



LOW CARBON LIVING
CRC

Understanding consumers' reactions to new housing options

A study for Australia's sustainable housing roadmap



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The author(s) confirm(s) that this document has been reviewed and approved by the project's steering committee and by its program leader. These reviewers evaluated its:

- originality
- methodology
- rigour
- compliance with ethical guidelines
- conclusions against results
- conformity with the principles of the [Australian Code for the Responsible Conduct of Research](#) (NHMRC 2007),

and provided constructive feedback which was considered and addressed by the author(s).

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Executive Summary

The aim of this research was to understand the market for sustainable housing and quantify potential impacts on the construction industry. To achieve this aim we addressed three research questions.

1. What percentage and segments of the home buyer market show interest in sustainable homes based off different labels to describe the type of home?
2. What type of message framing for these homes influences potential buyers' preferences, and for which segments of the population?
3. What percentage of new home buyers have the intention (if marketed/available to them) to build a sustainable/energy efficient home?

An online survey was conducted that mirrored the process of viewing a home builder's website. Participants filtered options to select their desired home. The first experimental phase involved a randomly labelled filter option regarding the type of home: "energy efficient," "comfort plus", and "cost saver". Three homes were filtered back to participants with one experimental home and message frame option (depending if the first stage experimental filter was selected, if not, any random option was given).

Overall, the term "energy efficient" appears to have the most traction among potential home buyers as a feature that they are interested in; and indeed this feature was selected more often in our sample than any other house feature, with 67.0% of participants who saw this option selecting it. Energy efficiency was especially preferred by people 40 years and older.

The terms "cost saver" and "comfort plus" generated lower levels of interest than we anticipated. This suggests that these terms were not automatically linked in peoples' minds to energy consumption, running costs or living space comfort; rather, they appear to have been interpreted as indicators of the purchase price of the house – "cost saver" was selected more by people on lower incomes, and "comfort plus" was selected more by people on higher incomes

The second phase involved showing people three potential homes (all three matched their preferences in terms of stories and bedrooms). For each participant, one of the homes they were presented was a "sustainable" adaptation of an existing design, and we tested three different message frames communicating the benefits of this home. Participants were presented with either:

- a 'cost saver' message which highlighted the cost saving benefits;
- a 'modern technology' message which communicated the modern technology and energy efficient benefits; or
- a 'comfort' message which discussed the liveability, comfort and lifestyle benefits that come with a sustainable house.

Overall, there was not a strong effect on initial house preferences from the three different framings used, but there were very large differences in preferences between individual houses. The results here suggest that participants' initial house preference is most strongly related to their individual response to the floorplan, and that changing how the house is framed has only a small effect relative to this impact. Qualitative analyses support this conclusion; most written explanations about the aspect of the house they liked best related to the floorplan, design or specific features of the home.

Overall, the "comfort" framing seems to be the best at influencing people's initial selection of their most preferred house. There were also indications that the framings differed in their impact for different types of houses (in terms of number of stories and number of bedrooms), and for different levels of participant income.

Finally we assessed participants' self-rated probability of purchasing the house they had selected as their first preference. Overall, the framing of "cost saver" is most effective at making people feel certain of their preference. However, again, the effect of framing depends strongly on the type of house viewed (stories/bedrooms), and participant income. Framing of 'comfort' and 'cost' works for lower-income people looking at big houses; framing of 'cost' works for all house types for high-income people (especially smaller houses), other framings work for bigger houses but not for smaller houses.

The qualitative analysis reflects a similar narrative and pattern to that of the quantitative results. It demonstrates the respondents have strong preferences on preferred house design, floor plan, layout and specific features; these preferences appear to drive house selection and consideration of potential adjustments to preferred houses.

Overall, our results demonstrate that people do respond to “sustainability” messaging associated with new homes, but that response is quite nuanced and diverse for different types of people.

- When presented as a simple phrase with no further explanation, “**energy efficient**” is best at attracting initial attention (and indeed was the single most popular design option in this study).
- When embedded in a written description of a house (with the sort of text used to market house designs), a “sustainability” based framing of **comfort** is most effective at influencing people’s preference among houses, although this influence is relatively small; the floorplan of the house itself seems to have the largest impact on overall preferences.
- Once someone chooses their preferred house, their (self-assessed) likelihood of purchasing that house is most strongly influenced by a framing of **cost saver**. However there is a complicated interaction between framing, type of house and income: some framing works best for particular house types and particular income levels.
- When people have chosen a preferred house with a sustainability framing, they rate their probability of purchase higher than if they chose a standard version of that house. On average, a sustainable version has a purchase probability 8.6 percentage points higher than the purchase probability of the standard version of the same design.

We conclude sustainability elements are much more likely to be adopted if they are available for all home designs offered by a builder – if sustainability features are only offered on a subset of house designs, then only people who respond positively to those particular house designs are likely to pursue such options.

Introduction

Market research consistently shows that home buyers want quality homes that are healthy, comfortable and efficient. However, home builders are not providing relevant information on their websites to attract these mainstream buyers. They appear to be missing the opportunity to tap into latent customer demand. This project aims to work with a select home builder, to test the impact of web based approaches for delivering key housing quality information, and selling more new homes.

A leading point-of-call for new home buyers seeking information is the builder's website. However, the information on the websites of the majority of builders, does not communicate how the home will perform in terms of thermal comfort, lifestyle and cost to run. This project will test different filters and phrases, in a simulated website environment, to better sell the advantages of a new home.

The aim of this project was to understand the market for sustainable housing and quantify potential impacts on the construction industry. To achieve this aim we address three research questions.

- What percentage and segments of the home buyer market show interest in sustainable homes based off different labels to describe the type of home?
- What type of message framing for these homes influences potential buyers' preferences, and for which segments of the population?
- What percentage of new home buyers have the intention (if marketed/available to them) to build a sustainable/energy efficient home?

We experimentally tested three different message frames communicating the benefits of sustainable homes. This included a 'cost saver' message which highlighted the cost saving benefits, a 'modern technology' message which communicated the modern technology and energy efficient benefits and finally a 'comfort' message which discussed the liveability, comfort and lifestyle benefits that come with a sustainable house.

Methodology

Survey design

A website based survey was designed to reflect the process of viewing a home builder's website and filtering through options to view potential homes. The study partnered with Henley Properties so that authentic home builder floor plans and descriptions were being used throughout the study. Henley branding was not used throughout the survey to avoid potential brand contamination. Australian Survey Research designed and hosted the survey on Survey Manager platform. A full outline of the study (including further website graphics) can be viewed in Appendix B.

Ethics

This study received ethical clearance from the CSIRO Human Resource Ethics Committee. Participant information was provided before beginning the survey and can be found in Appendix A.

Participant recruitment

The sample population for this survey was adults (18+) who were looking to build or buy a home within the next 3 years. The panel provider was Online Research Unit (ORU) who utilised their online panel of survey participants Australia wide.

The study was launched on the 4th of December, 2018. Participants received an email from ORU with a link to a website containing the survey designed by Australia Survey Research. Participants were offered an incentive via a dollar based points system which offered point's equivalent to \$2 monetary value for this survey.

Before commencing the study participants were screened to ensure they met the selection criteria above. If they met this selection criteria, they were provided with participant information (see Appendix A) and asked for their consent to begin the survey.

The survey was sent to 46764 people, with 1770 passing screening processes. The original sample was ~1000 but we found about 15% of people were rushing through the survey (taking under 3 mins), so the survey was sent back out to field on Friday 11th January for additional data collection. The final sample from both phases of data collection was 1172. Excluding the participants who rushed the survey, the usable sample was 990. All analyses are reported on this usable sample.

Experimental design

The study comprised of two experimental phases. The first experimental phase (to achieved research question 1) involved an experimental check box as a filter option amongst other filters (see Figure 1). This check box was randomly labelled one of three potential names that corresponded with the experiment message frames (*comfort plus*, *cost saver*, *energy efficient*). This first stage experiment tested which participants selected this filter check box (randomly labelled) as an item of interest in their preferred home design to understand which label is potentially most appealing and to whom.

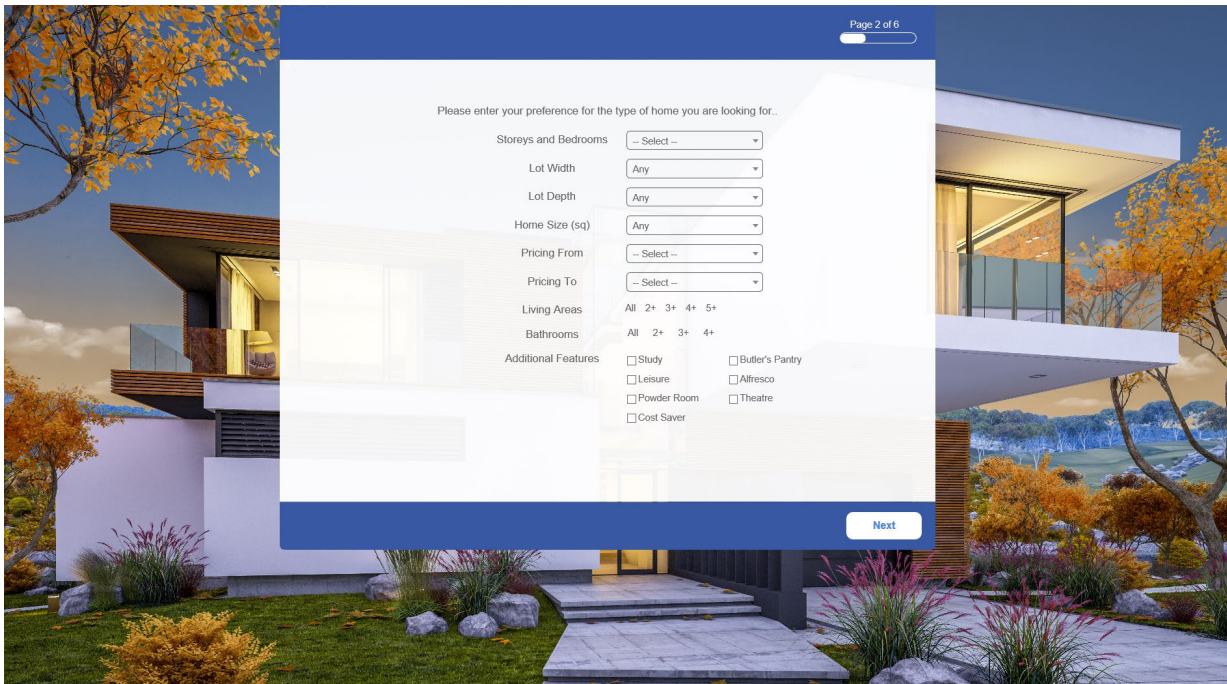


Figure 1: Screenshot of survey showing filter boxes for participant's to modify based off personal preferences.

The second experimental phase of the study (to achieve research question 2) involved testing randomly allocated message frames of the home designs in comparison to the control message frames (as per Henley Properties' descriptions). These message frames described the same sustainable features of a home design but emphasised the different benefits. For instance, one message frame described the cost saving benefits, one the comfort, liveability and health benefits, and the last, the modern technology and energy efficiency benefits. These message frames can be found in Section 2.5 below. Façade photo and floor plan variables were controlled through counterbalancing. Across participants, each available home in the sample was presented as the experimental home an equal number of times. This means that the actual floorplan that was shown as an experimental home was counterbalanced and specific house factors (e.g. rear master bedroom) can be excluded as an alternative explanation for the results. Participants were asked to rank the three homes shown to them from most preferred to least preferred.

The experimental homes included a range of additional sustainability features to the control homes. These were: appliance upgrades, double glazed doors, healthy home aspects, HRV system, hot water system upgrade, insulation upgrade and sealing and infiltration. In order to achieve cost parity and determine if home buyers are willing to trade off floor plan size for these sustainable features, the floor plans were smaller in the experimental homes. We conducted a thorough cost assessment of these features for each floor plan and determined the average increase in cost was ~\$14,000. We also calculated the cost for each home per m² which averaged \$1000 per m² across each home. Therefore, to achieve cost parity, 14 square meters or 1.5 squares needed to be removed from the experimental floor plan size. This updated size was labelled accordingly on the house description. Appendix D outlines the adjustments that were made to each home design.

Additional follow up questions were asked in order to address research question 3 – people's intentions to purchase their preferred homes.

Message framing for experimental homes

The three message frames attached to the experimental homes are presented below – participants saw only one of these, attached to one of the three houses they were presented. The experimental message frames were the complete and only description given i.e. they were not in addition to the normal "control" description. The other two houses had "control" messaging which was taken from the house descriptions used by the participating volume builder, Henley Properties (See Appendix C for a full list of the control descriptions). That is – these homes were shown as they would normally be with their standard descriptive text (other than house name changes to protect the privacy of the builder). Figure 2 below demonstrates how one home received an experimental frame and the other two homes received the control message frame.



Figure 2: Screenshot of the survey hosted by Survey Manager showing a participant's home options, message descriptions and dimensions.

1. Cost saver home

Seal and save. This home is more effectively sealed due to the quality construction process, attention to detail, and considered specification of fittings and fixtures. Downlights, exhaust fans, windows and door seals are all carefully selected to provide excellent performance in their intended function but also to specifically provide energy savings. You will love the additional savings that come with the higher efficiency heating system. Double glazed windows, insulation to the walls, ceilings, under the roof and even in the concrete slabs means that reducing energy costs in the summer and winter is a breeze. Live year round without the worry of high running costs. Blending good design and ongoing affordability, this home has everything you need to create the life you want. Enjoy the freedom of owning a home that is designed with ongoing running cost in mind.

2. Liveability/healthy home

This home is designed with comfort in mind. The quality construction process, attention to detail, and considered specification of fittings and fixtures all contribute to making this home a comfortable one. Downlights, exhaust fans, windows and door seals are all carefully selected to provide excellent performance in their intended function but also to specifically provide greater comfort throughout your home. With daytime living zones facing north to catch the sun's rays this provides significant natural heat and light to your home in winter. Home owners enjoy a more comfortable climate with double glazed windows featured throughout the home. Double glazed windows will reduce condensation, which occurs when inside is toasty warm and outside is freezing. Thus, improving indoor air quality and helping to reduce some of the triggers of asthma and allergies. Give your family the healthy home they deserve. This stylish and functional home maximises natural heating and cooling opportunities for year round comfort. Matching a home to the best orientation delivers the potential for a healthy and comfortable home; living rooms capturing natural sunlight and natural ventilation pathways work together to creating a wonderfully inviting family space. This helps maintain a house to be naturally more comfortable more of the time! We want you to live in the healthiest home possible.

3. Modern technology/energy efficient home

A modern home for a modern lifestyle. This home leverages what nature and innovation provide. Our built-in sustainability recommendations for double glazing is a big feature of this home. Double glazing means there are two layers of glass on windows and doors, which have a space between them, offering better insulation properties – resulting in another type of double... a win win! The benefits are better thermal protection, excellent sound insulation and better security as two panels are harder to break than a single glass pane. We use LED downlights that lead the field in performance, quality and warranty. Used with insulation they improve the thermal performance of your home. Award-winning building design delivers a home that can adapt to climate extremes, showcasing the latest energy and water efficiency fixtures. From construction to completion this home's impressive credentials deliver low life-cycle environmental impact. State of the art inclusions designed to impress. Experience the latest in 'smart' home features and future focussed innovation including integrated energy saving technology.

Analysis

Quantitative analysis

Quantitative analyses centred around three distinct areas.

1. How much interest is there in the housing market for “sustainable” housing options? When people are presented with an option to view house designs that are energy efficient, cost saving or comfortable, how often do they choose these options? How do these choices compare to other common house design options? And do these preferences differ between different types of consumers?
2. When people are presented with houses framed with “sustainability” language, are they more likely to prefer these houses? Are some people more likely than others to prefer these houses?
3. When people prefer a particular “sustainable” house, how strong is their preference for it? Is their preference strength influenced by other factors?

Qualitative analysis

Qualitative analyses centred around two main issues.

1. *What aspects of the house design are most attractive to people?* For the question “What do you like the most about your preferred design (1st rank)?” two researchers perused the first 100 responses in a Microsoft Excel spreadsheet and generated a rough coding scheme. They then discussed each coding scheme to come to a mutual agreement for a final coding scheme for both qualitative questions. For efficiency reasons and due to a large sample, one rater coded the first 60% of the responses from top to bottom to the excel spreadsheet. Another rater coded the bottom 60% of the data from bottom to top of the excel spreadsheet. This meant, there was an overlap in the middle of the responses, so 20% of responses were coded twice. This 20% was statistically checked for interrater reliability (kappa values). The reliability in the coder's responses for the codes were moderate to very high (.66 to 1.0).
2. *What aspects of the house design do people want to adjust?* The second question “Would you change or add anything to your preferred home (1st rank)?” If yes, please describe what you would add or change” used the same coding scheme as above. Two researchers coded the entire data set as this was a much smaller set of responses; interrater reliability (kappa) values for the codes were moderate to high (.71 to .90).

For a full description of each code and examples from the text see Appendix F. These codes are not independent; multifaceted responses were coded into more than one category, so the frequencies of respondents will add up to more than the sample size of the whole study. For instance, if a respondent's answer reflected more than one code, multiple codes were given. Where raters did not agree, we erred on the side of inclusion – that is, if either rater coded a response under a particular code, it was included even if the other rater did not use that code.

Results

Quantitative Results

How much interest is there in the housing market for “sustainable” housing options?

Overall, 28.8% of participants clicked on the filter option labelled “Energy Efficient/ Cost Saver/ Comfort Plus” before any experimental manipulation was applied. This can be considered an estimate of the overall level of unprompted interest in such options amongst the sample. Selection rates of each specific option were significantly different: “Energy Efficient” was selected most often (67.0% of the time), followed by “Cost Saver” (23.2%) and “Comfort Plus” (9.8%). The rate of selection in “Energy Efficient” is higher than the rates for any other design options.

Table 1: Rates of selection of optional housing features

Option	Frequency	%
Study	548	55.4
Butler’s Pantry	296	29.9
Leisure Area	271	27.4
Alfresco	404	40.8
Powder Room	182	18.4
Home Theatre	181	18.3
“Sustainable” Options (overall)	285	28.8
- <i>Comfort Plus</i>	28	9.8
- <i>Cost Saver</i>	66	23.2
- <i>Energy Efficient</i>	191	67.0

Follow-up analyses showed that rates of selection for the “sustainable” options differ depending on age and income. Younger people (those under 40) were more likely (compared to older people) to select “Comfort Plus”, while older people were more likely (compared to younger people) to select “Energy Efficient”. People with lower incomes were more likely (compared to higher incomes) to select “Cost Saver”, and people with higher incomes were more likely (compared to lower incomes) to select “Comfort Plus”.

Table 2: Selection of “sustainable” features by age group

Age Group		Feature Selected			Total
		Comfort Plus	Cost Saver	Energy Efficient	
Up to 39 years old	Count	19	28	69	116
	% within Age Group	16.4%	24.1%	59.5%	100.0%
40+ years old	Count	9	38	121	168
	% within Age Group	5.4%	22.6%	72.0%	100.0%
Total	Count	28	66	190	284
	% within Age Group	9.9%	23.2%	66.9%	100.0%

Table 3: Selection of “sustainable” features by income group

Income Group		Feature Selected			Total
		Comfort Plus	Cost Saver	Energy Efficient	
Less than \$104K	Count	10	46	100	156
	% within Income Group	6.4%	29.5%	64.1%	100.0%
\$104K or more	Count	13	15	65	93
	% within Income Group	14.0%	16.1%	69.9%	100.0%
Total	Count	23	61	165	249
	% within Income Group	9.2%	24.5%	66.3%	100.0%

Rates of selection for these options were not related to budget, type of house people were interested in, or level of education.

Overall, the term “Energy Efficient” appears to have the most traction among potential home buyers as a feature that they are interested in; and indeed this feature was selected more often in our sample than any other house feature. Energy efficiency was especially preferred by people 40 years and older.

The terms “Cost Saver” and “Comfort Plus” generated lower levels of interest than we anticipated. It appears that these terms were not automatically linked in peoples’ minds to energy consumption, running costs or living space comfort; rather, they appear to have been interpreted as indicators of the purchase price of the house – “Cost Saver” was selected more by people on lower incomes, and “Comfort Plus” was selected more by people on higher incomes.

When people are presented with houses framed with “sustainability” language, are they more likely to prefer these houses?

Overall, there was not a strong effect on initial house preferences from the three different framings used, but there were very large differences in preferences between individual houses. The results here suggest that participants’ initial house preference is most strongly related to their individual response to the floorplan, and that changing how the house is framed has only a small effect relative to this impact.

Table 4: Houses available for comparison with summary data on preferences

Home name	Bedrooms	Storey	% of sample ranking this house first	Purchase probability (when ranked first)
Bayview	4	1	45.0	54.1
Oakland	4	1	40.5	58.0
Ivory	4	1	14.5	55.1
Wingate	4	2	14.4	67.0
Willow	4	2	57.2	66.2
Fairview	4	2	28.4	61.7
Lillydale	3	1	25.1	56.8
Portsea	3	1	48.0	61.3
Amber	3	1	26.9	56.6

Overall, the “Comfort” framing seems to be the best framing at influencing people’s initial choice of their favourite house. The impacts of framing appeared to be different for different types of houses, and for different levels of participant income.

Table 5: Selection rates of preferred house by the type of framing used.

Framing type		Experimental House Chosen		Total
		No	Yes	
Comfort Plus	Count	139	75	214
	% within Framing type	65.0%	35.0%	100.0%
Cost Saver	Count	184	89	273
	% within Framing type	67.4%	32.6%	100.0%
Energy Efficient	Count	323	151	474
	% within Framing type	68.1%	31.9%	100.0%
Total	Count	646	315	961
	% within Framing type	67.2%	32.8%	100.0%

Table 6: Selection rates of preferred houses by type of house and type of framing

Storeys/Bedrooms				Experimental House Chosen		Total
				No	Yes	
Double storey four bedrooms	Framing type	Comfort Plus	Count	44	26	70
			% within Framing type	62.9%	37.1%	100.0%
		Cost Saver	Count	45	30	75
			% within Framing type	60.0%	40.0%	100.0%
		Energy Efficient	Count	84	35	119
			% within Framing type	70.6%	29.4%	100.0%
	Total		Count	173	91	264
			% within Framing type	65.5%	34.5%	100.0%
Single storey four bedrooms	Framing type	Comfort Plus	Count	44	18	62
			% within Framing type	71.0%	29.0%	100.0%
		Cost Saver	Count	58	25	83
			% within Framing type	69.9%	30.1%	100.0%
		Energy Efficient	Count	110	57	167
			% within Framing type	65.9%	34.1%	100.0%
	Total		Count	212	100	312
			% within Framing type	67.9%	32.1%	100.0%
Single storey three bedrooms	Framing type	Comfort Plus	Count	92	44	136
			% within Framing type	67.6%	32.4%	100.0%
		Cost Saver	Count	110	51	161
			% within Framing type	68.3%	31.7%	100.0%
		Energy Efficient	Count	176	77	253
			% within Framing type	69.6%	30.4%	100.0%
	Total		Count	378	172	550
			% within Framing type	68.7%	31.3%	100.0%

Table 7: Selection rates of preferred houses by type of house and income group

Storeys/Bedrooms				Experimental House Chosen		Total	
				No	Yes		
Double storey four bedrooms	Income Group	Less than \$104K	Count	79	43	122	
			% within Income Group	64.8%	35.2%	100.0%	
		\$104K or more	Count	76	40	116	
			% within Income Group	65.5%	34.5%	100.0%	
	Total			Count	155	83	238
				% within Income Group	65.1%	34.9%	100.0%
Single storey four bedrooms	Income Group	Less than \$104K	Count	99	54	153	
			% within Income Group	64.7%	35.3%	100.0%	
		\$104K or more	Count	87	29	116	
			% within Income Group	75.0%	25.0%	100.0%	
	Total			Count	186	83	269
				% within Income Group	69.1%	30.9%	100.0%
Single storey three bedrooms	Income Group	Less than \$104K	Count	254	118	372	
			% within Income Group	68.3%	31.7%	100.0%	
		\$104K or more	Count	92	39	131	
			% within Income Group	70.2%	29.8%	100.0%	
	Total			Count	346	157	503
				% within Income Group	68.8%	31.2%	100.0%

When people prefer a particular “sustainable” house, how strong is their preference for it?

Cost saver works best at making people feel more certain of their preference.

There was a main effect of framing on the strength of preference: when the preferred house was framed with a “cost saver” message, people who chose the house were more certain in their judgement that they would actually buy the house. However, further analyses revealed a more complex relationship: there was a three-way interaction between type

of house viewed (stories/bedrooms), experimental framing applied (comfort/cost/efficiency) and person's income (low and high).

Whether framing "works" to influence people's strength of preferences depends on the combination of the type of framing, the sort of house they looked at, and how much money they have. Framing of comfort and cost works for lower-income people looking at big houses; framing of cost works for all house types for high-income people (especially smaller houses), other framings work for bigger houses but not for smaller houses. It seems that the most effective framing is idiosyncratic, depending on the particular goals and resources of individual buyers.

Table 8: Purchase probability of preferred house for each framing

Framing type	Mean	n	Std. Deviation
Comfort Plus	59.63	75	20.762
Cost Saver	63.29	89	21.229
Energy Efficient	56.90	151	20.525
Total	59.36	315	20.891

Table 9: ANOVA results for effects on purchase probability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	13819.064 ^a	17	812.886	2.010	.011
Intercept	706530.107	1	706530.107	1746.599	.000
Framing type	3276.031	2	1638.015	4.049	.019
Storeys/Bedrooms	3265.851	2	1632.925	4.037	.019
Income Group	1117.956	1	1117.956	2.764	.098
Framing type by Storeys/Bedrooms	1905.823	4	476.456	1.178	.321
Framing type by Income Group	883.887	2	441.944	1.093	.337
Storeys/Bedrooms1 by Income Group	125.701	2	62.850	.155	.856
Framing type by Storeys/Bedrooms by Income Group	3723.041	4	930.760	2.301	.059
Error	104365.545	258	404.518		
Total	1100298.000	276			
Corrected Total	118184.609	275			

a. R Squared = .117 (Adjusted R Squared = .059)

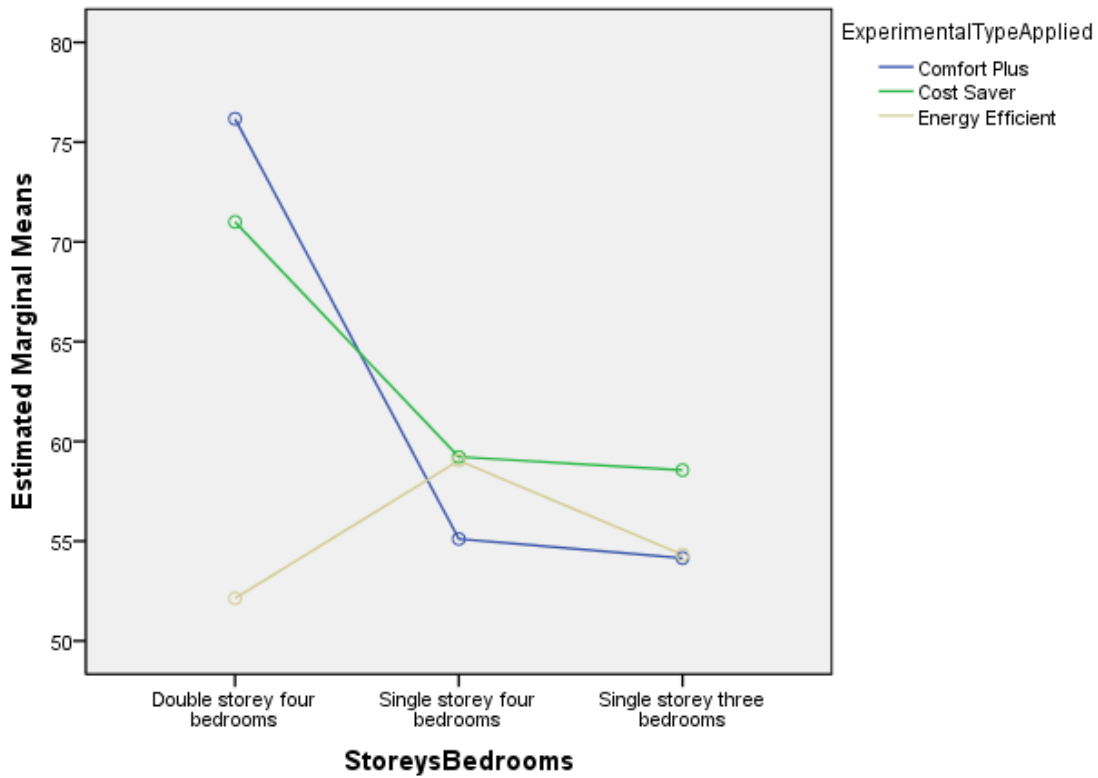


Figure 3: Average purchase probability of experimental house at income group = less than \$104K

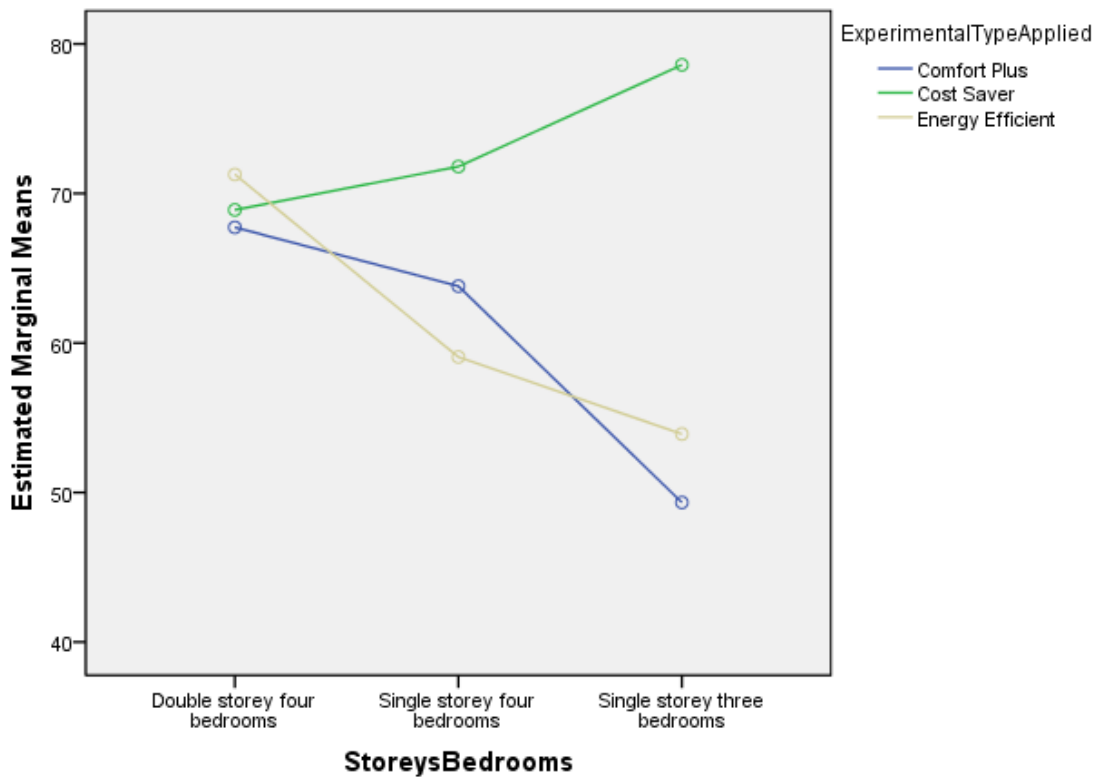


Figure 4: Average purchase probability of experimental house at income group = \$104K or more

We also assessed the overall effect of sustainability elements on purchase probability. There are 3 different “sustainability” descriptions, and these perform differently with different floorplans and different people. To best summarise this complexity, we identified the best performing sustainability description for each floorplan, and compared the purchase probability for this house against the purchase probability for the same house with a “standard” description (See Table 10).

Across nine different houses, the best-performing “sustainability” purchase probability is compared with the purchase probability for the “standard” description. In eight out of nine houses, one of the sustainability options is preferred. On average, a sustainable version has a purchase probability up to 8.6 percentage points higher than the purchase probability of the standard version of the same design.

Table 10: Purchase probabilities for sustainable and “standard” version of each house design.

House	Style	Average Purchase Probability		Difference
		Best-performing sustainability option	Standard option	
Amber	Single Storey 3 bed	66.8	54.8	12.0
Lillydale	Single Storey 3 bed	61.4	58.5	2.9
Portsea	Single Storey 3 bed	57.4	62.4	-5.0
Bayview	Single Storey 4 bed	68.8	53.4	15.4
Oakland	Single Storey 4 bed	67.1	55.2	11.9
Ivory	Single Storey 4 bed	69.0	52.2	16.8
Fairview	Double Storey 4 bed	69.0	65.0	4.0
Willow	Double Storey 4 bed	71.5	66.9	4.6
Wingate	Double Storey 4 bed	80.6	66.1	14.5
All Houses Average		68.0	59.4	8.6

Qualitative results

What aspects of the house design are most attractive to people?

Figure 5 below shows a word cloud of common responses people gave about the aspect of the house they liked best; larger words reflect more frequent mentions.



Figure 5: Word cloud showing aspects of the house that people liked best.

Floor plan, layout and design was the most commonly cited aspect that participants liked most about their chosen preference (43.9%). Comments included “I like the overall layout”, “the open plan front” and “the house design is functional”. The second most highly cited aspect was regarding a *specific feature and/or room of the house* (36.8%) followed by *the size of the house* (13.7%). Example comments included “it has a two car garage,” “it has a butler’s pantry,” and “it is my ideal size” respectively. Following these reasons were *visual appeal* and *spaciousness* (both similarly cited). The aspects relating to the experimental messaging of this experiment were rarely mentioned. However, of these, energy efficiency terminology was most popular, which also reflects quantitative results discussed above.

Table 11: What respondents liked most about their preferred design

Aspect	n	%
Floor plan, layout or design	435	43.9
Specific features or rooms of the house	365	36.8
Size of the house / or rooms	136	13.7
Visual appeal and style	119	12
Spaciousness or space	104	10
Energy Efficiency	25	2.5
Modern	22	2.2
Double glazing	19	1.9
Comfort/liveability	16	1.6
Cost Savings	9	0.9
Ecofriendly	8	0.8
Sustainability	6	0.6
Insulation	5	0.5
Innovative	3	0.3
LED lighting	2	0.2

What aspects of the house design do people want to adjust?

Figure 6 below shows a word cloud of common responses people gave about the aspect of the house they would change; larger words reflect more frequent mentions.



Figure 6: Word cloud showing aspects of the house that people would change.

There was a much smaller sample of responses for what participants would like to change about their chosen preference. Presumably this is because we initially asked “Would you change anything about your design?” with 71.4% of participants answering “no”. Those who said “yes” were asked for further details and the percentages reported in Table 12 are calculated based on these “yes” responses only. Of the sample, *specific features or room/s of the home* was overwhelmingly (74.9%) the most commonly cited aspect participants would like to change. Examples from the data include “an additional living room or study/library”, “an en suite at ground floor,” and “not having theatre room”. The second most highly cited reason (28.7%) was *floor plan/layout and design*, followed by *size* (21.8%). Participant comments included “too long and narrow,” “not have master bedroom at front,” and “make it smaller” as some respective examples. Again, the sustainability features were rarely cited as unprompted aspects people would like to change about their design.

Table 12: What respondents would change about their preferred design

Aspect	n	%
Specific features or rooms of the house	251	74.9
Floor plan, layout or design	96	28.7
Size of the house / or rooms	73	21.8
Spaciousness or space	15	4.5
Visual appeal and style	9	2.7
Ecofriendly	3	0.9
Cost Savings	3	0.9
Sustainability	2	0.6
Double glazing	2	0.6
Comfort/liveability	2	0.6
Energy Efficiency	1	0.3
Innovative	1	0.3
Modern	1	0.3
Insulation	0	0
LED lighting	0	0

Discussion

The aim of this research was to understand the market for sustainable housing and quantify potential impacts on the construction industry. Three research questions were addressed.

1. What percentage of new home buyers have the intention (if marketed/available to them) to build a sustainable/energy efficient home?
2. What segments of the market are more or less interested in these homes?
3. What type of message framing for these homes influences potential buyers' preferences, and for which segments of the population?

When presented without further explanation, the term “energy efficient” appears to have the most traction among potential home buyers as a feature that they are interested in; and indeed this feature was selected more often in our sample than any other house feature, with 67.0% of participants who saw this option selecting it. Energy efficiency was especially preferred by people 40 years and older.

The terms “cost saver” and “comfort plus” generated lower levels of interest than we anticipated. It appears that these terms were not automatically linked in peoples' minds to energy consumption, running costs or living space comfort; rather, they appear to have been interpreted as indicators of the purchase price of the house – “cost saver” was selected more by people on lower incomes, and “comfort plus” was selected more by people on higher incomes.

Overall, there was not a strong effect on initial house preferences from the three different framings used, but there were very large differences in preferences between individual houses. These results suggest that **participants' initial house preference is most strongly related to their individual response to the floorplan**, and that changing how the house is framed has only a small effect relative to this impact. Qualitative analyses support this conclusion; most written explanations about the aspect of the house they liked best related to the floorplan, design or feel of the home.

Overall, the “comfort” framing seems to be the best at influencing people's initial selection of their most preferred house. There were also indications that the framings differed in their impact for different types of houses (in terms of number of stories and number of bedrooms), and for different levels of participant income.

Overall, the framing of “cost saver” is most effective at making people feel certain of their preference. However the effect of framing depends strongly on the type of house viewed (stories/bedrooms), and participant income. Framing of comfort and cost works for lower-income people looking at big houses; framing of cost works for all house types for high-income people (especially smaller houses), other framings work for bigger houses but not for smaller houses.

The qualitative analysis reflects a similar narrative and pattern to that of the quantitative results. It demonstrates the respondents have strong preferences on preferred house design, floor plan, layout and specific features; these preferences appear to drive house selection and consideration of potential adjustments to preferred houses. This effect on preferences appears to overwhelm all other considerations in the qualitative results, and suggests that recognising home buyers' priority to have a home that reflects their strong layout and feature preferences needs to be considered when marketing sustainable features. Buyers' primary focus will be on finding the right floor plan and home features to suit them.

Overall, our results demonstrate that people do respond to “sustainability” messaging associated with new homes, but that response is quite nuanced and diverse for different types of people.

- When presented as a simple phrase with no further explanation, **energy efficient** is best at attracting initial attention (and indeed was the single most popular design option in this study).
- When embedded in a written description of a house (with the sort of text used to market house designs), a “sustainability”-based framing of **comfort** is most effective at influencing people's preference among houses, although this influence is relatively small; the floorplan of the house itself seems to have the largest impact on overall preferences.
- Once someone chooses their preferred house, their (self-assessed) likelihood of purchasing that house is most strongly influenced by a framing of **cost saver**. However there is a complicated interaction between framing, type of house and income: some framing works best for particular house types and particular income levels.
- When people have chosen a preferred house with a sustainability framing, they rate their probability of purchase higher than if they chose a standard version of that house. On average, a sustainable version has a purchase

probability 8.6 percentage points higher than the purchase probability of the standard version of the same design.

We conclude sustainability elements are much more likely to be adopted if they are available for all home designs offered by a builder – if sustainability features are only offered on a subset of house designs, then only people who respond positively to those particular house designs are likely to pursue such options.

Future research

This type of hypothetical study can reflect people's real interests and preferences, but is only an estimate of people's actual intentions, and cannot completely reflect actual behaviour in real purchase decisions. Relatedly, the entire process of purchasing a home is long and complex and cannot be completely captured in a single short interaction. Therefore, longitudinal studies that follow the entire process of selecting and purchasing a home will provide more accurate insight into the decision making process. Because of the study design, we were only able to test the effect of message framing as singular messages, rather than as a combination of their benefits. It is possible that combining these framings may have additional benefits and therefore is warranted for further investigation.

For the sake of simplicity, only a narrow range of the most popular housing configurations (number of storeys and number of bedrooms) were presented. Given our findings about the strength of preferences in this context, we can conclude that people who were interested on other configurations (5 or more bedrooms, split levels, townhouses, etc.) will not have been engaged well by the study options. Future studies that have a wider range of house designs to suit a large range of preferences will benefit from more accurate results.

Additionally, research that enables modifications to the design based off home buyers essential preferences will allow for greater insight. This is because we found floor plan layout/design and features to be of primary importance to home buyers. Once this priority is met, there is opportunity to delve further into research questions of preferences in homes beyond design and features (e.g. sustainability elements).

Appendix A: Participant Information

This material was provided to potential participants before they completed the survey.

Qualification

Are you 18 years or older and looking to purchase or build a home sometime within the next three years?

Survey explanation/consent

The CSIRO invites you to take part in a survey about the Australian housing industry.

The survey is seeking input from future home buyers who intend to build or purchase a home within the next three years across Australia to find out about their preferences in home designs. This information will help us to better understand the future potential market for quality housing in Australia. It is being funded by the Office of Environment and Heritage NSW.

What will I be asked to do?

Completing the survey should take less than 20 minutes. The survey requires you to navigate a web interface, where through the use of various filters (i.e. budget, number of bedrooms, storeys) you will be offered 3 house designs to consider. Each of these designs will provide a floor plan and description of the benefits of the home. We seek to understand your preferences in these designs and what each one has to offer, by ranking your 1st, 2nd and 3rd preference. From here, we will ask you a series of questions regarding your choices and some information about yourself. Your participation is completely voluntary and you are free to withdraw by stopping at any time. If you decide to withdraw from the survey, any responses you have provided up to that point will be deleted. You may also skip any questions after providing your rankings that you don't wish to answer.

"Please be aware all floor plans and façade photos in this survey are copyright of the participating home builder. All rights reserved. No part may be used, reproduced or copied by any means or in any form. In particular, please be aware that no one, or its associated companies is allowed to build a home to one of these designs."

How will the results of the study be used?

All information collected through the survey will be anonymous and used by CSIRO and project partners for research purposes only. Data will be reported in an aggregate form to ensure participants are not individually identifiable. The data may also be kept and used by CSIRO in a de-identified form for future research on this topic. Project partners will not have access to any identifying survey information

Results from this study will be published in scientific papers, public reports and conference presentations. A summary of the findings will also be made available to participants on completion of the study. Please email John.Gardner@csiro.au if you would like to receive a copy of this summary report.

What if I have any questions about this study?

If you have any questions about this project, please feel free to contact the project leader, Dr. John Gardner, at John.Gardner@csiro.au or on (07) 3833 5552.

This study has been approved by CSIRO's Social Science Human Research Ethics Committee in accordance with the National Statement on Ethical Conduct in Human Research (2007). Any concerns or complaints about the conduct of this study can be raised with the Manager of Social Responsibility and Ethics on (07) 3833 5693 or by email at csshrec@csiro.au.

If you consent to take part in this survey, please click the 'Next' button below to begin.

Appendix B: Survey

This material shows the text, questions and responses presented to participants in the survey. Actual photographs and floorplans that were used in the survey are not reproduced here.

1. Participants' filter home preferences:

The filter search bar was kept to 'business as usual' approach as possible. (See Henley homes website that was used as inspiration <https://henley.com.au/home-designs>). Participants had the option to use all of the features (storeys, bedrooms, lot width, lot depth, home size, pricing from and to, living areas, bathrooms, additional features). However, the web interface only filtered storeys, bedrooms, budget and the additional experimental check box to be added to the additional features options. Participants were only able to select one or two storeys and only 3 or 4 bedrooms homes.

A checkbox was added to the additional features section. It was randomly assigned 1 of 3 labels to correspond with the message framing of the homes (Cost Saver, Comfort Plus, Energy Efficient). Other additional features included: study, leisure, powder room, cost saver, butler's pantry, alfresco, theatre.

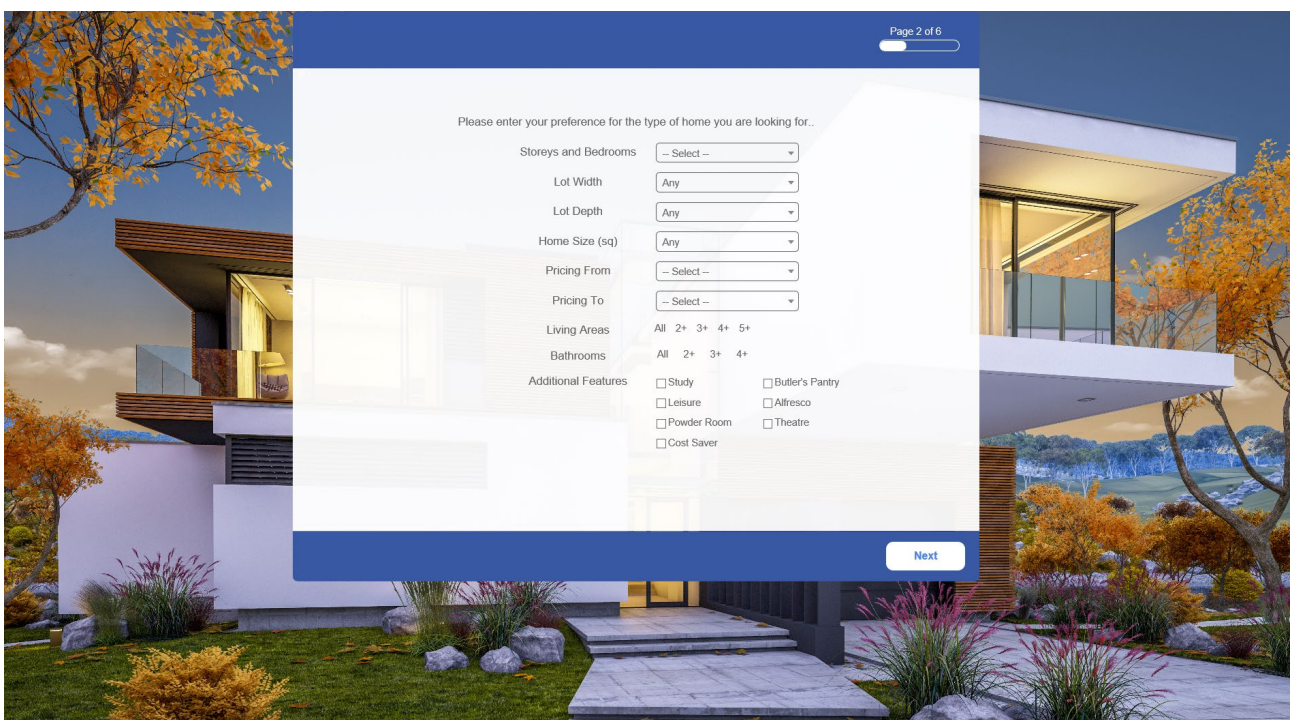


Figure 7: Screenshot of survey asking participants to filter home preferences

2. The website generated 3 options based on filtered preferences for participants to open each individually. Participants were shown three homes including façade, written text and a box to open to view each floorplan. The floor sizing (plus bedrooms, bathrooms etc.) were also shown.

Façade photo and floor plan were controlled for through counterbalancing. Across participants, each available home in the sample was presented as the "sustainable" an equal number of times. This means that the actual floorplan that was shown as a sustainable home is counterbalanced and specific house factors (e.g. rear master bedroom) can be excluded as an alternative explanation for the results.

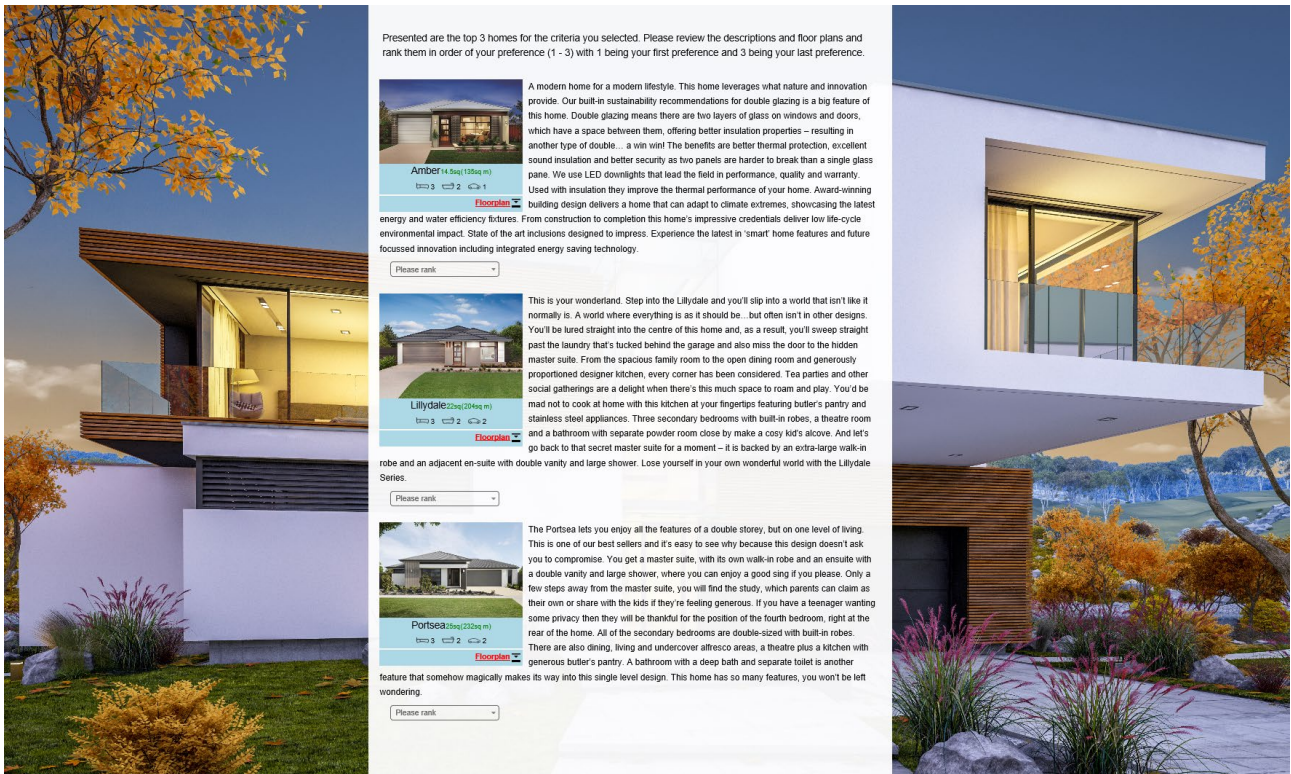


Figure 8: Screenshot of survey with example of three home designs and descriptions filtered back to participant. Two homes are control descriptions and one home is the experimental condition.

3. Ranking homes –participants were asked to rank each home:

“Please rank your preference in homes based on the descriptions of the homes you have just seen from 1 to 3 with 1 being your first preference and 3 being your last preference.”

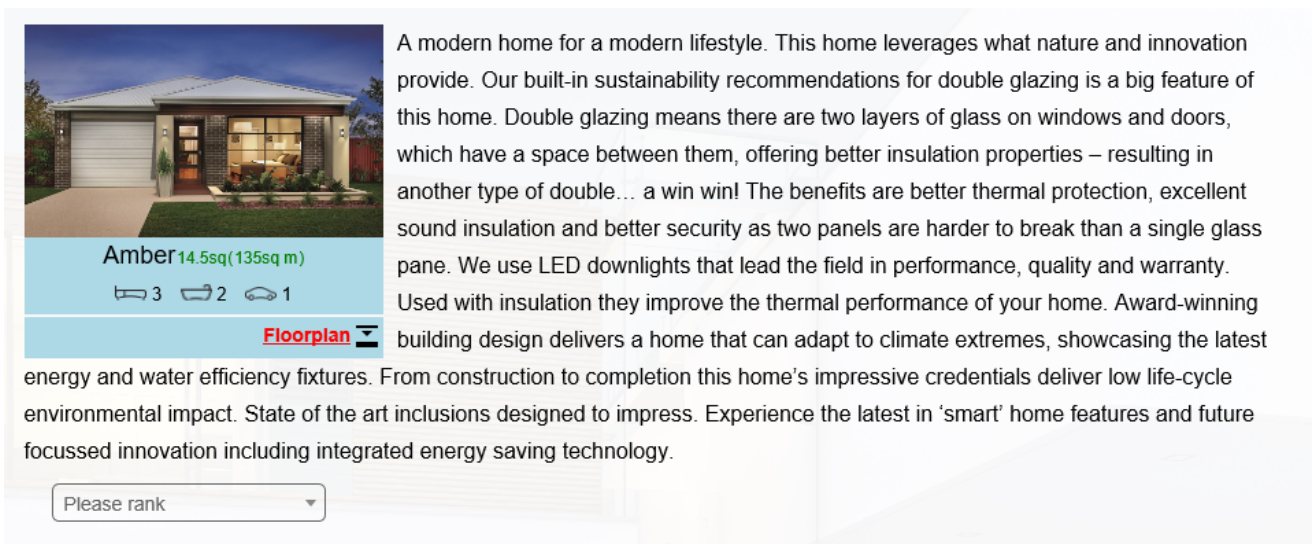


Figure 9: Screenshot of survey displaying the “energy efficient” message framing applied to a home design. Note the box at bottom asking for participant’s ranking.

4. Follow up questions:

- a) Now think about a probability scale ranging from 0% to 100%, where 0% means there's no chance at all that you would purchase your preferred home (1st rank), 50% means there's a 50/50 chance you would purchase, and 100% means you would definitely purchase the home. On a scale ranging all the way from 0% up to 100%, how likely is it that you would actually purchase the home you ranked as your first preference?

(Response: sliding scale)

- b) What do you like the most about your preferred design (1st rank)?

(Response: open ended)

- c) Would you change or add anything to your preferred home (1st rank)? If yes, please describe what you would add or change.

(Response: open ended)

- d) Using the following scale, please rate each of the following statements according to how well they describe what you're looking for in a home. (Please randomise order of statements shown).

1	2	3	4	5
Doesn't describe me well at all		Somewhat describes me		Describes me very well

- A house that reflects my commitment to sustainability
- Concerned about running costs
- I'm an innovator: I want a house that reflects that
- A safe and healthy home for my family
- A house that's simple and comfortable to run in retirement

- e) Now select the one statement that best describes what you're looking for in a home.
Please select one only

- A house that reflects my commitment to sustainability
- Concerned about running costs
- I'm an innovator: I want a house that reflects that
- A safe and healthy home for my family
- A house that's simple and comfortable to run in retirement

Demographic questions:

What is your age?

- 18-20 years old
- 20-29 years old
- 30-39 years old
- 40-49 years old
- 50-59 years old
- 60-69 years old
- 70 years or older

What is your gender?

- Female
- Male
- Other (please specify)

How many years have you lived in Australia?

- Less than 1 year
- 1 year to less than 3 years
- 3 years to less than 5 years
- 5 years to less than 10 years
- More than 10 years
- Always

Which of the following best describes your household?

- Lone person household - single person living alone
- One family household - couple with no children
- One family household - couple with children (including adult children)
- One family household - one parent family with children (including adult children)
- Multiple family household - two or more families (e.g. extended family grouping)
- Group household - two or more unrelated persons (e.g. share-house)
- Other type of household

What is your **total household income** per year, before tax? That is, the total of all wages/salaries, government benefits, pensions, allowances and other income (e.g. dividends, interest) your household usually receives. Do not deduct tax.

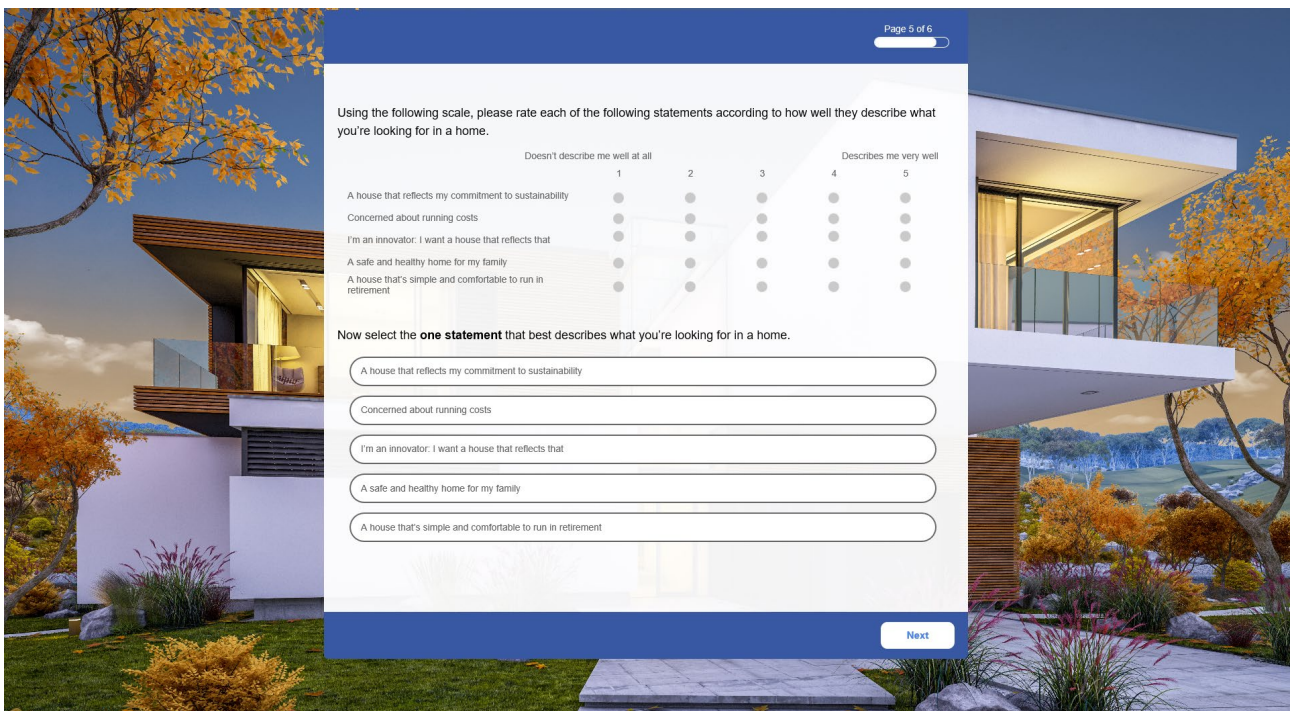
- Less than \$15,600 per year
- \$15,600 – \$33,799 per year
- \$33,800 – \$51,999 per year
- \$52,000 – \$77,999 per year
- \$78,000 – \$103,999 per year
- \$104,000 – \$129,999 per year
- \$130,000 – \$181,999 per year
- \$182,000 – \$259,999 per year
- \$260,000 or more per year
- Prefer not to say

What is the highest level of education you have completed?

- Less than Year 12 Secondary School
- Year 12 Secondary School
- Trade/TAFE qualification
- Undergraduate degree or diploma
- Postgraduate degree

What postcode are you looking to buy or build in? (If you are looking to buy or build in multiple postcodes, please select one)

Thank you for your participation in this research. If you would like further information please feel free to contact the project leader, Dr. John Gardner, at John.Gardner@csiro.au or on (07) 3833 5552.



The screenshot shows a survey interface overlaid on a background image of a modern house. The survey is titled "Using the following scale, please rate each of the following statements according to how well they describe what you're looking for in a home." The scale ranges from 1 (Doesn't describe me well at all) to 5 (Describes me very well). The statements are:

	1	2	3	4	5
A house that reflects my commitment to sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concerned about running costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm an innovator. I want a house that reflects that	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A safe and healthy home for my family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A house that's simple and comfortable to run in retirement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Below the scale, the user is asked to "Now select the **one** statement that best describes what you're looking for in a home." The statements are listed in a vertical list with radio buttons:

- A house that reflects my commitment to sustainability
- Concerned about running costs
- I'm an innovator. I want a house that reflects that
- A safe and healthy home for my family
- A house that's simple and comfortable to run in retirement

A "Next" button is located at the bottom right of the survey overlay.

Figure 10: Screenshot of two of the additional questions outlined above.

Appendix C: Control Home Descriptions

Table 13: Home descriptions used by participating builder for each home design and incorporated into our study design as the “control” message frames.

New home name ¹	Control description
Amber	<p>After a clever little design? Meet Amber – she’s a smart one! She knows how to make the most of a space without asking for compromise.</p> <p>Designed to suit a 10.5 metre wide block, this home works its magic to deliver an open-plan, free-flowing kitchen, living and alfresco area that perfectly sets the scene for modern life.</p> <p>The kitchen has been designed to a chef’s specifications (who also happens to be a parent) complete with an island bench and spacious butler’s pantry all overlooking the living areas so you don’t miss out on the action while you’re stirring the pasta sauce.</p> <p>If you’re looking for a functional, yet stylish home that lets you spend more time entertaining, the Amber is the home for you.</p>
Bayview	<p>Pleasant surprises await. Designed to suit a 12.5 metre wide block, you’ll wonder how on earth there are so many features in the one home – but, we’re not playing tricks on you, this is the real deal in the Bayview.</p> <p>The first things that are usually cut in designs for narrower blocks are features like walk-in robes and cupboard space but the Bayview won’t listen to that advice!</p> <p>There’s no shortage of storage space in this clever design with generous walk-in robes to all four bedrooms, large butler’s pantry to the kitchen and a handy linen closet near the laundry.</p> <p>An internal garage door makes hauling groceries, nappies, bulk buy dog food and party supplies as painless as possible and allows for easy transfer to the walk-in butler’s pantry in the kitchen.</p> <p>You’ll love all the surprises the Bayview throws in front of you, creating a home packed with features and style.</p>
Oakland	<p>Space + light = wow. So welcome to the wow-factor of the Oakland.</p> <p>The master suite is a very generous one, with space for a reading chair, yoga stretches or to roll around the floor with the dog while the light floods in through the front windows. There’s also a walk-in robe and ensuite so parents have a contained space that’s all theirs.</p> <p>The whole family will love congregating to enjoy meals and time together in the open plan living-dining-kitchen area. You can further extend this space and bring the bright outdoors in by opening the sliding doors to the alfresco.</p> <p>You’ll have plenty of storage space with a butler’s pantry, walk-in robe to master suite, robes to secondary bedrooms and a linen closet.</p> <p>The Oakland is an explosion of space and light. Boom.</p>

¹ The original home names of Henley Properties were renamed to avoid brand contamination.

New home name	Control description
Ivory	<p>After a clever little design? Meet Ivory – she’s a smart one! She knows how to make the most of a space without asking for compromise.</p> <p>Designed to suit a 10.5 metre wide block, this home works its magic to deliver an open-plan, free-flowing kitchen, living and alfresco area that perfectly sets the scene for modern life.</p> <p>The kitchen has been designed to a chef’s specifications (who also happens to be a parent) complete with an island bench and spacious butler’s pantry all overlooking the living areas so you don’t miss out on the action while you’re stirring the pasta sauce.</p> <p>If you’re looking for a functional, yet stylish home that lets you spend more time entertaining, the Ivory is the home for you.</p>
Wingate	<p>Theatre, living, alfresco, leisure and master suite – the Wingate has your family needs covered.</p> <p>With lots of dedicated spaces to share or retreat to, the Wingate is a modern family floorplan with four bedrooms cleverly all located on the second storey. Encouraging a peaceful zone, little tots can rest while the household activities continue downstairs. The kitchen is complete with a butler’s pantry and the design also features dual linen cupboards. More is more when it comes to walk in robes, and each bedroom has its very own walk in robe for the ultimate individual storage space.</p> <ol style="list-style-type: none"> 1. Four bedrooms with more <p>Each bedroom boasts walk in robes so residents have ample storage space.</p> <ol style="list-style-type: none"> 2. Multiple lifestyle rooms <p>Theatre, leisure, alfresco, living – choose a place to unwind together or apart.</p> <ol style="list-style-type: none"> 3. A resting zone <p>Leave the hustle and bustle of downstairs and retreat to the dedicated upstairs sleeping zone</p>
Willow	<p>It’s got style. This house design is an absolute hit.</p> <p>It’s all about style and presentation from the moment you walk in, with an impressive theatre set to the front of this beautiful home.</p> <p>At the rear, you’ll discover the masterpiece – a perfectly appointed kitchen featuring a spacious butler’s pantry and island bench set amongst the open plan living space.</p> <p>Upstairs, three secondary bedrooms all with walk-in-robes, a separate TV area and a private master suite with double walk-in robes provide ample space for your whole family to enjoy.</p> <p>Come on, check out the Willow.</p>

New home name	Control description
Fairview	<p>When compromise isn't on your agenda, check out the Fairview for a carefully considered family living design.</p> <p>Ready to enhance a 14 metre wide lot, the Fairview completes even the most discerning new home family checklist with two storeys of easy living, including four bedrooms. Boasting a master suite with walk in robe and double ensuite, as well as a dedicated leisure area, theatre, study and powder room, this is double the lifestyle with easy maintenance.</p> <ol style="list-style-type: none"> 1. Study your options <p>A dedicated study makes working from home or completing homework stress-free.</p> <ol style="list-style-type: none"> 2. Light is the way <p>Embrace a light filled life, with a central hallway creating a spanning visual.</p> <ol style="list-style-type: none"> 3. Leisure up a level <p>The leisure landing on the second storey is the perfect place for quiet play or rest.</p>
Lillydale	<p>This is your wonderland. Step into the Lillydale and you'll slip into a world that isn't like it normally is. A world where everything is as it should be...but often isn't in other designs.</p> <p>You'll be lured straight into the centre of this home and, as a result, you'll sweep straight past the laundry that's tucked behind the garage and also miss the door to the hidden master suite.</p> <p>From the spacious family room to the open dining room and generously proportioned designer kitchen, every corner has been considered.</p> <p>Tea parties and other social gatherings are a delight when there's this much space to roam and play. You'd be mad not to cook at home with this kitchen at your fingertips featuring butler's pantry and stainless steel appliances.</p> <p>Three secondary bedrooms with built-in robes, a theatre room and a bathroom with separate powder room close by make a cosy kid's alcove.</p> <p>And let's go back to that secret master suite for a moment – it is backed by an extra-large walk-in robe and an adjacent ensuite with double vanity and large shower.</p> <p>Lose yourself in your own wonderful world with the Lillydale Series.</p>
Portsea	<p>The Portsea lets you enjoy all the features of a double storey, but on one level of living.</p> <p>This is one of our best sellers and it's easy to see why because this design doesn't ask you to compromise. You get a master suite, with its own walk-in robe and an ensuite with a double vanity and large shower, where you can enjoy a good sing if you please. Only a few steps away from the master suite, you will find the study, which parents can claim as their own or share with the kids if they're feeling generous.</p> <p>If you have a teenager wanting some privacy then they will be thankful for the position of the fourth bedroom, right at the rear of the home. All of the secondary bedrooms are double-sized with built-in robes.</p> <p>There are also dining, living and undercover alfresco areas, a theatre plus a kitchen with generous butler's pantry.</p> <p>A bathroom with a deep bath and separate toilet is another feature that somehow magically makes its way into this single level design.</p> <p>This home has so many features, you won't be left wondering.</p>

Appendix D: Home Details

Table 14: Identifying characteristics of home sample and alterations for experimental design

New home name	Bedrooms	Storey	Henley budget	Henley floor area (sq)	Square meters (control)	Experimental floor area (sq)	Square meters (experimental)
Amber	3	1	\$167,900	16	149	14.5	135
Bayview	4	1	\$184,900	21	195	19.5	181
Oakland	4	1	\$177,900	19	177	17.5	163
Ivory	4	1	\$174,900	18	167	16.5	153
Wingate	4	2	\$266,900	29	269	27.5	255
Willow	4	2	\$272,900	32	297	30.5	283
Fairview	4	2	\$275,900	31	288	29.5	274
Lillydale	3	1	\$209,900	22	204	20.5	190
Portsea	3	1	\$225,900	25	232	23.5	218

Appendix E: Sample Demographics

Table 15: Age demographics

		Frequency	%
Valid	18-20 years old	9	.9
	20-29 years old	127	12.8
	30-39 years old	280	28.3
	40-49 years old	238	24.0
	50-59 years old	165	16.7
	60-69 years old	130	13.1
	70 years or older	37	3.7
	Total	986	99.6
Missing	na	4	.4
Total		990	100.0

Table 16: Age groups of respondents

		Frequency	%
Valid	Up to 39 years old	416	42.0
	40+ years old	570	57.6
	Total	986	99.6
Missing	System	4	.4
Total		990	100.0

Table 17: Gender demographics

		Frequency	%	Valid %
Valid	Female	518	52.3	53.0
	Male	459	46.4	47.0
	Total	977	98.7	100.0
Missing	na	12	1.2	
	Other	1	.1	
	Total	13	1.3	
Total		990	100.0	

Table 18: Years lived in Australia demographics

		Frequency	%
Valid	1 year to less than 3 years	22	2.2
	3 years to less than 5 years	36	3.6
	5 years to less than 10 years	74	7.5
	Always	579	58.5
	Less than 1 year	4	.4
	More than 10 years	270	27.3
	Total	985	99.5
Missing	na	5	.5
Total		990	100.0

Table 19: Demographics relating to those born in Australia

		Frequency	%
Valid	Born in Aust	579	58.5
	Not born in Aust	406	41.0
	Total	985	99.5
Missing	System	5	.5
Total		990	100.0

Table 20: State based demographics

		Frequency	%
Valid	na	13	1.3
	NSW	296	29.9
	ACT	11	1.1
	VIC	302	30.5
	QLD	172	17.4
	SA	70	7.1
	WA	107	10.8
	TAS	17	1.7
	NT	2	.2
Total		990	100.0

Table 21: Income demographics

		Frequency	%
Valid	\$104,000 – \$129,999 per year	125	12.6
	\$130,000 – \$181,999 per year	120	12.1
	\$15,600 – \$33,799 per year	75	7.6
	\$182,000 – \$259,999 per year	57	5.8
	\$260,000 or more per year	18	1.8
	\$33,800 – \$51,999 per year	109	11.0
	\$52,000 – \$77,999 per year	164	16.6
	\$78,000 – \$103,999 per year	183	18.5
	Less than \$15,600 per year	26	2.6
	Total	877	88.6
Missing	na	12	1.2
	Prefer not to say	101	10.2
	Total	113	11.4
Total		990	100.0

Table 22: Income groups demographics

		Frequency	%
Valid	Less than \$104K	557	56.3
	\$104K or more	320	32.3
	Total	877	88.6
Missing	System	113	11.4
Total		990	100.0

Table 23: Household type demographics

		Frequency	%
Valid	Group household - two or more unrelated persons (e.g. share-house)	41	4.1
	Lone person household - single person living alone	124	12.5
	Multiple family household - two or more families (e.g. extended family grouping)	33	3.3
	One family household - couple with children (including adult children)	405	40.9
	One family household - couple with no children	242	24.4
	One family household - one parent family with children (including adult children)	96	9.7
	Other type of household	33	3.3
	Total	974	98.4
Missing	na	16	1.6
Total		990	100.0

Table 24: Education demographics

		Frequency	%
Valid	Less than Year 12 Secondary School	55	5.6
	Postgraduate degree	226	22.8
	Trade/TAFE qualification	222	22.4
	Undergraduate degree or diploma	361	36.5
	Year 12 Secondary School	105	10.6
	Total	969	97.9
Missing	na	21	2.1
Total		990	100.0

Table 25: Education group demographics

		Frequency	%
Valid	No degree/diploma	382	38.6
	Degree or diploma	587	59.3
	Total	969	97.9
Missing	System	21	2.1
Total		990	100.0

Appendix F: Qualitative Analysis Codes

Table 26: Detailed descriptions and directions of coding structure used for qualitative analysis

Code name	Code key words and notes	Code examples
Floor plan/layout/design	More general code. Coded here if respondents mentioned a specific feature of the home AND the way this feature is laid out, or the design of it, or how it is positioned etc (e.g. "2 car garage next to main bedroom"). It demonstrates that the way the house is positioned or rooms are positioned or designed in relation to the rest of the house is important to them.	"Garage connected to the house," "Overall layout," "The open plan front," "The home design is functional," "Good use of space."
Specific features/rooms of the house	This is relating to a SPECIFIC feature of the home that respondents were after or really liked. Note: If respondents mentioned this feature AND additional aspects of the feature that reflect the layout/design of it and/or the space of it, it is coded as both. If someone has only mentioned the feature (e.g. "kitchen/family area") and we cannot be sure what aspect of the feature they like, then it has been coded as this code only. It demonstrates that this part of the house is important to them.	"4 bedrooms," "Dining area," "Garage is included," "WIR".
Other	Anything else that doesn't fit but is a legitimate answer.	"Elevation," "Good," "Great," "Love everything about it," "Solar panels," "Water tank."
Size of the house and rooms	The size of the house or rooms is what the participant wants. (Different to spaciousness) This is communicating that size is important to the respondents. If respondents mentioned a specific room/feature of the house and the size of that room/feature, than this was coded as both.	"Biggest," "The size," "It seemed larger."
Visual appeal and style	Regarding the aesthetics of the home.	"Aesthetic design," "The façade," "The presentation."
Spaciousness/Space	Respondents mentioned the spaciousness of the home, that they like the space, lots of space. (Different to the use of the space which relates to the floor plan design). Rather, this is that there is lots of space or the house is 'spacious'. Also different to the overall size of the house. If respondents mention that the rooms or a particular room is 'spacious' it is also coded here as it highlights 'space' is important to them.	"Roomy" "Plenty of living space" "Has all the space I would like"
na	This answer was not provided at all and the survey developers have put "na" here.	na

Code name	Code key words and notes	Code examples
Nonsensical	Answers do not make sense. It does not answer the question properly.	"Gh," "no,"
Nothing/I don't know	Participant wrote they don't like "nothing" or "I don't know" or "not sure"	"dk" – usually short for don't know, "not sure."
Energy efficiency	Anytime the words 'energy efficiency' or very similar are mentioned.	"Power saving features," "Energy efficiency."
Modern	Any time the word 'modern' is cited. If it also fits in another category code it is coded there also.	"Modern style," "Modern."
Double Glazing	Anytime the words 'double glazing' or very similar are mentioned.	"Double glazing".
Comfort/liveability	Relates to terminology that reflects the comfort and liveability message (but does not overlap with the other experimental messages).	"Comfortable," "Cosy design," "Natural light," "Light," and "North-facing alfresco," "Cooling system."
Cost Savings	Primary motivation behind answer is economic benefit. Respondent likes that the design will save money or is economical etc.	"That it will save money on running costs"
Ecofriendly/environmentally friendly	Eco-friendly/environmental friendly terminology cited here.	"Green"
Sustainability	Anytime the words sustainability or very similar are mentioned.	"Sustainable"
Insulation	Anytime the words insulation or very similar are mentioned.	"Improved insulation features"
Innovative	Smart, Clever, Innovative.	"Innovative"
LED lighting	Anytime the words LED lighting/low energy lighting or very similar are mentioned.	"Low energy lighting"