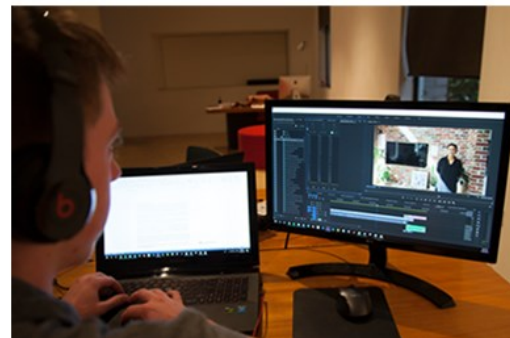
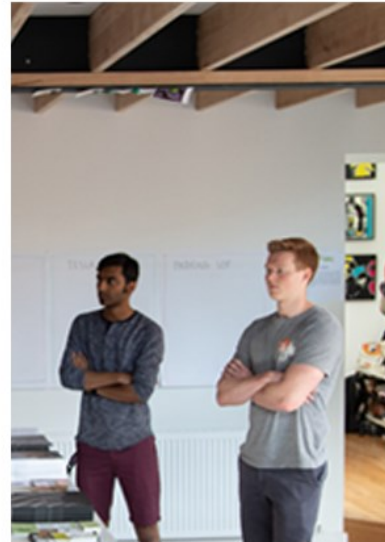


Promoting Sustainable Homes: Expanding Sustainability Outreach

Abstract

Sustainable housing is a key driver of global greenhouse gas emissions, and is therefore a powerful arena in which to tackle climate change. In Australia the residential sector is responsible for a significant portion of total energy use, and a recent study shows that cutting emissions by 25% in all residential and commercial buildings would achieve a one-eighth reduction of the total emissions. Our project aimed to spread awareness about the adoption of sustainable practices through our work with the Alternative Energy Association. In particular, we sought to enhance, promote, and streamline Sustainable House Day (SHD), an annual event in Australia and a valuable opportunity to educate homeowners and raise awareness. To do this, we improved SHD training materials, streamlined the sign-in process for visitors, created a SHD tour video, and expanded the ATA's promotion of SHD through social media. Additionally, we targeted renters by designing a video which offered quick and easy tips to live sustainably in their apartments. Taken together, our deliverables spread awareness of sustainable living within Australia and addressed the issue of climate change on a local level.



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May 3rd, 2018



An Interactive Qualifying Project submitted to the faculty of Worcester Polytechnic Institute in partial fulfillment
of the requirements for the Degree of Bachelor of Science



Promoting Sustainable Housing through Media

Sustainable housing is often viewed as a purely technological issue, but urban planning and household behaviors are also critical components. It is the combination of these three that allow for a reduced carbon footprint.

As government policy in Australia cuts back support for clean, renewable energy, the sustainable actions of householders, urban planners, and residential developers become even more important. According to Australia's Department of Environment and Energy, in 2016 the housing sector accounted for about 12% of all carbon emissions.¹ Improving sustainability in the residential sector can be used to help combat the global issue of climate change. In support of this, research from the Carbon Mitigation Initiative shows a reduction in 25% of household emissions would mean reducing total carbon emissions growth by over 12%.²

Promoting sustainable housing practices is a challenge, however. Residential energy use increased from 17 gigajoules per person in 1990 to 20 GJ per person in 2020, evidence that uptake of sustainable housing, whether that is making small habitual changes or investing in new technologies, is lacking in Australia.¹ Moreover, according to Spangenberg, there are many barriers to the uptake of sustainable housing, including economic, institutional, technical, and socio-cultural/behavioral factors.³ Issues such as high investment costs, a lack of government support and incentives, insufficient communication of mutual benefits between stakeholders, and misconceived perceptions of sustainability are common hindrances to sustainable housing.

To address these problems, Australia's Alternative Energy Association (ATA), educates consumers and advocates for people to live sustainably. The ATA describes itself as a "not-for-profit organization that enables and inspires people to live sustainably in their homes and communities."⁴ The goal of many of its events, such as Sustainable House Day (SHD), is to provide personal assistance to individuals looking to make any kind of change in sustainability - whether that is an involved project



Figure 1. Renters Make Up a Significant Portion of Housing in Melbourne

like installing solar panels, or simply addressing behavioral energy use. Within the last couple of years, the ATA has begun to target specific audiences with one-on-one consulting, but wishes to reach a larger population by introducing media into its approach. A media strategy would allow for sustainable living methods to be accessible to groups that haven't been targeted before, and further the implications of the ATA's sustainability advice.

A lot of sustainable housing incentives and communication has been focused around owners because belief is that have greater investment and willingness to make changes. However, studies show that there are also a lot of renters, especially in cities. Based on an Australian census in 2016, renters account for 30 percent of total residences in Melbourne. Figure 1 compares this growing population to other living situations in Melbourne:

This demographic is one that is often forgotten about in the promotion of sustainable living. Providing

renters with personalized advice about cost effective methods for living sustainably and how to negotiate with landlords to implement these changes could be effective.

In this project, we helped the ATA promote sustainable housing by promoting Sustainable House Day and designing a video to engage renters in sustainability.

Our four objectives were as follows:

1. Determine the factors affecting implementation (FAI's) of sustainable housing.
2. Enhance Sustainable House Day.
3. Expand audience outreach of the ATA.
4. Engage renters in sustainable living through media.

In sum, we sought to understand the multi-dimensional issue that is sustainable housing, including its planning, technologies, and promotion, and to use this information to create media that can help the ATA forward their message of sustainability.

Understanding Sustainable Housing and its Many Implications

Sustainable housing is a complex issue, but it has the potential for bringing huge positive change when addressed. Sustainable living and sustainable housing are two terms that are quite broad. A study by Yang and Yang identified that in today's society, sustainable living and sustainable housing are most commonly labelled with general terms such as "low carbon," "zero energy," "high performance" and most commonly "green."⁶ In reality, the scope of sustainable housing is much greater than this. Lovell stated that it is "housing that has environmental and social benefits", which takes into account other aspects of sustainability.⁷ These factors include "resource usage, natural and socio-cultural systems, growth and economic demands," and "lifestyle."⁶

Understanding these factors is critical to the successful promotion of sustainable housing. An article by D. Owen published in the magazine *Yale Environment 360* underlined the importance of urban planning, considering the "unconscious efficiencies" that make dense urban development more conducive to reducing emissions than widespread rural development.⁸ In cities, people are less automobile dependent; walking or utilizing public transportation is usually preferred over using personal automobiles⁸ and Estiri stated that rural households consume an average of about 24% more energy than their urban counterparts.⁹ Zou and Yang's study claimed that within the residence, half of energy consumption is dependent on resident behavior.¹⁰ An understanding of urban planning, current and upcoming renewable technologies and methods of bringing about behavioral change is critical.

Further, for this strategy to have a significant impact, it should "aim to directly affect individual recipients by invoking cognitive or emotional responses," so that it connects with the audience at a personal level.¹⁰ Additionally, to persuade individuals who are motivated by media messages to actually act on them, key services and

products should be accessible and concurrently available.¹⁰ To bring about behavioral change, the underlying factors that impact it must be understood. Some of the key factors that hinder the adoption of sustainable housing includes attitude, knowledge, and behavior towards being sustainable, high costs of construction and materials, a lack of governmental incentives for being sustainable.¹⁰ Campaigns and promotion of sustainable practices should be developed to utilize behavioral change to enable the widespread adoption of sustainable homes.

Understanding the need for sustainable housing is best approached by viewing housing in terms of the energy sector. A study by the American Society of Landscape Architects accounted the residential housing sector for twenty-one percent of the total energy consumption in the United States. This amount of energy use corresponds with 20% of carbon emissions.¹¹ A similar trend appears in Australia where the Department of Environment and Energy says residential energy use accounts for about 12% of all carbon emissions.¹ This energy use, and the resulting emissions illustrates the large influence that housing has regarding rising global temperatures, but also the power homeowners wield in reversing the current trends of climate change.¹²

Many Stakeholders are Involved in the Issue of Sustainability

There are a number of complex issues that influence the decision-making of key stakeholders' implementation of sustainable housing. The supply chain of housing development involves dozens of stakeholders who often have competing interests, and the complexity of this chain challenges efficient communication throughout. What makes sustainability less appealing to stakeholders is that it presents more risks than traditional building due to factors such as uncertainty in government repayment plans and energy prices. The risk stems from the fact that the value of sustainable practices to these groups is more 'intangible and non-immediate' than most economic activities.⁶ The consequence of this is a lack of homes practicing

sustainability.

The key stakeholders who make decisions affecting sustainability in housing include government officials, financial lenders, housing developers, builders, architects, and most notably, the homeowner or tenants.¹⁰ While it is true that they all have different interests, they generally value the economics of sustainable housing the most. Homeowners care about many aspects of a house, but if they cannot afford a house, they simply will not buy it. Builders mainly care about the profit they can make when constructing a house. Even the Australian government hasn't shown support of sustainable technologies due to lower costs of conventional energy sources. Because of the lack of support from the government, the general public is less confident in taking the risks to practice sustainability. In order to fully incorporate sustainability, the benefits from sustainable housing as opposed to conventional housing must be explicitly researched for all stakeholders.

In a study by Yang and Yang, it was revealed that above all else, "innovative collaboration" was the prerequisite for all other strategies of encouraging sustainable homes.⁶ Lowe and Oreszczyn confirm that the differing views on sustainability is a result of insufficient interdisciplinary interaction between technology, economy, and society.⁶ It is fundamental that technical experts, the government, builders, and tenants collaborate to create and communicate mutual benefits. This will inspire greater confidence in sustainable technologies and practices throughout the entire housing sector.

Currently sustainable housing is affected by a multitude of factors which are valued by different groups of people. In order to begin to understand how to tackle this complexity of barriers restraining sustainable housing, it is necessary to flesh out as many of these factors as is possible – for all key stakeholders. This is especially applicable to the homeowner who can make the largest and easiest changes in their energy use and sustainable practices with only some helpful advice.

Australian Residential Sector Contributes Significantly to Energy Use

The housing industry in Australia “needs to respond to environmental sustainability.”⁶ The study stated that in 2011, 11% of carbon emissions came from the construction and housing sector alone. It has only been rising since. According to Australia’s Department of Industry, Innovation and Science, the residential housing sector accounted for 11% of Australia’s total energy consumption.¹³ Although the residential sector is a significant contributor to the country’s energy use, there has not been a widespread adoption of sustainable housing among households’ and individuals.⁶

Through the Carbon Mitigation Initiative, Australia can attempt to tackle the stabilization triangle to have a positive impact on reducing climate change.² The stabilization triangle can be broken up into eight different wedges. This study, stating that cutting emissions by 25% in all residential and commercial buildings would achieve a wedge worth of emissions reductions, emphasizes the potential implications for promoting sustainable homes. This is a significant amount of energy and this reduction can be partially achieved with sustainable homes.

Sustainable housing can be used to address the significant energy use of the residential sector. The adoption of sustainable housing can be viewed from both the national and household level. The study “Sparking a change” outlined a variety of ways to take a household approach to promoting sustainable housing.¹⁴ A combination of educating tenants, emphasizing options and choices, effective marketing, and providing a better understanding of the basic things households can do to be sustainable is effective in convincing homeowners to switch to, adopt, or continue to use sustainable homes.¹⁴

“Sustainable housing can be used to address the significant energy use of the residential sector”

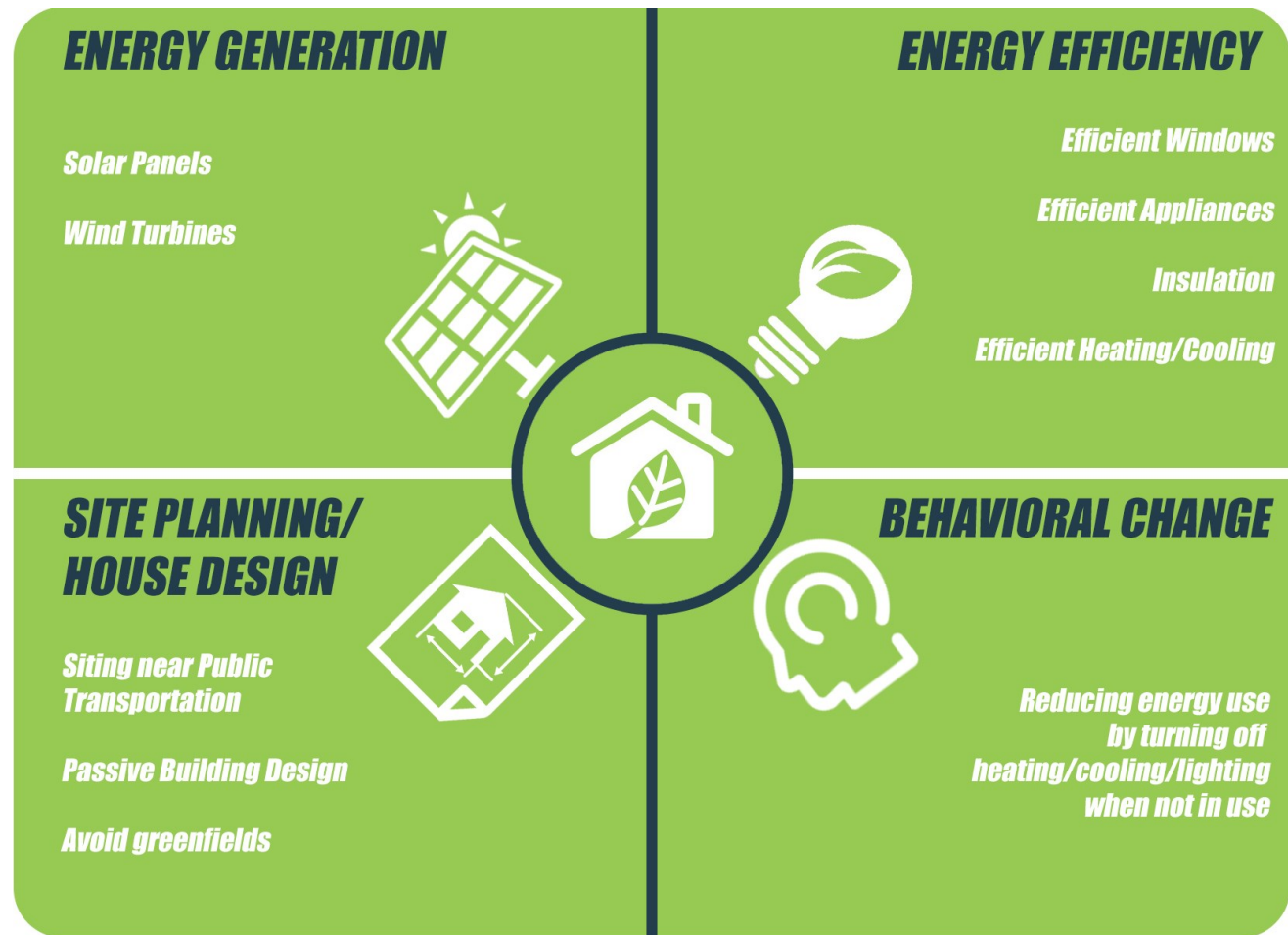


Figure 2. Four Main Categories of Sustainable Housing Solutions

Sustainability Encompasses a Variety of Solutions

There are a number of ways to approach sustainability in housing, as seen in Figure 2. Harnessing solar power and charging batteries often come to mind as go-to-methods to more effectively utilize energy. These are technological approaches to sustainability in housing.

However, the methods available to accomplish sustainability does not only encompass technology.

Sustainable homes can also be achieved through efficient houses, not just appliances and devices. Yang and Yang identified that easily achievable home building technologies such as “structural insulation, glazing, passive heating and cooling design,” are considered suitable sustainable measures.⁶

Additionally, the study claimed that newer

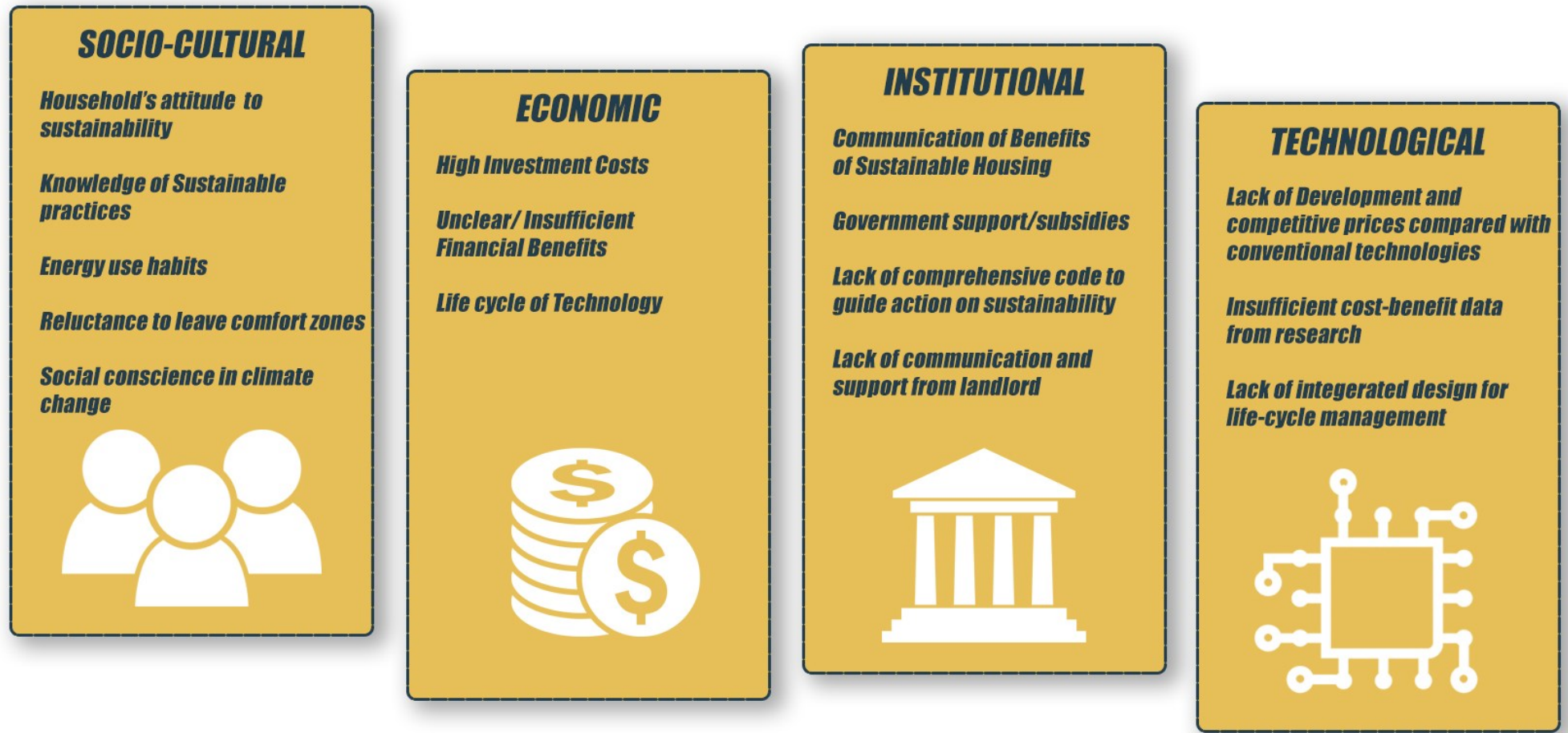


Figure 3. Factors Affecting Implementation (FAI's) of Sustainable Housing

technologies that focused on improving energy saving measures have been appealing. These include “the use of wind turbines, solar panels and biomass.”⁶ Behavioral considerations are also a key approach to sustainability in housing that is often overlooked.¹⁰ A study by Zou and Yang explained that the way householders’ behave is just as, if not more important than actually having the technologies in their homes.¹⁰ An example of this is a change in behavior that caters towards water conservation.⁶

This opens up an educational path, in which householders could be educated on sustainable behaviors.

“Sustainable homes can also be achieved through efficient houses, not just appliances and devices.”

Summary of Factors Affecting Implementation of Sustainable Housing

In order to begin to develop a solution to low sustainable housing uptake, it is necessary to identify the myriad factors affecting implementation of sustainable housing in the first place, as shown in Figure 3. These

factors have been extensively studied through previous literature and stakeholder studies and can be classified into four distinct categories as identified in Spangenberg's sustainability prism: technical and design factors, economic factors, institutional factors, and social & behavioral factors.³ The critical factors affecting the implementation of sustainable housing in Australia were identified by pulling from an extensive set of previous literature and studies on the issue.⁶

Yang and Yang identified these economic factors: a high investment cost; unclear benefits from future legislation, or market change (increasing energy price and carbon tax); and inadequate fiscal incentives or government subsidies.⁶ Another study confirmed these factors and added that life-cycle cost savings and market price and demand for resale are also important influxes of homeowner's decisions.¹⁰ Economic factors such as high cost will have an impact on the motivation of homeowners to use sustainable practices and products. And with the Australian government eliminating fiscal incentives for environmentally friendly housing, this has become a significant barrier to sustainable housing uptake.

Technical and design factors also affect the implementation of sustainable housing: insufficient interdisciplinary research to demonstrate cost-benefit to homeowners and the housing industry, lack of methodologies and tools to consistently define and measure sustainability, inadequate or untested sustainable technologies or materials; and poor life-cycle management.⁶ It was also said that a general lack of competitive prices can be seen as a barrier to sustainable technology as well.¹⁰

Institutional factors commonly cited as barriers to sustainable housing include: lack of collaborative integration among stakeholders in the housing industry; inadequate government mandates and sustainability requirements, lack of government incentives; lack of comprehensive guide to action regarding sustainability; lack of professionals with knowledge of energy efficient devices or skill to construct sustainable homes; and poor attitudes toward sustainability by the government and professionals.^{6,10} The lack of collaboration among stakeholders means that groups such as the government, builders, and homeowners cannot communicate the mutual

benefits of sustainable housing. In addition, the lack of any kind of comprehensive guide to sustainability and lack of support from the government and experts leads most consumers to marginalize the idea of sustainability before even truly considering it.

Social and behavioral factors are the last category commonly identified. Both studies include the factors of social attitudes toward sustainability; perceptions of sustainability; and the knowledge and behavior of households in terms of sustainable practices.

In general, most people are reluctant to leave their comfort zone or change their traditional practices which contributes to the slow uptake in sustainable practices. In addition, the factors of insufficient promotion of the scientific advantages of sustainable housing, and the lack of social conscience in climate change and resource preservation were identified.⁶ The stereotyped additional cost of sustainable features only makes the situation worse.⁶ Social perceptions can have the largest effect on sustainable housing uptake, whether that is in a good or bad way. For example, if a community heavily stresses sustainability, homeowners are more likely to.

Behavioral Change can be used to Promote Sustainable Practices

To effectively engage the public and promote behavioral change, there needs to be an understanding of their opinions, motivations, and priorities. No single solution fits all audiences. Muriuki, Dowd, & Ashworth



Figure 4. Four Main Groups used for Segmentation Criteria

claimed that “focusing on what matters most for different segments of society,” increases the “potential to design effective processes to engage with people.”¹⁵ Audience segmentation, financial incentives, risk reduction, social identity, and promotional events are multiple components of behavioral change that can be used to make people willing to change their daily habits.

First, one of the key dimensions of behavioral change is audience segmentation.¹⁵ A guide by The Health Compass identified four main groups of segmentation criteria. They are socio-demographic, geographic, behavioral, and psychographic and are summarized below in Figure 4.¹⁶ Audience segmentation considers that different audiences exist and any attempt to be effective requires an understanding of their attitudes, beliefs, and behaviors. To bring about behavioral change, this information is used to help identify any significant differences between subgroups. From there, campaigns and promotion of sustainable practices should be developed to utilize behavioral change to enable the widespread adoption of sustainable homes.

Methodology & Results: Designing and Implementing Media to Make Sustainable Housing Mainstream

In this section, we review our objectives and report on the associated methods and results for each. The methods for each objective below are summarized in Figure 5.

1. Determine the factors affecting implementation (FAI's) of sustainable housing.
2. Enhance Sustainable House Day.
3. Expand the ATA's audience outreach.
4. Engage renters in sustainable living through media.

Objective 1: Determine the factors affecting implementation (FAI's) of sustainable housing



We researched the key factors affecting implementation of sustainable housing via a *literature review* on behavioral change and on stakeholders involved in the promotion of sustainable practices. We summarized our findings in the previous section (p. 4).

Objective 2: Enhance Sustainable House Day

In order to enhance Sustainable House Day, we prepared four deliverables:



1. SHD Tour Video
2. SHD Training Presentation for Home Openers
3. SHD Social Media Plan
4. SHD Streamlined Sign-in Process.



Figure 5. Methodology Flowchart

For each deliverable, we looked into the most effective ways to develop the product. Following this, we either produced a video or provided recommendations for the ATA to utilize in the promotion of SHD.

SHD Tour Video

The SHD Tour Video simulates what a house tour during SHD might look like, serving two purposes. First, it gives home owners an example of what to include in their own tours, and second, it can give potential visitors a taste of what they might expect on the day and inspire them to make changes in their own homes.

Our first step in making the tour video was to *identify homeowners*. We began by asking the ATA staff for a list of experienced and charismatic homeowners who have given SHD tours in the past and would be open to filming their tour. They highly recommended Melbourne Vernacular, a sustainable home in Yarraville. This home was fairly small and compact, but it still offered a plethora of sustainable features and had a very appealing design.

We *filmed* the homeowners conducting a tour of their house and discussing its sustainable features as if it were an SHD event. We asked clarifying questions where we felt more information was needed. The owners of the house, Melbourne Vernacular had posted signs on all of the sustainable features of their home, highlighting their benefits and giving information about the technologies, which we included in our video. Some of these features included:

- Hydronic heating
- Passive heating and cooling
- Efficient electric appliances
- Solar panels
- Smart thermostat
- Heat pump
- Water storage tank
- Vegetable garden and compost
- Reused and recycled materials
- Efficient insulation
- Green roof
- North facing windows

In addition to filming the guided tour, we gathered B-roll footage to overlay in our video. On the day of Melbourne Vernacular's event we focused on the visitors as well as the tour Scott was giving us. While setting up shots, we chose a location that had good lighting, enough open space, and was not overcrowded. Doing this allowed us to film quality videos without too much interference between us and the visitors in the small house. Before filming shots with visitors, we had Scott explain the purpose of our project to his visitors and we showed them a consent form and those that accepted being filmed wore green name tags while those that did not wore yellow tags. Additionally,

Green Roof

~~The green roof was sort of a non-negotiable for us from the very beginning it was something that a number of architects and builders sort of scoffed at. We've got a about a 200 square meter block here which is very small. We knew we wanted to have a family, we wanted to have green spaces outdoor spaces and we weren't going to have a lot of that in our back yard so we wanted to add some additional space up here on the roof.~~

Figure 6. Strikethrough of transcription

while filming, we included footage of the different features without visitors or the owners. The purpose of this B-roll footage was to overlay the corresponding footage during Scott's explanations when he was referring to specific aspects of their house. We filmed as much as possible which gave us a resource of alternate footage to include and made the editing process possible.

The large amount of footage required good organization so that we could easily determine the essential content and quotes from the tour. To facilitate the editing process, we created a file system for our footage. First, we named each clip based on their content, including the features that were discussed, the angles at which they were shot, and the people in them. The clips were then sorted into folders according to the type of footage spanning: introduction/welcoming, discussion of features, B-roll or filler shots, and concluding shots. This allowed the editor to quickly sort through the footage when a particular shot was needed.

Before editing the video, we did some data processing to pick out the most important scenes and

quotes. This was necessary because the footage of the tour itself was over 30 minutes long. Even though the house had many interesting features, only the most relevant to our video were selected to keep our video under 13 minutes. To do this, we transcribed everything that was said during the tour to more easily pick out the best quotes and eliminate any redundant speech. It was easy to strikethrough unnecessary text to save the editor time (Figure 6). The editor then picked out these important quotes and included them in the video.

The ideal length of our video was under 13 minutes, so material from the 30 minutes of total footage

needed to be cut down. Our final video ended up being about 11 minutes in length. To complete this, we edited the content. Using Adobe Premiere Pro, we first cut out the footage that was crossed out in the transcript. Once we had the footage that we wanted to use, we arranged them in a way that best portrayed a tour during SHD. The video was fairly lengthy due to the nature of a house tour. Therefore, we split up the editing into scenes that were produced separately (eg. introduction, passive heating and cooling, efficient appliances, solar, heat pump, sustainable philosophy, conclusion). The scenes were progressively cut down until they were about one minute each. The transcript was further refined by carefully cutting out pauses and filler words to make the tour flow. After the timeline of the video was established, we began to add transitions to make the scene changes less abrupt and overlaid our B-roll footage to polish off the video and hide any cuts in the video. The B-roll footage was placed wherever a specific feature was being talked about in order to make the video more dynamic and interesting. The footage was also essential due to the number of cuts we made in the content. It was used to

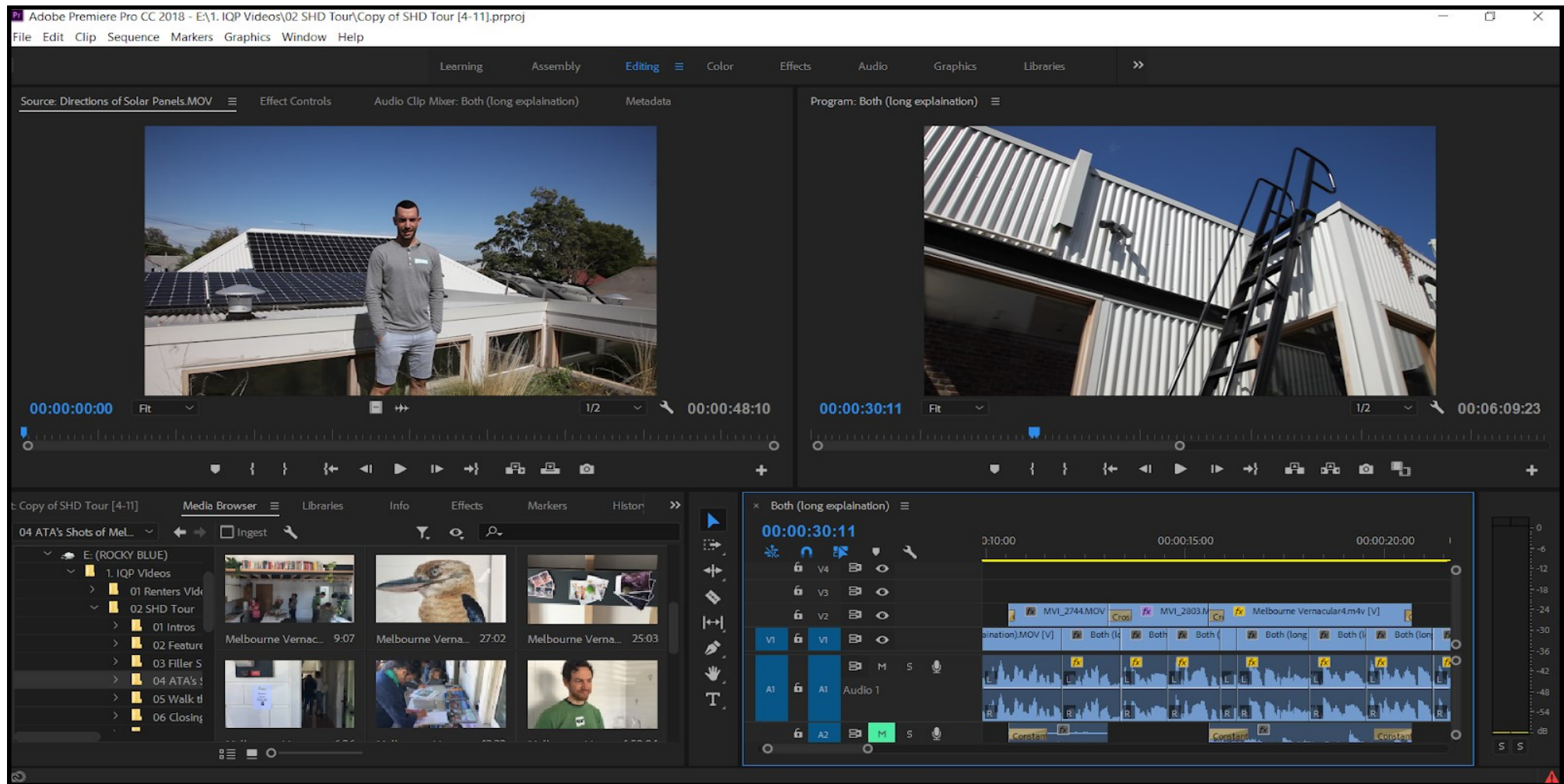


Figure 7. Editing SHD Tour in Adobe Premiere Pro

cover up the skips in the footage of the homeowners speaking where the cuts were made. We corrected shots that were shaky by stabilizing them with Premiere and corrected the audio levels and contrast when it was necessary. After the main video was complete, the introduction and conclusion graphics were added according to the requests of our sponsor. Apart from reducing the video length, we cut down and edited the footage with the

goal of retaining the structure of the house tour, and ensuring key elements were stressed and included. Figure 7, shows the editing process in Adobe Premiere. In particular, the bottom right panel shows the video timeline, where we cut, edit, and put the video together.

The full tour video can be found here: <https://youtu.be/4lci92F9nHY>. Key shots from the final video can be seen on pages 9 and 10. The video begins with the

homeowners introducing their house, and follows them on a guided tour of the property. The video length for the SHD tour was appropriate for audiences who were already interested in seeing a sustainable house tour, however, this video length would not have been ideal for attracting a wider audience. Overall, it should still be a powerful tool to promote sustainable housing year-round and help enhance Sustainable House Day for the ATA.



Sustainable House Day Intro



“Hi and welcome to the home of Melbourne Vernacular, I am Leanne and this is Scott.”



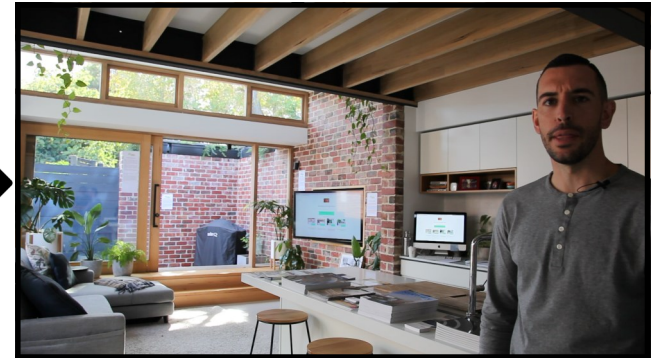
“We’re going to take you through the home and introduce you to some of its features”



North facing windows used for light and passive heating



Double Glazed, High Efficiency, Weather Sealed Windows



Thermal mass, reused materials, bricks and polished concrete, and thermal breaks



Hydronic heating and all-electric house



“The engine room of our sustainable home...”
“Our Heat Pump and Storage Tank...”



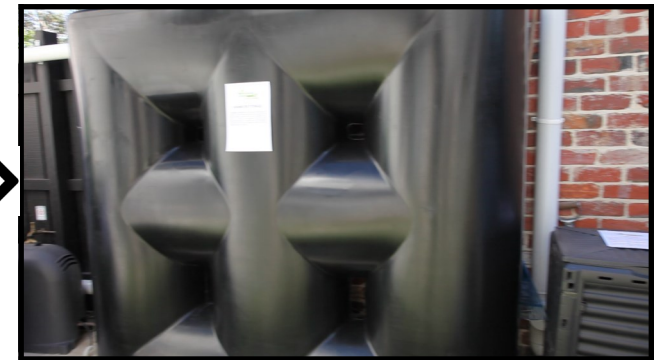
“The reason we chose a heat pump is that we wanted to be off of gas”



Smart fans and thermostat actively heat and cool the house



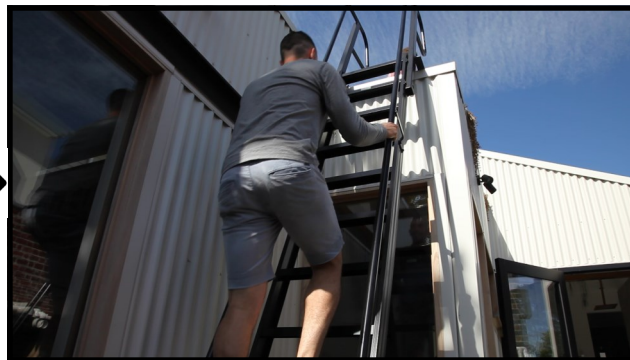
“There were a number of sustainability designs incorporated in the kitchen...”



“Being water wise is also really important with a sustainable home...”



No-dig veggie garden for sustainable living



Rooftop features



“We chose to invest most of our money in solar panels...”



“We’ve also planted exclusively plants that are native to this part of Melbourne...”



“We hope that you enjoyed the tour of Melbourne Vernacular and that it inspired you...”



SHD Links and further information

SHD Training Presentation for Homeowners

The SHD Training Presentation serves to give homeowners information about how to prepare for SHD. This includes how to promote their house leading up to SHD, how to bring in volunteers to help, and relevant forms they must complete prior to the day. At present, the ATA e-mails volunteers this information in a long list of documents. Jodi Rashbrook, the ATA's Event Manager, indicated that much of this information goes unread, causing unnecessary confusion leading up to SHD. In converting this complex documentation into a presentation, we aimed to provide homeowners with an integrated and engaging display of the content, all in one location.

In order to *generate content* for the presentation, we interviewed Jodi Rashbrook. Jodi provided us with the forms that are sent out each year to the SHD homeowners, which walk them through the process of preparing for the event, and also offered insight into issues that commonly arise. We also interviewed five experienced SHD homeowners. This gave us a better idea of the instructions to delve into more detail about, and other problems areas that we could address in our content. Our most notable findings included strategies for better management of tours and methods of dealing with troublesome visitors.

In *designing the presentation*, shown in Figure 8, we condensed the information into three categories: Pre-SHD Forms, Event Preparation and Management, and Post SHD Packup, and chose a medium to present this information. Since we were producing educational media with a predefined audience (SHD homeowners), we considered engaging the viewer to be a priority over length, and decided to use Prezi as a platform. Prezi's animations are dynamic, the layout allows for the viewer to get a broad overview of the information within the video and the control to go to different sections of it,²⁴ and audio can be inserted at different points during the presentation. Figure 9, shows how the video was laid out.

Once the outline was complete, we inputted information and recorded audio to accompany the content, using the voice of Jodie Meehan, the ATA's Administration

Manager. The overview screen outlines the three top level categories of information. From here, there are additional layers that delve into more detail per section. The Pre-SHD section mainly goes into detail about the necessary forms to



Figure 8. Designing the Presentation

fill out, and provides links for each one. Next is the Event Preparation & Management section, which explains how to outline event plans, recruit volunteers, market one's home, and manage interviews. Figure 10 is a screenshot of the "Radio Interviews" section, which details methods for studio interviews, live phone interviews, and talkback on air, and is accompanied by its corresponding audio. You would find this section within "Event Preparation & Management" and under "Manage Interviews".



Figure 9. Overview Screen of the SHD Training

Event Preparation & Management: Radio Interviews, Talkback

Narrator: If the radio station gets some calls during a live interview, they might ask if you want to answer some talkback questions. If you do some talkback on air:

Keep your answers short and to the point, and admit if you don't know the answer. Say you'll find out and let the presenter know, or ask the caller to leave their number with the producer so you can call later. Additionally, don't get into debates. Be pleasant and put your message across without arguing.

Last, give the website address, www.sustainablehouseday.com, and info number at the end.

Figure 10. Radio Interview section of SHD Training Presentation and Corresponding Script

Following this section and wrapping up the presentation is Post SHD Packup. This section goes into detail about the importance of inspecting the home after the event and other risk management strategies that have to be completed. The full training presentation can be found here: <https://prezi.com/view/mO3HNNbHEa4Ep9aoUgKx>.

SHD Social Media Strategy

The SHD Social Media Strategy serves to promote SHD and achieve more publicity prior to the day. The ATA began promoting SHD on social media two years ago, occasionally posting content about sustainable housing on Facebook and Instagram, but lacked an organized approach. We conducted research and submitted recommendations for the ATA to use prior to SHD in September.

In order to *identify expert processes*, we conducted interviews and a literature review. We interviewed Katy Daily, the ATA's Relationship and Marketing Manager, and Sasha Shtargot, the ATA's Media and Online Content Manager, to gain baseline information on the current use of social media to promote SHD and the houses featured during the event. In doing this, we found that the ATA had a substantial following on multiple social media platforms, but did not have a concrete strategy in their approach. Additionally, we identified specific areas for the ATA to improve, pertaining to the frequency of their posts as well as the specific content included.

A brief *literature review* gave us insight into effective social media practices that the ATA could adopt, particularly with Facebook and Instagram. We decided to focus on these because Facebook is the most widely used social media platform in Australia, with about 15 million monthly users, and 50% of the Australian population logging in every day.²⁵ In third place, is Instagram, with 9 million monthly Australian users²⁵ and is valuable in the promotion of SHD because of its reliance on visual content. Further, the ATA has used these in the past, and has established a significant follower base within each one. While there are other social media platforms available such as YouTube, the second most popular Australian social media platform, and Twitter, Daily indicated that expanding to these would spread the ATA staff thin, as the employees are all juggling multiple projects.

Once we had decided which platforms to focus on, we began developing a social media strategy to promote SHD. This involved identifying what content to post and how to it in a way that maximized views and interactions. First, we looked into ideal days and times to post. Social Media Today gives different recommendations for each

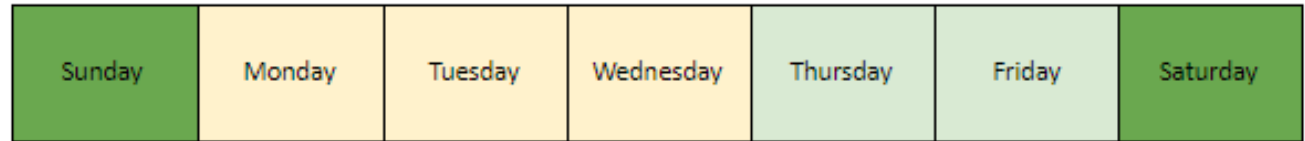


Figure 11. When to Post: Facebook²⁶

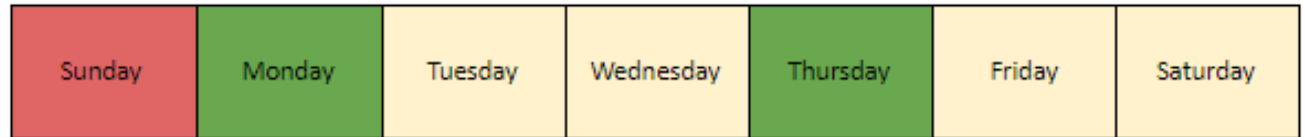


Figure 12. When to Post: Instagram²⁶

platform, (Figures 11 and 12). Green is a great day to post, yellow is an average day, and red is a day that should be avoided.

Ideal posting times are also quite different per platform. Based on research done by Social Media Week, a company dedicated to give professionals social media insight, the ideal times are as follows:

Facebook: 1pm - 4pm²⁷

Instagram: 2am,²⁷ 11am - 1pm, 7pm - 9pm²⁸

Effective content is critical for the strategy to be successful. Some of the best content for businesses on social media is subject matter that engages the audience on a personal level.²⁹ Examples of this include:

- Behind the scenes content
- Highlight reels from past events
- Pictures of past participants with quotations of a positive review
- Polls
- Event countdown
- “Sneak peeks” of the upcoming event
- Hashtags (general and event specific)

Posting prior to an event is all about unique and captivating content.²⁹ These strategies can help to draw in viewers that might not have been engaged otherwise.

We used this research to develop recommendations for a social media plan to assist the ATA in promoting SHD. The social media plan we created from this research contains three parts:

1. A calendar outline for May – August, 2018

2. A detailed plan for the three weeks leading up to SHD on September 16
3. Suggested strategies to track social media progress for Facebook and Instagram

Part 1 gives the ATA flexibility regarding the time of posting and content of the social media posts, in which we recommended posting roughly three time per week per platform. The suggested strategies to track progress will help to identify the ideal posting times and content to include so that when September arrives, user exposure to the SHD promotional content has been optimized. If these times happen to be inconvenient, the ATA can choose to input the content and have the post uploaded automatically at the desired time. For the calendar outline, we gave recommendations for May - August for the days to promote SHD on social media. This schedule is more flexible than that of September, and can give valuable insight on which practices work best.

In beginning the strategy, there are some major factors for the ATA to keep in mind. Forbes suggests to retain followers on both Facebook and Instagram, people should *post content consistently* rather than sporadically with multiple posts at a time.³⁰ Additionally, interacting with other social media accounts can increase follower numbers.³¹ It is critical to *respond* to comments, *comment* on other posts, and *share* relevant content, which all send the message to your followers that you are interested and engaged in social media. Further, on Facebook, make posts visual to engage users most effectively.²⁹ This means posting pictures or adding color and making edits that make

the content more visually appealing. *Hashtags* can also be excellent tools in marketing to social media users, particularly on Instagram, where there is the option to follow a hashtag. Therefore, including a hashtag on a post can bring in and engage viewers that otherwise wouldn't have seen the content. Table 1, shows our recommended hashtags, sorted into four categories.

A lot of these hashtags can be used to promote general sustainability. However, some, like #solar and #woodworking could be used with some of the innovative and beautiful homes showcased during SHD. Though not directly linked to sustainability, they are widely used and can bring more views.

In 2018, Instagram updated its algorithm from a chronological feed to one based on engagement.³² Consequently, posts that receive engagement at a faster rate than others move to the top of the feed. One way to use this advantageously is to utilize the Instagram story feature. On Instagram, stories differ from posts in a couple of ways. Most notably, it stays on top of the user's feed for a full 24 hours and it's often used to update followers on casual content, while posts are saved for more important updates. Due to the updated algorithm, high engagement on the story will boost your post to the top of the feed, and posting times don't matter since they're visible for 24 hours.³³ Further, people that don't follow you can still view them,³³ and there is the option to share location and run polls.³⁴ Even better, users have the option to share Instagram stories, so including hashtags and embellishing them by using visual

aids, like stickers and the pen tool, can go a long way in driving user engagement.³⁴ Embedding links can also help drive a message out to a larger population. Currently, this feature is available only for verified accounts or business accounts with more than 10,000 followers³³ but could be a future strategy for the ATA.

Part 2 of the plan maps out the three weeks leading up to SHD in more detail. The number of posts per day increases, but we still stress consistency over frequency. We included polls and countdowns, and closer to the event we recommended posting behind the scenes content. Also, sneak peeks of houses that will be showcased on the day will help to drum up more excitement. Table 2, shows week three of the plan, detailing the time of day and content to include in the posts.

Though the plan outlines posts leading up to the event, posts during SHD will help to engage visitors and can serve to point them in the direction of homes that they haven't yet visited. Further, after the day, it will be important to keep posting consistently throughout the week. Posts at this time could include pictures from homes that participated, participant reviews, and promotion of next year's event.

Last, we recommended some strategies to track the progress of the plan. The suggested data to track is available for manual collection free on Facebook and Instagram, which can be found via the insight tab on Facebook, or on Instagram once the account has been converted to a

Table 2. Detailed Social Media Plan for the Third Week in September

Sept 9 - Sept 15			
Sunday	FACEBOOK	1:00 PM	1 week: countdown to SHD 2018, show house from SHD 2017
Monday	FACEBOOK	9:00 AM	Behind the scenes setup of SHD 2018
	INSTAGRAM	11:00 AM	Visual quote of a positive review from last year
Tuesday	INSTAGRAM	7:00 PM	Snippet of Renter Sustainability Video
	INSTAGRAM	12:00 PM	House from SHD 2017
Wednesday	FACEBOOK	4:00 PM	Snippet of SHD Training Video
Thursday	FACEBOOK	9:00 AM	Post about energy bills at a house showcased at SHD 2017
	INSTAGRAM	1:00 PM	Brief snippet of a home opener for SHD 2018 with a picture of the owner(s)
	INSTAGRAM	7:00 PM	Visual quote of a positive review from last year
Friday	FACEBOOK	8:00 AM	Sneak peak of SHD 2018: a house that may be showcased
	INSTAGRAM	9:00 PM	Behind the scenes setup of SHD
Saturday	FACEBOOK	12:00 PM	Weekly poll about sustainable features
	FACEBOOK	3:00 PM	Sneak peak of SHD 2018: a house that will be showcased

business page. We suggested this data is collected at the end of each week in order to best identify strategies that have been effective. The proposed data to collect for Facebook includes net page likes, number of posts, shares, likes, link clicks, impressions, and reach. We've outlined some potential end goals to keep the plan on track and evaluate its success and listed the top three for each below:

Facebook:

- Increase page likes by 20%
- Obtain a 100% response rate with users
- Receive 20 event reviews after SHD
- Get at least 10 shares on a post

Instagram:

- Increase follower count by 50%
- Obtain a 100% response rate with users
- Increase story views by 5% each week
- Reach 10% users more users each week

Google analytics is a useful tracking tool in addition to using the metrics supplied by Facebook and Instagram, and can give more insight into social media interactions. The full social media plan can be found in Supplemental Materials.

Table 1. Categories and Recommendations for Hashtags

Energy Conversion	Energy Technologies	Décor	Place/Event Promotion
#nature	#energy	#decor	#sustainablehouseday
#awareness	#innovation	#homer renovation	#SHD
#energy	#renewableenergy	#woodworking	#SHD2018
#gogreen	#greenenergy	#interiorstyling	#renew
#sustainable	#solar	#ecofashion	#alternativetechassociation
#ecofriendly	#tech	#interiordesign	#eventsaustralia

Streamlined SHD Sign-in Process

In the past, the ATA has used an archaic paper sign-in sheet at the entrance of every house during SHD and took months to enter all of the data into the system. We developed recommendations for the ATA to streamline their SHD sign-in process and automate data entry for their contact lists. This was done through *interviews* and a *literature review*.

To do this, we *identified technical options* for the ATA to use for the sign-in process. We conducted interviews with Katy Daily and Gary Cookson, a Web Developer who works on the SHD registration and regulates the ATA’s database. Once we were able to gauge what kind of sign-in system the ATA was looking for, we researched options available to approach this implementation. The options that we found were to either use a third-party platform or create a system from scratch. Using a third-party platform, such as Eventbrite, would be free to use and has a wide range of features to customize the event experience. However, this would include sharing of private information with the platform that may raise concerns of data security. Creating an in-house system from scratch would solve the data security concern; however, it would prove to be very costly and time consuming. Due to the lack of funds available to ATA, as mentioned by Gary Cookson, we chose to recommend working with a third-party platform. We found that it is possible to digitize the sign in process using a QR-code based Mobile Application. In addition, the web development team is capable of creating a feed that can link the existing database to the check-in app, which can result in instantaneous data collection of the SHD attendance. Our next step was to research possible platforms that can be used to execute this process.

We reviewed business software options on Capterra. Users of different check-in apps rate their experience and give feedback, and a few options that stood out to us are:

1. **Eventbrite**, a global ticketing and event technology platform that allows event organizers to plan, promote, and sell tickets to events.³⁶ Attendees can also find and

purchase tickets on the platform. It covers most aspects of event management from promotion to check-ins.

2. **Zkipster**, the check in and event management software for the world's best events. This program is used by organizations as it is fast, reliable, has a secure guest check in process and smart event analytics.
3. **Boomset**, which provides a customizable event automation platform. Its major services include automating marketing efforts and simplifying the registration process with products like on-site custom-branded self-check-in kiosks, multi-session management and RFID tracking.

Table 3. Application Decision Matrix³⁵

Product	Price	Overall Rating	Ease of Use	Customer Service
Eventbrite	FREE ³⁶	5/5	4.5/5	5/5
Z	\$399 ³⁷	4.5/5	5/5	5/5
boomset Event Software Solutions	\$699 ³⁸	4.5/5	4.5/5	4.5/5

When comparing specific features for each of the three options, Eventbrite stood out in two categories. All three software options have the capabilities for attendee segmentation, badge printing, data import/export, data synchronization, and guest list management. However, Eventbrite additionally is capable of lead capture, which optimizes data analysis, and multi event management, which could be useful if the ATA decides to branch out and use the QR code sign-in process for events in addition to SHD. To further compare our choices, we looked at some of the most important factors provided by Capterra.com that need to be considered before making this decision, shown in Table 3.

Our next step was to develop recommendations for the ATA to use. We recommended working with Eventbrite because it’s free to use and is has a user friendly interface. Our solution can potentially ensure the seamless collection of the data from the

SHD sign-in process and significantly decrease the lead time of analysis.

As seen in Figure 13, the first step is the registration process. The SHD website has a section where people can register as attendees. This page will have a link for event registration on the Eventbrite website, and once the form is filled and submitted, their data is collected and stored in the Eventbrite database. The user then receives a ticket with a unique QR code that corresponds to their information. The intermediate step is a feed between the ATA’s MySQL database and the Eventbrite database. The feed will be activated so that it can collect the data from Eventbrite and store it in ATA’s database. The final step is at SHD. When an attendee arrives at one of the houses, the homeowner or a volunteer will use the Eventbrite Organizer App to scan the ticket with their respective QR code and enter if there are any guests with them. This information is directly fed into the Eventbrite database and this data can be exported to ATA’s database through the pre-established feed and is ready to be analyzed.

In speaking with the ATA, there were some reservations about using a third party system for the sign-in process. Without a third party to go through, the only other option would be to develop a system from scratch to process the QR codes, which is not something that the ATA has the resources for. Therefore, these recommendations will most likely be adopted gradually over a few years. For the upcoming SHD in September, 2018, they plan to give each attendee a unique number to check in at each house. This can serve as an intermediate step between their current archaic process and our recommendations, during which the ATA will be able to determine which future steps they’d like to take.



Figure 13. Sign-in Process Flow Map

Objective 3: Expand audience outreach of the ATA



To identify which audience we might target to expand ATA's outreach, we interviewed sustainability experts at the ATA and discussed potential audiences for our video.

We interviewed Katy Daily and Jodi Rashbrook about potential segments of the Australian housing population. Some of these segments included subsets by region, financial standing, motivation to live sustainably, and age. The resulting decision was to create media to promote sustainability toward one distinct group: renters. Renters are an ever-increasing population within Australia, particularly within Melbourne. However, due to their perceived barriers to implementing sustainable practices, they are typically not addressed with events like SHD, and could be targeted by a series of videos aiming to give 'quick and easy tips' for renters.

After deciding to focus on renters, we completed a brief *literature review* on this group and their needs. The ATA had previously identified renters as a potential target audience due to the increasing portion of Melbourne residents who do not own their housing outright. In the Melbourne area, less than 31% of residents own their homes.⁵ Through interviews, we learned that more residents are opting for strata-living which includes apartment units, duplexes, and high-rises, and many of these are rental units. Because of this, the ATA has placed more importance on demonstrating sustainable practices for strata-living and applied for a grant to create videos that would correspond with the Renters Guide to Sustainable Living.³⁹ This guide supplied us content to adapt into our video targeting renters.

Renting presents its own unique barriers to implementing sustainable practices. Many of the changes require renters to consult with their landlords. Additionally, renters are typically less willing or committed to improving the sustainability of their housing as they think they will not reap any benefits. Consequentially, they will not invest the time to implement change, make renovations, or invest in efficient technology. However, as an increasing demographic, renters are important and worthy of attention.

Objective 4: Engage renters in sustainable living through media



Our fourth objective was to create a video targeting this largely underrepresented group within sustainable living. Though renters are limited in certain ways, there are a lot of small changes they can make that, taken together, can have a substantial effect on energy use. As a result of our research on the motivations and behaviors of renters as a target audience, we chose to focus on the easiest changes a renter could make to save money on their utility bills and also help reduce emissions to the environment.

Snapshots of Sustainability: Quick & Easy Tips for Renters

"Snapshots of Sustainability" is designed to be a series of videos showing renters how to live sustainably, and is something that the ATA can build on after we leave. The video that we produced, "Quick & Easy Tips for Renters," kicks off the series by giving renters an idea of some of the easiest and most impactful changes they can make in their strata housing. To produce this video, we completed the steps shown in Figure 14.



Figure 14. Steps for Renters Video Production

Before we began designing the videos, we completed a brief *literature review* on how to produce effective videos. We first looked into strategies to increase video engagement. A study done by Fishman states that when coming into contact with a product or idea for the first time, "short and sweet" videos are most engaging. Further, under a minute is best for first exposure, and between one and two minutes is effective for additional exposure to the video content.⁴⁰ This same study aggregated data from over 1.3 billion video plays, drawing from over five hundred thousand different videos serving a large number of different purposes, shown in Figure 15. Out of all the people that clicked on a video, 70% watched through the first minute, at which point viewership drops.

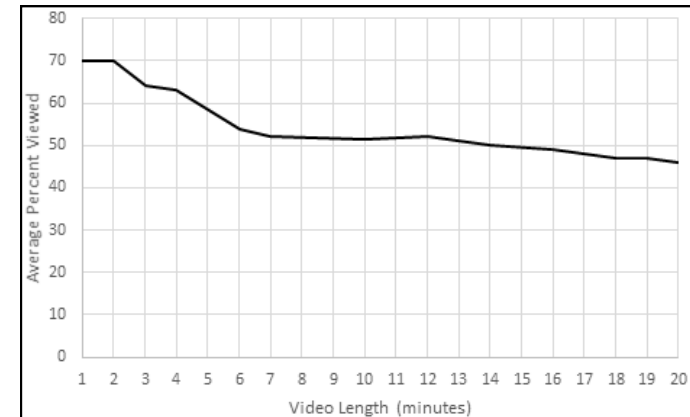


Figure 15. Average Percent Viewings of Corporate Videos of Increasing Lengths

Figure 15, shows the optimal two-minute region for audience engagement. This two-minute-or-less rule can be used effectively in advertisements, where the message is presented quickly and exposure is the most important aspect. However, when the message can't be effectively presented within this time constraint, producers can take advantage of the second "level-off" region which occurs from the six to twelve-minute range. In another study by Guo, which analyzed ideal times for educational videos in particular, a length of 6-9 minutes was found to be ideal for audience engagement.⁴¹

Apart from optimizing video length, another factor that has shown to increase engagement with videos is the use of subtitles. A study by Brown found that videos with captions are watched 12% longer than those without.⁴² Captions allow for the promotion of video to larger audiences and also can help to bring about a clearer message to the viewer.

Next, we completed a brief *literature review* of the video production process. This helped inform us of the best practices for putting together the renter video. Storyboarding, a key process in video production, is the use of a visual ‘script’ to outline the different scenes of a video production. According to Paez and Jew, storyboarding begins as an outline of the content and accompanying video shots that must be filmed to make the video.⁴³ This is usually done by creating a basic outline with sketches of each scene or shots with the information that will be presented at that point in the video. Once the storyboard has been finalized and actors, props, and the script have been approved, filming can finally take place. During this time, any audio soundtracks should also be recorded. Once all of the content is collected, editing and finalizing the footage is the final step before making the video public.⁴³

In order to *generate content* for the video, we reviewed the Renters Guide to Sustainable Living to outline important information that would be included. Additionally, we conducted an interview with Jacinta Cleary, the author of the Renters’ Guide. Once this was complete, we drafted a rough outline of the video, and then began to storyboard and produce a script. The review of the Renters Guide and our interview with Cleary helped us to identify the content for our video. Within the Renters Guide to Sustainable Living there are six “Biggest Impact” strategies for renters:

- Implement Draught proofing
- Use Window Shading
- Replacing halogen lights
- Going efficient electric
- Checking insulation
- Replacing old, inefficient fridges
- Looking at apartment heating type

Six categories was too much content for our short video, so we condensed the material into three categories: water use, heating and cooling, and lighting. Additionally,

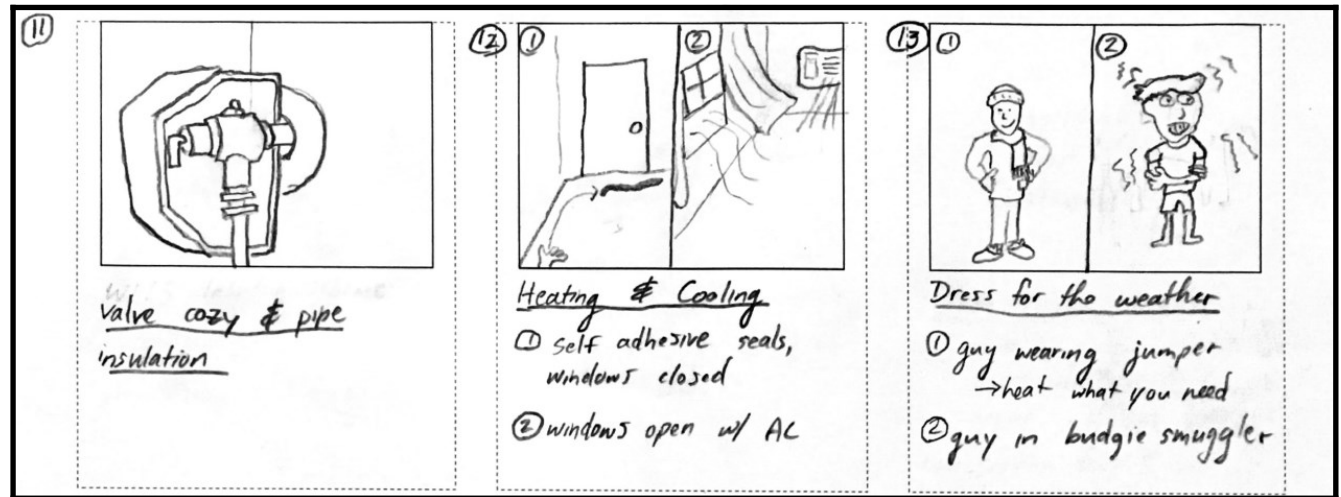


Figure 16. Storyboard for Scenes 11-13 of Snapshots of Sustainability: Quick & Easy Tips for Renters

Cleary outlined some additional areas to address, including simple behavioral practices and landlord relations.

After outlining the content of the video, we began storyboarding with the goal to integrate humor into the video to make it more appealing and expand its reach on social media. Before filming we identified the logistics of filming, such as finding actors and narrators, filming locations and all necessary shots. Figure 16, shows a snippet of our storyboard.

Once our storyboard was finalized, we began *filming*. Filming took place over two days, during which we worked to obtain all the shots we needed for the video. We used the voice of Jodie Meehan to narrate the video. Figure 17, shows the script for our opening scene.

Editing was the final step in the video production, and we utilized Adobe Premiere Pro to put the video together. After reviewing the footage to ensure all scenes were accounted for, we utilized the storyboard and script to put the footage in the right order. The video was edited scene by scene, in accordance with the storyboard. This allowed us to work on scenes in any order, instead of working on the video chronologically. The body was worked on and completed before the introduction and outro, as the introduction utilized snippets of the body

footage. We also edited individual pieces of footage to ensure a smooth video and cut down length as necessary. Matching up video footage and the recorded voice narrations led to cutting down more footage, or re-recording in order to match the footage better. Once individual scenes were completed, we moved them into one main sequence where we added transitions to allow for a better flow when viewing the video. The full video can be found here: <https://youtu.be/ib24frQxY6w>.

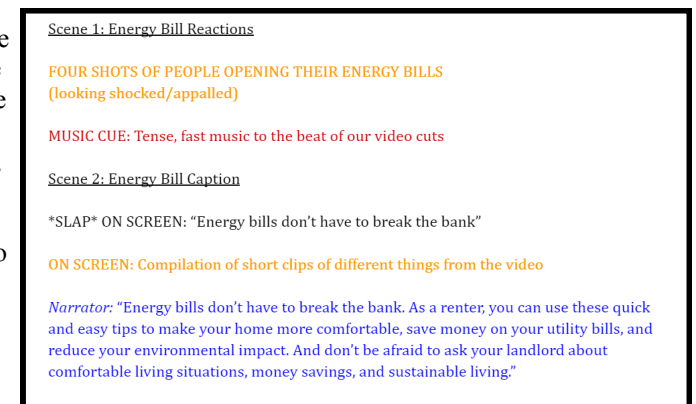


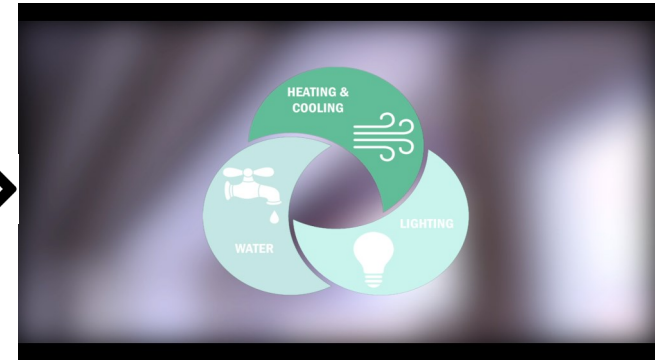
Figure 17. Script for Scenes 1-2 of the Renters Video



Energy bill reaction shots, used to hook viewers to watch the video.



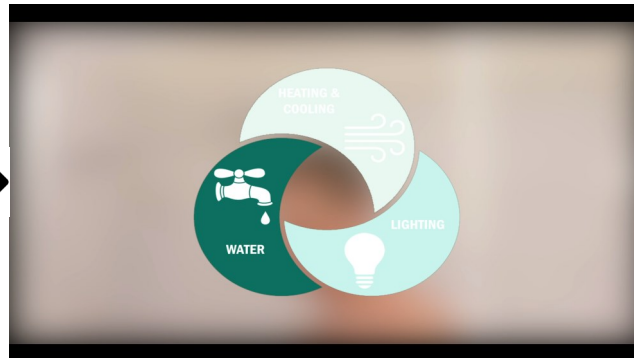
Title sequence for Snapshots of Sustainability video.



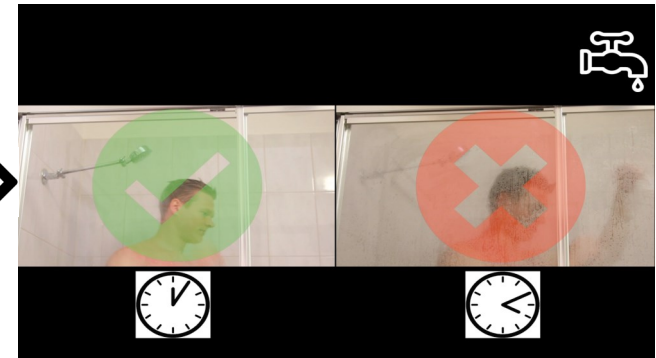
Overview graphic introducing the Heating & Cooling section of the video.



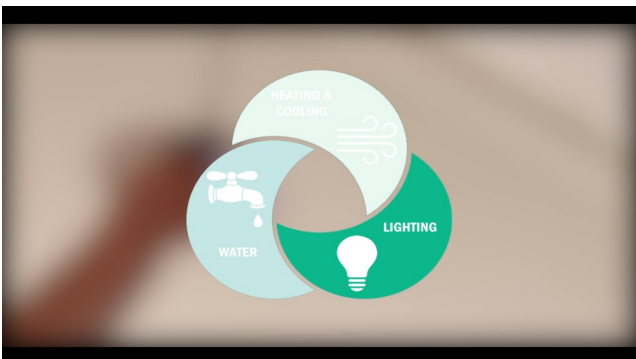
Introducing draught proofing as a tip for renters.



Overview graphic introducing the Water Use section of the video.



Introducing efficient showering, while incorporating humor, as a tip to be sustainable.



Overview graphic introducing the Lighting section of the video.



Introducing the use of LED lights as a tip to be sustainable.



Closing credits, directing viewers to the ATA Facebook page and website.

Recommendations and Conclusions: Future Steps in Promoting Sustainability

While working with the ATA, we produced five deliverables to promote sustainable living. Sustainable House Day grows every year, and the ATA's strategies need to evolve in order to maintain a high level of success. Our four SHD deliverables ensure this improvement. Our Training Presentation and Tour Video enable homeowners to be better trained and educated for the day. Further, our Social Media Plan will spread the message of SHD to a larger audience, and the streamlined Sign-in system can make the process more convenient for all parties and account for a larger number of visitors on the day. Our promotion of sustainability extends beyond SHD, where we expand the outreach of the ATA to include renters. Appealing to a larger population is beneficial for the ATA and also necessary for the adoption of sustainable practices by all people, not just a small niche.

Continuous iterative improvement of the training video

For our SHD Training Video, we developed recommendations to test and improve the effectiveness of our presentation. We defined "effective" as covering the necessary information, resolving uncertainties for homeowners, instilling confidence in, and engaging the viewer. We developed questions for the ATA give to a small group of target homeowners, incorporating a mix of past and first-time SHD homeowners after they watch the presentation.

- *Were you able to follow the video?*
- *What made it easy to follow?*
- *What made it difficult to follow?*
- *Was there any content that you think should have been covered that wasn't?*
- *Was there any content that you believe was unnecessary?*

- *Was there any content that was covered that you are still unsure about?*
- *Was the video engaging? If not, what could be done to change that?*
- *Do you feel more confident in opening your home for SHD now than you did prior to watching the video?*
- *Are there any other factors holding you back from opening your home? What could be done to address these concerns?*

These questions will allow the ATA to identify any necessary changes. In making adjustments based on feedback, the training presentation will become increasingly useful for SHD homeowners in the future.

SHD Social Media Plan and Sign-in Process should continuously evolve

Sustainable House Day is a growing event and its outreach will determine how much it can grow. Implementing our recommended social media plan is the first step, but ensuring continuity is the next. The ATA should use our recommended success metrics to identify what has been successful and what needs improvement, which can dictate a new plan for the following year. As the event's growth continues, so should its outreach. Continuously improving and fine tuning their social media plan can help increase SHDs outreach.

In addition, streamlining the sign-in process is also important. For the ATA to better understand their audience, collecting accurate registration data is necessary. As a growing event, increased attendance is expected. To account for this increase in numbers, we recommended using third party software to enhance the sign-in process. This will avoid the costly process of creating a custom platform in terms of time and money, while implementing QR code scanning to simplify and streamline the sign-in process. With an improved sign-in process, it should be easier to handle the large influx of people, and more convenient for the visitors. In the long run, the ATA could look into developing an in-house sign-in system, which they could potentially use for multiple events.

Expanding outreach to an underrepresented group within sustainability

We recommend that our video "Quick and Easy Tips for Renters" is the first of a number of videos within the "Snapshots of Sustainability" series. Renters are an excellent opportunity for the ATA to expand their audience and short, humorous videos are a key first step in exposing renters to sustainable habits. Renters are a large, diverse group, so we came up with some potential video ideas that could address some of the subsets. These videos include marketing towards:

1. Landlords: Landlords are often seen by renters as a barrier to sustainable living, and this video could address the communication gap between them.
2. Recent college graduates: After college, many graduates are living on their own for the first time. Giving them tips for the future could encourage sustainable living that they carry on in the future.
3. Children: Children can play a large role in encouraging their parents to make changes within the household, a video could instill lessons early in their lives.
4. Different regions of Australia: Climates vary dramatically within Australia, and videos targeting some of the regions could provide a more personal touch to sustainable living and reach a larger population.
5. Specific energy saving categories: Focusing on heating and cooling, water use, efficient appliances, etc. could give a more detailed list of options for people to utilize. "Quick and Easy Tips for Renters" touches briefly upon these categories, but in an effort to be succinct, we cut a lot of details.
6. Low-income renters: Some of the tips included in the video are costly, and therefore aren't realistic for low-income families. A video focusing solely on behavioral change for renters could help to span this gap.

In making these videos, the ATA should first seek feedback from renters on "Quick and Easy Tips for Renters." This will help them identify effective content to include in each of these six videos.

Acknowledgements

We would like to thank the following people and organizations for their contributions to our project:

Worcester Polytechnic Institute and the **Alternative Technology Association**, for providing us the opportunity to complete this project.

Our advisors, Professor **Katherine Foo** and Professor **Lorraine Higgins**, for their advice and instilling confidence in us throughout the journey.

The **ATA Staff**, for their hospitality and support.

Katy Daily, for her expert guidance throughout the project and letting us use her residence for filming.

Jodi Rashbrook, for her help in the process of contacting homeowners and identifying sustainable homes for the SHD tour video.

Jodie Meehan, for narration in our videos and always offering a helping hand.

All of the participants in our interviews, for their cooperation and insight.

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