

Volume Home Builders' Sustainability Messaging and Communication in NSW, Australia

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Abstract

Australia is often noted as having some of the poorest sustainability credentials for new homes in the developed world. Despite extensive research on why homes should be more sustainable, market implementation has been slow due to limited regulatory regimes and low engagement by volume home builders. While there is demand for more sustainable homes from potential purchasers, it is not clear what options are available for consumers who would like to purchase a more energy-efficient home. To investigate what sustainable and energy-efficient home options were available, this research used content analysis to investigate the online communication channels of 23 New South Wales volume home builders through their websites, blogs and social media. The research was conducted over two periods: early 2020 and early 2022.

The initial findings demonstrate that while the leaders in the industry have improved their product offerings, the overall sector has reduced its communication of sustainability and energy efficiency information for new volume-built homes. This suggests that further research is required to examine why, between 2020 and 2022, volume home builders have refrained from increasing and enhancing their sustainability product offering and associated information for consumers through their online platforms.

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Keywords: sustainable housing, residential construction, communication, homebuyers.

Introduction

Australia's housing stock is often categorised by its lack of sustainability and energy-efficient performance, with only four in five houses being built to the minimum standards and a negligible proportion to an optimal performance standard of 7.5 stars (based on the nationwide rating scheme NatHERS) or more (Moore et al., 2019). Residential buildings create about 12% of Australia's greenhouse gas emissions (Fyfe, 2019) and consume 24% of Australia's electricity (Commonwealth of Australia, 2022). The combination of emissions during construction of a new dwelling and throughout its operation as a single home will be responsible for approximately 545 tCO_{2e} by 2050 (Schmidt et al., 2020). Volume home builders (VHBs)—known for their lack of sustainability inclusions and promotion of energy efficiency features—build a large portion of these houses (Crawford et al., 2016; Moore et al., 2019; Warren-Myers, 2017). One of the major barriers to providing more sustainable housing alternatives is the lack of available information provided to consumers by home builders (McRae, 2019; Warren-Myers et al., 2017). Homebuyers have a limited amount of knowledge when it comes to housing sustainability and the building process. As such, VHBs guide homebuyers through their build process and play a critical role in educating their customers. Homebuyers rely on the information available to them, such as VHB websites and other online social media platforms to inform their decision. A recent study by Warren-Myers and McRae (2017) examined Australia's Housing Industry Association's top 100 VHB websites. Their study found that there was a major lack of sustainability-related information, which may have contributed to the disengagement by consumers regarding the sustainability features of new homes. The present study builds upon this previous research and aims to take a closer look at what kind of sustainability information is presented by VHBs on their available communication channels, such as their websites and social media accounts.

This research investigated the communication of sustainability and energy efficiency information and offerings across the top 20 VHBs operating in New South Wales (NSW), plus a further three builders who appear in the top 100 builders in Australia but are specifically positioning themselves in the provision of sustainable and energy-efficient housing. The focus of this investigation was primarily on the sustainability messaging provided by these NSW builders. An initial baseline was created by data collected in 2020, with subsequent data collected in 2022. This paper provides hereafter a summary background to the Australian housing market and sustainability considerations and demand. This is followed by the research approach and a synopsis of the study's findings.

Background

The Australian New Housing Market

Australia will need to build an average of 232,486 new dwellings per year to house the expected population growth of 41.4 million (based on the current population growth rate of 1.6%) by the year 2050 (Scutt, 2018). A large share of these new homes will be built by VHBs, who dominate the Australian residential market, with an estimated market share of 44% as of 2021 (Reardon and Lillicerap, 2021). VHBs are large building companies that construct hundreds of homes per year from a set catalogue of designs that improves their affordability (when compared to custom or architect-led dwellings) due to their standardised designs and

maximised efficiency with materials and trades. VHBs often use aggressive marketing strategies to attract homebuyers' attention by providing what appears to be a wealth of options for homebuyers to choose from, but these options are actually quite limited due to the processes used by VHBs to achieve efficiencies of scale and maximise profits (Reardon, 2013; Warren-Myers & Heywood, 2016a, 2016b, 2016c; Warren-Myers & McRae, 2017).

The sustainability credentials of these VHBs have been found to be quite questionable. Studies such as those conducted by Warren-Myers and McRae (2017), Warren-Myers (2017), Worrall (2018) and McNabb (2012) have found that VHBs provide misleading information about the energy efficiency performance of their homes and have poor adoption of sustainability principles in their design and construction. In fact, Warren-Myers et al. (2020) examined the types of messaging VHBs were providing on websites and found, on a number of occasions, potential breaches to the Australian Consumer Law (Section 18); these occurred in logo use, language and, in some cases, the absence of information. Homes rarely exceed the minimum energy efficiency standards set down in the National Construction Code, and, in the majority of cases, the Nationwide House Energy Rating Scheme (NatHERS) is used with 6 stars out of 10, indicating that minimum standards are being met. In Australia, the average NatHERS rating is 6.2 stars for new detached homes, with approximately 19% of new homes (175,266 homes that had a NatHERS certification in 2020) being awarded 7 stars, yet 24% still rated below 6 stars (CSIRO, 2021).¹ A recent study found that four in five houses are being built to the minimum standards and a negligible proportion (only 1.5%) to an optimal performance standard of 7.5 stars or more (Moore et al., 2019). It has been suggested that increasing the minimum performance standard is one of the most effective ways to improve the energy outcomes and increase the uptake of more energy-efficient homes (Moore et al., 2019). However, it is important to be aware that studies such as Crawford et al. (2016) have found that solely increasing the energy efficiency level of houses beyond current minimum standards does not always result in significant energy savings and can lead to greater energy demands (like embodied energy) through the supply chain.

Previous Studies

Few studies have focused on the communication between VHBs and consumers—in particular, examining the communication channels and the type of information and product offerings in these environments. Warren-Myers and McRae (2017) examined the top 100 VHB websites to evaluate their sustainability and energy efficiency messaging, finding that only a small number of builders provided information. Further, for those that did, the information was often in the context of corporate strategies rather than sustainability or energy-efficient offerings. An extension of this work also examined what aspects relating to sustainability or energy efficiency were disclosed in the standard inclusions for new homes, as perhaps VHBs were providing but not necessarily explaining or communicating them to consumers (Warren-Myers et

¹ It should be noted that compliance with the National Construction Code (NCC) minimum energy efficiency requirements have different pathways, although the predominant approach is to be certified with NatHERS, with a minimum 6 stars required in many regions of Australia. Recent changes in 2022 to the NCC has lifted these minimum requirements to 7 stars for many regions of Australia.

al., 2017). Unfortunately, the authors found a severe lack of information available to new homebuyers. As part of the CRC for Low Carbon Research, it was identified that real estate agents play a key role in providing verbal information and have the potential to influence homebuyers; this led to the generation of the Liveability program (now hosted by CSIRO), which focuses on real estate agent training and education about sustainability and energy efficiency (Low Carbon Living & Australian Sustainable Built Environment Council, 2019; The Centre for Liveability Real Estate, 2022; Wong et al., 2016). However, it does not focus on the online presence and information provision. Warren-Myers et al. (2020), in a later review of Australia's top 30 Australia-wide detached VHB websites, blogs and inclusions list, examined the communication and representation of energy efficiency and the NatHERS ratings to understand the accuracy of the information provided. That research found that 22 of the 30 VHBs mentioned energy efficiency. However, the use of non-official logos and misleading language could lead a consumer to be deceived or misled and, as a result, could potentially be breaching the Australian Consumer Law (Section 18).

Despite the extensive number of studies on the residential housing sector and, more particularly, consumers' preference and engagement with sustainability and energy efficiency through evaluations of consumers' experiences and hypothetical testing, there is demand for further investigations into the key communication channels between VHBs and consumers. In particular, the investigation of VHB online media communication channels, comprising not just their websites and blogs but, importantly, social media. Further investigation of the context of sustainability-related information, the terminology used to present this information, the platforms used and the differences in content presented has been called for. The Australian market has thus found itself on the cusp of change, where:

- changes to the National Construction Code in 2022 will see an increase to a 7-star NatHERS rating as the minimum energy efficiency requirement for new homes
- a Green Star Homes Standard (providing a best-practice tool) will be introduced
- a series of projects by the NSW and Victorian state governments will be implemented to increase sustainability and the energy efficiency awareness of consumers and the building industry.

This study provides a timely investigation of communication channels and information communicated by VHBs. The research examines the top 20 VHBs in addition to three VHBs identified as having key sustainability programs in NSW (Australia's oldest and most populous state) regarding the communication of sustainability and energy efficiency information. Further research can track changes in the behaviour and approaches of the VHBs in their use of different communication channels and their communication of sustainability and energy efficiency information, products and options.

Research Approach

This research investigates the following research questions:

- What types of online communication channels are VHBs using to communicate sustainability with consumers?
- Are sustainability messaging and VHB product offerings aligning?

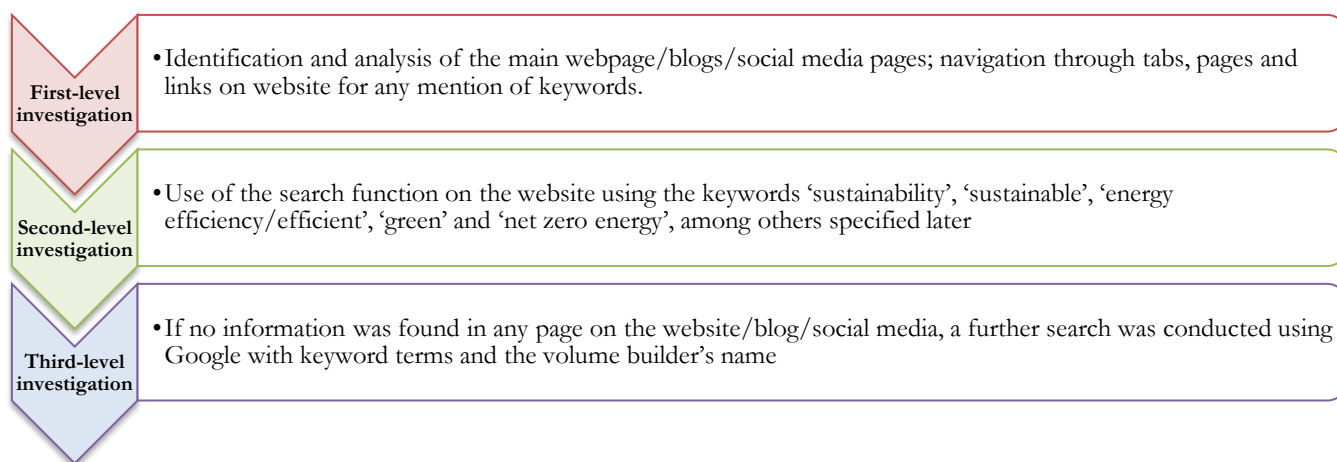
The research uses and adapts the approach used in Warren-Myers and McRae (2017) to document VHB website analysis and their communication of sustainability and energy efficiency information. While previous research only examined VHB websites, the present study extends its examination to the multiple types of media used to communicate with consumers. Thus, the research is expanded to include blogs and particular social media platforms used by VHBs.

The analysis comprised a combination of content analysis and web content analysis techniques (Herring, 2010; MacNamara, 2005; McMilan, 2000), which were then applied in the context of social media. The analysis of the websites and social media used the quantitative and qualitative techniques of content and web content analysis to understand sustainability and energy efficiency content (Riff et al., 2014). Qualitative content and quantitative analysis were undertaken using the same coding techniques and key themes in web content as in Warren-Myers et al. (2017); this allowed for quantitative analysis via explicit rules for coding. In addition, NVivo 12 software was used to further explore the data collected. The data collection approach and data analysis approach are described in more detail below.

Data Collection Approach

This project’s focus was on the top 20 VHBs operating in NSW, as determined by the 2018/2019 Housing Industry Association (HIA) report (2018), and three VHBs positioning themselves as sustainable housing providers, who also have a prominent presence in the NSW new-housing market. The sample comprised 23 VHBs. A three-tiered data collection approach was used to identify relevant content from the online communication channels relating to sustainability and energy efficiency, and net-zero energy considerations, information and product offerings (see Figure 1).

Figure 1: *The Three-Tiered Investigation Approach*



To gather the required data, each VHB website was first analysed. A selection of keywords was nominated as part of this study to determine VHBs’ preferred vocabulary when it came to sustainability-related information. These keywords included ‘sustainability’, ‘energy’/‘energy rating’, ‘energy efficiency’, ‘net zero’, ‘eco’, ‘NatHERS’, ‘BASIX’ (Building Sustainability Index), ‘positive energy’, ‘above code’ and ‘carbon ready’. Each of the 23 VHBs was assessed in terms of whether they made use of any of the keywords, followed by the number of times each keyword was mentioned. Other website-related

investigations included whether each VHB had a dedicated ‘sustainability’ tab or dedicated sustainability range. The same keyword exercise was completed for all other social media platforms—blogs, Facebook, LinkedIn, Instagram, Twitter, Pinterest and YouTube. The standard inclusions were also analysed to evaluate what kind of sustainability and energy efficiency considerations may be included.

Data Analysis Approach

The analysis of the sustainability information on the websites comprised a combination of qualitative and quantitative analyses:

- thematic theoretical analysis techniques, as described by Braun and Clarke (2006) and as used in Warren-Myers et al. (2017)
- media content analysis techniques, in which a coding system was created to allow for an understanding of the likely impact of the text (MacNamara, 2005; Warren-Myers et al., 2017).

The dataset consisted of websites, blogs and social media; both qualitative and quantitative analyses were performed using frequency of observation and advanced analyses with NVivo (QSR International, 2021). Text and images were downloaded (i.e., text was manually copied into NVivo for analysis) from the VHB websites, blogs and social media outlets and then imported into NVivo. Thematic nodes were created for coding that the software then used to analyse the text. An example of such a thematic node was to analyse all the text from VHB websites and determine how many times the term ‘sustainability’ was used. The software then computed the frequency of the total number of appearances of the word.

Limitations

The research limitation pertains to the active and live interface of online media, with the changing nature of online media, particular websites, blogs and social media. While efforts were made to get historical posts, particularly with regard to the blogs and social media, it cannot be guaranteed that all relevant material was captured. Content in online media can change from one day to the next or be removed or updated. As such, the information collected and analysed is reflective of what was accessible on the websites, blogs and social media of various VHBs from August to September 2020 and January to April 2022.

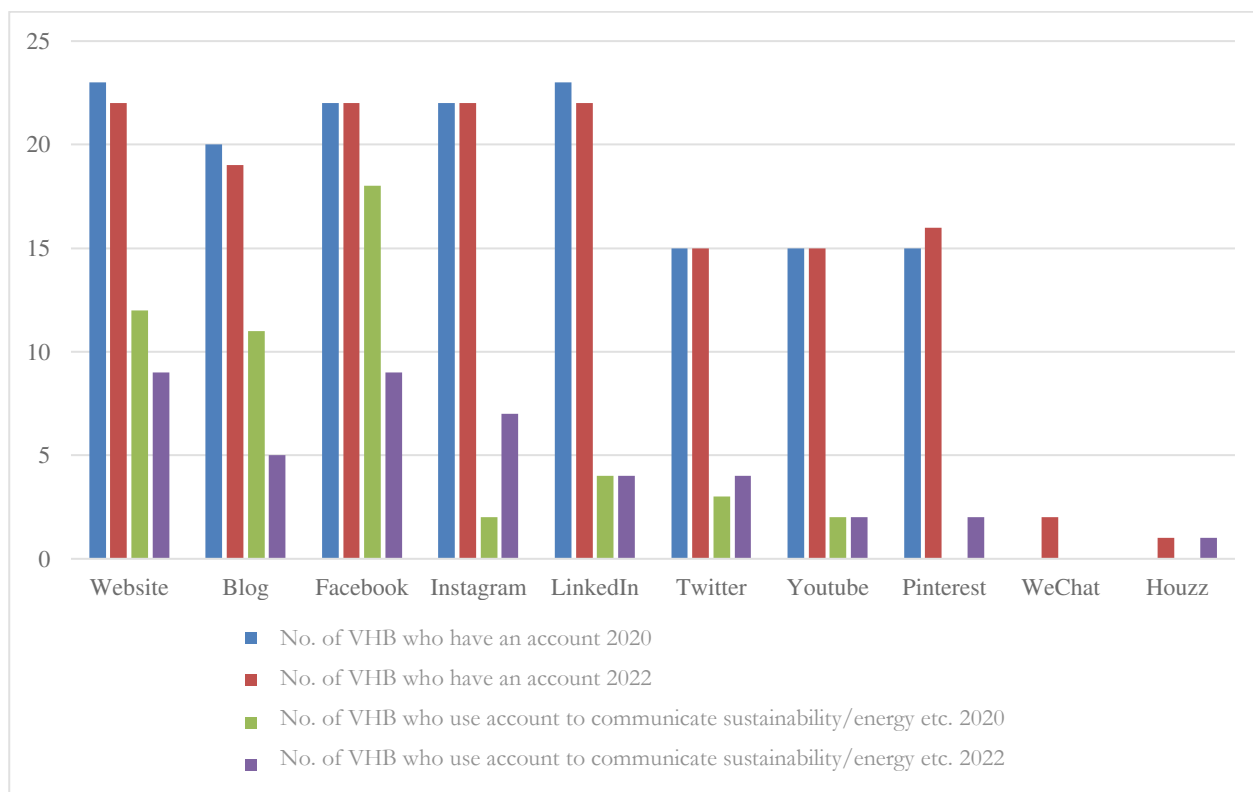
Findings

This research investigated the communication of sustainability and energy efficiency information and offerings across the top 23 VHBs operating in NSW. The focus of this investigation was primarily on the sustainability and energy efficiency messaging provided by these builders. Initial data collection was undertaken in 2020 to create a baseline for future investigations. The second stage of data collection was conducted in 2022. This paper provides a comparison between the baseline data analysis conducted in 2020 and the most recent data collection analysis conducted in 2022. Where applicable, these observations are compared to Warren-Myers and McRae’s (2017) and Warren-Myers et al.’s (2017) studies of the top 100 VHBs in Australia.

Online Presence

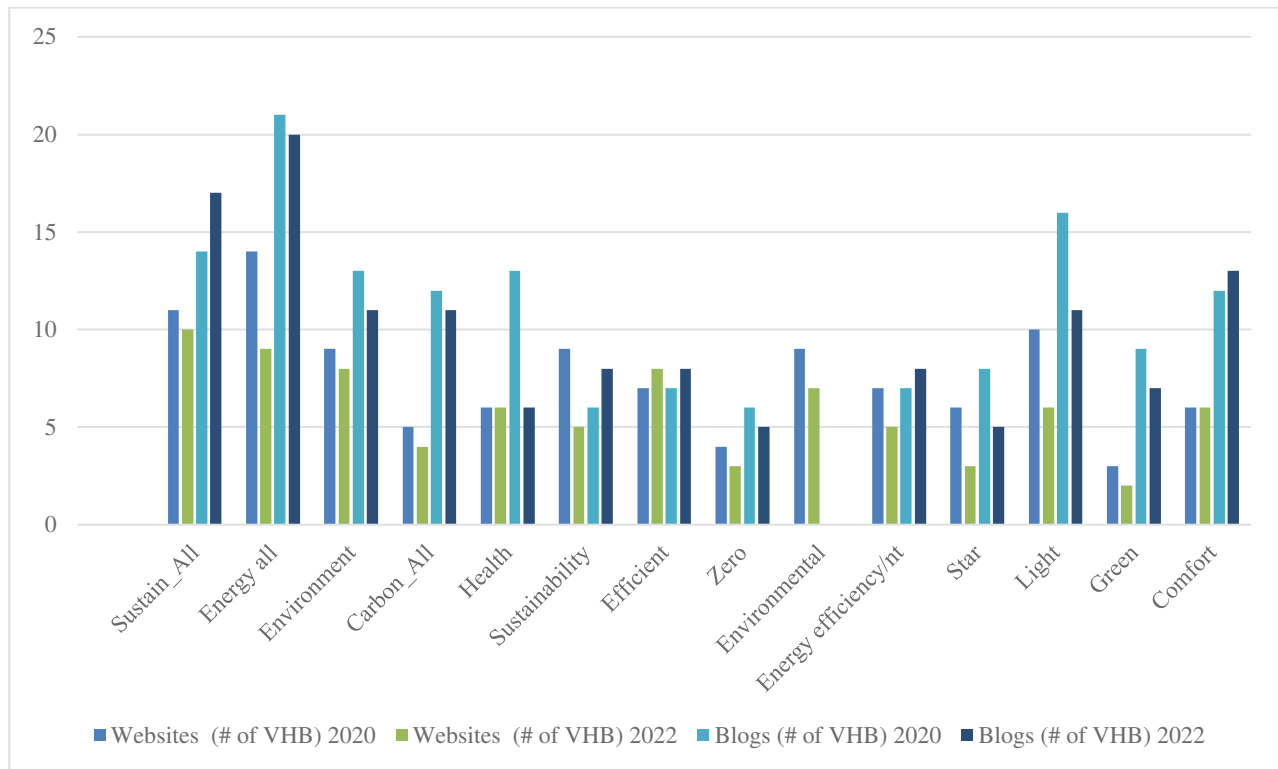
The research established that VHBs achieved a prominent online presence through websites, LinkedIn, Facebook, Instagram and blogs. Less popular were Twitter, YouTube and Pinterest, with a limited presence on WeChat and Houzz. Information on how the VHBs then used those different platforms to communicate sustainability was, unfortunately, limited. The decrease in the number of VHBs who used their website (and other key platforms like blogs and Facebook) in 2022 to communicate sustainability or energy-related content is notable. As shown in Figure 2, most of the VHBs had a blog (87%) and Facebook (100%), Instagram (100%) and LinkedIn (100%) accounts, with Twitter, YouTube and Pinterest not as popular (only 65% if VHBs had accounts on those platforms). The number of blog and social media posts communicating about sustainability and/or energy efficiency dropped in 2022. Part of evaluating the websites included examining whether there were quick links to their sustainability and energy efficiency information. In 2020, there were six builders with clear tabs on their websites; in 2022, there were only three, and of those three, the tabs were not necessarily named ‘sustainability’, instead having other obscure phrases, such as ‘A different way’ and ‘Good Energy’. The types of words used to communicate sustainability and energy efficiency in the websites and blogs that were regularly used are shown in Figure 3. The word analysis saw some interesting patterns, particularly for ‘sustainability’, which dropped in its use on websites but increased in its use on blogs. Energy efficiency, star ratings and references to ‘green’ all reduced in 2022 on VHBs’ websites, with similar reductions noted on the blogs, with the exception of the sustainability terms, ‘energy efficiency’ and ‘comfort’.

Figure 2: Website and Social Media Analysis for VHBs



Note. VHB = Volume home builder.

Figure 3: Use of Common Sustainability Words on VHB Websites and Blogs



Product Offering

Overall, only a very small number of VHBs had a dedicated housing range. In 2020, there were only three builders; in 2022, this grew to five. Interestingly, the 2022 analysis observed that now consumers could actually buy products (in 2020, there was lots of promotion of a demonstration house by each, but it was unclear as to whether these could actually be purchased by consumers). In Warren-Myers et al.’s (2017) study, only one builder was identified as having a dedicated housing range; however, that range comprised 23 different dwelling types to choose from (although it is worth noting that this builder no longer has this housing range).

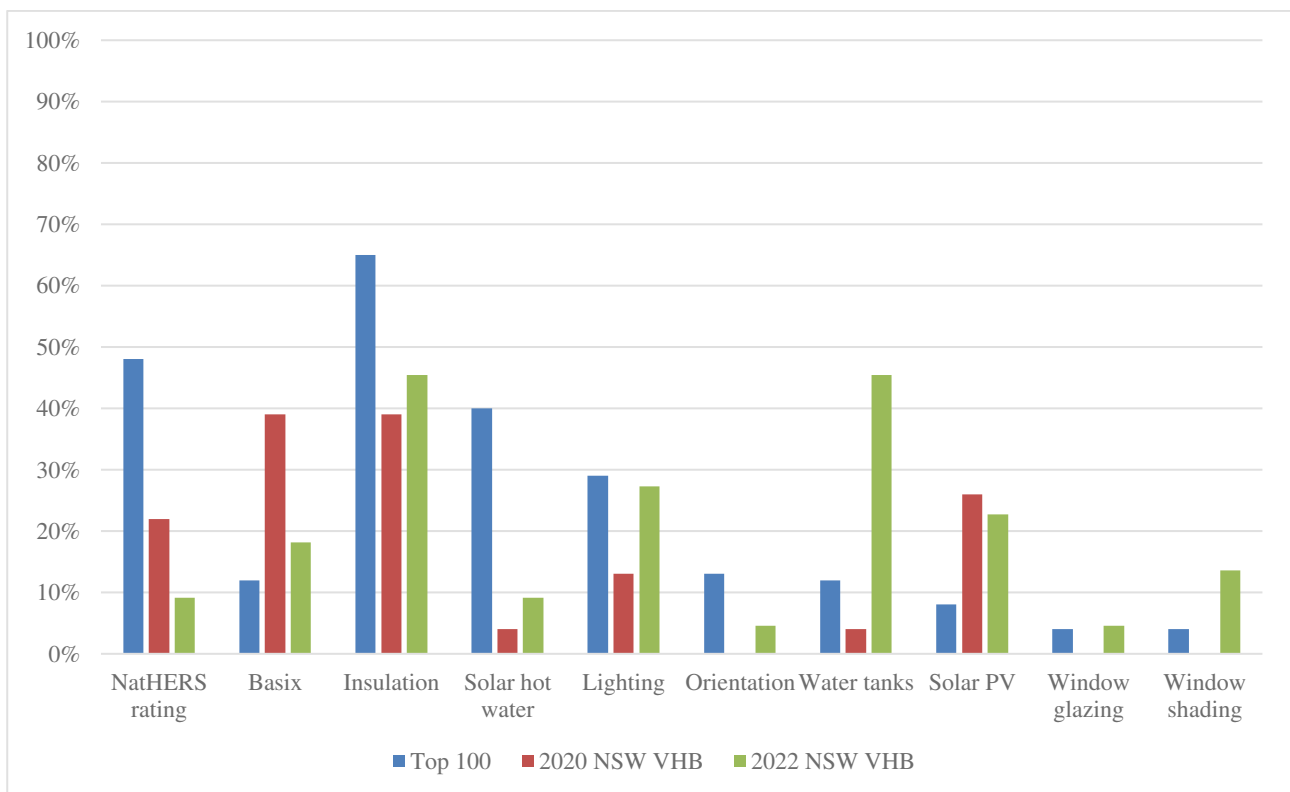
Each of the five VHBs with a dedicated housing range mentioned the operational energy of the homes in terms of energy efficiency or net-zero energy homes. None of the VHBs mentioned the embodied energy of the houses. These five VHBs each had one or two dedicated house designs that provided their customers with more sustainable features than their other designs; however, the cost of this sustainability range was not provided. Often, the details of what made these homes ‘sustainable’ was vague or non-existent. Claims were made about them being sustainable homes, but no further information was provided other than a basic description and floor plan. In the 2022 versions, simple information was provided with a ‘request more information’ form at the bottom of the webpage. Others made claims regarding ‘Industry-Leading Sustainable Practices’ but provided no more information on what this was or entailed.

For some VHBs, their claimed sustainability inclusion features were actually items like ceiling and wall insulation and sarking, which should be standard for meeting the minimum National Construction Code energy efficiency requirements (depending on the state). In other cases, it appears that they relied on the term

‘sustainable’ being enough for their customers, suggesting that no further questions should be asked regarding what makes it sustainable, which was found in the analyses of both the 2020 and 2022 data.

A list of standard inclusions is a document often provided by a VHB detailing a synopsis of the key inclusions in the base price of the home as standard. This information is sometimes available for download; more often, it needs to be requested on inquiry with the VHB. It was difficult to find data and specific details about the sustainability inclusions provided by VHBs in NSW. Some VHBs had very basic to no inclusions listed, and others provided ranges depending on the purchaser’s budget. Figure 4 shows the frequency of the sustainability-related items listed in the standard inclusions in 2020 and 2022 and compares these to those found in Warren-Myers et al.’s (2017) study, which undertook a similar study of the top 100 VHBs across Australia. (Please note that there is a substantial difference in the sample size between Warren-Myers et al.’s [2017] study and the 2020/2022 studies presented in the present paper, and that NSW VHBs would have been included in the Warren-Myers et al.’s [2017] study.)

Figure 4: *Frequency of Sustainability-Related Items in VHBs’ Standard Inclusions*



Some VHBs had changed their insulation details since 2020, as shown in Table 1. Some builders, like VHB6 and VHB10, no longer provide details of their standard inclusions. VHB2, VHB4 and VHB7 now offer the insulation rating in their inclusions list. VHB12 claims that it provides ‘Gold’ insulation, but there is no detail as to what this comprises. VHB9 did include insulation levels for particular ranges in 2020, but not for its general standard inclusion; in 2022, the specific ranges are no longer identified, but the general standard inclusions now comprise R4 for ceiling insulation and R2 for walls. This means that VHB9 offers the highest level of insulation as advertised through the standard inclusions.

Table 1: Insulation Thermal Ratings Stated by VHBs (2020–2022 Comparison)

Volume home builder	2020		2022	
	Ceiling	Wall	Ceiling	Wall
VHB1	R3.5	R1.5	R3	R1.5
VHB2	NA	NA	R3.5	R2
VHB3	R4.1	R2	R3.5-4.1	R2-2.5
VHB4	NA	NA	R3	R1.5
VHB5	R2.5	R1.5	R2.5	\$1.5
VHB6	R4	R2	NA	NA
VHB7	NA	NA	R3.5	R2
VHB8	R2.5	R1.5	R2.5	R2
VHB9 (Particular Range a)	R3	R1.5	NA	NA
VHB9 (Particular Range b)	R4	R2	NA	NA
VHB9 (No range specified)	NA	NA	R4	R2
VHB10	R2.5	R1.5	NA	NA
VHB11	R3	R1.5	R3	R1.5
VHB12	‘Gold’ no rating	‘Gold’ no rating	‘Gold’ no rating	‘Gold’ no rating

One of the only other sustainability-related inclusions provided was solar photovoltaic (PV; Table 2), with five VHBs providing solar PV as an optional extra. However, the profile of offering, as well as the size of the solar PV systems, changed between the data collection periods. In the 2022 analysis, it was found that the solar PV systems were now offered up to 10.5kW, whereas the previous largest size was 6.6kW. The smallest solar panel system offered was 2.2kW (VHB9 and VHB11). VHB12 offered a 4kW system but only in a key development. VHB1 offered a 5.1kW system with 10kW battery storage, while VHB16 offered a 6.5kW system and Thrive Homes a 6.6kW system with 10kW battery storage. VHB6 and VHB15 both offered up to 10.5kW solar PV systems. Information for solar systems provided by VHB11 and VHB16 was not found in the 2022 search. Infrastructure for electric vehicle (EV) charging was offered by VHB15 in addition to their solar PV option, while VHB13 provided no PV options but did offer EV charging.

Table 2: Solar PV System and Battery Stated by VHBs (2020–2022 Comparison)

Volume home builder	2020		2022		
	Solar PV	Battery	Solar PV	Battery	EV Charging
VHB12	NA	NA	4kW	NA	
VHB1	5kW	10kW	5.1kW	10kW	
VHB2	6.6kW	10kW	6.6kW	10kW	
VHB13	NA	NA	NA	NA	Yes
VHB 14	NA	NA	6.5kW	10kW	
VHB15	NA	NA	Up to 10.5kW	NA	Yes
VHB16	5kW	NA	NA	NA	
VHB6	3kW	NA	Up to 10kW	NA	
VHB9	NA	NA	2.2kW	NA	
VHB11	2.2kW	NA	NA	NA	

The results suggest that while communication, per se, of sustainability and energy efficiency has waned in recent years, the actual product offering in terms of housing ranges has increased (although details are scarce), and specific features like solar PV and battery systems and EV charging have been introduced into

the standard inclusion options. Whether these latter features are a result of market interest and demand, change in government/international perspectives on emissions or government incentives (of which there are a number of federal, state and local government options), or that communicating the details of these aspects is comparably easier, was not explored in this research. However, it does indicate some level of positive change for increasing sustainability and energy efficiency features in new homes in Australia.

Discussion

This research highlights that most of the sampled VHBs do not have a visible sustainability or energy efficiency message or product offering, with only three builders having a dedicated ‘sustainability’ tab on their home page, down from six. It would seem that VHBs have moved away from having sustainability links and information on their websites compared to the 2020 baseline. The content analysis indicated a higher number of VHBs having no sustainability message or product offering, and the extent of sustainability and energy efficiency messaging had also deteriorated overall. The same VHBs are prevalent in their leadership in both the 2020 and 2022 analyses and were also identified in 2017 (Warren-Myers & McRae, 2017; Warren-Myers et al., 2017) as leaders in terms of sustainability communication, albeit more for their corporate sustainability messaging than leading in product provision.

There was an increase in the number of actual sustainable or energy-efficient housing range options—notably, for VHB1, VHB2, VHB12, VHB14 and VHB16. This number was greater than in Warren-Myers et al.’s (2017) study, where only one builder was identified as having a housing range, compared to one or two possible homes by the VHBs in the present study. The amount of detail on these varied, but the information in blogs and news items about showcase projects being ‘net zero’ indicates a changing direction of focus. Aspects like embodied energy were not mentioned. Interestingly, when examining the inclusions (particularly insulation considerations) in several cases, some builders’ R-values dropped between 2020 and 2022, and several did not disclose the R-values. However, on the upside, there was much more advertising for solar PV, with a range of kW options, three cases of battery options and two mentions of EV charging.

The social media analysis saw comparable numbers of VHBs with social media accounts. There was an uptick (slight) in the use of Instagram and Twitter to communicate sustainability and energy efficiency messaging, with significant drops in sustainability and energy efficiency messaging on blogs and Facebook. In a more detailed analysis of posts, it was identified that while some VHBs used many of these channels to communicate, there was very little focus on sustainability or energy efficiency.

Overall, NSW’s top VHBs continue to demonstrate limited communication of sustainability and energy efficiency to consumers, and this has reduced further since 2020. A slight increase was identified in the actual product offerings and available options for consumers in the 2022 data collection. Compared to Warren-Myers et al.’s (2017) study examining the inclusions promoted by VHBs, and Warren-Myers and McRae’s (2017) examination of the top Australian VHB websites’ communication, quality and content, the present study found that the industry does not appear to be progressing towards better communication approaches with consumers in the context of sustainability and energy efficiency, either in offerings or their promotion.

Conclusion

This research posed two key questions to shape the investigation of the various online media channels used by VHBs to communicate with consumers.

1. *What types of online communication channels are VHBs using to communicate sustainability with consumers?*

As expected, all VHBs had a website and a LinkedIn account, with close to all having Facebook, Instagram and a blog. However, they predominantly chose to communicate sustainability information via Facebook (although this did increase in 2022), followed by their website and then their blog. Instagram, LinkedIn, Twitter and YouTube were rarely used for sustainability communication, and Pinterest was used by only one VHB in 2022. An interesting aspect was the type of information portrayed on each of the different platforms and the manner it took. In communicating in these forums, popular words used were ‘sustainability’, ‘energy efficiency’, ‘energy ratings’ and ‘BASIX’. For the most part, these words appeared on websites, blogs and Facebook. The terms ‘sustainability’, ‘energy efficiency’ and ‘energy rating’ were mostly used on blogs, with a substantially lower frequency of those words appearing on the websites. This suggests that the VHBs use their blogs more than they do their websites to communicate sustainability and energy efficiency messaging. Further, demonstration projects were often featured on social media and blogs but were often not shown on the websites.

2. *Are sustainability messaging and VHB product offerings aligning?*

The research found that between 2020 and 2022, the number of VHBs with a dedicated sustainable home offering increased from three to five. However, information and costs were not provided, and detailed information on what made the home sustainable was very limited. Compared to the analysis conducted by Warren-Myers et al. (2017), the results of the present study have highlighted that perhaps VHBs are moving towards sustainable housing offerings, albeit very slowly. However, this appears to be at odds with the decrease and level of messaging found on various online media channels. This was further exacerbated by difficulties in finding any information that might suggest sustainability inclusions, which might appear in a standard inclusions document for the different builders, with only the mention of water tanks making a substantial increase. Nevertheless, the number of solar PV options with batteries and the introduction of EV charging in the home did show positive signs of communicating renewable energy options. This was, again, a poor reflection when considered against the top 100 (Warren-Myers et al., 2017), with much lower percentages mentioning a NatHERS rating, solar hot water and BASIX in 2022. What VHBs were noting in their inclusions was BASIX and, often, an option for solar PV, yet these were frequently noted to be outside of the standard pricing. Further, the 2022 data collection found that VHBs avoided stating BASIX as an inclusion. Again, this reinforces the issue that while the VHBs appear to be providing more offerings (marginally) around sustainability and energy efficiency, an interested homebuyer would likely find barriers to finding further information due to a lack of connection to detailed information. Homebuyers would have to rely on, or ‘trust’, the VHB’s classification of sustainability and energy efficiency offered in the new homes, which does not provide the homebuyer with any form of certainty or understanding of the benefits, let alone the costs.

This study has demonstrated that the top Australian VHBs have an enormous opportunity to improve their sustainability messaging and information about their own organisations and the products they provide. There was no exemplar builder who demonstrated thorough sustainability and energy-related communication across information messaging and product provision. However, there were definite improvements made by some, who transitioned from corporate sustainability communication to actually offering more sustainable and energy-efficient homes. This leaves areas for improvement for all the VHBs—not just those involved in this study but for all VHBs in Australia. Disappointingly, it appears that over the last two years, VHBs have moved away from any form of mention of sustainability and energy efficiency, with substantial declines in the use of these words on websites and social media. It is not particularly clear why this is occurring, but perhaps COVID-19 shutdowns, material and labour shortages and uncertainty around changes to the National Construction Code requirements have had an impact, and VHBs have simplified their offering or what is contained in their communication channels.

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References

- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Commonwealth of Australia. (2022). *Residential buildings*. Retrieved 9 September 2022, from <https://www.energy.gov.au/government-priorities/buildings/residential-buildings>
- Crawford, R. H., Stephan, A., Jensen, C. & Bartak, E. (2016, 5 September). Higher star ratings for housing don't necessarily save energy. *The Fifth Estate*. <https://www.thefifthestate.com.au/columns/spinifex/higher-star-ratings-for-housing-dont-necessarily-save-energy/>

- Fyfe, M. (2019, 24 August). Power bills cheaper than your morning coffee. *The Sydney Morning Herald*.
<https://www.smh.com.au/national/power-bills-cheaper-than-your-morning-coffee-20190820-p52iy6.html>
- Herring, S. C. (2010). Web content analysis: Expanding the paradigm. *International handbook of Internet research*, 233-249.
- Housing Industry Association. (2018). *Housing 100 2018/2019*. HIA Economics.
- Housing Industry Association. (2020). *HIA reveals Australia's top homebuilders for 2019*. Housing Industry Limited.
- Low Carbon Living & Australian Sustainable Built Environment Council. (2019, 1 July). Growing the market for sustainable homes. *Low Carbon Living CRC*. <http://www.lowcarbonlivingcrc.com.au/news/news-archive/2019/07/new-roadmap-sets-course-sustainable-homes>
- MacNamara, J. (2005). Media content analysis: Its uses, benefits and best practice methodology. *Asia Pacific Public Relations Journal*, 6(1), 1–34.
- McMillan, S. J. (2000). The microscope and the moving target: The challenge of applying content analysis to the World Wide Web. *Journalism & Mass Communication Quarterly*, 77(1), 80-98.
- McNabb, D. (2012, 28 June). Volume home builders could do so much better. *The Fifth Estate*.
<https://www.thefifthestate.com.au/articles/volume-home-builders-could-do-so-much-better-with-a-bit-of-design-retweaking-sustainability-house-finds/>
- McRae, M. (2019). *Australians reach for the stars when it comes to energy efficient homes*. CSIRO.
<https://ecos.csiro.au/energy-efficient-homes/>
- Moore, T. & Holdsworth, S. (2019). The built environment and energy efficiency in Australia: Current state of play and where to next. In P. Rajagopalan, M. M. Andamon & T. Moore (Eds.), *Energy performance in the Australian built environment* (pp. 45–59). Springer.
- Moore, T., Ambrose, M. & Berry, S. (2019, 26 June). Australia's still building 4 in every 5 new houses to no more than the minimum energy standard. *The Conversation*. <https://theconversation.com/australias-still-building-4-in-every-5-new-houses-to-no-more-than-the-minimum-energy-standard-118820>
- QSR International. (2021). *NVivo*. <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/about/nvivo>

- Reardon, C. (2013). *Buying a home off the plan*. Your Home. Retrieved 9 September 2021, from <https://www.yourhome.gov.au/you-begin/buying-home-plan>
- Reardon, T., Lillicrap, A. (2021). *HIA reveals Australia's Top Home Builders for 2020/21*, Media release Housing Industry Association. Retrieved 25 September 2021, from <https://hia.com.au/our-industry/newsroom/economic-research-and-forecasting/2021/09/hia-reveals-australias-top-home-builders-for-2020-21>
- Riff, D., Lacy, S. & Fico, F. (2014). *Analyzing media messages: Using quantitative content analysis in research*. Routledge.
- Schmidt, M., Crawford, R. H. & Warren-Myers, G. (2020). Quantifying Australia's life cycle greenhouse gas emissions for new homes. *Energy and Buildings*, 224. <https://doi.org/10.1016/j.enbuild.2020.110287>
- Scutt, D. (2018). Australia will need to build a stack of new homes if population growth continues on its current trajectory. *Business Insider*. <https://www.businessinsider.com.au/australia-population-growth-housing-affordability-supply-forecasts-hia-2018-4>
- The Centre for Liveability Real Estate. (2022). *Liveability*. <https://www.liveability.com.au/>
- Warren-Myers, G. (2017). *New homebuyers and the challenges of navigating sustainability and energy efficiency with Australian volume builders* [Paper presentation]. 8th International Conference on Sustainability in Energy and Buildings, Energy Procedia, Greece.
- Warren-Myers, G. & Heywood, C. (2016a). Investigating demand-side stakeholders' ability to mainstream sustainability in residential property. *Pacific Rim Property Research Journal*, 22(1), 59–75.
- Warren-Myers, G., & Heywood, C. (2016b). Identifying client roles in mainstreaming innovation in Australian residential construction. Presented at the CIB World Building Congress 2016, Kähkönen, K., & Keinänen, M. (Eds.) (2016). *Proceedings of the CIB World Building Congress 2016: Volume I - Creating built environments of new opportunities*. (Tampere University of Technology. Department of Civil Engineering. Construction Management), 323-324.
- Warren-Myers, G., & Heywood, C. (2016c). *Mainstreaming Sustainability in the Housing Sector: A New Approach to an Established Process*, presented at the 22nd International Sustainable Development Research Society Conference, Lisbon Portugal.
- Warren-Myers, G. & Heywood, C. (2018). A new demand-supply model to enable sustainability in new Australian housing. *Sustainability*, 10(2), 376.

- Warren-Myers, G. & McRae, E. (2017). Volume home building: The provision of sustainability information for new homebuyers. *Construction Economics and Building*, 17(2), 24–40.
- Warren-Myers, G., Craddock, L. & Bartak, E. (2020). Observing energy rating stars through the Australian Consumer Law lens: How volume home builders' advertising can fail consumers. *Energy Policy*, 139. <https://doi.org/10.1016/j.enpol.2020.111370>
- Warren-Myers, G., McRae, E. & Heywood, C. (2017). *Volume home building: Sustainability inclusions for new homes* [Paper presentation]. 23rd Annual Pacific Rim Real Estate Society Conference, Sydney.
- Wong, S. Y., Susilawati, C., Miller, W. & Mardiasmo, D. (2016). Understanding Australian real estate agent perspectives in promoting sustainability features in the residential property market. In W. Miller, K. Manley & C. Susilawati (Eds.), *Healthy Housing 2016: Proceedings of the 7th International Conference on Energy and Environment of Residential Buildings* (pp. 471–480). Queensland University of Technology.
- Worrall, A. (2018, 2 October). *Three Victorian volume builders to offer zero net carbon homes by 2020*. Domain. <https://www.domain.com.au/news/three-volume-builders-offer-zero-net-carbon-homes-2020-768772/>
- Wynne, E. (2020, 23 January). Home energy efficiency could be improved significantly through simple tweaks like roof colour. *ABC News*. <https://www.abc.net.au/news/2020-01-23/home-design-energy-efficiency/11886208>