RESEARCH ARTICLE

# Volume Home Building: The Provision of Sustainability Information for New Homebuyers

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## Abstract

The new residential housing sector is producing approximately 200,000 homes a year that could benefit from methods to increase sustainability and energy efficiency. Currently, there is limited implementation of sustainability measures beyond mandatory minimum requirements in Australia. New homebuyers are often the scapegoats for the poor sustainability adoption due to their perceived lack of interest and willingness to pay. However, their knowledge and engagement in sustainability is likely to be strongly guided by information provided by the volume builders. This paper investigates the sustainability information that homebuyers are provided by builders, as communicated through their websites. Web searching as an important means of information gathering in the preliminary stages of the process for new homebuyers. This paper reports on the analysis of Australia's Home Industry Association's top 100 volume builders' websites and their provision of sustainability information. The results suggest the lack of sustainability-related information provided by builders is contributing to disengagement by consumers in the sustainability features available in new homes.

## Keywords

Residential construction, sustainability, consumers, energy efficient housing, volume builders

## Introduction

Current approaches to increasing sustainability in new home construction are suboptimal in Australia and lag other developed countries (CSR, 2014; Obst, 2015). Current mandatory requirements for new homes through the National Construction Code nationally comprise a six-star Nationwide House Energy Rating Scheme (NatHERS) rating, and a further rating in NSW using the Building Sustainability Index (BASIX). However, these rating schemes were found to have significant deficiencies as highlighted by Pitt and Sherry (2014), who identified a range of factors as described in Table 1. These weaknesses in the regulatory environment have a significant long-term impact, as the houses built today have a life expectancy of at least 50 years. One aspect identified by Pitt and Sherry as a key barrier to increasing energy efficiency in new dwellings was consumers' (homebuyers') disengagement with sustainability and energy efficiency in the building process. However, for consumers to be able to make an informed choice, information needs to be provided and choices made available (McGregor, 2005). It is well established that homeowners generally have very limited knowledge of sustainability and the building process in general (Crabtree, 2006; Williams and Dair, 2007; Crabtree and Hes, 2009; Dalton, Horne and Maller, 2008; Warren-Myers et al., 2012; Pitt and Sherry, 2014). Consumers are reliant upon the information, education, guidance and provision of products that engage their interest and desire. As a result, when building a new home, information will primarily be obtained from builders. What information could homebuyers be exposed to that would allow them to make an informed choice?

This research acknowledges consumers' limited knowledge about energy efficient features, but challenges the notion that this is the sole responsibility of the consumer. Taking a broader view of the industrialised volume building industry (home builders who are producing large numbers of dwellings), it argues that the power in the industry sits with the building

**Table 1  Pitt and Sherry's (2014) synopsis of issues associated with the energy efficiency for new dwellings in Australia**

| Design | - inconsistencies in the assessments performed by raters using various software for the rating schemes and rater errors<br>- limited attention to masterplan development designs to enable enhanced energy efficiency for new dwellings |
|---|---|
| Construction | - lack of sign off and physical inspection that verifies what was designed was built<br>- poor practices in dwelling construction affecting the thermal performance of the dwelling due to a variety of aspects including incorrect or missing insulation, poor sealing of the dwelling, product substitutions and divergence from the approved designs |
| Operation | - a disconnect between the dwelling's designed performance and actual energy use |
| Skills and Knowledge | - limited skills and knowledge throughout the delivery supply chain limited knowledge of requirements and options to increase energy efficiency |
| Consumers | - lack of concern regarding energy performance<br>- limited understanding of the requirements<br>- unwillingness to pay for energy efficiency features |

companies, rather than with the consumer. Therefore, the building company has the responsibility and ability to direct consumers towards sustainable features that are available in new homes. They currently communicate with consumers by advertising through websites, newspapers and display homes with new lifestyle features such as ensuites, alfrescos, walk-in-robes and stone bench-tops. Therefore, the volume builders have established communication methods with consumers. But what efforts are builders making in terms of providing information in relation to sustainability and energy efficiency features to be included in new homes?

Consumers are increasingly reliant on the information available from the internet to make decisions (Littlefield, Bao and Cook, 2000; Hasbrouck and Woodruff, 2008; Oates et al., 2008; Weinberg et al., 2015). The purpose of this research article is to investigate the type, style and depth of sustainability information homebuyers are exposed to on builders' websites when selecting a new home. The results demonstrate the severe lack of information regarding sustainability available to consumers. Our article suggests that this lack of information and shortage of quality information may contribute to consumers' disengagement in sustainability in building a new home.

## THE AUSTRALIAN VOLUME BUILDING INDUSTRY, NEW HOMEBUYERS AND SUSTAINABILITY CHOICES

New homebuyers are flooded with choice from what are now commonly known as "volume builders." The Australian residential construction sector through the mass-production of new homes means volume builders are the conduit for homebuyers to build a new home. Volume builders offer a complete home package in terms of end-to-end project management and delivery (Dowling, 2005). The sector is dominated by substantial-sized volume builders, like Metricon, BCG and Simonds. These builders act as a powerhouse of providers and, as can be seen in their market share and economic performance, they account for between 37% and 41% of all new housing in Australia (Dowling, 2005; Dalton et al., 2011a). There are between 170,000 and 200,000 dwellings built annually, and competition within the sector is high. This has resulted in highly aggressive marketing approaches to attain new homebuyers' attention. The volume builders effectively tell consumers what they want and how they want it; while providing what appears to be a wealth of options, they are limiting choices to ensure they can maximise efficiencies of scale and profits (Reardon, 2013; Warren-Myers and Heywood, 2016a, 2016b).

The residential volume building sector in Australia is essentially split into three key areas: speculative builders, project home builders (order builder) and franchise builders (a subset of project home builders).

- *A speculative builder* provides a fixed product to the market; the houses are pre-planned dwellings, commonly sold off the plan and the development characteristics are typically fixed with only minimal selections (mostly internal to finishes; e.g., selection of a colour palette) to be made by the purchaser. A speculative volume builder is often considered a community builder, where a homebuyer will purchase an integrated product from a development, commonly an apartment, townhouse or house and land package; e.g., products from Mirvac, Villaworld or Frasers.
- *An order builder or project home builder* provides a set of plans, house types, facades and finishes from which a purchaser may select including upgrade options (of which there are usually a limited amount); the homebuyer will then "order" a home and the builder will be engaged to build the dwelling; e.g., Metricon and Simonds.

- *Franchise project home builder* **is** the same as an order builder or project home builder; however, the business is franchised to smaller operators (usually small- to medium-building firms) often under a national brand name, allowing for efficiencies in marketing, product development and documentation and material and trade supplies; e.g., G.J. Gardner and Hotondo Homes.[1]

Oligopoly behaviour is evident in the top 100 Australian Builders who operate industrialised business models delivering a standardised approach to home building, targeting the bulk of market demand for new housing. In the bespoke end of the market, the consumer has more power and choice over what they include in their home and their interaction with the builder is more like that of a traditional client, as the purchaser will prescribe the program, and specify characteristics and product details (Tombesi, 2006). Conversely, in the bulk end of the market that is serviced by volume builders, homebuyers in this process are effectively a customer, selecting a prescribed product from a volume builder, which concurs with Tombesi's (2006) viewpoint that the housing consumer is the customer choosing a "known" product (Warren-Myers and Heywood, 2016b).

The bulk end of the new housing market is serviced by volume builders. They effectively provide a product to consumers with many benefits such as value for money (e.g., more floor space), a single contract and short build time. The process has been refined by the volume builders to ensure the new homebuyer feels empowered in their choices of dwelling, features, finishes and certainty of the price and product to be delivered (Barlow and Ozaki, 2003). Simultaneously, the volume builders are making substantial profit by creating a mass construction procurement process that cuts costs and enables prompt and efficient delivery. To ensure this process, volume builders' "dominant competitive strategy" (Barlow and Ozaki, 2003, p. 92) is to create a standard set of plans, which have a certain number of choices in materials, finishes and options. These options are used to entice the consumer to build with them and to provide what appears to a wealth of options, making the homebuyers feel empowered. Volume builders effectively capitalise on consumers as infrequent purchasers with limited knowledge of the residential construction processes, and guide them in their choices of dwelling, features, and finishes, and provide certainty of the price and product to be delivered (Barlow and Ozaki, 2003; Dalton, Wakefield and Horne, 2011b). These houses can be built as "speculative" dwellings, defined products ahead of customer purchase, or in response to customer orders (Dalton, Wakefield and Horne, 2011b).

The homebuyer is not without their individual wants or needs, but nonetheless they are strongly guided by professionals in the decision-making process. Homebuyers are led by volume builders to purchase "lifestyle" aspects they are encouraged to aspire to. Volume builders use lifestyle as a marketing tool and create competitive marketing between each other, often sold as "special packages," "optional extras" or "bonuses." In current practice, the homebuyer has limited power to choose features that are not specified as "options" or offered as part of the "package." Consequently, in examining opportunities for sustainability, a lack of options to choose from and a lack of knowledge compounds their inability to request and demand sustainability- and energy-efficiency-reflated features. Consequently, they are reliant on the volume builders to provide the options, information, guidance and "package" of sustainability and energy efficiency features.

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1 Order builders or project home builders often provide 'house and land' packages; however, they generally have a split contract between the dwelling and the land because the land is part of a development and the contract is with the developer unless the volume builder has purchased the land.

Studies have shown that in relation to sustainability, consumers lack knowledge and are not confident in investing in options they know very little about (for example see Crabtree, 2006; Williams and Dair, 2006; Crabtree and Hes, 2009; Dalton, Horne and Maller, 2008; Warren-Myers et al., 2012; Pitt and Sherry, 2014). Essentially, they are reliant on others to guide them (McGregor, 2005). Consumers need to be provided with information and feel confident in their choices to pay for sustainability features (Gangale, Mengolini and Onyeji, 2013). Trust in the information is paramount for decision-making, and consumers looking to build a new home place that responsibility with the builders. Oates et al. (2008) indicate the amount of time and attention given to investigate and analyse options increases depending on the level of financial involvement. For example, low-involvement goods like light bulbs require very little time and effort to understand and make decisions about, while high-involvement products like cars require a significant amount of time and effort to research, understand and come to a decision. A new home, generally the largest investment one will make, is in the high-involvement category. Information sources used to inform decision-making for homebuyers vary substantially and include websites (including blogs), television, print advertising, display homes and less tangible sources such as word of mouth (Pickton and Broderick, 2005). The complexity and variety of information available complicates consumer decision-making, requiring consumers to decipher the reliability of information and verify for themselves the choices they should make (Hansen, 2005). In the case of sustainability in new homes, how much information is available from the builders? Builders are the key intermediary in the building process, but currently, the level of information, guidance and education they provide to consumers on sustainability and energy efficiency is unknown.

## Research approach

This research investigates volume builders' communication of sustainability information to homebuyers. The research examines builders' websites and the display and provision of sustainability information to investigate issues such as access to and depth and educational content of the information provided and of links to further information.

The research approach utilised Content Analysis and Web Content Analysis techniques, which comprised a combination of qualitative and quantitative techniques (see McMillan, 2000; MacNamara, 2005; Herring, 2010). Content analysis was utilised as an established technique for the analysis of documents and comprises a systematic and replicable technique that can provide objective analysis of characteristics in content (Holsti, 1969; Krippendorf, 1980). The research assesses a multitude of factors that are observable through content analysis to understand the influence of the sustainability content variable that is of interest (Riff, Lacy and Fico, 2014). This research examined themes in web content and utilised coding to allow for quantitative analysis with the use of explicit rules of coding.

The purpose of analysing the content of the volume builders' websites was to understand the level of information communicated about sustainability. This was investigated using a three-tiered approach to identify content that was then separated into five themed components for analysis:

- visibility of information
- depth of information relating to sustainability
- type and quality of information
- educational content and reference to other documents or websites for consumers to find more information.

| | |
|---|---|
| First level investigation | • Investigation and analysis of main webpage, navigation through tabs, pages and links on website |
| Second level investigation | • Use of the search function on the website, using keyword terms 'sustainability', 'sustainable', 'energy efficiency/efficient', and 'green' |
| Third level investigation | • If no information found within a page or in a specific page, a further search was conducted using google with keyword terms and the volume builders' name |

Figure 1    Three-tiered investigation approach

The analysis of the sustainability information on the websites comprised:

- thematic theoretical analysis techniques for analysis of the websites as described by Braun and Clark (2006)
- media content analysis techniques in which a coding system was created to allow an understanding of the likely impact of the text (MacNamara, 2005)
- scaling of observed factors from 0–5 utilised for relevance weighting (Robertson and Jones, 1976; Craswell et al., 2005).

The quantitative coding of qualitative content required researcher judgment, which was validated through comparison and consolidation of opinions between two researchers.

## DATA AND SAMPLE

To identify the sample population, the Home Industry Association's (HIA) top 100 residential builders list (HIA, 2015) was used to identify the builders to be included in the study. This was relied upon because the top 100 volume builders are contributing between 36% and 46% of housing in Australia.

The total number of websites examined was 125, from 97 of the top 100 HIA home builders. These included several subsidiary providers who are under the banner of larger organisations like BCG who had six subsequent building companies and associated websites (HIA top 100, No. 1 in 2014–15) and Alcock Brown-Neaves Group who had 7 companies and associated websites (No. 2 in 2014–15), which resulted in there being more than 100 websites. There were three builders on the list that did not have affiliated websites with their products or had gone out of business, thus they were removed from the sample.

The distribution of residential home builders across states is shown in Table 2. The distribution of builders by state is consistent with the relative size of their population and GDP output and is an indicator of the differing nature of the competitive building industry environment in each state.[2]

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2    It should be noted that the "state" indicated in the HIA top 100 report represents the state in which the business is registered rather than where it as operating or offering its building services. The analysis practically assumes that it is operating and is most influenced by the industry environment in this state; however, it should be noted, many volume builders build houses in multiple states, if not Australia-wide. Thus, the results presented here are representative of the HIA top 100 identification of builder location and provides an initial indication of where the market is more industrialised by volume builders'.

Websites are active and live interfaces and, consequently, information and data can change quickly and be different from one day to the next. The analysis of the websites took place between 15 and 26 August 2016. A limitation of this research is that the analysis of websites did not drill down to the regional websites of all builder types. Further, where there may have been more than one website for a building company in different states, generally only one was chosen and this was based on where the builders head office was as per the HIA top 100 report.

## Results

The results report on the investigation and analysis of the websites of the top 100 HIA builders in Australia. The results detail information provided about sustainability that is available to new homebuyers by examining and quantifying the level of visibility, depth and quality of information, and capacity for educational content.

### VISIBILITY

Volume builders' websites are a key source of information for consumers about the types of homes that they can choose to build from, providing information about floor plans, facades, styles and colours, and are therefore a primary source of information in the consumer purchasing process.

Upon investigation, the visibility of sustainability information on the top 100 HIA builders' websites overall was poor, with 69% of the websites demonstrating no reference to sustainability or green practices, options or information, as shown in Table 3. There were only seven builders (6%) that had sustainability information that could be easily found on their websites.

Table 2   State and territory profile of top 100 home builders in Australia and ABS dwelling building approvals Jul 2014–Jun 2015: state by state

|  | Total | Vic | NSW | Qld | WA | SA | ACT | Tas. |
|---|---|---|---|---|---|---|---|---|
| No. of builders | 97 | 27 | 20 | 23 | 18 | 7 | 1 | 1 |
| % |  | 28% | 21% | 24% | 19% | 7% | 1% | 1% |
| ABS dwelling approvals by state |  | 30% | 27% | 20% | 14% | 5% | 2% | 1% |

**Source:** HIA (2015) Top 100 Home builders in Australia; Australian Bureau of Statistics, 2016, Building Approvals, 8731

Table 3   Visibility coding of sustainability content on top 100 homebuilders' websites

| Ranking | Description of Ranking | Overall | |
|---|---|---|---|
| 0 | None | 86 | 69% |
| 1 | Very difficult to find—extensive searching required | 9 | 7% |
| 2 | Difficult to find—significant searching required | 13 | 10% |
| 3 | Some searching required | 10 | 8% |
| 4 | Easy to find—found in second level search | 5 | 4% |
| 5 | Very easy to fine—tab with sustainability on main page | 2 | 2% |
|  |  | N = 125 | 100% |

The visibility of sustainability information on websites was very limited, with only a select few order builders and speculative builders making it easy to find sustainability-related information. A rating of five was achieved by the Mirvac website and the Frasers Property Australia website. Both sites had "Sustainability" tabs on the primary navigation bar at the top of the home page, allowing very easy access to their sustainability information.

The "some searching required" rating of three was given to ten builders for which multiple tabs and pages needed to be searched to find sustainability information. For example, on one volume builder website, the "About" link needed to be selected from a homepage with multiple menu items at the top of the page. On the "About" page, "Sustainability" was number four on the menu on the left of the page. Overall, these results indicate that further analysis of information type, depth and quality will produce limited insights due to the 69% of builders not having any sustainability-related information on their websites.

## LEVEL OF INFORMATION

Finding the sustainability-related information was the first step; the next comprised grading and coding the level of information in terms of the amount of information on the website that may be useful in contributing to the consumers' knowledge. This rating ranged from 0 = none to 5 = very high level of information with a dedicated tab and pages.

Consistent with the poor results for the visibility, the weighting towards limited sustainability information available was high. As shown in Table 4, the coding analysis identified that 88 home builders had no information relating to sustainability. The slight differential in the numbers between the level of information and the visibility was that there were two websites that indicated sustainability would be found, yet when navigating to the page there was no information at all. In one instance, the page was in development while the other showed an error page. Only ten home builders were rated four or five. These volume builders provided dedicated pages of information relating to sustainability that could help consumers better understand sustainability and sustainable features. An example of a website that was rated four, high level, had an Environmental Responsibility page with multiple headings and "Read More" links that consumers could follow to gain more information about sustainability. Eleven websites provided moderate information comprising a dedicated page and descriptions and were ranked three, while seven provided

Table 4   Level of information found on the top 100 homebuilders' websites

| Ranking | Description of Ranking | Overall | |
|---|---|---|---|
| 0 | None | 88 | 70% |
| 1 | Minimal—mention in a page | 9 | 7% |
| 2 | Some—paragraphs | 7 | 6% |
| 3 | Moderate—dedicated page and descriptions | 11 | 9% |
| 4 | High level—multiple dedicated pages | 8 | 6% |
| 5 | Very high level—dedicated tab and pages | 2 | 2% |
| | | N = 125 | 100% |

Table 5   Type of information found on the top 100 homebuilders' websites

| Ranking | Description of Ranking | Overall | |
|---|---|---|---|
| 0 | None | 88 | 70% |
| 1 | Very basic—inclusions only | 14 | 11% |
| 2 | Basic information—business operation-related only | 4 | 3% |
| 3 | General description with some detail—NatHERS rating, Greensmart Accreditation | 11 | 10% |
| 4 | Detailed descriptions—Greensmart/NatHERS/ BASIX, plus list of inclusions | 7 | 6% |
| 5 | Comprehensive detail and discussion—use of video and interactive presentation to explain sustainable strategy and concepts | 1 | 1% |
| | | **N = 125** | **100%** |

minimal information and were ranked two. Nine sites were rated one, with minimal information described as a mention on a page. For example, on one website of a NSW order builder, there was an image of the six-star energy rating and a sentence stating all their homes are built to a six-star energy rating. This very low level of information offers minimal opportunity for the customer to increase their knowledge about the benefits of sustainability features in a new home and options for including them. All it does is highlight that the builder provides a six-star energy rating. It failed to highlight that it is a regulatory requirement.

## TYPE AND QUALITY OF INFORMATION

To gauge whether the information appearing on the websites would be useful in contributing to consumers' knowledge about sustainability, the next analysis phase assessed the type and quality of information provided on the website using a scale ranging from 0 = none, to 5 = comprehensive detail and discussion, as described in Table 5. Again, the quality and type of information provided to consumers relating to sustainability was very poor overall. As shown in Table 5, 70% of websites examined have no information, and the remaining 30% are weighted to the low ratings with 14% rated as providing very basic or basic information and a further 10% with generalised descriptions only. Information that fell in these categories would contribute very little to a consumers' understanding of sustainability in building a new home. Detailed descriptions were provided by seven builders and only one builder provided comprehensive detail and discussion that provided high-quality information that would increase a consumer's knowledge in the area.

The distribution rankings are like the visibility of information and the level of information factors in that it is heavily weighted towards the lower end where there is no information (70%) or only very basic information (11%). Only four of the sites fell in the basic information rating of two. These sites focused on explaining the environmental or sustainable aspects of their internal operations rather than their home building products and services and benefits to the client. An example is an order builder that built over 1000 homes in 2014–2015, where a brief statement regarding their use of materials and corporate social responsibility was

found under a heading of "Environment" on the "Quality, Safety and Environment" page. A further example is a speculative builder that built 332 dwellings (in 2014 – 2015) and the sustainability information was aligned to their strategic business strategy, rather than providing information on the properties they build.

Eleven websites rated three with general descriptions and some detail of sustainable features and accreditation. Examples are a builder that under the "Thinking Green" heading mentions "Greensmart" and discusses some benefits of sustainable features in a home and how they achieve them. The focus of the information found on this page was to educate the consumers about the products offered and describes their use of glass, timber and Hebel products, and how they can contribute to a sustainable home. Another example, a builder that rated four, provided detailed descriptions of the benefits of sustainable features, comprising orientation, insulation, solar PV cells and ventilation, highlighting both comfort and financial benefits.

A speculative builder based in NSW was the only builder in the HIA top 100 that achieved a five for the type and quality of information. They built 1684 homes in 2014–15 and on their website, they provide detailed information about their strategy for developing more sustainable homes and present it in ways that engage the consumer. They provide information that can extend the consumers knowledge about sustainability and detail a plan for change to implement more sustainability. They provide case studies of future initiatives and projects, and explain the contribution of sustainable design and features in their homes to reductions in the cost of living and improvements in their customers' lifestyle.

### LEVEL OF EDUCATIONAL CONTENT

The analysis of the websites examined whether there was any form of educational content to assist homebuyers to build knowledge on sustainability. The benchmark to achieve a rating of one in the level of education content was not only to mention a sustainable design, a feature or a product but to discuss in some way how it may improve the home owners' experience of the home or lifestyle, or provide some cost benefit to the homeowner in the long term. Websites that may have mentioned sustainable features or products but did not extend the information provided to a discussion of the benefits, were considered to provide no educational content and were given a rating of zero.

There were 24 websites that did attempt to provide some educational material, but 101 websites did not. Table 6 provides an overview of the level of educational content found on the various websites, where only one website provided very high level information to educate new homebuyers (located in NSW) and five provided a high level.

There are many government- and industry-based websites that provide educational type content for consumers. Only five builders' websites had links to some of these resources, and directed consumers towards the Living Housing Australia, Yourbuilding.org, BASIX and NatHERS websites. However, some sites were not reviewed and kept up to date, as two builders still had links to the Sustainable Energy Association of Australia website, which was shut down in December 2014 (Sanson, 2014). Thus, although attempting to provide further direction and information, their failure to stay up to date with industry change in relation to sustainability meant consumers interested in sustainability may have been led to pages that no longer exist. This does not portray a particularly established sustainability industry to convince them to investigate sustainability benefits and options further or to confidently make decisions about including such features in their home.

Table 6   Level of educational content

| Ranking | Description of Ranking | Overall | |
|---|---|---|---|
| 0 | None—no discussion of the potential lifestyle or cost-saving benefits of sustainable design, features or products | 101 | 81% |
| 1 | Minimal—broad discussion of lifestyle and/ or cost-saving benefits of one of a sustainable design, feature or product | 4 | 3% |
| 2 | Some—discussion of the lifestyle and/or cost-saving benefits of more than one sustainable design, feature or product | 10 | 8% |
| 3 | Moderate—some discussion of the lifestyle and/or cost-saving benefits of more than one sustainable design, features or products, plus reference to a rating system or accreditation program | 4 | 3% |
| 4 | High level—discussion of the lifestyle and/or cost-saving benefits of many sustainable design, features or products, plus reference to a rating system or accreditation program and external links to further information | 5 | 4% |
| 5 | Very high level—as above in 4, plus discussing its real-world application and evidence of the lifestyle and cost benefits | 1 | 1% |
| | | N = 125 | 100% |

## VOLUME HOUSING MARKET OVERVIEW

To gauge the profile of the top 100 volume builders' engagement in the sustainability space across the industry, a multi-hierarchical cluster analysis was performed, using Squared Euclidean Distance as the measure of the ranked analyses for visibility, level of information, quality of information and educational content. This analysis identified three main clusters that are depicted in Figure 2.

The first cluster identified active sustainability advocates among the volume builders, comprising 12% of builders in Australia. This was split between 23% speculative builders and 77% order builders. There was one builder that managed to score very highly across all categories, indicating that this organisation is a leader in the housing sector in terms of sustainability. This builder was a speculative builder and had clear sustainability objectives. However, the implementation of these sustainability credentials within the developments they produce was unclear from the website content analysis. Overall, it is apparent there are leaders in the sector trying to approach and incorporate sustainability and advocate to consumers the importance of sustainability through information provision.

The central cluster comprised builders who were moderately active in advocating sustainability, and this cluster demonstrated some level of attempt at sustainability information communication. However, this often meant finding the information was more difficult and the
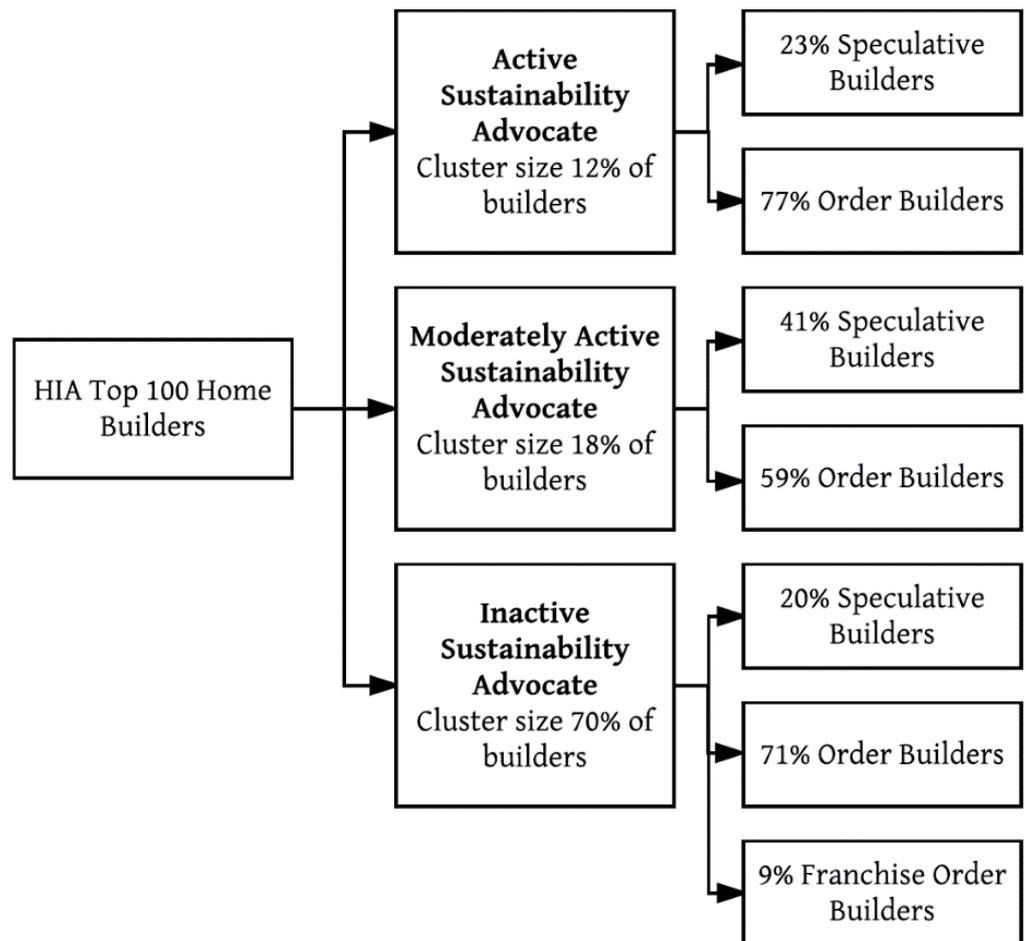
Figure 2   Sustainability advocacy cluster analysis of the HIA top 100 home builders

quality and quantity of information was not consistent. This cluster comprised 18% of the total volume builder sample, and was split into 41% speculative builders and 59% order builders.

The final cluster encompassed builders who were inactive and not attempting to include any, or very minimal levels of, sustainability advocacy and information. This includes the bulk of the volume building sector (as profiled by the HIA top 100 home builders). This cluster comprised 70% of all builders and was split into 9% franchise builders (all the franchise builders were situated in this cluster), 20% speculative builders and 71% order builders.

Overall, only 12% of the top 100 home builders are advocating for sustainability in their new housing products, with a further 18% attempting some statement or sustainability positioning, while the majority do not place any importance on sustainability at all. Consequently, this research suggests there is consumer disengagement from sustainability in new homes due to a lack of information and guidance.

## Discussion

In searching volume builders' websites across Australia, this research has found that a meagre level of sustainability-related information is available to consumers. As consumers utilise volume builders' websites to gather information for decision-making purposes, the lack of information relating to sustainability provides evidence for why consumers demonstrate little engagement in the sustainability agenda when entering the building process.

This research has identified that in the top 100 home builders in Australia, there is a lack of sustainability information available on their websites; further, the level and depth of information is limited and only a select few provide a comprehensive and educational discussion on sustainability. After examining the information available to consumers on the topic of sustainability on the volume builders' websites, it is no surprise that consumers exhibit a reluctance to engage in sustainability and energy efficiency initiatives in the designing and building of their homes. This concurs with Eves and Kippes (2010), who found that, except for high-income individuals, the general population does not consider sustainability or energy efficiency to be a main determinate in their housing choice. Decisions regarding sustainability often result in a trade-off of other aspects (Moisander, 2007). Particularly where there is a lack of information, consumers are unlikely to purchase something they have little knowledge of or trust in (Young et al., 2010). As Hoffman and Henn (2008) suggest, education and information to overcome the psychological barriers perceived in sustainability, like trust and costs, are required to create incremental changes in building practices, which will lead to sustainability becoming more mainstream.

As McGregor (2005) suggests, information is paramount for consumers to have confidence to invest in sustainability; otherwise, as Kimmet (2009) implies, consumers will be sceptical about the capacity of builders to deliver on sustainable technologies. The lack of information regarding sustainability presented to consumers questions the reliability and robustness of sustainability capacity and the implementation ability of the builder. Consequently, examining the results in context, a lack of information available to new homebuyers in Australia suggests they lack confidence to invest in sustainability or energy efficiency features. This concurs with Young et al.'s (2010) study on green consumption and the barriers that impact purchaser decision-making. Subsequently, consumer considerations in Australia are reduced because of the lack of knowledge about the product, as green consumption and decision-making criteria require knowledge, time for decision-making, desire for the product and capacity to afford the financial costs. In the case of this study, information pertaining to actual sustainability initiatives is limited and even more limited is any mention of associated costs. The commonly perceived understanding of sustainability is that it will cost more, and this appears to be a major barrier to homeowners (Dalton, Horne and Maller, 2008; Maller, Horne and Dalton, 2011; Warren-Myers et al., 2012). Lack of information, costs details and financial and perceived benefits regarding sustainability options means consumers will be reluctant to engage in these options or seek these options. Further investigations are required in terms of examining the user experience and decision-making in the use of display homes, booklets, pamphlets, print and social media. However, this research suggests a primary reason for consumers' lack of engagement in sustainability and energy efficiency perceived by industry stakeholders, as outlined in the Pitt and Sherry (2014) report, is the result of a lack of available information for consumers on builders' websites.

## Conclusion

The technology and the capacity for more sustainable and energy efficient homes is there, and the sector has the capacity to ensure these can be delivered without inordinate costs (Warren-Myers and Heywood, 2016a). However, this research has identified several key barriers to sustainability engagement by consumers that must be overcome to increase the sustainability demand and uptake from consumers:

- lack of information to describe initiatives and educate consumers on the benefits
- misleading information or missing information leading to distrust of builders' capacity to deliver

- limited offerings of sustainability or energy efficiency initiatives available to the homebuyer
- where sustainability offerings do exist, no cost information and only some evidence pertaining to benefits
- sustainability options are subject to rapid change.

Although not the intent of the research, on reviewing the analysis and revisiting websites, it was observed that sustainable information and attributes advertised via websites were subject to rapid change or disappearance. One example is a sustainability housing range that was no longer available several months later due to a change of leadership within the company. There is a suggestion that volume builders are experimenting in providing sustainability options; however, perhaps due to a lack of communication with consumers, these strategies are failing to attain buyer interest. Volume builders need to rethink and improve information provision to new homebuyers. Like other initiatives that are effectively marketed by the volume builders, they need to provide information and education and create desire for the product. This will involve some creative strategies but also clarity of information and detailed cost–benefit analysis for consumers. To further engage consumers in sustainability and energy efficiency in the home, they need to be guided and educated, and shown a range of options that will assist in their decision-making. In addition, volume builders may have to commit to this strategy for a period before engagement by consumers in their product is achieved. As Hoffman and Henn (2008) suggest, the adoption curve for green construction takes time, for either successful adoption or creation of a niche market. Failure to persist with initiatives leads to failed adoption, and is possibly why builders reported to Pitt and Sherry (2014) that consumers are disinterested.

This study explored and established a key barrier for consumers' engagement in sustainability: a lack of information. This can be readily solved through builders creating better information portals and increased availability of information. However, to achieve industry-wide change, further research is needed to investigate consumer choices to provide more specific direction to volume builders, supply chain product manufactures and government on how to engage consumers in the sustainability agenda in building their new homes. Strategy development across the new housing market will lead to better outcomes and a more sustainable and energy efficient residential housing sector in Australia.

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