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Executive Summary

Monash University, in collaboration with the City of Monash conducted a survey of 457 residents within the City of Monash to understand the motivations and barriers for households to install renewable energy in the home. For the purpose of this survey, renewable energy technology includes roof-top solar, battery storage and solar hot water systems.

The survey found the top five reasons for choosing renewable energy technologies in the home were reducing gas/electricity bills, environmental reasons, sustainability reasons, reducing household carbon emissions and reducing air pollution generated from coal/fossil fuels/non-renewable resources. The survey also found that home owners without renewable technologies avoided having them installed primarily due to installation costs while the leading reason for renters was that they felt they could not make changes to their houses.

A second purpose of the survey was to research the efficacy of a range of positive, easy to process messages about renewable energy. When owners and renters were asked about their feelings on the future potential of renewables by looking at 6 different images, they ranked the images below from 1 being most pessimistic to 6 being very optimistic. This found that images of Parliament House and lightbulbs elicited pessimistic feelings, while images of electric cars and solar panels were seen to be overly optimistic.













Thirdly, the research explored the most effective channels in which renewable messages can be deployed ranging between social media, mainstream media and through local newspapers.

It was found that over 90% of renters and owners had a keen interest in receiving information about renewable energy technology and both groups had the same top five preferred ways of receiving information about solar energy systems. These were found to be online, information leaflets/letters through the post, by having a home energy expert visiting their house, direct email or advertising on television or radio.

Summary of Findings

The surveyed residents resided in the following dwellings:

Owners/Mortgagees	Renters
67.14% Detached	43.36% Apartment/Unit
13.78% Apartment/Unit	37.76% Detached
10.95% Townhouse	11.89% Townhouse
Business owners 3.49%	Business renters 6.40%

54% of owner/mortgagee respondents had at least one renewable appliance in their homes compared to 30.07% of renters. In owner households, solar panels were the most popular renewable technology (90.13%) followed by solar hot water (34.87%) and battery storage (21.05%)

For renters, solar panels were the most popularly utilised technology (67.44%) followed by solar hot water (53.49%) and battery storage at 20.93%

Only 12.50% of business owners and renters surveyed had solar technology.

The top 5 reasons for choosing renewable energy technologies in the home were 1) reducing gas/electricity bill (78.95%) 2) environmental reasons (75%), 3) sustainability reasons (55%), 4) reducing household carbon emissions (51%), 5) reducing air pollution generated from coal/fossil fuels/non-renewable resources (48%).

76.74 % of residents reported that the renewable energy system was already installed before moving into their home.

The main reason homeowners without renewable technologies had avoided having them installed was due to the cost of installation (69.29%) compared with 74% of renters who stated that 'I cannot make any changes to my house.'

If the current barriers to having renewable energy technology in the home were removed 29.37% of owners would act to install within 6 months and 26.98% within 1 month. A further 22.22% would act to install within 12 months.

For renters, 30.30% would act to install within 1 month if the current barriers to having renewable energy technology in the home were removed, with, 25.25% acting within 6 months, and 23.23% within 12 months.

For owners, the top 5 benefits of renewable technology were reducing electricity bills (89.47%), environmental responsibility (78.07%) reducing gas bills (54.39%) and to be less reliant on energy retailers (49.12%).

For renters, the top 5 benefits of renewable technology were reducing electricity bills (94.62%), environmental responsibility (78.49%) reducing gas bills (64.52%) and to be less reliant on energy retailers (44.09%).

Owners reported that they engaged in a range of other sustainability activities including recycling (90.65%), having energy efficient appliances (71.58%), reducing use of plastics and other non-organic materials (67.27%) and having insulation (64.03%).

Renters reported that they engaged in a range of other sustainability activities including recycling (88.73%), reducing use of plastics and other non-organic materials (65.49%), having energy efficient appliances (57.04%) and having insulation (21.83%).

Generally, both owners and renters reported being well informed about renewables. 66.55% of owners reported being well informed, with 16.19% neither informed or uninformed and 17.26% felt uninformed about renewable energy. In comparison, 52.86% of renters reported being well informed, with 27.86% neither informed or uninformed and 19.29% being uninformed. For owners, the top 5 sources of information about renewables were the internet (59.85%), television (40.51%), word of mouth (40.51%), newspapers and magazines (38.69%) and environmental organisations (32.85%). Similarly, for renters, the top 5 sources of information about renewables were from the internet (63.04%), word of mouth (48.55%), television (43.48%), environmental organisations (34.78%) and newspapers and magazines (32.61%).

Renters and owners had the same top 5 preferred ways of receiving information about solar energy systems. For owners these were online (54.15%), information leaflets/letters through the post (38.27%), by having a home energy expert visit the house (31.05%), via direct email (29.24%) and an advertisement on television or radio (20.58%)

For renters these were online (55%), information Leaflets/letters through the post (36.43%), by having a home energy expert visit the house (24.29%), via direct email (29.29%), and an advertisement on television or radio (27.86%)

83.02% of owners were inspired by the Monash University net zero emission strategy video while 16.98% felt uninspired. For renters, 80.6% were inspired and 19.4% uninspired.

More than 92% of owners thought it important that large businesses in the Monash City Council area follow a net zero emission strategy like Monash University. Likewise, 91% of renters thought it important that large businesses in the Monash City Council area follow a net zero emission strategy like Monash University

All respondents reported feeling positive (69.65%), hopeful (54.48%) and inspired (42.60%) when seeing the image below:



When owners and renters were asked about their feelings on the future potential of renewables by looking at 6 different images, they ranked the images below from 1 being most pessimistic to 6 being very optimistic:













More than 90% of owners and close to 97% of renters thought the Federal Government should follow a Clean Energy Target.

Introduction

Research in the <u>US</u> and <u>Australia</u> has found that 'social learning' through visualizing the rapid transformational capacity of renewable technology had a substantial impact on consumer decisions about domestic solar.

Establishing a proven model of how renewable and distributed energy works has much greater potential for uptake than highlighting the threats of dangerous climate change. However, the complexity of renewable technologies, such as battery storage, using solar hot water as a form of energy storage, and purchasing clean sources of energy, can make it difficult for consumers to visualise.

The project aimed to evaluate the responses of residents in the City of Monash in outer Melbourne to two forms of visualising renewables. The first initiative was the development of a micro grid at Monash University to facilitate the university becoming energy independent by 2030. The second was to look at resident responses to a range of images that might be used in a renewables communication campaign. A total of 629 responses were recorded. 71.08% of respondents were residents of the City of Monash (457), with 65.54% of these owning their property and 34.46% renting their dwelling. Further, a total of 17 businesses answered the survey and 155 responses from outside the City Council were also gathered.

Monash University's Net Zero Initiative

This project will test a range of visually-focussed renewable messages inspired by Monash University's Net-Zero Initiative program with residents of the City of Monash. It is hoped that this will provide a benchmark for how renewable energy programs, policies and communication can be scaled up to entire cities across Australia. A short animation showing details of how Monash's microgrid works was embedded in the survey. 83% of owners and 80% of renters were inspired by the video as a model of what could be done across the built environment.

Monash's ambitious project to become entirely energy independent by 2030 holds the potential to be upscaled to entire cities. Monash University is committed to transitioning all its campuses to net zero emissions in line with ClimateWorks Australia's 'Pathway to Deep Decarbonisation'. Effective education and communication with consumers about how it works, and how they could benefit from such energy transformation will have considerable positive impacts on consumer behaviour. There are research-led projects currently exploring the use of visualisation strategies to communicate the benefits of renewable energy solutions proving that 1), this kind of research can achieve results at a city council level, and that 2), it is scalable to metropolitan levels.

To visualise the Net Zero Initiative, the project draws on the expertise of animated urban modelling to explain the significance of the Net Zero Initiative program in an engaging way.



The City of Monash's research into messaging for renewables campaigns

Research in the US has found that programs for effective action of climate solutions were most effective at local and regional levels. Subsequently, this study identified residents in the City of Monash as the immediate audience for communicating the transformation at Monash University. This project addresses climate change mitigation and adaptation as one of the City of Monash's key priority areas. In its Environmental Sustainability Strategy 2016 – 2026 the council itself aims to 'reduce corporate energy consumption and greenhouse gas emissions.' This is because, as the report points out, 'Climate change adversely affects all the other priority areas contained in this ESS and therefore Council needs to demonstrate leadership in mitigation and adaptation of climate change at the local level." The council will also focus on increasing the community preparedness for the impacts of climate change through education and encouraging use of renewable sources.

It is expected that the research conducted within the City of Monash on the improved communication of climate solutions will also provide council with an understanding of resident expectations of council action on climate change. It is envisioned that the results of this research will be applicable to renewable energy education programs across Australia.

Project Outcomes

- 1) The production of a set of informative graphics piloted within the City of Monash that could also be circulated in a wide range of media channels.
- 2) The production of a short, high quality, 3-minute video to be produced by the MediaLab, within the School of Media, Film and Journalism, that showcases the NET-ZERO Renewable Energy Transformation project at Monash.
- 3) Improved understanding of the benefits of renewable energy grids amongst Australian social media and mainstream media audiences.
- 4) Comprehensive research of City of Monash residents that can inform council policy.

5) A refined survey instrument that can be reused for a wide range of surveys looking at audience responses to renewable energy.

Background on the use of imagery for engagement with clean technology and renewables.

In their recent study on efficacy in relation to climate change mitigation behaviours in the US, UK & Australia, O'Neill et al. (2013) found that images of climate change undermined self-efficacy (the feeling that individuals can act on climate change), while images of energy futures promoted self-efficacy. In Australia, images associated with politics and politicians particularly undermined self-efficacy. In the current study, we explored to what extent these trends were true at a local government level by gauging reactions to the following images.















In the O'Neill study, respondents tended to group together the following images as examples to 'personally undertake (or were already undertaking) meaningful mitigated actions through their energy choices': solar panels, wind farms, electric cars, home insulation, traffic jam and fuel pump images (O'Neill 419).

Interestingly, these images were much stronger and efficacious than images based on commitments and choices including political protest, travel choices, carbon offsetting, sustainable housing and avoiding red meat.

These images correspond to behaviours that support a core dimension of what Whitmarsh et al. (2011a, b) term 'carbon capability – a way of understanding the situated meanings of carbon and energy in everyday life' (O'Neill 2013, 420). However, the most positive form of carbon capability was indicated by images of energy futures.

The research also evaluated responses to an animation of Monash University's Net Zero Initiative micro grid project. More information about this program can be found at https://www.monash.edu/net-zero-initiative

Background Research comparing Monash City Council with Councils in Greater Melbourne

For the current study, we conducted background research on the 27 councils within Greater Melbourne and produced a demographic profile for each council based on several factors including age, income, household tenure and type, education, and birthplace of residents. For the purposes of the study we also investigated the percentage/density of solar energy system installations in residential homes per council. The graphs below represent our findings regarding the comparability of the City of Monash with other councils within Greater Melbourne in terms of demographic and density of solar energy system installations.

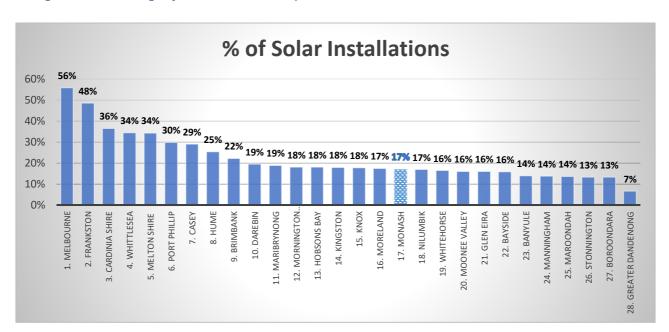
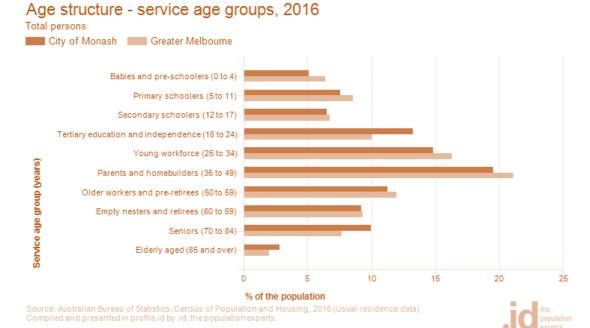


Figure 1.1 Percentage of solar installations by council

For percentage of solar density by councils we calculated the number of solar photovoltaic (PV) rooftop panels as well as the number of solar hot water installations. As the graph shows, the City of Melbourne had solar energy systems installed in over 50% of properties. This is largely due to the increase in construction of new energy efficient buildings in the inner-city area when compared with more residential councils. For the purposes of the study the graph highlights how the City of Monash, in terms of percentage of solar installations, sits in the middle band, at 17%, when compared to other councils within Melbourne.

Figure 1.2 Age structure of residents: City of Monash and Greater Melbourne



The age structure of residents from the City of Monash and Greater Melbourne are statistically comparable.

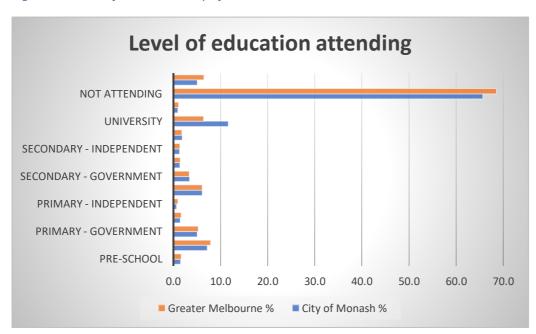
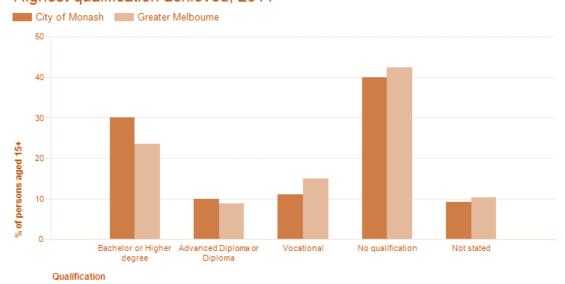


Figure 1.3 Level of education: City of Monash and Greater Melbourne

When comparing the level of education of residents of Greater Melbourne and City of Monash, the graph highlights the similarities between educational levels of residents with the vast majority of councils not currently attending education. The only difference in educational demographics in this case is that of the large student population living in the City of Monash due to the location of the Clayton campus. For the purposes of the study, we have chosen to include students in the study whilst filtering respondents according to their tenure status and occupation.

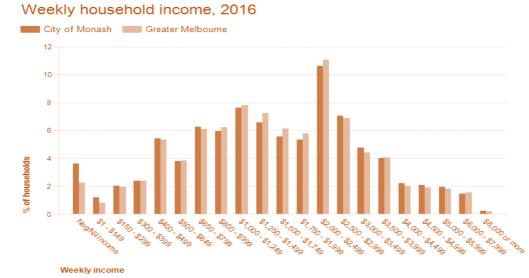
Figure 1.4 Highest qualification achieved: City of Monash and Greater Melbourne Highest qualification achieved, 2011



Source: Australian Bureau of Statistics, Census of Population and Housing, 2011 (Usual residence data) Compiled and presented in profile.id by .id, the population experts.

the population experts

Figure 1.5 Weekly household income: City of Monash and Greater Melbourne



Source: Australian Bureau of Statistics, Census of Population and Housing, 2016 (Enumerated data) Compiled and presented in profile.id by .id, the population experts.



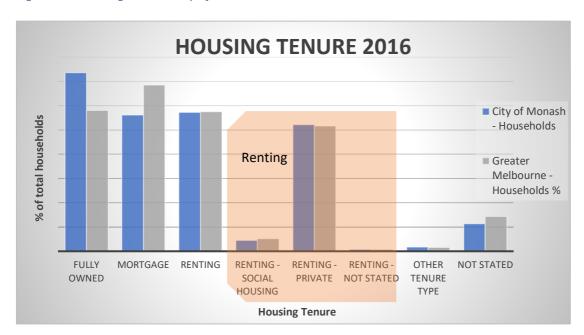


Figure 1.6 Housing tenure: City of Monash and Greater Melbourne

As the graph shows, the housing tenure of residents from City of Monash and Greater Melbourne are similar. The percentage of residents who privately rent their property are almost exact, with City of Monash having 26.1% of residents privately renting and Greater Melbourne having 25.8% of residents privately renting.

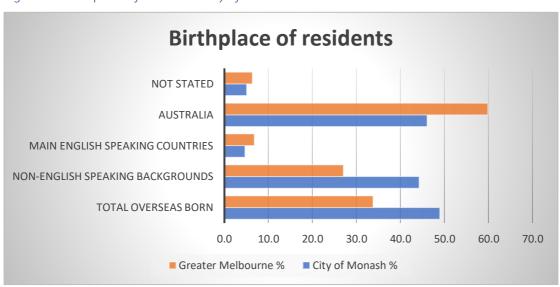


Figure 1.7 Birthplace of residents: City of Monash and Greater Melbourne

As the graph shows, the City of Monash has a much larger portion of total overseas born when compared to Greater Melbourne. As discussed, this could be due to the large student population residing near the Clayton campus.

Methodology

This project will adopt a 'non-persuasive communication' approach to communicating the power of Renewables and Micro grids for Consumers. This approach requires research into the efficacy of a range of positive, easy to process renewables messages and Monash's Net Zero Initiative project, which can educate the public about the future of energy systems. The messages take advantage of social learning around what can be done rather than moral arguments about the need for innovation.

Research Plan

Background research to understand demographics of Monash and how it compares to greater Melbourne to assist in message development and potential to scale up research.

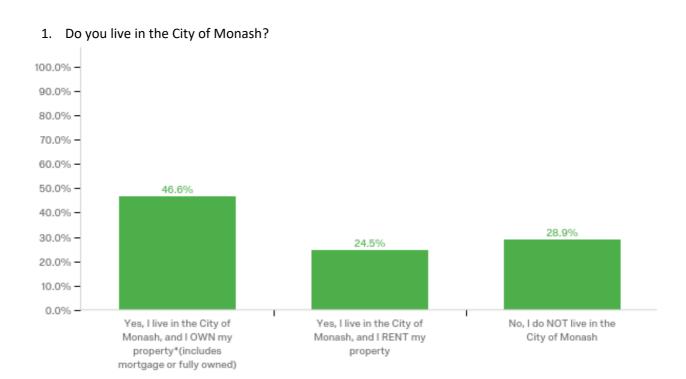
- 2) The use of a Qualtrics designed survey tailored by researchers at The University to embed a range of media in to the survey to measure engagement in sustainable energy and zero-carbon concepts. The survey assessed the most effective channels in which these messages could be deployed within social media, mainstream media and in local newspapers.
- 3) A range of graphics and video clips were created for the survey to help gauge resident views on the merits of adopting renewable energy opportunities through surveys, polls and focus groups.
- 4) Images, animation and video clips were sourced, produced and edited in the School of Media, Film and Journalism's Media-Lab with the assistance of Tom Morgan from Monash Art Design and Architecture.
- 5) Monash City Council promoted the survey to encourage resident participation by sending out information through its Sustainable Monash newsletter, its bulletin, by posting on its website and via social media channels.

Survey Results

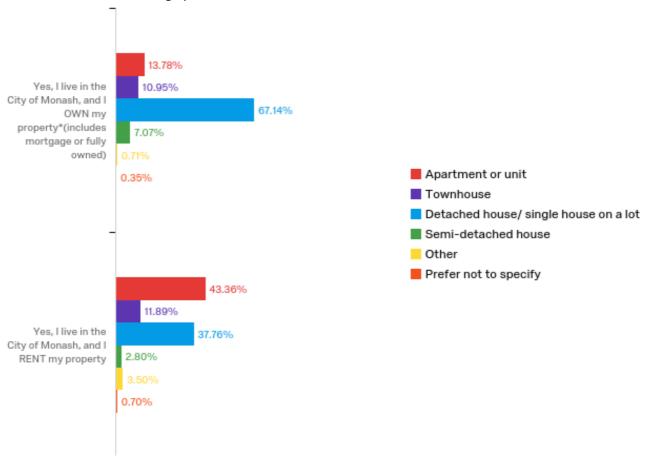
Visualising the Power of Renewables

Survey for Monash City Council - Final Results

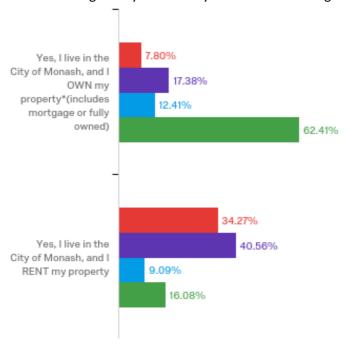
March 2018

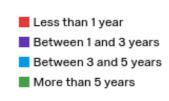


2. Which of the following options best describes the home?

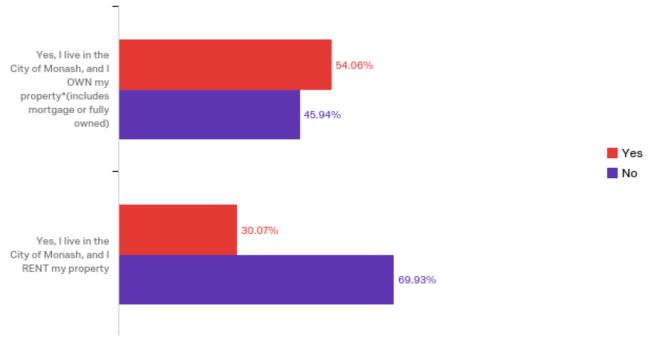


3. How long have you lived in your current dwelling?

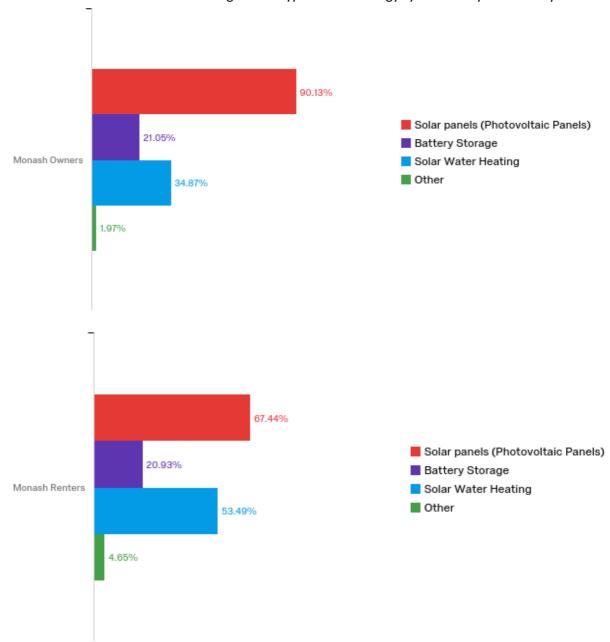




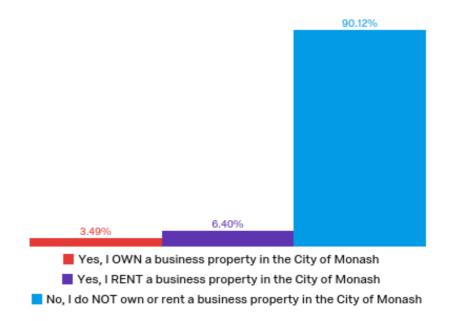
4. Do you use solar energy in your house? *For this survey, solar energy includes: solar panels, solar hot water or battery storage



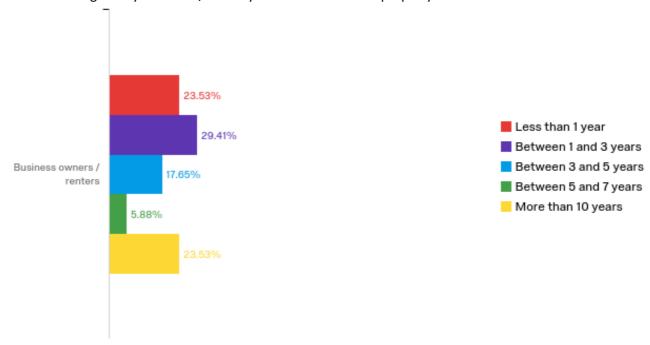
5. Please select from the following list the type of solar energy system that you currently have:



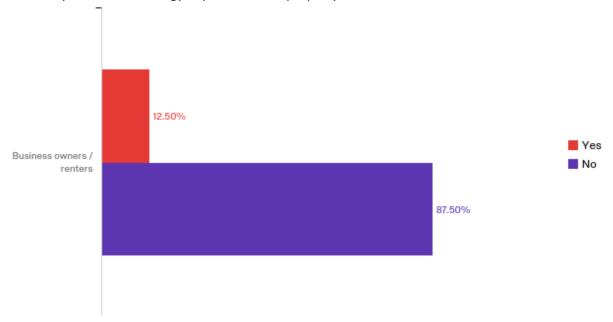
6. Do you own or rent a business property in the City of Monash?



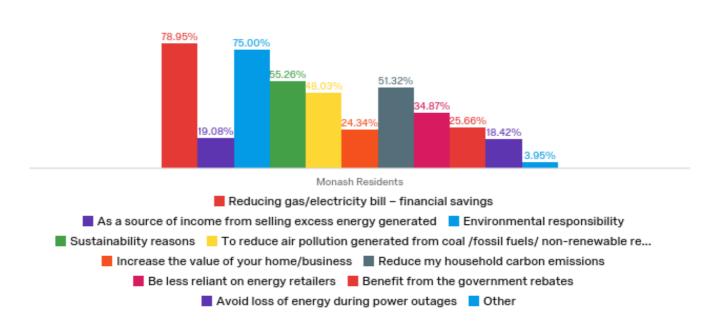
7. How long have you owned/rented your current business property?



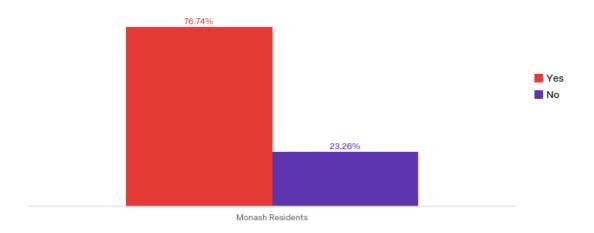
8. Do you use solar energy in your business property?



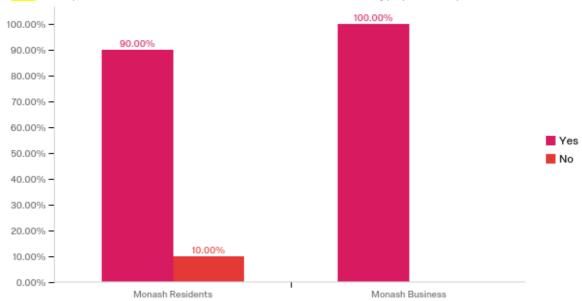
9. Why did you choose to install any renewable energy option in your house/business? (Select one or more)

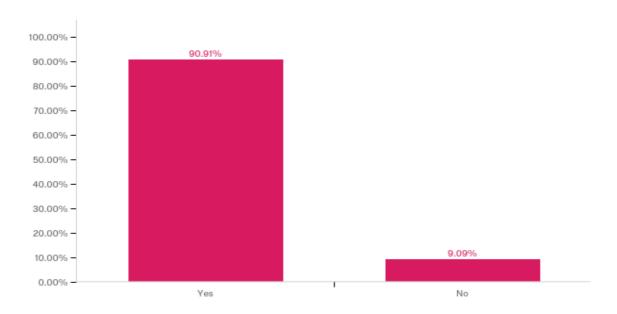


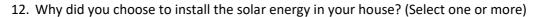
10. Was the solar energy system installed before you moved into the property?

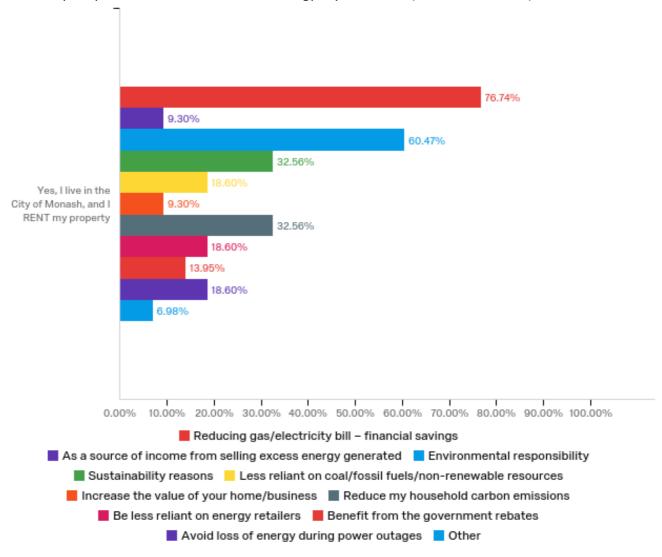


11. Were you involved in the decision to install the solar energy system in your home?

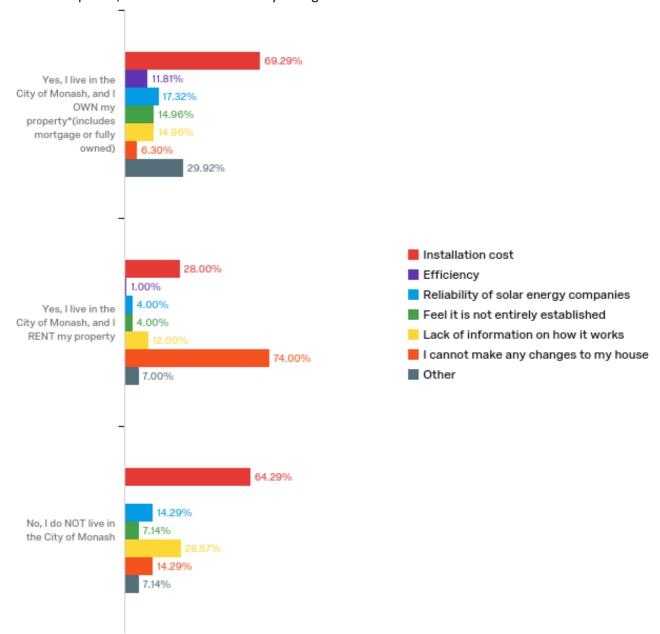




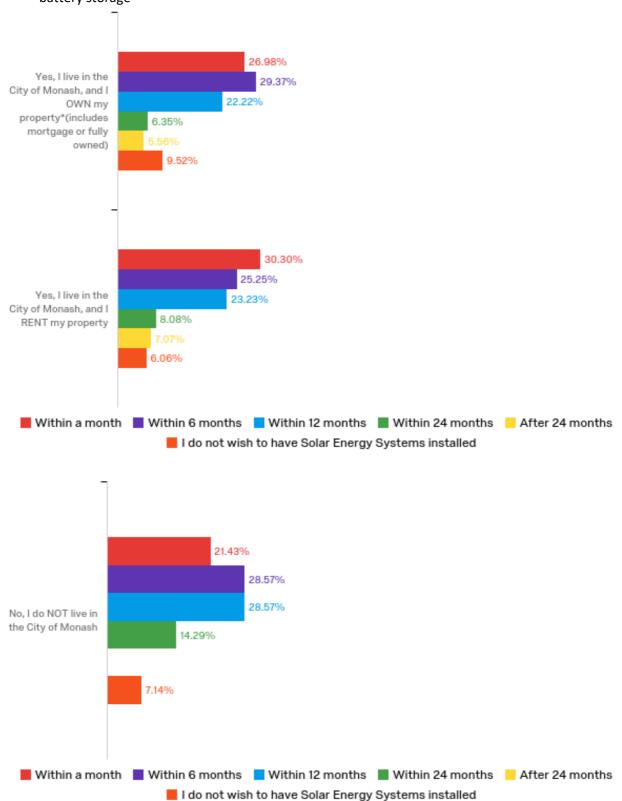




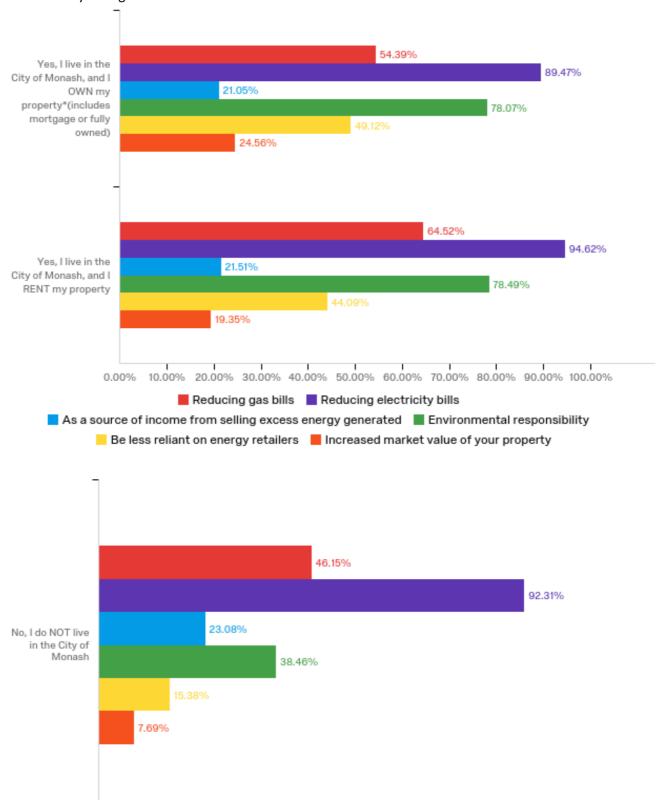
13. What are the main reasons that you do not have a solar energy system installed in your house/business property? (Select one or more) *For this survey, solar energy system includes: solar panels, solar hot water or battery storage



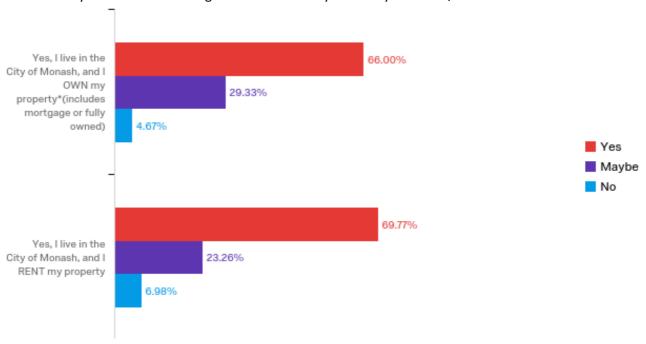
14. If your current reasons for not having solar energy systems were overcome, would you consider having them installed? If so, when would be a desirable timeframe for the installation to take place? *For this survey, solar energy system includes: solar panels, solar hot water or battery storage



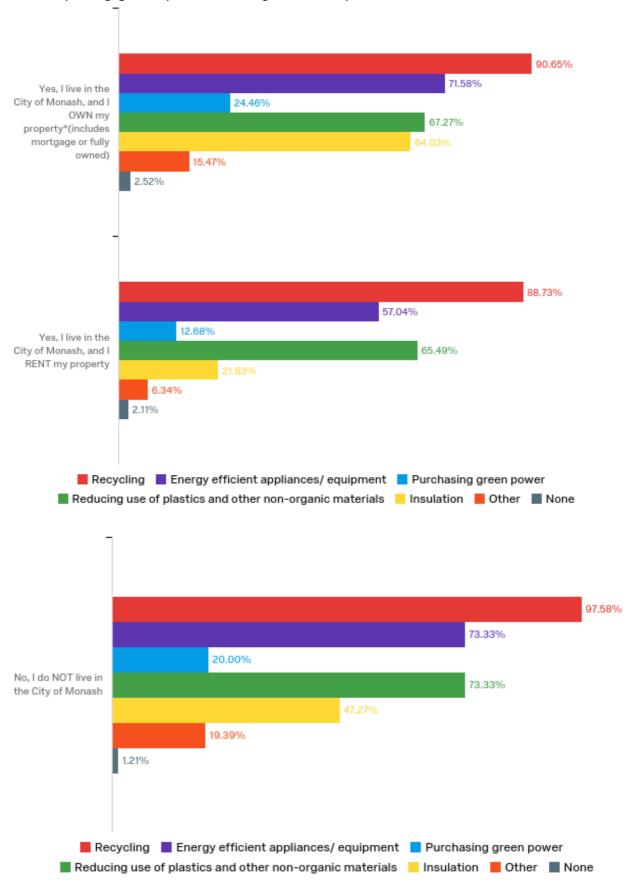
15. Please select the benefits that you are most likely to enjoy from a solar energy system? (Select one or more) *For this survey, solar energy system includes: solar panels, solar hot water or battery storage



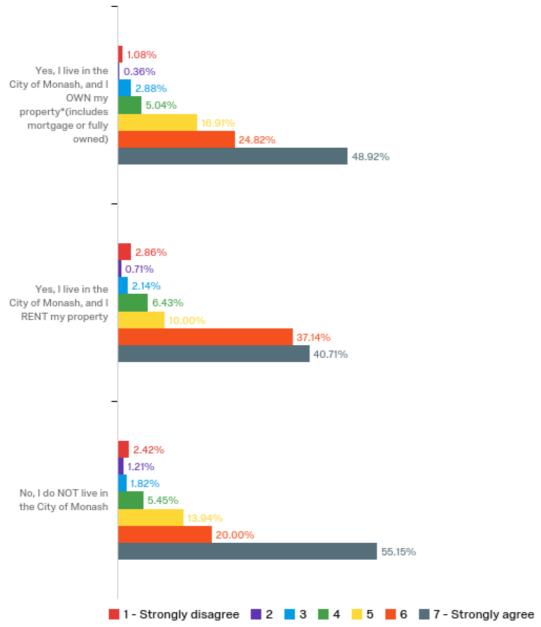
16. Would you consider installing other renewable systems in your home/business?



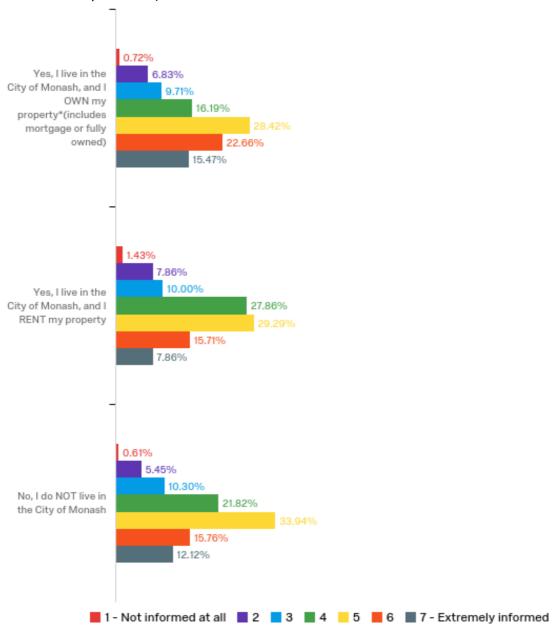
17. Do you engage in any of the following sustainability activities?



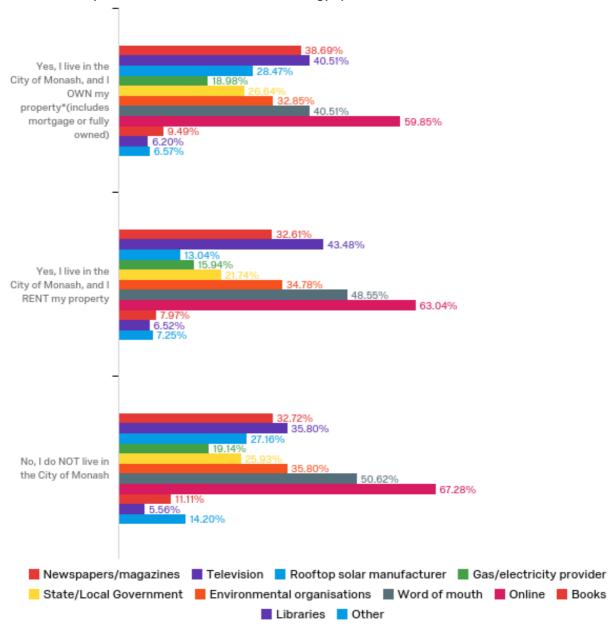
18. How much do you agree, if at all, that solar energy systems uptake in the home will help to reduce the impacts on the environment? (1= Strongly disagree, 7= Strongly agree)



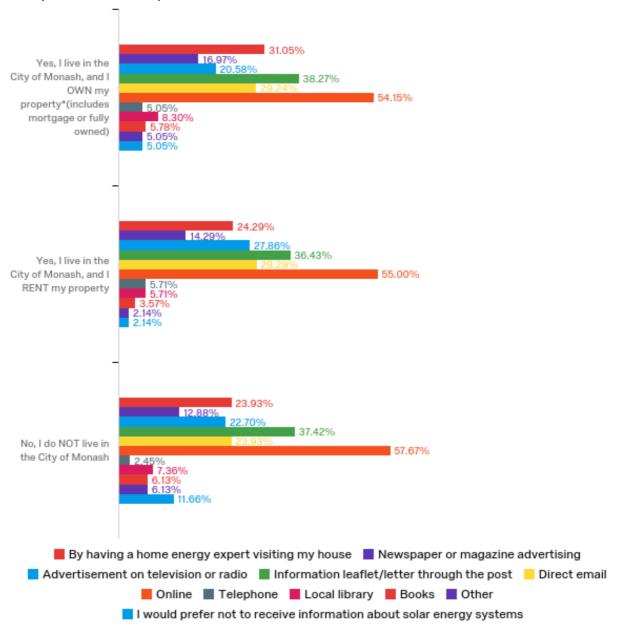
19. How well informed do you feel about solar energy systems? (1 = Not informed at all, 7 = Extremely informed)



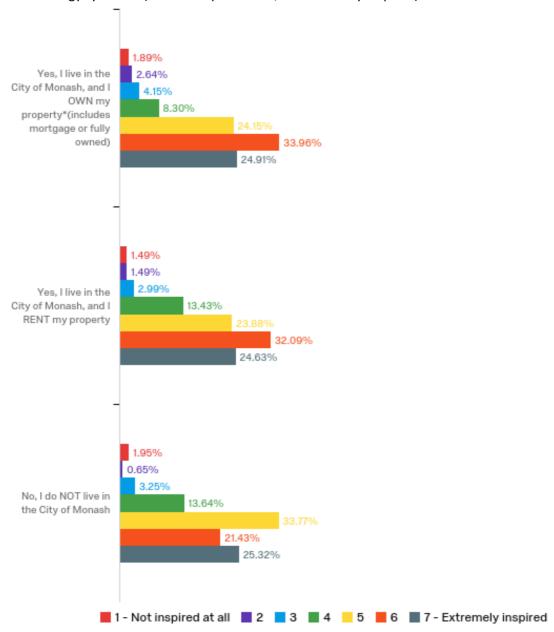
20. How did you find information about solar energy systems?



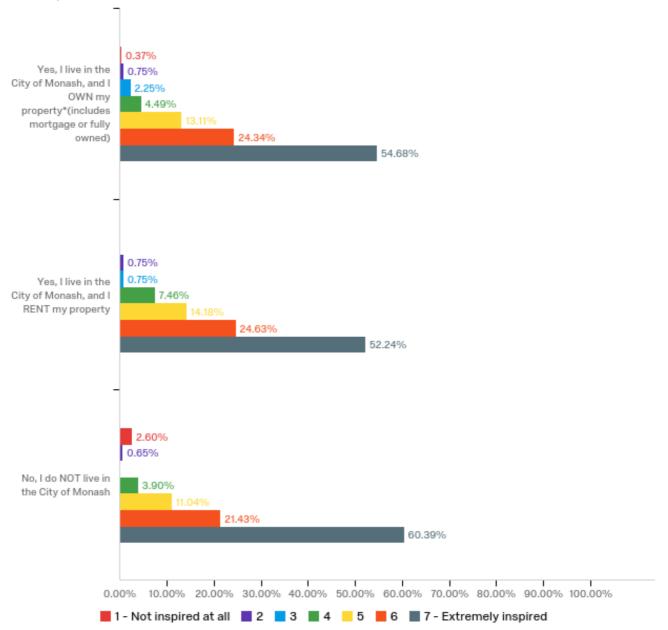
21. What would be your preferred way to receive information about solar energy systems? (Select one or more)



22. From the previous video, how inspired, if at all, do you feel about the potential of renewable energy systems? (1 = Not inspired at all, 7 = Extremely inspired)

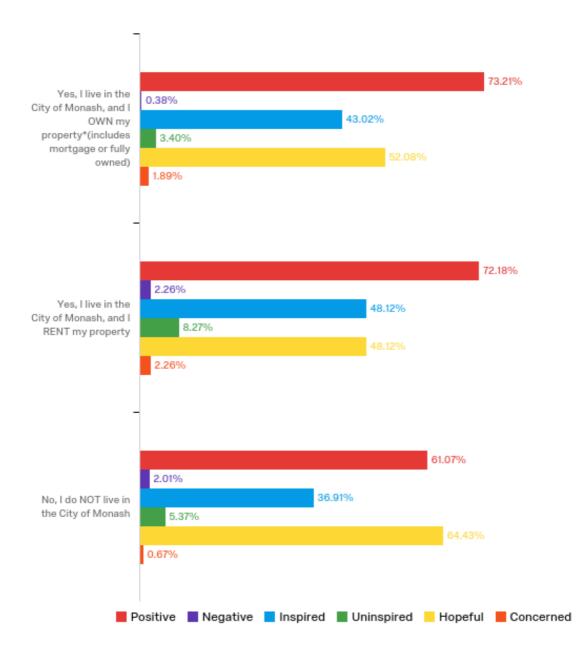


23. How important do you think it is that large businesses in the Monash City Council area follow a Net Zero Emission Strategy like Monash University? (1 = Not important at all, 7 = Extremely important)

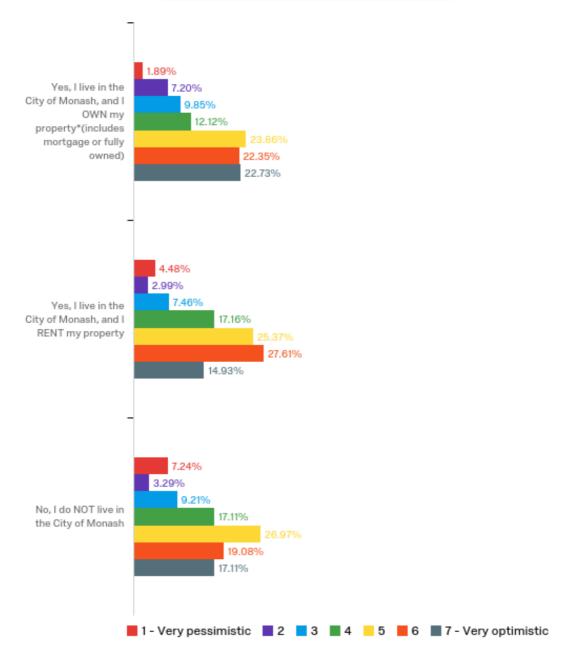


24. In relation to solar energy systems, how does this image make you feel about the potential of renewable energy systems? Please select one or more options



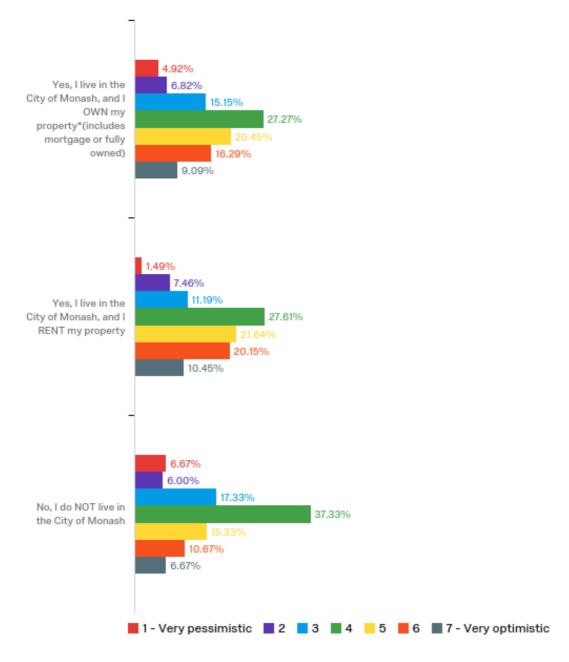




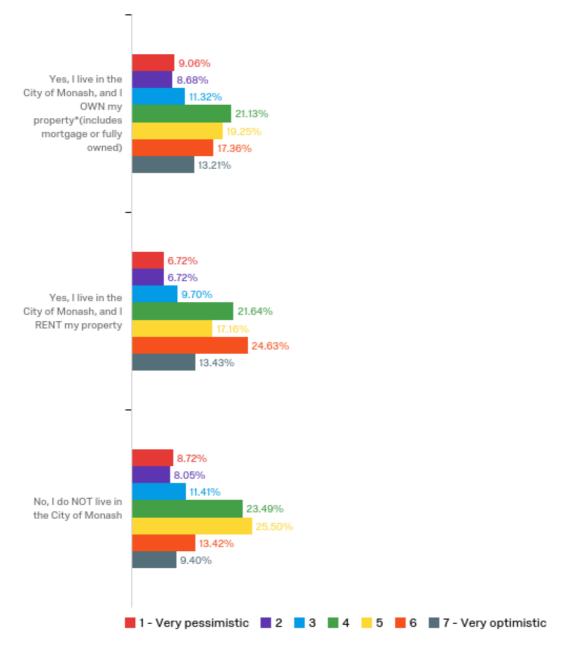


26. On a scale of 1-7, how does this image of the City of Monash Neighbourhood House make you feel about the future potential of renewables? (1= Very pessimistic and 7= Very optimistic).

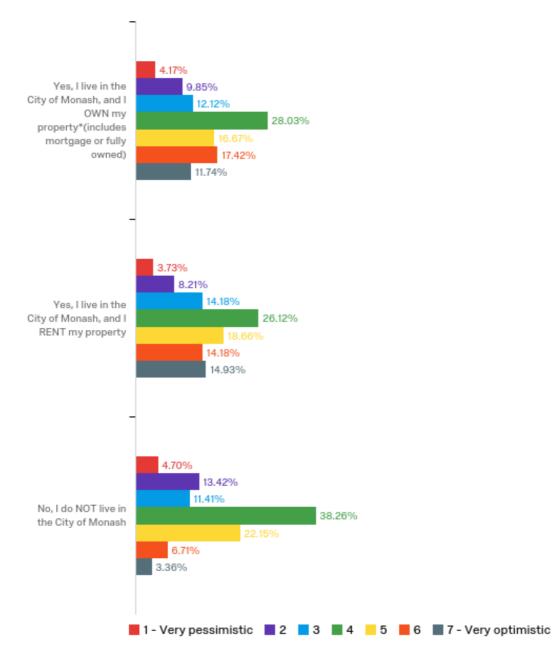




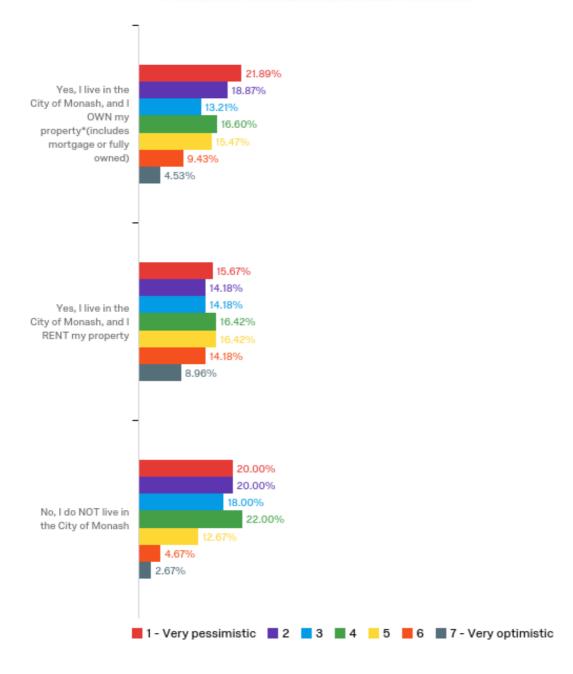




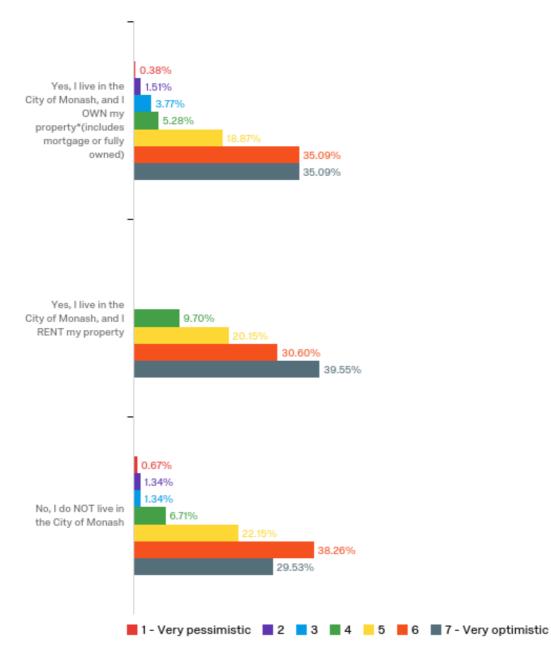




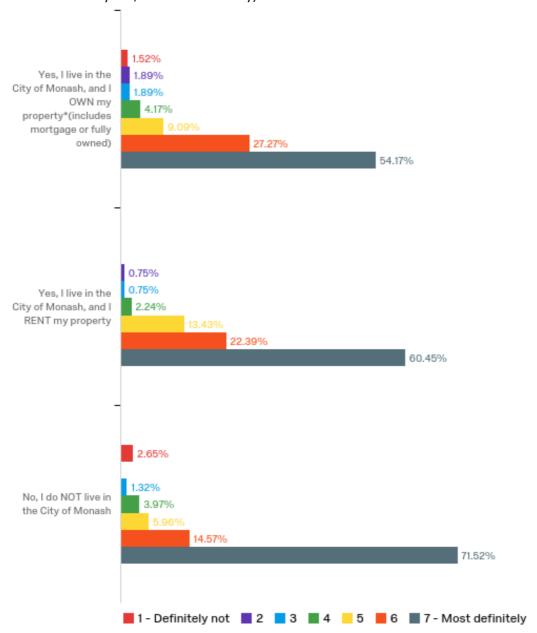




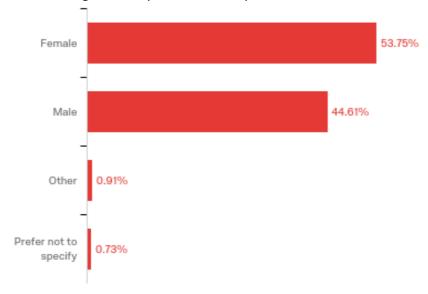




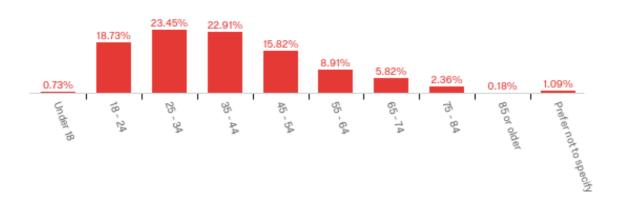
31. A Clean Energy Target provides an incentive for new low emissions forms of energy generation. Do you think the Federal Government should follow a Clean Energy Target? (1 = Definitely not, 7 = Most definitely)



32. What gender do you most identify with?



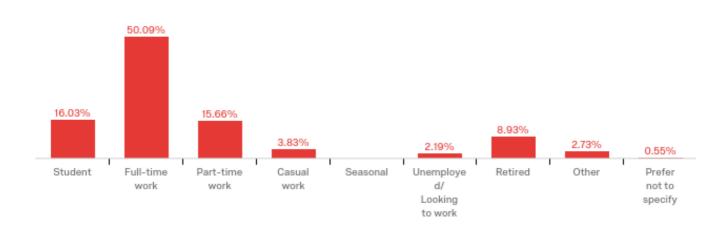
33. What is your age range?



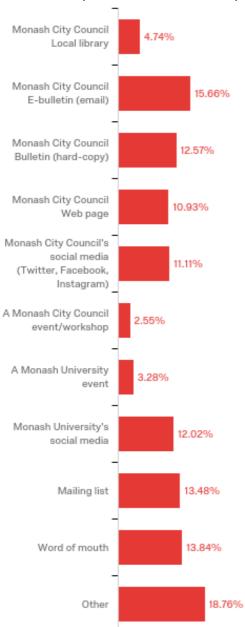
34. What is your Highest Educational Attainment Level?



35. What is your current employment situation?



36. How did you hear about this survey?



References

City of Monash, (insert publication date), *Environmental Sustainability Strategy Summary 2016-2026*, viewed 5th March 2018, https://www.monash.vic.gov.au/files/assets/public/our-services/environment/2016-2026-environmental-sustainability-strategy-summary.pdf

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Fischhoff, B. (2007). Non-persuasive communication about matters of greatest urgency: Climate change. *Environmental Science & Technology*, 41(21), 7204-7208. 10.1021/es0726411

O'Neill, S. J. (2013). Image matters: Climate change imagery in US, UK and Australian newspapers. *Geoforum*, 49, 10–19. https://doi.org/10.1016/j.geoforum.2013.04.030

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APPENDIX

Explanatory Statement used in Survey

Project: Visualising the Power of Renewables and Microgrids for Consumers in the City of Monash

Chief Investigator's name

Dr. David Holmes Communications and Media

Phone: 0399055496

email: David.Holmes@monash.edu

You are invited to take part in this study. Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

What does the research involve?

The survey seeks to evaluate the City of Monash Residents take up of domestic renewable technologies, including rooftop solar, battery storage and solar hot water. The survey will ask homeowners, business owners and renters how they feel about these technologies. For those who have not yet adopted any of them, or only some of them, the survey will ask what kinds of messages are likely to deter or to motivate them into purchasing such technologies.

The survey features a short animation of Monash University's net-zero emissions project launched on October 9th, and asks resident opinions on such a large project being launched in their municipality.

In taking the survey you will be asked to respond to approximately forty questions, with most of those being multiple choice answers and only two that invite you to add your own comments.

Why were you chosen for this research?

You were invited to complete the survey as you currently receive the City of Monash Monthly bulletin and are a resident or business owner within the city of Monash.

Consenting to participate in the project and withdrawing from the research

Consenting to the survey takes place on the opening page where is explains;

"You are invited to take part in a research survey conducted by Monash University and Monash City Council regarding *solar energy systems* such as solar panels, battery storage and solar hot water in the home and/or business.

Your responses will help Monash City Council better understand how to direct community engagement around renewables.

Your answers to this survey are anonymous, but if you'd like to go in the draw to win an iPad, please provide your email address and contact number at the end of the survey when prompted.

By clicking Yes to the above terms, you consent that you are willing to answer the questions in this survey.

This survey will take approximately 5-10 minutes.

Thank you for your time.

- NO (1)
- YES (2)"

Possible benefits and risks to participants

There are no risks to participants and all information that is recorded will be completely anonymous.

All Australians have important decisions to make about how to make their local and national environments more sustainable. Understanding the what drives consumer behaviour and sustainability decisions around renewables in the City of Monash is of benefit to all residents

Confidentiality

The data is anonymous at the point of collection, and the end-user of the data, Monash University, will not be a part of the collection process. Once collected the already anonymous individual responses will be aggregated for use in reports, journal articles and conference papers.

Storage of data

Qualitrics will save and store the data initially. The data will then be stored by the Monash Climate Change Communication Research Hub, and stored in secure servers within Monash University and destroyed after 5 years.

Results

Results of the findings will be published on the website of the Monash Climate Change Communication Research Hub

Complaints

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics (MUHREC):

Executive Officer

Monash University Human Research Ethics Committee (MUHREC)

Room 111, Chancellery Building E,

24 Sports Walk, Clayton Campus

Research Office

Monash University VIC 3800

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Thank you,

Dr David Holmes