finished	Dummy variable, 1=partly finished basement

5 RESULTS

5.1 Baseline transaction price model

The estimated baseline transaction price model (denoted M0) is shown below:

```
Results: Ordinary least squares
==============================================================================
Model:                      OLS                   Adj. R-squared:          0.832
Dependent Variable:         ln_price_constant     AIC:                     -19956.7321
No. Observations:           15193                 Log-Likelihood:          10521.
Df Model:                   542                   F-statistic:             139.7
Df Residuals:               14650                 Prob (F-statistic):      0.00
R-squared:                  0.838                 Scale:                   0.015199
------------------------------------------------------------------------------
                                  Coef.  Std.Err.     t     P>|t|   [0.025  0.975]
------------------------------------------------------------------------------
const                            12.2886   0.0086 1430.5488 0.0000 12.2718 12.3055
Sale_Age                         -0.0045   0.0001  -49.0531 0.0000 -0.0047 -0.0044
Full_Baths                        0.0334   0.0020   16.3633 0.0000  0.0294  0.0374
Floor_area_above_ground_m2        0.0027   0.0000   81.0425 0.0000  0.0027  0.0028
Garage                            0.0615   0.0018   34.4160 0.0000  0.0580  0.0650
Basement_Fully_Finished           0.0710   0.0026   26.9641 0.0000  0.0658  0.0762
Sell_under_56                     0.0101   0.0023    4.4842 0.0000  0.0057  0.0145

------------------------------------------------------------------------------
Omnibus:                983.640        Durbin-Watson:           1.588
Prob(Omnibus):          0.000          Jarque-Bera (JB):        4727.062
Skew:                   0.036          Prob(JB):                0.000
Kurtosis:               5.732          Condition No.:           41594688939586047 1808
==============================================================================
```

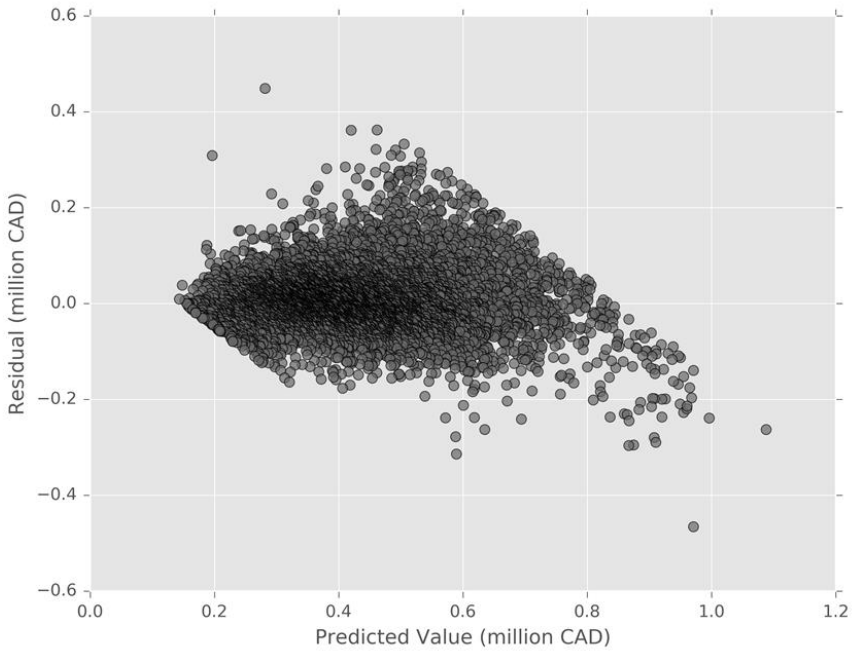
The optimized structural variables in the baseline model include: the age of the home at the time of sale; the number of full baths; the size of the home (area above grade); the number of garage parking spaces; and whether the basement is fully developed. The set of structural variables included was chosen from among all possible subsets in order to maximize the Adjusted R^2, while also maximizing the F-statistic, and controlling for several other measures of model fit, including the p-values associated with variable coefficients.

The baseline model also captures the impact on the transaction price of a home selling under the average of 56 listed days. Note that estimated coefficients and p-values associated with location (neighbourhood) and time (quarter sold) variables, which are included in the baseline model, are not shown for ease of presentation.

All variables in the baseline model are highly statistically significant with p-values <0.001, corresponding to a confidence level of >99.9%. The baseline model explains just over 83 percent of the natural log of the transaction price of a detached single family home in Edmonton. Overall, it is a good fit to the data.

The residual plot for the baseline model is shown in Figure 5. There is some heteroscedasticity present, where variation in residuals appears to increase slightly for homes with higher predicted transaction prices. Nonetheless, most residuals appear to be randomly distributed within $0.2 million of the predicted sale price. The linear ‘cut-off’ pattern to the bottom left and top right of the residual plots is a function of the fact that the study sample data only contains homes with sale prices between $0.15 and $0.85 million.

Figure 5: Residual plot for baseline model (M0)



There are different ways to interpret the estimated coefficients (e.g., β). For instance, the transformation of $100 \times \beta$ can be used for interpreting the estimated coefficients for continuous variables due to the model's log-level functional form (Wooldridge, 2006). Alternatively, for the interpretation of the estimated coefficients of indicator variables, the transformation of $100 \times (exp(\beta) - 1)$ can be used (Halvorsen and Palmquist, 1980). Both interpretations result in a % price difference in a house's selling price (all other variables held constant) either for a 1 unit increase in a continuous variable, or for the presence of an attribute as indicated by a dummy variable value of 1 (for indicator variables). In general, the two interpretations are similar when the estimated coefficient, β, is small. Nonetheless, the more correct interpretation is that the % price difference in a house's selling price is equal to $100 \times (exp(\beta) - 1)$ for any β. Consequently, this function is used when interpreting model coefficients herein.

Looking at the estimated coefficients for the baseline model, the age of the home has a negative sign and thus negative effect on the transaction price, as expected. Each additional year added to a home's age when sold was associated with a 0.45% decrease in the expected transaction price. All other variables have a positive impact on the transaction price. For each additional full bathroom, a home's expected price increased by 3.40%. An additional square meter added to a home's above ground floor space was associated with an increase of 0.27% to the expected price. The addition of one garage parking space was associated with a 6.34% increase to the expected price. The presence of a fully finished basement was associated with a 7.35% increase to a home's expected price. Finally, homes that sold in under 56 days (less than average) were associated with a 1.02% increase in the expected sale price.

5.2 Price effects of energy efficiency and renewable energy terms

The key energy efficiency and renewable energy terms in column 1 of Table 3 were introduced into the baseline model, one group at a time. The results for the seven additional models (denoted M1, M2, …, M7) are presented below. Note that both the terms “high efficiency furnace” and “mid-efficiency furnace” were included in the same model, M1. Hence, only seven additional transaction price models were estimated and not the eight models implied by Eq.1 (where $k = 8$) and the number of term groups in Table 3.

In all the additional models (M1 to M7) the reporting of coefficients and p-values associated with location (neighbourhood) and time (quarter sold) were suppressed for ease of presentation. The full estimated model output for M7 can be found in Appendix A. For all models, the F-statistic was sufficiently large to be associated with a p-value less than 0.001, implying an overall good fit. A more complete set of model fit measurements is provided with the detailed results below.

The addition of a dummy variable for key energy efficiency or renewable energy terms in models M1 to M7 did not greatly change the coefficients of the baseline model’s independent variables. Similarly, the Adjusted R^2 and F-statistic remain stable in models M1 through M7. Due to the stability of model characteristics, the presentation below focuses on the incremental impact of the additional key term dummy variables.

The residual plots for models M1 through M7 are almost indistinguishable from each other, and from the plot for the baseline model (shown in Figure 5). For this reason, the residual plot is shown only for model M7, which considers the impact of any key terms of interest on transaction prices.

Model 1: baseline model plus “High efficiency furnace” and “Mid efficiency furnace” dummy variables

The estimated transaction price model 1 (denoted M1) is shown below:

```
Results: Ordinary least squares
================================================================================
Model:                    OLS                  Adj. R-squared:          0.832
Dependent Variable:       ln_price_constant    AIC:                     -19999.9531
No. Observations:         15193                Log-Likelihood:          10545.
Df Model:                 544                  F-statistic:             139.6
Df Residuals:             14648                Prob (F-statistic):      0.00
R-squared:                0.838                Scale:                   0.015154
--------------------------------------------------------------------------------
                                  Coef.  Std.Err.     t     P>|t|   [0.025  0.975]
--------------------------------------------------------------------------------
const                            12.2866   0.0086 1431.0150 0.0000 12.2697 12.3034
Sale_Age                         -0.0045   0.0001  -48.6340 0.0000 -0.0047 -0.0043
Full_Baths                        0.0334   0.0020   16.3640 0.0000  0.0294  0.0374
Floor_area_above_ground_m2        0.0027   0.0000   81.0024 0.0000  0.0027  0.0028
Garage                            0.0614   0.0018   34.3779 0.0000  0.0579  0.0649
Basement_Fully_Finished           0.0714   0.0026   27.1393 0.0000  0.0662  0.0765
Sell_under_56                     0.0104   0.0023    4.6340 0.0000  0.0060  0.0149
High_Efficiency_Furnace           0.0241   0.0038    6.3077 0.0000  0.0166  0.0316
Mid_Efficiency_Furnace           -0.0128   0.0061   -2.1142 0.0345 -0.0247 -0.0009

--------------------------------------------------------------------------------
Omnibus:                  978.141        Durbin-Watson:           1.587
Prob(Omnibus):            0.000          Jarque-Bera (JB):        4675.304
Skew:                     0.035          Prob(JB):                0.000
Kurtosis:                 5.717          Condition No.:           354077805909176811520
================================================================================
```

Model M1 included the addition of two dummy variables: one indicating the presence of a high-efficiency furnace and one indicating the presence of a mid-efficiency furnace. The presence of a high-efficiency furnace was associated with a $100 \times (exp(0.02410) - 1) = 2.44\%$ increase in a home’s expected transaction price.

The estimated coefficient for the mid-efficiency furnace dummy variable implies that the presence of a mid-efficiency furnace is associated with a $100 \times (exp(-0.0128) - 1) = 1.27\%$ decrease in the expected transaction price. However, the p-value for this variable is 0.0345, so it should be treated with caution.

5.2.1 Model 2: baseline model plus "Furnace" group dummy variables

The estimated transaction price model 2 (denoted M2) is shown below:

```
 Results: Ordinary least squares
==============================================================================
Model:                      OLS                   Adj. R-squared:          0.832
Dependent Variable:         ln_price_constant     AIC:                     -19987.6139
No. Observations:           15193                 Log-Likelihood:          10538.
Df Model:                   543                   F-statistic:             139.8
Df Residuals:               14649                 Prob (F-statistic):      0.00
R-squared:                  0.838                 Scale:                   0.015167
------------------------------------------------------------------------------
                                  Coef.  Std.Err.     t     P>|t|   [0.025  0.975]
------------------------------------------------------------------------------
const                            12.2871   0.0086 1431.1460 0.0000 12.2703 12.3039
Sale_Age                         -0.0046   0.0001  -49.4229 0.0000 -0.0048 -0.0044
Full_Baths                        0.0335   0.0020   16.4022 0.0000  0.0295  0.0375
Floor_area_above_ground_m2        0.0027   0.0000   81.1389 0.0000  0.0027  0.0028
Garage                            0.0617   0.0018   34.5423 0.0000  0.0582  0.0652
Basement_Fully_Finished           0.0705   0.0026   26.7867 0.0000  0.0653  0.0756
Sell_under_56                     0.0101   0.0023    4.4721 0.0000  0.0057  0.0145
FURNACE_GROUP                     0.0147   0.0026    5.6337 0.0000  0.0096  0.0198

------------------------------------------------------------------------------
Omnibus:                 986.697        Durbin-Watson:           1.590
Prob(Omnibus):           0.000          Jarque-Bera (JB):        4741.613
Skew:                    0.044          Prob(JB):                0.000
Kurtosis:                5.735          Condition No.:           476395500245196013568
==============================================================================
```

Model M2 included a dummy variable for the "Furnace" group (where a value of 1 indicates the presence of terminology related to furnaces in the realtor's description of homes for sale). Here, the presence of furnace-related terminology (recall column 2 in Table 1) was associated with a 1.48% increase in a home's expected transaction price.

5.2.2 Model 3: baseline model plus "Water tank" group dummy variables

The estimated transaction price model 3 (denoted M3) is shown below:

```
Results: Ordinary least squares
==============================================================================
Model:                     OLS                   Adj. R-squared:          0.832
Dependent Variable:        ln_price_constant     AIC:                     -19956.0994
No. Observations:          15193                 Log-Likelihood:          10522.
Df Model:                  543                   F-statistic:             139.4
Df Residuals:              14649                 Prob (F-statistic):      0.00
R-squared:                 0.838                 Scale:                   0.015199
------------------------------------------------------------------------------
                                  Coef.  Std.Err.     t     P>|t|   [0.025  0.975]
------------------------------------------------------------------------------
const                            12.2881   0.0086 1428.0222 0.0000 12.2712 12.3049
Sale_Age                         -0.0045   0.0001  -49.0395 0.0000 -0.0047 -0.0044
Full_Baths                        0.0335   0.0020   16.3802 0.0000  0.0295  0.0375
Floor_area_above_ground_m2        0.0027   0.0000   81.0298 0.0000  0.0027  0.0028
Garage                            0.0616   0.0018   34.4325 0.0000  0.0581  0.0651
Basement_Fully_Finished           0.0709   0.0026   26.9407 0.0000  0.0658  0.0761
Sell_under_56                     0.0101   0.0023    4.4806 0.0000  0.0057  0.0145
WATER_TANK_GROUP                  0.0039   0.0034    1.1482 0.2509 -0.0027  0.0105

------------------------------------------------------------------------------
Omnibus:                984.605        Durbin-Watson:           1.589
Prob(Omnibus):          0.000          Jarque-Bera (JB):        4734.519
Skew:                   0.037          Prob(JB):                0.000
Kurtosis:               5.734          Condition No.:           42519757674949233868
==============================================================================
```

Model M3 included a dummy variable for the "Water tank" group (where a value of 1 indicates the presence of terminology related to water tanks in the realtor's description of homes for sale). In this case, the associated p-value is 0.2509, implying that the variable is not significant in the model. Hence, interpreting the estimated coefficient is meaningless.

5.2.3 Model 4: baseline model plus “Heat recovery” group dummy variables

The estimated transaction price model 4 (denoted M4) is shown below:

```
Results: Ordinary least squares
================================================================================
Model:                    OLS                  Adj. R-squared:          0.832
Dependent Variable:       ln_price_constant    AIC:                     -19957.4964
No. Observations:         15193                Log-Likelihood:          10523.
Df Model:                 543                  F-statistic:             139.4
Df Residuals:             14649                Prob (F-statistic):      0.00
R-squared:                0.838                Scale:                   0.015197
--------------------------------------------------------------------------------
                                  Coef.  Std.Err.     t     P>|t|   [0.025  0.975]
--------------------------------------------------------------------------------
const                            12.2881   0.0086 1429.4044 0.0000 12.2712 12.3049
Sale_Age                         -0.0045   0.0001  -48.8863 0.0000 -0.0047 -0.0043
Full_Baths                        0.0334   0.0020   16.3692 0.0000  0.0294  0.0374
Floor_area_above_ground_m2        0.0027   0.0000   81.0526 0.0000  0.0027  0.0028
Garage                            0.0616   0.0018   34.4436 0.0000  0.0581  0.0651
Basement_Fully_Finished           0.0711   0.0026   26.9968 0.0000  0.0659  0.0763
Sell_under_56                     0.0101   0.0023    4.4918 0.0000  0.0057  0.0146
HEAT_RECOVERY_GROUP               0.0171   0.0105    1.6327 0.1026 -0.0034  0.0375

--------------------------------------------------------------------------------
Omnibus:                983.276        Durbin-Watson:           1.588
Prob(Omnibus):          0.000          Jarque-Bera (JB):        4724.021
Skew:                   0.035          Prob(JB):                0.000
Kurtosis:               5.731          Condition No.:           495360500628479082496
```

Model M4 included a dummy variable for the “Heat recovery” group (where a value of 1 indicates the presence of terminology related to heat recovery technologies in the realtor’s description for homes). In this case, the associated p-value is 0.1026, implying that the variable is not significant in the model. Hence, interpreting the estimated coefficient is meaningless. Furthermore, homes with heat recovery terminology in the realtor’s description made up only 1.0% of the study sample.

5.2.4 Model 5: baseline model plus “Windows” group dummy variables

The estimated transaction price model 5 (denoted M5) is shown below:

```
Results: Ordinary least squares
=============================================================================================
Model:                      OLS                    Adj. R-squared:          0.834
Dependent Variable:         ln_price_constant      AIC:                     -20127.2322
No. Observations:           15193                  Log-Likelihood:          10608.
Df Model:                   543                    F-statistic:             141.3
Df Residuals:               14649                  Prob (F-statistic):      0.00
R-squared:                  0.840                  Scale:                   0.015029
---------------------------------------------------------------------------------------------
                                    Coef.  Std.Err.     t     P>|t|   [0.025  0.975]
---------------------------------------------------------------------------------------------
const                              12.2839   0.0085 1436.7927 0.0000 12.2672 12.3007
Sale_Age                           -0.0045   0.0001  -49.3117 0.0000 -0.0047 -0.0044
Full_Baths                          0.0332   0.0020   16.3593 0.0000  0.0293  0.0372
Floor_area_above_ground_m2          0.0027   0.0000   81.6508 0.0000  0.0027  0.0028
Garage                              0.0617   0.0018   34.6951 0.0000  0.0582  0.0652
Basement_Fully_Finished             0.0708   0.0026   27.0321 0.0000  0.0656  0.0759
Sell_under_56                       0.0101   0.0022    4.5023 0.0000  0.0057  0.0145
WINDOWS_GROUP                       0.0497   0.0038   12.9333 0.0000  0.0421  0.0572

---------------------------------------------------------------------------------------------
Omnibus:               1002.324        Durbin-Watson:           1.591
Prob(Omnibus):         0.000           Jarque-Bera (JB):        4883.871
Skew:                  0.049           Prob(JB):                0.000
Kurtosis:              5.776           Condition No.:           430335533121533378560
=============================================================================================
```

Model M5 included a dummy variable for the “Windows” group (where a value of 1 indicates the presence of terminology related to window technologies in the realtor’s description for homes). Here, the presence of window-related terminology (recall column 2 in Table 1) was associated with a 5.10% increase in a home’s expected transaction price.

5.2.5 Model 6: baseline model plus “Insulation” group dummy variables

The estimated transaction price model 6 (denoted M6) is shown below:

```
Results: Ordinary least squares
==============================================================================
Model:                    OLS                  Adj. R-squared:         0.834
Dependent Variable:       ln_price_constant    AIC:                    -20113.1906
No. Observations:         15193                Log-Likelihood:         10601.
Df Model:                 543                  F-statistic:            141.1
Df Residuals:             14649                Prob (F-statistic):     0.00
R-squared:                0.840                Scale:                  0.015043
------------------------------------------------------------------------------
                                  Coef.  Std.Err.     t     P>|t|   [0.025  0.975]
------------------------------------------------------------------------------
const                            12.2895   0.0085 1438.0322 0.0000 12.2727 12.3062
Sale_Age                         -0.0046   0.0001  -49.9158 0.0000 -0.0048 -0.0044
Full_Baths                        0.0332   0.0020   16.3383 0.0000  0.0292  0.0372
Floor_area_above_ground_m2        0.0027   0.0000   81.6280 0.0000  0.0027  0.0028
Garage                            0.0611   0.0018   34.3712 0.0000  0.0576  0.0646
Basement_Fully_Finished           0.0707   0.0026   26.9747 0.0000  0.0655  0.0758
Sell_under_56                     0.0098   0.0022    4.3863 0.0000  0.0054  0.0143
INSULATION_GROUP                  0.0652   0.0053   12.3929 0.0000  0.0549  0.0756

------------------------------------------------------------------------------
Omnibus:                 993.966        Durbin-Watson:           1.593
Prob(Omnibus):           0.000          Jarque-Bera (JB):        4830.670
Skew:                    0.034          Prob(JB):                0.000
Kurtosis:                5.762          Condition No.:           411947912750794342400
==============================================================================
```

Model M6 included a dummy variable for the “Insulation” group (where a value of 1 indicates the presence of terminology related to insulation in the realtor’s description for homes). Here, the presence of insulation-related terminology (recall column 2 in Table 1) was associated with a 6.74% increase in a home’s expected transaction price.

5.2.6 Model 7: baseline model plus “Any terms” dummy variable

The estimated transaction price model 7 (denoted M7) is shown below:

```
 Results: Ordinary least squares
==============================================================================
Model:                     OLS                   Adj. R-squared:          0.833
Dependent Variable:        ln_price_constant     AIC:                     -20083.3179
No. Observations:          15193                 Log-Likelihood:          10586.
Df Model:                  543                   F-statistic:             140.8
Df Residuals:              14649                 Prob (F-statistic):      0.00
R-squared:                 0.839                 Scale:                   0.015072
------------------------------------------------------------------------------
                                  Coef.  Std.Err.     t     P>|t|   [0.025  0.975]
------------------------------------------------------------------------------
const                            12.2831   0.0086 1433.4639 0.0000 12.2663 12.2999
Sale_Age                         -0.0046   0.0001  -50.1178 0.0000 -0.0048 -0.0045
Full_Baths                        0.0334   0.0020   16.4119 0.0000  0.0294  0.0374
Floor_area_above_ground_m2        0.0027   0.0000   81.5892 0.0000  0.0027  0.0028
Garage                            0.0617   0.0018   34.6647 0.0000  0.0582  0.0652
Basement_Fully_Finished           0.0702   0.0026   26.7723 0.0000  0.0651  0.0754
Sell_under_56                     0.0102   0.0022    4.5372 0.0000  0.0058  0.0146
ANY_TERMS_GROUP                   0.0263   0.0024   11.1583 0.0000  0.0217  0.0310

------------------------------------------------------------------------------
Omnibus:              1003.569       Durbin-Watson:           1.591
Prob(Omnibus):        0.000          Jarque-Bera (JB):        4880.133
Skew:                 0.056          Prob(JB):                0.000
Kurtosis:             5.774          Condition No.:           428560551882010132480
==============================================================================
```

Model M7 included a dummy variable for any of the key terms of interest in column 2 of Table 1 (“Any term” group) (where a value of 1 indicates the presence of any key terminology in the realtor’s description for homes). Here, the presence of any key terminology was associated with a 2.66% increase in a home’s expected transaction price.

The full results for model M7 are provided in Appendix 1. The residual plot for Model M7 is shown in Figure 6. As noted above, there is some heteroscedasticity present, where variation in residuals appears to increase slightly for homes with higher predicted transaction prices.

Finally, a summary of the results for all models, M0 through M7, is provided in Table 8.

Figure 6: Residual plot for Model M7 (“Any terms”)

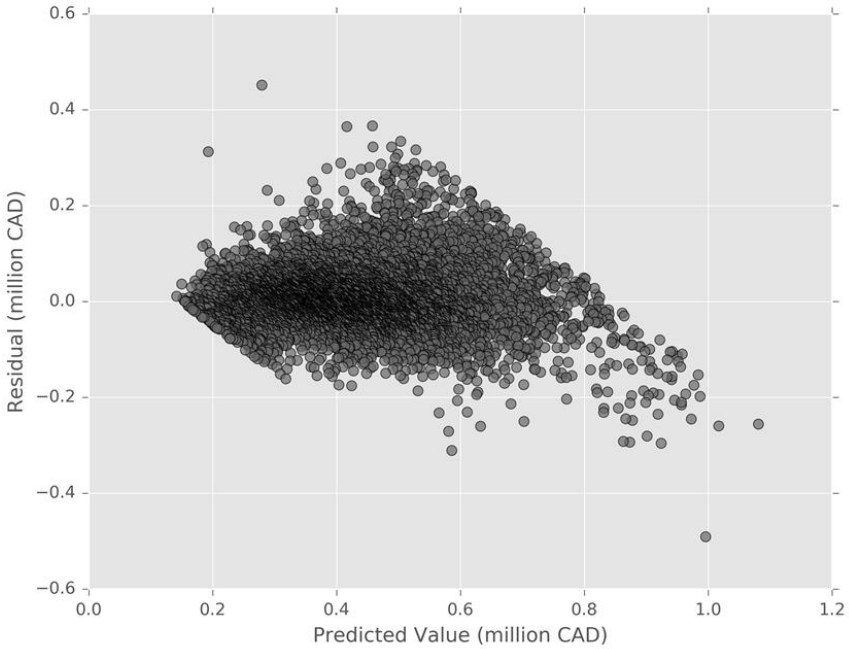


Table 8: Summary of estimated transaction price models

	M0	M1	M2	M3	M4	M5	M6	M7
Adjusted R^2	0.832	0.832	0.832	0.832	0.832	0.834	0.834	0.833
F-stat	139.7	139.6	139.8	139.4	139.4	141.3	141.4	140.8
Probability (F-stat)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant (intercept)	12.29	12.29	12.29	12.29	12.29	12.28	12.29	12.28
Days-listed (< 56 days)	0.0101	0.0104	0.0101	0.0101	0.0101	0.0101	0.0098	0.0102
Age at sale	-0.0045	-0.0045	-0.0046	-0.0045	-0.0045	-0.0045	-0.0046	-0.0046
Full bathrooms	0.0334	0.0334	0.0335	0.0335	0.0334	0.0332	0.0332	0.0334
Floor area above grade (m2)	0.0027	0.0027	0.0027	0.0027	0.0027	0.0027	0.0027	0.0027
Garage parking spaces	0.0615	0.0614	0.0617	0.0616	0.0616	0.0617	0.0611	0.0617
Fully finished basement	0.0710	0.0714	0.0705	0.0709	0.0711	0.0708	0.0707	0.0702
Key term dummy variables:								
High efficiency furnace		0.0241						
Mid efficiency furnace		-0.0128*						
Furnace group			0.0147					
Water tank group				0.0039**				
Heat recovery group					0.0171**			
Windows group						0.0497		
Insulation group							0.0652	
Any terms group								0.0263

Notes: M0 is the baseline transaction price model. Structural variables dropped from the optimized baseline model (and not shown in the table) include the number of bedrooms, the number of finished levels and whether the basement is partly finished. * indicates the p-value > 0.01, while ** indicates the p-value is > 0.05.

6 DISCUSSION

6.1 Estimated price premium in the context of other studies

Estimated transaction price premiums from models M1-M7 are shown in Table 9. These show the percentage difference in a house's selling price (all else being equal) associated with the presence of specific energy efficiency and renewable energy terms in the realtor's description of homes. By way of example, consider two houses that sold at the same time and are identical in every way, including being in the same neighbourhood. If the realtor's description of one home included terminology related to (say) "insulation" only, whereas the other contained no such terminology, the former home would be expected to sell at a premium of about 6.7%. Likewise, if one home included any of the key terms of interest in Table 3, while the other did not, the former home would be expected to sell at a premium of about 2.7%.

If one accepts that including the key terms of interest in the realtor's description of homes reflects the presence of these energy efficient and renewable energy technologies in the homes, then the positive price premiums found in this study suggest that the energy performance of homes is being capitalized into home values in Edmonton.

Table 9: Estimated price premium associated with the presence of energy efficiency and renewable energy terms in the realtor's description of homes

Key term group	Impact (% change) on expected transaction price
Furnaces	+1.48
Water tanks	NA
Heat recovery	NA
Windows	+5.10
Insulation	+6.74
Any terms	+2.66
High-efficiency furnace	+2.44
Mid-efficiency furnace	-1.29

Note: N/A indicates the estimated coefficient for the variable was not statistically significant, with a p-value > 0.05

To put the above estimated transaction price premiums in context, Table 10 provides a summary of results from several international studies that have investigated price premiums for home energy and green labelling programs and the presence of renewable energy technologies. The estimated price premiums found in this study are certainly within the range of values found in the literature.

Table 10: Summary of house price premiums relating to the energy performance of residential properties from other studies

Reference	Location	Findings
Brounen and Kok (2011)	Netherlands	+10% (rating A) to +2% (rating C) relative to D EPC rating
Bloom et al (2011)	Fort Collins, CO.	+ $US 8.66 per ft^2 for ENERGY STAR home certification
Bruegge et al (2015)	Gainesville, FL.	+ 4.9% for ENERGY STAR home certification
Walls et al (2016)	3 US cities	+ 2% for ENERGY STAR home certification; +3% to +8% for local home certification
Dastrup et al (2012)	San Diego, CA.	+3.5% for presence of solar panels on homes
Bio Intelligence (2013)	EU	+2.8 to +8.0% for 1-letter improvement in EPC rating
Fuerst et al (2015)	England	+5% (rating A) to +1.8% (rating C) relative to (average) D EPC rating
Fuerst et al (2016)	Wales	+12.8% (rating A) to +3.5% (rating C) relative to (average) D EPC rating
Cadena (2015)	San Antonio, TX.	+ 1.1% for ENERGY STAR home certification
NEEA (2015)	Washington State	+4.5% to +8.0% for ENERGY STAR home certification
Australian Gov (2008)	ACT	+2% for 0.5 unit improvement on EE rating scale
Kok and Kahn (2012)	California	+9% for 'green' labels, including ENERGY STAR
Ayala et al (2015)	Spain	+9.8% for EPC ratings A, B or C relative to EPC ratings D, E, F or G
Pride et al (2018)	Alaska	EE program participants homes sell for +4.2%
Chegut et al (2015)	Netherlands	+7.0% (for A EPC rating relative to C rating), +1.9% (for B EPC rating relative to C rating)

Note: EPC refer to the Energy Performance Certificates of the European Union's Energy Performance of Buildings Directive.

6.2 Price premium and implied value of energy savings

To determine if the estimated price premiums are reasonable, their dollar value is calculated, and then annualized to derive annual energy cost savings from the implied presence of energy efficient and renewable energy technologies in homes. The results of this exercise are summarized in Table 11. Applying the estimated % price premiums to the average transaction price of a detached single family home in the study sample ($419,637), produces a measure of the discounted present value of implied energy savings (shown in column 3 of Table 11). For example, the dollar value of the transaction price premium (equal to the discounted present value of implied energy savings) due to the presence of any key terminology of interest in the realtor's description of homes for sale is about $11,160. This present value is converted to equal annual energy cost savings, that when discounted and summed over time yield the same present value. The implied annual energy savings are calculated at two different discount rates (5% per annum and 8% per annum) and three time horizons (10 years, 15 years, and 20 years). Continuing the above example, the implied annual energy cost savings associated with a dollar price premium of $11,160, range from about $895 (20 years at 5% per annum) to $1,665 (10 years at 8% per annum).

Table 11: Estimated price premiums for key terminology of interest in realtor's home description and the implied annual energy savings

Term	Transaction price premium		Implied energy savings ($ 2019 Q1)		
	%	$ (2019 Q1)	10 years @ 5% DR	15 years @ 5% DR	20 years @ 5% DR
High-efficiency furnace	2.44%	10,239	1,326	986	822
Furnace group	1.48%	6,211	804	598	498
Windows group	5.10%	21,401	2,772	2,062	1,717
Insulation group	6.74%	28,284	3,663	2,725	2,270
Any terms group	2.66%	11,162	1,446	1,075	896
	%	$ (2019 Q1)	10 years @ 8% DR	15 years @ 8% DR	20 years @ 8% DR
High-efficiency furnace	2.44%	10,239	1,526	1,196	1,043
Furnace group	1.48%	6,211	926	726	633
Windows group	5.10%	21,401	3,189	2,500	2,180
Insulation group	6.74%	28,284	4,215	3,304	2,881
Any terms group	2.66%	11,162	1,664	1,304	1,137

To assess the business case for homeowners to invest in energy efficiency improvements for their homes, the implied annual energy savings in Table 11 could be compared with estimated savings from energy efficiency programs for existing residential homes, as well as the upfront investment costs of upgrades installed. Unfortunately, these data were not available for this study. Of interest, the former comparison would shed light on whether prospective buyers

associate the energy performance of homes with improved comfort and 'good quality' in general—in particular, if annual energy savings from retrofit programs are less than those implied by the estimated price premiums.

6.3 Behavioural failures

The estimated price premiums presented above may be distorted (upward or downward) by a range of behavioural biases and anomalies. Even if all conditions necessary for the housing market to operate efficiently are met (including perfect information), an optimal level of energy efficiency may still not result from market transactions because buyers do not behave rationally. Classical welfare economics assumes market participants are rational in their behaviour—carefully weighing their own costs and benefits in making economic decisions to maximize their utility.[3] Consequently, with perfectly functioning markets, a buyer (and seller) would be expected to make decisions that maximize well-being. There is substantive evidence nevertheless that consumer decisions are not always perfectly rational—and indeed suffer from systematic biases ("behavioural failures") that may lead to sub-optimal levels of investment in energy efficiency.[4] Behavioural failures describe decision-making that is inconsistent with the maximization of individual well-being, even when individuals are provided with the appropriate information and incentives.[5] Cognitive capacity, for instance, is known to affect our ability to make efficient decisions involving complex, probabilistic information. Other potential behavioural biases manifest as decision inertia, procrastination and high discount rates.

6.4 Further analysis

As only nine homes that participated in the "Know Our Homes YEG" program were listed and sold in the last 21 months—the time frame covered by this study—it was not possible to evaluate the effectiveness of the home labelling program, in terms of capitalizing energy efficiency into house prices. When enough homes with EnerGuide labels have sold at least once (roughly 150-200), the above analysis could be repeated to determine the impact of home energy labels on transaction prices and listing durations.

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[3] Utility is the term economists use to refer to an individual's level of satisfaction, happiness, well-being or personal benefit.

[4] Shogren and Taylor (2008), Venkatachalam (2008), Brown and Hagen (2010), Shogren, et al. (2010), Pollitt and Shaorshadze (2011), Baddeley (2011), and Gsottbauer and van den Bergh (2011) provide reviews of this evidence in the context of environmental, energy and climate policy.

[5] Specifically, behavioural failures describe decision-making that is inconsistent with "rational choice theory".

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8 APPENDIX 1: DETAILED RESULTS FOR MODEL 7

Results: Ordinary least squares

Model:	OLS	Adj. R-squared:	0.833
Dependent Variable:	ln_price_constant	AIC:	-20083.3179
No. Observations:	15193	Log-Likelihood:	10586.
Df Model:	543	F-statistic:	140.8
Df Residuals:	14649	Prob (F-statistic):	0.00
R-squared:	0.839	Scale:	0.015072

	Coef.	Std.Err.	t	P>|t|	[0.025	0.975]
const	12.2831	0.0086	1433.4639	0.0000	12.2663	12.2999
Sale_Age	-0.0046	0.0001	-50.1178	0.0000	-0.0048	-0.0045
Full_Baths	0.0334	0.0020	16.4119	0.0000	0.0294	0.0374
Floor_area_above_ground_m2	0.0027	0.0000	81.5892	0.0000	0.0027	0.0028
Garage	0.0617	0.0018	34.6647	0.0000	0.0582	0.0652
Basement_Fully_Finished	0.0702	0.0026	26.7723	0.0000	0.0651	0.0754
Sell_under_56	0.0102	0.0022	4.5372	0.0000	0.0058	0.0146
ANY_TERMS_GROUP	0.0263	0.0024	11.1583	0.0000	0.0217	0.0310
Q1	0.1079	0.0056	19.3613	0.0000	0.0970	0.1188
Q2	0.0697	0.0051	13.6245	0.0000	0.0597	0.0797
Q3	0.0914	0.0051	17.9426	0.0000	0.0814	0.1014
Q4	0.1057	0.0048	21.9072	0.0000	0.0963	0.1152
Q5	0.0760	0.0049	15.6544	0.0000	0.0665	0.0855
Q6	0.0291	0.0051	5.7155	0.0000	0.0191	0.0391
Akinsdale	0.0493	0.0137	3.6060	0.0003	0.0225	0.0762
Albany	0.0550	0.0342	1.6072	0.1080	-0.0121	0.1220
Alberta Avenue	-0.0480	0.0133	-3.6052	0.0003	-0.0741	-0.0219
Alcomdale	-0.0000	0.0000	-0.0144	0.9885	-0.0000	0.0000
Alder Flats_CWET	-0.1238	0.1227	-1.0097	0.3126	-0.3643	0.1166
Aldergrove	0.0574	0.0203	2.8274	0.0047	0.0176	0.0972
Alexandra Park	-0.2473	0.0708	-3.4914	0.0005	-0.3861	-0.1085
Allard	0.0495	0.0140	3.5447	0.0004	0.0221	0.0769
Allendale	0.3590	0.0166	21.5687	0.0000	0.3264	0.3916
Ambleside	0.0963	0.0141	6.8212	0.0000	0.0686	0.1240
Andrew	-0.6718	0.1227	-5.4755	0.0000	-0.9123	-0.4313
Ardmore	-0.4307	0.0867	-4.9659	0.0000	-0.6006	-0.2607
Ardrossan	0.1610	0.0434	3.7095	0.0002	0.0759	0.2461
Ardrossan II	0.3313	0.0868	3.8155	0.0001	0.1611	0.5015
Argyll	0.4007	0.0371	10.7902	0.0000	0.3279	0.4735
Ashmont	-0.0000	0.0000	-0.7506	0.4529	-0.0000	0.0000
Aspen Gardens	0.4712	0.0238	19.8133	0.0000	0.4246	0.5178
Aspen Glen	-0.0483	0.0242	-1.9974	0.0458	-0.0957	-0.0009
Aspen Trails	0.0798	0.0172	4.6459	0.0000	0.0461	0.1135
Athabasca Town	-0.4271	0.1227	-3.4817	0.0005	-0.6675	-0.1866
Athlone	-0.0786	0.0196	-4.0132	0.0001	-0.1169	-0.0402
Avonmore	0.2895	0.0199	14.5510	0.0000	0.2505	0.3285
Balwin	-0.0298	0.0169	-1.7658	0.0774	-0.0628	0.0033
Bannerman	-0.0180	0.0290	-0.6202	0.5351	-0.0748	0.0389
Barrhead	-0.3309	0.0209	-15.8600	0.0000	-0.3718	-0.2900
Baturyn	-0.0099	0.0195	-0.5067	0.6124	-0.0482	0.0284
Beach Avenue Estates	-0.0456	0.0867	-0.5253	0.5994	-0.2155	0.1244
Beacon Heights	-0.0719	0.0173	-4.1469	0.0000	-0.1058	-0.0379
Bearspaw_Edmo	0.0918	0.0308	2.9833	0.0029	0.0315	0.1521
Beau Meadow	-0.0011	0.0355	-0.0297	0.9763	-0.0706	0.0685
Beau Val	-0.0463	0.0501	-0.9231	0.3560	-0.1445	0.0520
Beaumaris	0.0092	0.0229	0.4004	0.6889	-0.0357	0.0541
Beaumont	0.0104	0.0252	0.4119	0.6804	-0.0390	0.0598
Beaumont Lakes	0.0234	0.0464	0.5036	0.6145	-0.0676	0.1144
Beauridge	0.0152	0.0388	0.3914	0.6955	-0.0609	0.0913
Belgravia	0.7786	0.0223	34.8727	0.0000	0.7349	0.8224
Belle Rive	0.0029	0.0186	0.1558	0.8762	-0.0336	0.0394
Bellevue	0.2061	0.0212	9.7409	0.0000	0.1647	0.2476

Belmead	0.0530	0.0209	2.5404	0.0111	0.0121	0.0939
Belmont	-0.0275	0.0251	-1.0950	0.2735	-0.0768	0.0217
Belvedere	-0.0222	0.0210	-1.0567	0.2907	-0.0634	0.0190
Bergman	-0.0398	0.0290	-1.3709	0.1704	-0.0966	0.0171
Beverly Heights	0.0194	0.0137	1.4187	0.1560	-0.0074	0.0463
Bisset	0.0058	0.0233	0.2503	0.8024	-0.0398	0.0515
Black Stone	-0.1316	0.0309	-4.2623	0.0000	-0.1921	-0.0711
Blackburne	0.0935	0.0298	3.1322	0.0017	0.0350	0.1520
Blackmud Creek	0.1120	0.0196	5.7172	0.0000	0.0736	0.1504
Blue Quill	0.1839	0.0341	5.3869	0.0000	0.1170	0.2508
Blue Quill Estates	0.2129	0.0371	5.7354	0.0000	0.1401	0.2857
Bon Accord	-0.1962	0.0251	-7.8021	0.0000	-0.2454	-0.1469
Bonnie Doon	0.4180	0.0166	25.1289	0.0000	0.3854	0.4506
Bonnyville	-0.1858	0.0179	-10.3997	0.0000	-0.2208	-0.1508
Boyle	-0.6238	0.1226	-5.0877	0.0000	-0.8641	-0.3835
Boyle Street	0.2054	0.0710	2.8932	0.0038	0.0663	0.3446
Brady Heights	-0.1646	0.0389	-4.2344	0.0000	-0.2407	-0.0884
Braeside	0.1494	0.0189	7.9106	0.0000	0.1124	0.1864
Brander Gardens	0.4141	0.0342	12.1223	0.0000	0.3471	0.4810
Breckenridge Greens	0.0173	0.0242	0.7169	0.4734	-0.0301	0.0648
Brentwood_CSTS	0.1427	0.0219	6.5205	0.0000	0.0998	0.1855
Breton	-0.3197	0.1226	-2.6067	0.0091	-0.5601	-0.0793
Brickyard	-0.0199	0.0465	-0.4275	0.6690	-0.1110	0.0712
Bridgeport	-0.0930	0.0219	-4.2538	0.0000	-0.1358	-0.0501
Bridgeview Fort Sask.	-0.0500	0.0614	-0.8155	0.4148	-0.1703	0.0702
Brintnell	-0.0592	0.0131	-4.5191	0.0000	-0.0849	-0.0335
Britannia Youngstown	0.1027	0.0188	5.4673	0.0000	0.0659	0.1396
Broadmoor Estates	0.2891	0.0434	6.6578	0.0000	0.2040	0.3742
Broadmoor Village	0.2956	0.1226	2.4108	0.0159	0.0553	0.5359
Broadmoor_CSTS	0.1634	0.0708	2.3061	0.0211	0.0245	0.3022
Brookside	0.3890	0.0242	16.0593	0.0000	0.3416	0.4365
Brookside_BEAU	0.0305	0.0389	0.7837	0.4332	-0.0457	0.1067
Brookview	-0.1601	0.0329	-4.8643	0.0000	-0.2247	-0.0956
Brookwood	0.0129	0.0215	0.5980	0.5498	-0.0293	0.0550
Broxton Park	0.0005	0.0269	0.0183	0.9854	-0.0522	0.0532
Bruderheim	-0.3038	0.0257	-11.8292	0.0000	-0.3542	-0.2535
Bulyea Heights	0.1751	0.0199	8.8108	0.0000	0.1361	0.2140
Caernarvon	0.0114	0.0222	0.5126	0.6083	-0.0321	0.0548
Calder	-0.0671	0.0186	-3.6070	0.0003	-0.1036	-0.0306
Caledonia	-0.0596	0.0233	-2.5590	0.0105	-0.1053	-0.0140
Callaghan	0.1184	0.0329	3.5953	0.0003	0.0538	0.1829
Callingwood North	0.1993	0.0549	3.6322	0.0003	0.0918	0.3069
Calmar	-0.1964	0.0179	-10.9926	0.0000	-0.2315	-0.1614
Cameron Heights_EDMO	0.0923	0.0247	3.7306	0.0002	0.0438	0.1408
Camrose	-0.1627	0.0709	-2.2961	0.0217	-0.3017	-0.0238
Canon Ridge	-0.0518	0.0299	-1.7357	0.0826	-0.1104	0.0067
Canora	0.0546	0.0329	1.6593	0.0971	-0.0099	0.1192
Canossa	-0.0201	0.0183	-1.0999	0.2714	-0.0560	0.0157
Capilano	0.4448	0.0176	25.2163	0.0000	0.4102	0.4794
Cardiff	-0.0532	0.0282	-1.8845	0.0595	-0.1085	0.0021
Carlisle	-0.0177	0.0209	-0.8489	0.3959	-0.0586	0.0232
Carlton	-0.0116	0.0162	-0.7119	0.4765	-0.0434	0.0203
Carter Crest	0.1725	0.0269	6.4050	0.0000	0.1197	0.2253
Cascades	-0.2847	0.1226	-2.3218	0.0203	-0.5250	-0.0444
Casselman	-0.0521	0.0328	-1.5851	0.1130	-0.1164	0.0123
Cavanagh	-0.0132	0.0259	-0.5096	0.6103	-0.0640	0.0376
Central Business District	-0.0895	0.0614	-1.4584	0.1448	-0.2098	0.0308
Central Mcdougall	0.0414	0.0550	0.7539	0.4509	-0.0663	0.1492
Centre-Ville	0.0496	0.0867	0.5718	0.5675	-0.1204	0.2195
Chamberlain	0.0635	0.1226	0.5182	0.6043	-0.1768	0.3039
Chambery	-0.0038	0.0238	-0.1579	0.8745	-0.0504	0.0429
Champagne	-0.1258	0.0867	-1.4506	0.1469	-0.2958	0.0442
Chappelle Area	0.0062	0.0107	0.5740	0.5660	-0.0149	0.0272
Charlesworth	-0.0224	0.0144	-1.5530	0.1204	-0.0506	0.0059
Charlton Heights	0.1032	0.0308	3.3541	0.0008	0.0429	0.1634
Chelsea Heights	-0.0074	0.0549	-0.1353	0.8924	-0.1150	0.1002

Cherhill	-0.0000	0.0000	-1.3766	0.1686	-0.0000	0.0000
Cherry Grove	-0.1511	0.0464	-3.2529	0.0011	-0.2421	-0.0600
Chipman	-0.2344	0.1226	-1.9119	0.0559	-0.4748	0.0059
Citadel Ridge	-0.0212	0.0410	-0.5177	0.6047	-0.1015	0.0591
City Centre	0.0151	0.0549	0.2759	0.7826	-0.0924	0.1227
Clareview Town Centre	-0.1191	0.0867	-1.3738	0.1695	-0.2891	0.0508
Clarkdale Meadows	0.0483	0.0146	3.3124	0.0009	0.0197	0.0768
Clover Bar Ranch	0.0571	0.0269	2.1247	0.0336	0.0044	0.1098
Cloverdale	0.5355	0.0867	6.1731	0.0000	0.3655	0.7056
Clyde	-0.5086	0.1226	-4.1471	0.0000	-0.7490	-0.2682
Cold Lake North	-0.1354	0.0141	-9.5813	0.0000	-0.1631	-0.1077
Cold Lake South	-0.2299	0.0163	-14.1042	0.0000	-0.2619	-0.1980
Colonial Estates_COLD	-0.2692	0.0709	-3.7990	0.0001	-0.4081	-0.1303
Coloniale Estates_BEAU	0.0125	0.0176	0.7126	0.4761	-0.0220	0.0471
Copperhaven	-0.0121	0.0868	-0.1394	0.8892	-0.1823	0.1581
Corinthia Park	0.0045	0.0206	0.2168	0.8284	-0.0359	0.0449
Country Plains Estates	0.2519	0.0708	3.5559	0.0004	0.1130	0.3907
Craigavon	0.1353	0.0252	5.3768	0.0000	0.0860	0.1847
Crawford Plains	0.0136	0.0186	0.7319	0.4643	-0.0229	0.0502
Creekside	-0.0952	0.0613	-1.5519	0.1207	-0.2154	0.0250
Crestwood	0.6014	0.0243	24.7826	0.0000	0.5538	0.6489
Cromdale	0.2724	0.0549	4.9589	0.0000	0.1647	0.3801
Crystal Heights_CSTS	0.2899	0.1226	2.3645	0.0181	0.0496	0.5302
Crystallina Nera East	-0.0108	0.0709	-0.1522	0.8790	-0.1497	0.1281
Crystallina Nera West	0.0090	0.0184	0.4855	0.6273	-0.0272	0.0451
Cumberland	-0.0306	0.0138	-2.2142	0.0268	-0.0576	-0.0035
Cy Becker	-0.0013	0.0220	-0.0596	0.9525	-0.0445	0.0419
Cynthia	0.0000	0.0000	1.7999	0.0719	-0.0000	0.0000
Daly Grove	-0.0231	0.0206	-1.1203	0.2626	-0.0634	0.0173
Dansereau Meadows	0.0148	0.0502	0.2956	0.7675	-0.0835	0.1132
Davidson Creek	0.0396	0.0185	2.1466	0.0318	0.0034	0.0758
Daysland	-0.4329	0.1226	-3.5301	0.0004	-0.6732	-0.1925
Dechene	0.0283	0.0299	0.9468	0.3438	-0.0303	0.0868
Decoteau	0.5794	0.1226	4.7246	0.0000	0.3390	0.8197
Deer Park_SPGR	0.0169	0.0263	0.6420	0.5209	-0.0347	0.0684
Deer Ridge_SALB	0.0290	0.0115	2.5327	0.0113	0.0066	0.0515
Deer Valley	-0.1015	0.0258	-3.9402	0.0001	-0.1520	-0.0510
Delton	-0.0654	0.0235	-2.7873	0.0053	-0.1113	-0.0194
Delwood	0.0050	0.0144	0.3458	0.7295	-0.0233	0.0332
Desrochers Area	-0.0124	0.0343	-0.3608	0.7183	-0.0796	0.0548
Devon	-0.0724	0.0130	-5.5636	0.0000	-0.0978	-0.0469
Donsdale	0.2557	0.0410	6.2418	0.0000	0.1754	0.3361
Dovercourt	0.1949	0.0205	9.5218	0.0000	0.1548	0.2350
Downtown_STPL	0.0239	0.0434	0.5497	0.5825	-0.0613	0.1090
Drayton Valley	-0.2229	0.0155	-14.3675	0.0000	-0.2533	-0.1925
Duffield	-0.4247	0.1226	-3.4634	0.0005	-0.6650	-0.1843
Duggan	0.2009	0.0175	11.4507	0.0000	0.1665	0.2353
Duggan Park	-0.6837	0.1227	-5.5724	0.0000	-0.9243	-0.4432
Dunluce	0.0044	0.0198	0.2245	0.8223	-0.0343	0.0432
Eaglemont Heights	0.0146	0.0258	0.5678	0.5701	-0.0359	0.0652
Eastwood	-0.0833	0.0213	-3.9171	0.0001	-0.1250	-0.0416
Eaux Claires	0.0036	0.0252	0.1450	0.8847	-0.0457	0.0530
Ebbers	0.0690	0.0435	1.5856	0.1128	-0.0163	0.1542
Edgemont_EDMO	0.0021	0.0154	0.1378	0.8904	-0.0281	0.0323
Edmonton Energy And Technology Park	0.5056	0.1228	4.1158	0.0000	0.2648	0.7463
Edson	-0.0935	0.0867	-1.0778	0.2812	-0.2634	0.0765
Ekota	0.0008	0.0282	0.0279	0.9778	-0.0546	0.0561
Elizabeth Heights	-0.4557	0.0867	-5.2560	0.0000	-0.6257	-0.2858
Elk Point	-0.2752	0.0389	-7.0835	0.0000	-0.3514	-0.1991
Ellerslie	-0.0392	0.0187	-2.0948	0.0362	-0.0758	-0.0025
Elmwood	0.1556	0.0215	7.2220	0.0000	0.1134	0.1978
Elmwood Park	0.0165	0.0329	0.5002	0.6169	-0.0481	0.0811
Elsinore	-0.0114	0.0263	-0.4328	0.6651	-0.0628	0.0401
Emerald Hills	0.0699	0.0291	2.4057	0.0162	0.0129	0.1269
Empire Park	0.3047	0.1226	2.4847	0.0130	0.0643	0.5450
Entwistle	-0.2732	0.0614	-4.4513	0.0000	-0.3934	-0.1529

Erin Ridge	0.1146	0.0123	9.2930	0.0000	0.0905	0.1388
Erin Ridge North	0.1949	0.0169	11.5178	0.0000	0.1618	0.2281
Ermineskin	0.1483	0.0355	4.1822	0.0000	0.0788	0.2178
Estates of Sherwood	0.5521	0.1226	4.5034	0.0000	0.3118	0.7925
Evansburg	-0.3422	0.0501	-6.8303	0.0000	-0.4405	-0.2440
Evansdale	0.0188	0.0179	1.0500	0.2937	-0.0163	0.0539
Falconer Heights	0.1471	0.0308	4.7822	0.0000	0.0868	0.2074
Fawcett	0.0000	0.0000	0.6971	0.4857	-0.0000	0.0000
Fieldstone	0.0586	0.0868	0.6751	0.4996	-0.1115	0.2286
Forest Green_STPL	-0.0653	0.0308	-2.1227	0.0338	-0.1256	-0.0050
Forest Heights_BEAU	-0.0376	0.0224	-1.6832	0.0924	-0.0814	0.0062
Forest Heights_EDMO	0.3615	0.0166	21.7148	0.0000	0.3289	0.3942
Forest Lawn_SALB	0.1323	0.0209	6.3318	0.0000	0.0913	0.1733
Forrest Greens	0.1104	0.0341	3.2376	0.0012	0.0436	0.1773
Fort Assiniboine	0.0000	0.0000	1.7573	0.0789	-0.0000	0.0000
Fort Kent	-0.2808	0.0867	-3.2378	0.0012	-0.4508	-0.1108
Four Season Estates_BEAU	0.1538	0.0549	2.8003	0.0051	0.0461	0.2614
Foxboro	0.0306	0.0143	2.1313	0.0331	0.0025	0.0587
Foxhaven	0.0559	0.0329	1.7019	0.0888	-0.0085	0.1204
Fraser	-0.0132	0.0195	-0.6748	0.4998	-0.0515	0.0251
Fulton Place	0.2748	0.0166	16.5477	0.0000	0.2422	0.3073
Gariepy	0.1435	0.0263	5.4505	0.0000	0.0919	0.1952
Garneau	0.6571	0.0285	23.0838	0.0000	0.6013	0.7129
Genesis On The Lakes	0.1048	0.1227	0.8541	0.3930	-0.1357	0.3452
Gibbons	-0.1807	0.0148	-12.1707	0.0000	-0.2098	-0.1516
Glastonbury	0.0069	0.0152	0.4537	0.6500	-0.0229	0.0367
Glen Allan	0.1321	0.0129	10.2123	0.0000	0.1067	0.1574
Glenbrae Meadows	0.0242	0.0613	0.3947	0.6931	-0.0960	0.1445
Glendale	-0.1923	0.1226	-1.5682	0.1169	-0.4326	0.0481
Glendon	-0.0826	0.0708	-1.1654	0.2439	-0.2214	0.0563
Glengarry	0.0698	0.0194	3.5977	0.0003	0.0318	0.1079
Glenora	0.5648	0.0203	27.8017	0.0000	0.5250	0.6046
Glenridding Heights	0.0341	0.0177	1.9248	0.0543	-0.0006	0.0689
Glenridding Ravine	0.0768	0.0300	2.5640	0.0104	0.0181	0.1356
Glens The	-0.0690	0.0298	-2.3115	0.0208	-0.1274	-0.0105
Glenwood_EDMO	0.1021	0.0192	5.3287	0.0000	0.0645	0.1396
Gold Bar	0.2718	0.0190	14.2975	0.0000	0.2345	0.3091
Goudreau Terrace	-0.0174	0.0549	-0.3175	0.7508	-0.1250	0.0902
Grandin	0.1297	0.0137	9.4785	0.0000	0.1029	0.1565
Grandview Heights_EDMO	0.7268	0.0501	14.4984	0.0000	0.6285	0.8251
Granville_EDMO	0.0927	0.0243	3.8168	0.0001	0.0451	0.1403
Graybriar	-0.1374	0.0329	-4.1778	0.0000	-0.2018	-0.0729
Graydon Hill	0.0623	0.0868	0.7178	0.4729	-0.1079	0.2325
Greenbury	0.0408	0.0308	1.3244	0.1854	-0.0196	0.1013
Greenfield	0.2625	0.0157	16.7091	0.0000	0.2317	0.2933
Greenview_EDMO	0.0431	0.0209	2.0659	0.0389	0.0022	0.0841
Griesbach	0.1160	0.0188	6.1823	0.0000	0.0792	0.1527
Grove Meadows	-0.0566	0.0229	-2.4737	0.0134	-0.1015	-0.0118
Grovenor	0.3261	0.0174	18.7178	0.0000	0.2919	0.3602
Gwynne	-0.2097	0.1226	-1.7103	0.0872	-0.4501	0.0306
Haddow	0.1579	0.0189	8.3506	0.0000	0.1208	0.1949
Hairsine	-0.0742	0.0464	-1.5979	0.1101	-0.1652	0.0168
Hamptons, The	0.0280	0.0119	2.3557	0.0185	0.0047	0.0514
Hardisty	-0.4370	0.1226	-3.5632	0.0004	-0.6774	-0.1966
Harvest Ridge	-0.0285	0.0175	-1.6332	0.1024	-0.0627	0.0057
Hawks Ridge	0.0442	0.0239	1.8494	0.0644	-0.0026	0.0910
Hawthorne	-0.0929	0.1226	-0.7576	0.4487	-0.3332	0.1474
Hay Lakes	-0.2518	0.0709	-3.5546	0.0004	-0.3907	-0.1130
Hays Ridge Area	0.4473	0.0868	5.1554	0.0000	0.2772	0.6174
Hazeldean	0.3523	0.0191	18.4021	0.0000	0.3148	0.3898
Heatherglen	-0.0722	0.0290	-2.4861	0.0129	-0.1291	-0.0153
Henderson Estates	0.2213	0.0318	6.9587	0.0000	0.1590	0.2836
Heritage Estates_STPL	-0.0333	0.0708	-0.4705	0.6380	-0.1721	0.1055
Heritage Hills	0.1489	0.0181	8.2333	0.0000	0.1135	0.1844
Heritage Lakes	0.1040	0.0175	5.9284	0.0000	0.0696	0.1384
Heritage Point	0.1731	0.1227	1.4111	0.1582	-0.0674	0.4135

High Park_EDMO	0.0596	0.0283	2.1081	0.0350	0.0042	0.1150
High Park_STPL	-0.0153	0.0318	-0.4815	0.6302	-0.0775	0.0470
Highlands	0.3127	0.0167	18.7780	0.0000	0.2801	0.3454
Hilldowns	-0.0102	0.0222	-0.4584	0.6466	-0.0537	0.0334
Hillview	0.0478	0.0251	1.8995	0.0575	-0.0015	0.0970
Hinton	-0.0738	0.1227	-0.6018	0.5473	-0.3142	0.1666
Hinton Hill	0.2678	0.1226	2.1844	0.0289	0.0275	0.5081
Hodgson	0.1220	0.0242	5.0396	0.0000	0.0746	0.1695
Holden	-0.6829	0.1226	-5.5699	0.0000	-0.9233	-0.4426
Hollick-Kenyon	-0.0291	0.0150	-1.9436	0.0520	-0.0585	0.0002
Holyrood	0.3372	0.0167	20.1767	0.0000	0.3044	0.3699
Homesteader	-0.0159	0.0290	-0.5482	0.5836	-0.0727	0.0409
Horseshoe Bay Estates	0.1288	0.0868	1.4851	0.1375	-0.0412	0.2989
Hudson	-0.0101	0.0308	-0.3276	0.7432	-0.0704	0.0503
Hughenden	-0.6570	0.1226	-5.3574	0.0000	-0.8974	-0.4166
Idylwylde	0.2784	0.0201	13.8413	0.0000	0.2390	0.3178
Inglewood_EDMO	0.2796	0.0154	18.2109	0.0000	0.2495	0.3097
Inglewood_SALB	0.2648	0.0614	4.3139	0.0000	0.1445	0.3851
Innisfree	-0.0000	0.0000	-0.2884	0.7730	-0.0000	0.0000
Jackson Heights	-0.0180	0.0177	-1.0156	0.3098	-0.0526	0.0167
Jamieson Place	0.0401	0.0172	2.3334	0.0196	0.0064	0.0737
Jasper Park	0.1585	0.0355	4.4650	0.0000	0.0889	0.2281
Jensen Lakes	0.2594	0.0277	9.3699	0.0000	0.2051	0.3136
Jesperdale	-0.0195	0.0355	-0.5498	0.5825	-0.0892	0.0501
Josephburg	-0.3492	0.0868	-4.0224	0.0001	-0.5193	-0.1790
Jutland Ridge	-0.2638	0.0503	-5.2486	0.0000	-0.3623	-0.1653
Kameyosek	0.0130	0.0434	0.2995	0.7646	-0.0721	0.0981
Keheewin	0.0837	0.0251	3.3324	0.0009	0.0345	0.1330
Kenilworth	0.2107	0.0194	10.8555	0.0000	0.1727	0.2488
Kensington	0.0552	0.0167	3.3054	0.0010	0.0225	0.0880
Kenton	0.0405	0.0389	1.0399	0.2984	-0.0358	0.1168
Kernohan	-0.0695	0.0218	-3.1876	0.0014	-0.1123	-0.0268
Keswick Area	0.1777	0.0259	6.8703	0.0000	0.1270	0.2284
Kildare	0.0010	0.0263	0.0399	0.9682	-0.0505	0.0526
Kilkenny	0.0250	0.0193	1.2951	0.1953	-0.0129	0.0629
Killarney	0.0170	0.0223	0.7619	0.4461	-0.0267	0.0606
King Edward Park	0.3198	0.0152	21.0951	0.0000	0.2901	0.3495
Kingman	-0.2925	0.1227	-2.3844	0.0171	-0.5329	-0.0520
Kingswood	0.2386	0.0233	10.2243	0.0000	0.1928	0.2843
Kiniski Gardens	-0.0287	0.0125	-2.3081	0.0210	-0.0532	-0.0043
Kinokamau Plains Area	0.4380	0.0708	6.1834	0.0000	0.2991	0.5768
Kirkness	-0.0388	0.0218	-1.7805	0.0750	-0.0816	0.0039
Klarvatten	-0.0392	0.0140	-2.8001	0.0051	-0.0666	-0.0118
La Perle	0.0349	0.0237	1.4717	0.1411	-0.0116	0.0815
Lac La Biche	-0.0188	0.1226	-0.1530	0.8784	-0.2591	0.2215
Lacombe Park	0.1589	0.0120	13.2605	0.0000	0.1354	0.1823
Lago Lindo	-0.0304	0.0172	-1.7686	0.0770	-0.0640	0.0033
Lake Westerra	-0.0789	0.0192	-4.1190	0.0000	-0.1165	-0.0414
Lakeland Ridge	0.0652	0.0135	4.8188	0.0000	0.0387	0.0917
Lakeridge Estates	-0.0997	0.0501	-1.9882	0.0468	-0.1980	-0.0014
Lakeside Estates	0.0167	0.0355	0.4709	0.6377	-0.0528	0.0863
Lakewood Estates	-0.0415	0.0389	-1.0677	0.2857	-0.1177	0.0347
Lakewood_SPGR	-0.0676	0.0187	-3.6168	0.0003	-0.1043	-0.0310
Lamont	-0.3859	0.0329	-11.7452	0.0000	-0.4503	-0.3215
Lansdowne	0.4995	0.0355	14.0610	0.0000	0.4299	0.5691
Larkspur	-0.0212	0.0170	-1.2462	0.2127	-0.0546	0.0121
Lauderdale	-0.0083	0.0242	-0.3435	0.7313	-0.0559	0.0392
Laurel	0.0071	0.0140	0.5072	0.6120	-0.0203	0.0345
Laurier Heights	0.5590	0.0196	28.4496	0.0000	0.5205	0.5975
Lavoy	-0.0000	0.0000	-0.4173	0.6765	-0.0000	0.0000
Leduc Estates	0.0490	0.0290	1.6898	0.0911	-0.0078	0.1058
Lee Ridge	-0.0294	0.0290	-1.0136	0.3108	-0.0863	0.0275
Lefebvre Heights	-0.1824	0.0867	-2.1033	0.0355	-0.3524	-0.0124
Legacy Park	-0.0769	0.0389	-1.9791	0.0478	-0.1531	-0.0007
Legal	-0.2046	0.0229	-8.9333	0.0000	-0.2495	-0.1597
Leger	0.1448	0.0233	6.2070	0.0000	0.0991	0.1905

Lendrum Place	0.3896	0.0247	15.7567	0.0000	0.3412	0.4381
Lewis Farms Industrial	-0.0000	0.0000	-0.4175	0.6763	-0.0000	0.0000
Linkside	0.1367	0.0355	3.8496	0.0001	0.0671	0.2063
Linsford Park	-0.0421	0.0318	-1.3251	0.1852	-0.1045	0.0202
Long Lake	-0.0085	0.0867	-0.0982	0.9218	-0.1785	0.1615
Lorelei	0.0312	0.0257	1.2137	0.2249	-0.0192	0.0815
Lymburn	0.0370	0.0152	2.4368	0.0148	0.0072	0.0668
Lynnwood	0.2581	0.0190	13.5935	0.0000	0.2209	0.2953
Macewan	-0.0200	0.0176	-1.1382	0.2551	-0.0544	0.0144
MacTaggart	0.2389	0.0299	7.9805	0.0000	0.1802	0.2976
Magrath Heights	0.1820	0.0263	6.9066	0.0000	0.1303	0.2336
Malmo Plains	0.3783	0.0216	17.5410	0.0000	0.3360	0.4206
Mannville	-0.3916	0.1226	-3.1937	0.0014	-0.6319	-0.1512
Maple	-0.0261	0.0243	-1.0733	0.2832	-0.0736	0.0215
Maplegrove	0.1765	0.0269	6.5590	0.0000	0.1238	0.2293
Maplewood_CSTR	0.1196	0.0290	4.1184	0.0000	0.0627	0.1765
Marwayne	-0.4287	0.1226	-3.4955	0.0005	-0.6691	-0.1883
Matt Berry	-0.0248	0.0215	-1.1531	0.2489	-0.0669	0.0173
Mayerthorpe	-0.2504	0.1226	-2.0417	0.0412	-0.4907	-0.0100
Mayfield	0.0714	0.0178	3.9977	0.0001	0.0364	0.1063
Mayliewan	-0.0199	0.0193	-1.0333	0.3015	-0.0578	0.0179
Mccauley	-0.0333	0.0209	-1.5960	0.1105	-0.0742	0.0076
McConachie Area	-0.0113	0.0117	-0.9653	0.3344	-0.0343	0.0117
McKernan	0.6497	0.0197	32.9430	0.0000	0.6110	0.6884
McLaughlin_SPGR	-0.0233	0.0355	-0.6559	0.5119	-0.0930	0.0464
Mcleod	0.0063	0.0215	0.2939	0.7688	-0.0359	0.0485
McNicol	-0.1043	0.1226	-0.8501	0.3953	-0.3446	0.1361
McQueen	0.2852	0.0253	11.2863	0.0000	0.2357	0.3347
Meadowlark Park_EDMO	0.1970	0.0176	11.1631	0.0000	0.1624	0.2316
Meadowview Park_LEDU	-0.0055	0.0216	-0.2546	0.7991	-0.0477	0.0368
Menisa	0.0210	0.0282	0.7455	0.4560	-0.0343	0.0764
Meridian Heights	-0.0632	0.0370	-1.7069	0.0879	-0.1358	0.0094
Meyokumin	0.0300	0.0237	1.2666	0.2053	-0.0164	0.0765
Meyonohk	0.0166	0.0242	0.6867	0.4923	-0.0308	0.0640
Michaels Park	0.0252	0.0329	0.7653	0.4441	-0.0393	0.0896
Miller	-0.0580	0.0257	-2.2533	0.0243	-0.1084	-0.0075
Millet	-0.1995	0.0247	-8.0925	0.0000	-0.2478	-0.1512
Millgrove	-0.0010	0.0246	-0.0407	0.9675	-0.0493	0.0473
Mills Haven	0.1080	0.0179	6.0279	0.0000	0.0729	0.1431
Minchau	-0.0341	0.0212	-1.6084	0.1078	-0.0755	0.0074
Mission_SALB	0.1247	0.0222	5.6208	0.0000	0.0812	0.1682
Montalet	-0.0377	0.0341	-1.1060	0.2687	-0.1046	0.0291
Montrose Estates	0.0264	0.0319	0.8291	0.4071	-0.0360	0.0889
Montrose_EDMO	-0.0963	0.0205	-4.6972	0.0000	-0.1365	-0.0561
Morinville	-0.1032	0.0095	-10.8622	0.0000	-0.1218	-0.0846
Mundare	-0.2718	0.0464	-5.8557	0.0000	-0.3627	-0.1808
Myrnam	-0.5577	0.0867	-6.4301	0.0000	-0.7277	-0.3877
Nelson Heights	-0.1329	0.0299	-4.4513	0.0000	-0.1914	-0.0744
New Norway	-0.2133	0.1226	-1.7398	0.0819	-0.4537	0.0270
New Sarepta	-0.2066	0.0501	-4.1240	0.0000	-0.3048	-0.1084
Newbrook	0.0000	0.0000	0.5626	0.5737	-0.0000	0.0000
Newton	-0.0769	0.0186	-4.1318	0.0000	-0.1134	-0.0404
None	-0.1244	0.0085	-14.6911	0.0000	-0.1410	-0.1078
North Glenora	0.3698	0.0184	20.1509	0.0000	0.3338	0.4057
North Ridge	0.0945	0.0130	7.2666	0.0000	0.0690	0.1199
North Telford	0.0708	0.0614	1.1534	0.2488	-0.0496	0.1912
Northmount	0.0410	0.0215	1.9045	0.0569	-0.0012	0.0832
Nottingham	0.1406	0.0177	7.9467	0.0000	0.1059	0.1753
Oakmont	0.1670	0.0154	10.8153	0.0000	0.1367	0.1973
Ogilvie Ridge	0.2272	0.0356	6.3855	0.0000	0.1575	0.2970
Old Fort Saskatchewan	0.0011	0.0253	0.0432	0.9656	-0.0485	0.0507
Old Town_STPL	0.0432	0.0291	1.4870	0.1370	-0.0137	0.1002
Oleskiw	0.2715	0.0227	11.9854	0.0000	0.2271	0.3159
Oliver	0.5723	0.0869	6.5884	0.0000	0.4020	0.7425
Onoway	-0.2582	0.0275	-9.3853	0.0000	-0.3121	-0.2042
Orchards At Ellerslie, The	0.0160	0.0175	0.9142	0.3606	-0.0184	0.0504

Ormsby Place	0.0569	0.0169	3.3749	0.0007	0.0238	0.0899
Ottewell	0.2855	0.0115	24.8297	0.0000	0.2629	0.3080
Overlanders	-0.0399	0.0388	-1.0261	0.3048	-0.1160	0.0363
Oxford	-0.0005	0.0185	-0.0279	0.9777	-0.0367	0.0357
Ozerna	-0.0044	0.0206	-0.2120	0.8321	-0.0447	0.0360
Paisley	0.0475	0.0308	1.5389	0.1239	-0.0130	0.1079
Parkallen_EDMO	0.4327	0.0216	20.0343	0.0000	0.3904	0.4751
Parkdale_EDMO	-0.0869	0.0155	-5.6185	0.0000	-0.1172	-0.0566
Parklane	0.0173	0.0867	0.2000	0.8415	-0.1526	0.1873
Parkview	0.5504	0.0173	31.8105	0.0000	0.5165	0.5844
Patricia Heights	0.2920	0.0371	7.8751	0.0000	0.2193	0.3646
Peace River	0.0476	0.1226	0.3884	0.6978	-0.1927	0.2880
Pibroch	-0.0000	0.0000	-0.8071	0.4196	-0.0000	0.0000
Pickardville	-0.3534	0.0867	-4.0759	0.0000	-0.5234	-0.1835
Pineview	0.1071	0.0263	4.0772	0.0000	0.0556	0.1586
Pineview Fort Sask.	0.0209	0.0135	1.5543	0.1201	-0.0055	0.0474
Place Chaleureuse	0.0428	0.0248	1.7288	0.0839	-0.0057	0.0914
Pleasantview_EDMO	0.3735	0.0210	17.8088	0.0000	0.3324	0.4146
Pollard Meadows	-0.0097	0.0251	-0.3865	0.6991	-0.0590	0.0396
Potter Greens	0.0966	0.0341	2.8322	0.0046	0.0297	0.1634
Prescott	0.0103	0.0465	0.2217	0.8246	-0.0808	0.1014
Prince Charles	0.0909	0.0222	4.0874	0.0000	0.0473	0.1344
Prince Rupert	0.1401	0.0270	5.1936	0.0000	0.0872	0.1930
Queen Alexandra	0.4505	0.0184	24.5138	0.0000	0.4145	0.4866
Queen Mary Park	0.2667	0.0239	11.1493	0.0000	0.2198	0.3136
Quesnell Heights	0.4878	0.0709	6.8817	0.0000	0.3488	0.6267
Radway	-0.4447	0.1227	-3.6258	0.0003	-0.6851	-0.2043
Ramsay Heights	0.2422	0.0238	10.1609	0.0000	0.1955	0.2889
Rapperswill	0.0008	0.0179	0.0473	0.9623	-0.0342	0.0358
Red Fox Estates	-0.0635	0.0614	-1.0347	0.3008	-0.1839	0.0568
Redwater	-0.3167	0.0206	-15.3938	0.0000	-0.3570	-0.2764
Regency Park_CSTS	0.0940	0.0247	3.8083	0.0001	0.0456	0.1424
Rhatigan Ridge	0.2400	0.0196	12.2430	0.0000	0.2015	0.2784
Richfield	0.0398	0.0299	1.3342	0.1822	-0.0187	0.0983
Richford	-0.0286	0.0708	-0.4044	0.6859	-0.1675	0.1102
Rideau Park_EDMO	0.1746	0.0389	4.4931	0.0000	0.0984	0.2508
Rio Terrace	0.4393	0.0247	17.7670	0.0000	0.3909	0.4878
Ritchie	0.3779	0.0154	24.6074	0.0000	0.3478	0.4080
River Pointe	-0.0234	0.0708	-0.3303	0.7412	-0.1622	0.1154
Riverdale	0.4266	0.0308	13.8698	0.0000	0.3663	0.4868
Riverside_SALB	0.1381	0.0549	2.5142	0.0119	0.0304	0.2458
Riverview Area	0.2372	0.0502	4.7300	0.0000	0.1389	0.3355
Riverview_STPA	0.0000	0.0000	0.7551	0.4502	-0.0000	0.0000
Riviere Qui Barre	-0.0035	0.1227	-0.0285	0.9772	-0.2440	0.2370
Robb	0.0945	0.1227	0.7700	0.4413	-0.1460	0.3349
Robinson	-0.0959	0.0356	-2.6966	0.0070	-0.1656	-0.0262
Rochester	0.0000	0.0000	2.0413	0.0412	0.0000	0.0000
Rochfort Bridge	0.0000	0.0000	0.9430	0.3457	-0.0000	0.0000
Rocky Rapids	-0.2034	0.0867	-2.3458	0.0190	-0.3734	-0.0334
Rolly View	-0.3899	0.1226	-3.1798	0.0015	-0.6303	-0.1496
Rosenthal_EDMO	0.0571	0.0197	2.8938	0.0038	0.0184	0.0958
Rossdale	0.5782	0.0436	13.2691	0.0000	0.4928	0.6636
Rosslyn	0.0686	0.0207	3.3147	0.0009	0.0280	0.1092
Round Hill	-0.3522	0.1226	-2.8721	0.0041	-0.5926	-0.1118
Royal Gardens_EDMO	0.2136	0.0204	10.4832	0.0000	0.1737	0.2535
Ruisseau	-0.0257	0.0435	-0.5908	0.5547	-0.1109	0.0595
Rundle Heights	0.0188	0.0283	0.6632	0.5072	-0.0367	0.0742
Rural North East South Sturgeon	0.3963	0.0614	6.4578	0.0000	0.2760	0.5166
Rural West Big Lake	0.0000	0.0000	0.9258	0.3546	-0.0000	0.0000
Rutherford	0.0202	0.0131	1.5435	0.1227	-0.0055	0.0459
Ryley	-0.5457	0.0867	-6.2912	0.0000	-0.7157	-0.3757
Sakaw	0.0199	0.0218	0.9136	0.3609	-0.0228	0.0627
Salisbury Village	0.1851	0.0614	3.0131	0.0026	0.0647	0.3054
Sangudo	-0.6908	0.1226	-5.6342	0.0000	-0.9312	-0.4505
Satoo	0.0021	0.0229	0.0906	0.9278	-0.0428	0.0470
Schonsee	0.0321	0.0199	1.6112	0.1072	-0.0069	0.0711

Secord	0.0205	0.0129	1.5873	0.1125	-0.0048	0.0457
Sherbrooke	0.1404	0.0188	7.4569	0.0000	0.1035	0.1773
Sherridon Heights	-0.0079	0.0257	-0.3064	0.7593	-0.0583	0.0425
Sherwood	0.0973	0.0282	3.4479	0.0006	0.0420	0.1527
Sherwood Heights	0.1933	0.0180	10.7485	0.0000	0.1581	0.2286
Sienna	-0.0566	0.0614	-0.9222	0.3564	-0.1769	0.0637
Sifton Park	-0.0240	0.0501	-0.4788	0.6321	-0.1222	0.0742
Silver Berry	-0.0356	0.0140	-2.5445	0.0110	-0.0630	-0.0082
Silverstone	-0.1623	0.0614	-2.6444	0.0082	-0.2827	-0.0420
Skyrattler	0.0701	0.0867	0.8085	0.4188	-0.0998	0.2400
Smoky Lake Town	-0.2037	0.0708	-2.8758	0.0040	-0.3425	-0.0648
South Creek	-0.0400	0.0502	-0.7966	0.4257	-0.1383	0.0584
South Fort	-0.0009	0.0120	-0.0775	0.9382	-0.0245	0.0227
South Park	-0.0406	0.0198	-2.0527	0.0401	-0.0794	-0.0018
South Telford	-0.0179	0.0355	-0.5047	0.6138	-0.0876	0.0517
South Terwillegar	0.0589	0.0135	4.3519	0.0000	0.0324	0.0855
Southfork	-0.1114	0.0159	-6.9959	0.0000	-0.1426	-0.0802
Southridge_STPL	-0.0117	0.0355	-0.3287	0.7424	-0.0812	0.0579
Springate	-0.1077	0.0614	-1.7539	0.0795	-0.2281	0.0127
Spruce Avenue	0.0508	0.0249	2.0394	0.0414	0.0020	0.0996
Spruce Ridge	-0.0836	0.0299	-2.7954	0.0052	-0.1421	-0.0250
Spruce Village	-0.0993	0.0209	-4.7407	0.0000	-0.1404	-0.0583
Spruce Woods	-0.3300	0.0465	-7.0976	0.0000	-0.4211	-0.2388
St. Andrews	-0.0688	0.0370	-1.8569	0.0634	-0.1414	0.0038
St. Michael	-0.0000	0.0000	-1.1312	0.2580	-0.0000	0.0000
St. Paul Town	-0.2066	0.0143	-14.4646	0.0000	-0.2346	-0.1786
St. Vital	0.0161	0.0614	0.2629	0.7926	-0.1041	0.1364
Starling	0.0790	0.0270	2.9242	0.0035	0.0260	0.1319
Steinhauer	0.0971	0.0299	3.2528	0.0011	0.0386	0.1557
Stewart Greens	0.0321	0.0300	1.0699	0.2847	-0.0267	0.0908
Stillwater	-0.0436	0.0465	-0.9372	0.3487	-0.1348	0.0476
Stoneshire	0.0270	0.0434	0.6220	0.5340	-0.0581	0.1121
Stonycreek_STPL	-0.0762	0.0867	-0.8783	0.3798	-0.2462	0.0938
Strathcona	0.6277	0.0178	35.3182	0.0000	0.5929	0.6625
Strathcona Village	-0.0182	0.0389	-0.4683	0.6396	-0.0944	0.0580
Strathearn	0.3925	0.0283	13.8737	0.0000	0.3371	0.4480
Sturgeon Heights	0.1525	0.0185	8.2246	0.0000	0.1161	0.1888
Suder Greens	0.0224	0.0176	1.2771	0.2016	-0.0120	0.0569
Summerlea	-0.0188	0.0409	-0.4584	0.6467	-0.0990	0.0615
Summerside	0.0147	0.0097	1.5115	0.1307	-0.0044	0.0338
Summerwood	0.0518	0.0127	4.0599	0.0000	0.0268	0.0768
Sunshine Estates	-0.0584	0.0409	-1.4279	0.1533	-0.1387	0.0218
Suntree_LEDU	-0.0918	0.0168	-5.4494	0.0000	-0.1248	-0.0588
Sweet Grass	0.1631	0.0269	6.0645	0.0000	0.1104	0.2159
Tamarack	-0.0194	0.0180	-1.0784	0.2809	-0.0547	0.0159
Taradale	-0.0385	0.1226	-0.3137	0.7538	-0.2788	0.2019
Terrace Heights_EDMO	0.2712	0.0242	11.1910	0.0000	0.2237	0.3187
Terwillegar Towne	0.0403	0.0137	2.9528	0.0032	0.0136	0.0671
The Fairways_STPL	-0.0470	0.0269	-1.7465	0.0807	-0.0997	0.0057
The Ridge	0.2019	0.0181	11.1612	0.0000	0.1665	0.2374
Thickwood Heights	0.2011	0.1226	1.6404	0.1010	-0.0392	0.4414
Thorburn	0.1273	0.1226	1.0378	0.2994	-0.1131	0.3676
Thorhild	-0.6034	0.1226	-4.9201	0.0000	-0.8438	-0.3630
Thorncliffe_EDMO	0.0566	0.0434	1.3030	0.1926	-0.0285	0.1417
Thorsby	-0.4277	0.0329	-13.0125	0.0000	-0.4922	-0.3633
Tipaskan	-0.0112	0.0355	-0.3169	0.7513	-0.0808	0.0583
Tofield	-0.2390	0.0225	-10.6138	0.0000	-0.2831	-0.1948
Tonewood	-0.0342	0.0709	-0.4819	0.6299	-0.1732	0.1048
TR-City Estates	-0.0807	0.0299	-2.6956	0.0070	-0.1393	-0.0220
Tribute	-0.1117	0.0222	-5.0268	0.0000	-0.1553	-0.0681
Triomphe Estates	-0.0210	0.0465	-0.4521	0.6512	-0.1122	0.0701
Trumpeter Area	0.0708	0.0248	2.8528	0.0043	0.0221	0.1194
Tweddle Place	0.0163	0.0257	0.6335	0.5264	-0.0341	0.0666
Twin Brooks	0.1081	0.0154	7.0109	0.0000	0.0779	0.1383
Two Hills	-0.3648	0.0708	-5.1504	0.0000	-0.5036	-0.2259
Uplands, The	-0.0124	0.0411	-0.3016	0.7630	-0.0929	0.0681

Valleyview_MDGV	-0.3749	0.1227	-3.0563	0.0022	-0.6153	-0.1345
Vegreville	-0.3283	0.0179	-18.3668	0.0000	-0.3634	-0.2933
Viking	-0.3518	0.0867	-4.0569	0.0000	-0.5218	-0.1818
Village on the Lake	0.0761	0.0233	3.2654	0.0011	0.0304	0.1218
Villeneuve	-0.0781	0.1226	-0.6371	0.5240	-0.3184	0.1622
Vilna	-0.7969	0.1226	-6.5000	0.0000	-1.0372	-0.5566
Vimy	0.0000	0.0000	1.7438	0.0812	-0.0000	0.0000
Violet Grove	-0.5109	0.1227	-4.1649	0.0000	-0.7513	-0.2704
Virginia Park	0.2876	0.0502	5.7317	0.0000	0.1892	0.3859
Wabamun	-0.3014	0.0501	-6.0159	0.0000	-0.3996	-0.2032
Wainwright	-0.2096	0.1229	-1.7064	0.0880	-0.4505	0.0312
Walker	0.0030	0.0129	0.2334	0.8154	-0.0223	0.0283
Warburg	-0.6033	0.0613	-9.8348	0.0000	-0.7235	-0.4831
Waskatenau	-0.4871	0.0867	-5.6159	0.0000	-0.6571	-0.3171
Webber Greens	0.0433	0.0223	1.9457	0.0517	-0.0003	0.0869
Wedgewood Heights	0.1008	0.0263	3.8284	0.0001	0.0492	0.1523
Weinlos	-0.0253	0.0212	-1.1921	0.2333	-0.0669	0.0163
Wellington	0.0723	0.0163	4.4373	0.0000	0.0404	0.1043
West Grandview	0.0000	0.0000	0.7849	0.4325	-0.0000	0.0000
West Grove	-0.0582	0.0238	-2.4472	0.0144	-0.1048	-0.0116
West Haven	-0.1070	0.0204	-5.2422	0.0000	-0.1470	-0.0670
West Haven Park	0.1140	0.1227	0.9287	0.3530	-0.1266	0.3545
West Jasper Place	0.1008	0.0233	4.3288	0.0000	0.0552	0.1464
West Lethbridge City	-0.1787	0.1226	-1.4569	0.1452	-0.4190	0.0617
West Meadowlark Park	0.1283	0.0234	5.4872	0.0000	0.0825	0.1742
Westboro	0.1315	0.0218	6.0168	0.0000	0.0886	0.1743
Westbrook Estate	0.4959	0.0709	6.9905	0.0000	0.3569	0.6350
Westerra	-0.0380	0.0549	-0.6921	0.4889	-0.1456	0.0696
Westlock	-0.2942	0.0169	-17.4328	0.0000	-0.3273	-0.2611
Westmount	0.6036	0.0151	39.9719	0.0000	0.5740	0.6332
Westpark_FSAS	-0.0144	0.0106	-1.3559	0.1751	-0.0353	0.0064
Westridge_EDMO	0.2661	0.0264	10.0977	0.0000	0.2145	0.3178
Westwood Trails	-0.0621	0.0867	-0.7161	0.4739	-0.2321	0.1079
Westwood_EDMO	0.0049	0.0264	0.1871	0.8516	-0.0468	0.0566
Wetaskiwin	-0.2875	0.0104	-27.7742	0.0000	-0.3078	-0.2672
Whitecourt	0.0287	0.0867	0.3311	0.7406	-0.1413	0.1987
Wild Rose	-0.0381	0.0148	-2.5762	0.0100	-0.0671	-0.0091
Wildwood_YELL	0.0000	0.0000	5.9482	0.0000	0.0000	0.0000
Willingdon	0.0000	0.0000	5.8689	0.0000	0.0000	0.0000
Willow Park_LEDU	-0.0443	0.0355	-1.2490	0.2117	-0.1139	0.0252
Willow Park_STPL	0.0958	0.0389	2.4642	0.0137	0.0196	0.1720
Windermere	0.1293	0.0120	10.7884	0.0000	0.1058	0.1528
Windermere Area	-0.0140	0.0868	-0.1617	0.8715	-0.1841	0.1560
Windrose	0.0832	0.0204	4.0836	0.0000	0.0432	0.1231
Windsor Park_EDMO	-0.0000	0.0000	-5.8849	0.0000	-0.0000	-0.0000
Woodbridge Farms	0.0839	0.0222	3.7824	0.0002	0.0404	0.1273
Woodcroft	0.2310	0.0216	10.6748	0.0000	0.1886	0.2734
Woodhaven_SPGR	0.0060	0.0308	0.1941	0.8461	-0.0543	0.0663
Woodlands_SALB	0.1096	0.0233	4.6986	0.0000	0.0639	0.1554
Woodlands_STPL	-0.1128	0.0355	-3.1799	0.0015	-0.1823	-0.0433
Woodside_SPGR	-0.0046	0.0549	-0.0838	0.9332	-0.1122	0.1030
York	-0.0063	0.0230	-0.2756	0.7828	-0.0513	0.0387

Omnibus:	1003.569	Durbin-Watson:	1.591
Prob(Omnibus):	0.000	Jarque-Bera (JB):	4880.133
Skew:	0.056	Prob(JB):	0.000
Kurtosis:	5.774	Condition No.:	428560551882010132480

ALL ONE SKY FOUNDATION is a not-for-profit, charitable organization established in 2010 to help vulnerable populations at the crossroads of energy and climate change. We do this through education, research and community-led programs, focusing our efforts on adaptation to climate change and energy poverty. Our vision is a society in which ALL people can afford the energy they require to live in warm, comfortable homes, in communities that are able to respond and adapt to a changing climate.

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