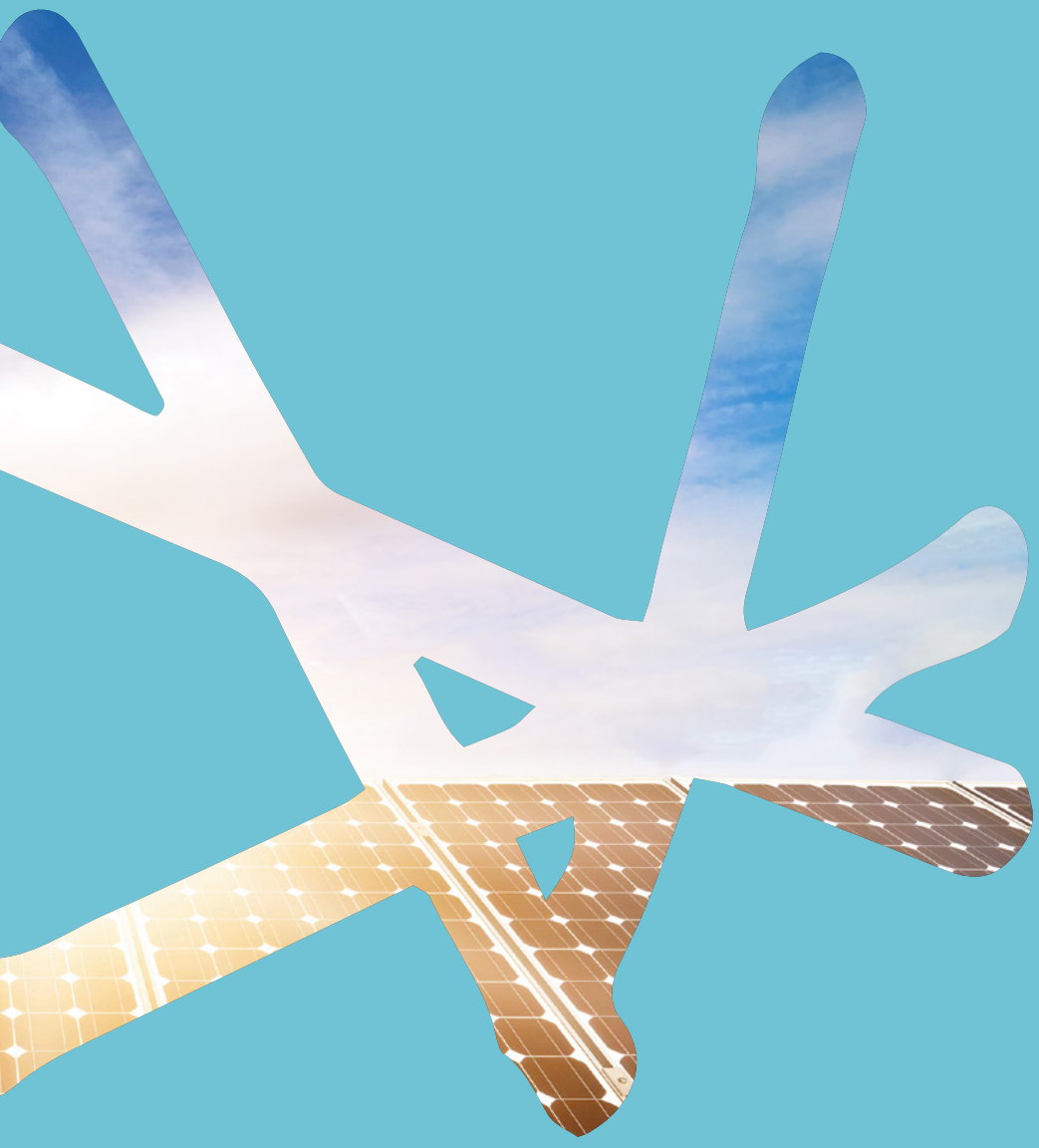
Ginninderry

Householder Attitudes to Residential Renewable Energy Futures



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Ginninderry is a joint venture project between the ACT Government's Land Development Agency and Riverview Developments Pty Ltd, with Riverview Projects (ACT) Pty Ltd acting as development manager.

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Infographics sourced with thanks from Accenture, Energy Consumers Australia & CSIRO as referenced (some colours modified from original).

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EXECUTIVE SUMMARY

The residential energy market is in a state of change. Advances in energy efficient appliances, falling battery storage prices and the continued uptake of solar PV are presenting householders with opportunities to install smarter energy systems that can deliver reductions in both energy bills and greenhouse gas emissions.

This report provides a snapshot of householder attitudes towards a number of residential renewable energy futures: energy efficient homes, solar PV combined with battery storage, a precinct-level residential microgrid and the option of a fully electric (no mains gas) suburb. It provides an insight into the current state of knowledge through combining relevant academic and industry research with learnings from a series of community workshops and surveys into the proposed energy solutions for Ginninderry, a major cross border residential area being planned and delivered by a Joint Venture between the ACT Government's Land Development Agency (LDA) and Riverview Developments Pty Limited (Riverview).

Financial considerations such as up-front costs, the effect on energy bills and payback periods are top of mind for householders considering renewable energy for their homes. Consumers are looking for payback periods of 3-4 years when investing in more efficient heating and hot water systems and appliances, while for investments in solar PV and battery storage longer payback periods are expected. The positive impact on property values rated highly as a benefit, reinforced by recent academic studies into the property markets of Australia and the US demonstrating between 2-5% uplift for homes with rooftop solar PV.

Environmental considerations also rate highly amongst householders and many see this as an equal priority with cost of living. However the 'knowledge-action gap' cautions that pro-environmental attitudes do not necessarily translate into pro-environmental behaviours. In addition, environmental concerns were raised about the lifecycle and recycling of equipment, particularly batteries.

There is a growing awareness of and interest in battery storage with half of workshop participants stating they had researched batteries, a figure echoed in a recent ACT wide consumer survey which found 41% were considering battery storage.

While initial awareness and understanding of microgrids is low, community members responded positively to the concept of a local microgrid, seeing it as well suited to Ginninderry. People saw benefits in its environmental impact, the ability to control their power and the social connectivity it could foster. Concerns centred on the set-up costs, ongoing maintenance and operating costs as well as governance issues relating to who would own such a system and how it would be run.

In the absence of any context relating to renewable energy, two thirds of Canberrans would consider living in a suburb with 'no mains gas'. This figure increased significantly amongst community members after attending a workshop about the alternatives to gas and the benefits of an energy solution that combined solar PV, energy efficient electric appliances and energy management. Likewise, Ginninderry builders, who in the Canberra climate would typically offer gas appliances as standard, responded positively to the option of a fully electric suburb and were of the opinion that it would present minimal barriers to sales.

Overview

The world is undergoing a period of rapid energy system transformation as it seeks to address climate change through a reduction in global greenhouse gas emissions. At the national level Australia has committed to reduce its emissions by 26-28 % on 2005 levels by 2030[1]. At state and territory level there are a range of targets, the most ambitious being the ACT's emissions reduction target of 40% below 1990 levels by 2020, net zero emissions by 2050 and a target of 100% renewable energy by 2020[2].

"Energy systems are being diversified, decarbonised, electrified and decentralised, a process set to face many challenges"

ADNAN AMIN, DIRECTOR GENERAL IRENA, 2016

Advances in renewable energy technology and falling costs of solar PV and battery storage are propelling a transition from the traditional centralised system of energy generation to a more decentralised and distributed system. Growing numbers of Australians are embracing these technologies and taking on new roles as both generators and consumers of energy within their homes.

OVERVIEW

MICROGRIDS

Precinct-level energy solutions such as microgrids, which have long been deployed in remote areas such as mining sites and island communities, are increasingly being considered and adapted for residential communities, both in urban contexts and greenfield developments. A microgrid is defined here as 'a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that can act as a single controllable entity with respect to the grid' (US Department of Energy). They can be either grid-connected or standalone systems operating off-grid.

Global microgrid capacity is expected to grow from 1.4 GW in 2015 to 7.6 GW in 2024[3]. This rapidly emerging sector is of growing interest to a wide range of stakeholders including industry, energy utilities, regulators, policy makers, developers and communities.

"While knowledge about microgrids among consumers is low, utilities expect them to proliferate in the next five years."

ACCENTURE, 2015[4]

CONTEXT

Ginninderry is a new residential development in the north west of the ACT extending across the ACT/NSW border into the Yass Valley (subject to planning approval). It is being planned and delivered by a joint venture between the ACT Government's Land Development Agency (LDA) and private developer Riverview Developments Pty Limited (Riverview) and will consist of some 4 new suburbs, containing approximately 11,500 dwellings and a wide range of urban services, facilities and amenities built over the next 30-40 years. The vision for Ginninderry as 'a sustainable community of international significance within the Capital Region'[5] has led the project team to explore a number of precinct-level energy solutions including the option of a residential microgrid and a fully electric (no mains gas) community. It should be noted that in the case of Ginninderry, the microgrid explored would be grid-connected (as opposed to a stand-alone system) maintaining its link with the main ActewAGL distribution network.

In 2016, the South East Region of Renewable Energy Excellence (SERREE), supported by funding from the Australian Renewable Energy Agency (ARENA), commissioned a social research project to explore the benefits of involving the community at an early stage in the decision-making process for precinct-level renewable energy solutions. The aim was to start to understand and address knowledge gaps surrounding the social dimension of renewable energy futures. The research was woven into Ginninderry's community consultation into the proposed energy solutions, to establish whether the energy options are in line with what people expect from a sustainable suburb. It also provides an opportunity to measure the impact of education and demonstration. The program structured to ensure responses and ideas from the local community and key stakeholders were fed directly into the decision-making process on the proposed energy solution for Stage 1 of the development.

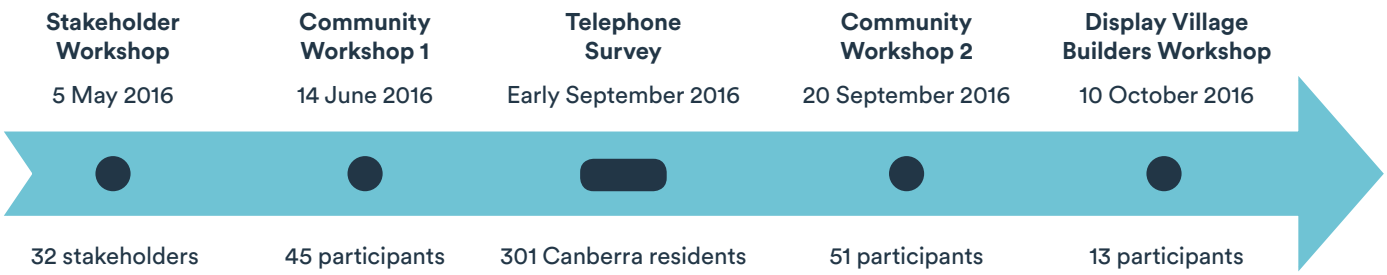
OVERVIEW

PROCESS

This social research project synthesises information in the public domain relating to consumer perspectives on renewable energy futures. It references current Australian and international research, from academic and industry sources. In many instances data and information is lacking due to the novel nature of the scenarios, confirming the existence of knowledge gaps.

Alongside existing research this report also presents key findings from a series of Ginninderry stakeholder and community workshops and surveys held in Canberra over the course of 2016. These were coordinated by QED Energy on behalf of Riverview and were delivered by ORIMA Research and the Ginninderry project team.

- **Stakeholder Workshop** – A stakeholder workshop involving members of industry, government, private and community sectors. The outcomes of this workshop were used to determine broad areas of interest for the subsequent community workshop.
- **Community Workshop 1** – A 3 hr community workshop involving 45 participants discussing renewable energy and the concept of a microgrid.
- **Telephone Survey** - A short telephone survey of 301 randomly selected Canberrans asking them about their gas usage and preferences. The raw sample was weighted by age and gender to match proportions in the ACT population.
- **Community Workshop 2** – Two identical 1.5 hr community workshops involving 51 participants in total examining responses to a fully electric (no mains gas) suburb before and after an education/demonstration session.
- **Display Village Builders Workshop** – A stakeholder workshop involving 13 Ginninderry display village builders examining responses to a fully electric (no mains gas) suburb before and after an education/demonstration session.



Cautionary note

Readers are cautioned against extrapolating the results from the community and builder workshops to the wider population. Participants in the workshops were recruited to give a cross section of the community, but they are not representative of the total population in a statistical sense. As such, participant numbers have been used rather than percentages for results from the community and builder workshops. While results from these workshops are not statistically representative of the broader population they are still meaningful. and significant within the parameters of this study.

Results from the telephone survey have been provided as percentages due to the statistical significance of the survey participants to match the population of the ACT.

Results or findings from external sources have been provided in their original format (typically percentages).

Please also note that not all participants answered all questions during workshops and surveys. The number of participant answers completed have been provided in the findings throughout this report.

This report provides a snapshot of the main results. The full reports from each of these workshops are available on request from the Ginninderry project team.


Findings

FINDINGS

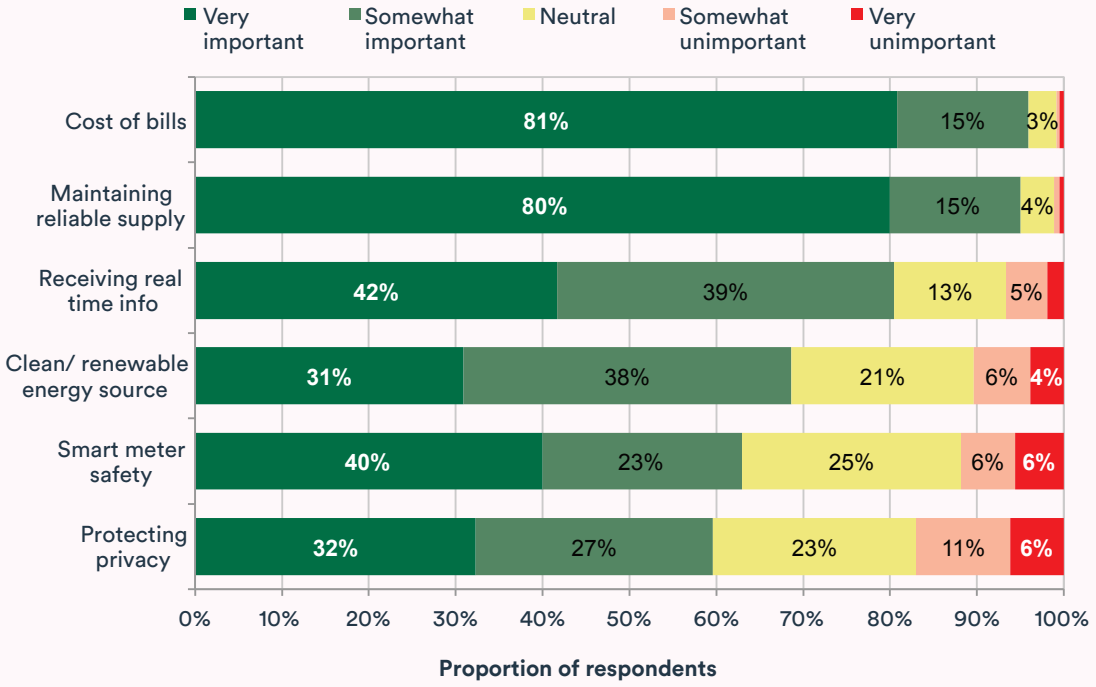
FINANCIAL CONSIDERATIONS

National research[6,7] suggests that financial considerations, including initial set-up costs, the effect on energy bills and payback periods, are top of mind for most householders considering renewable energy options.

ENERGY BILLS AS MAIN DRIVER

Findings from the Smart Grid, Smart City project[6] indicated that the cost of electricity bills was the most important priority for 96% of respondents.

Importance placed on different priorities relating to electricity supply



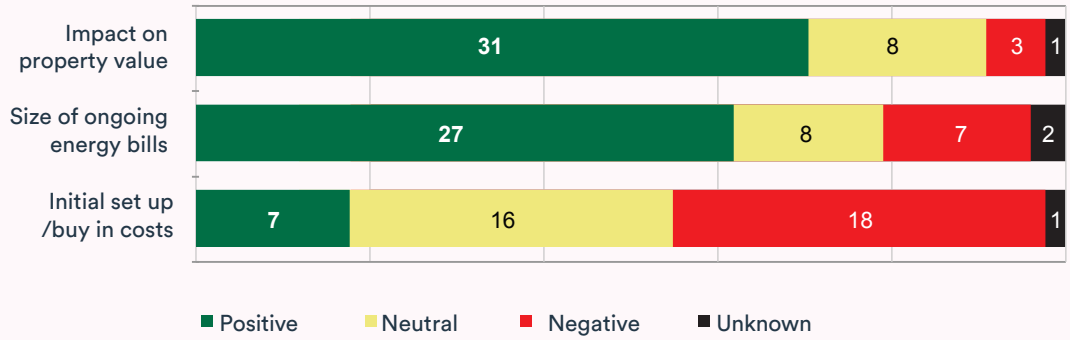
Source: Smart Grid, Smart City Customer Research Report, 2014[6]

In a national CSIRO survey[7] householders were most interested in purchasing solar PV upfront, with similar preferences expressed across different income groups. However, among those with an annual income of $60,000 or less, there was a preference for leasing and entering into contracts with energy service providers when compared with higher income groups.

UPFRONT COSTS & PAYBACK PERIODS

Similar attitudes regarding the financial aspects of renewable energy were expressed in the Ginninderry Community Workshop 1. Participants listed the reduced size of the ongoing energy bill as the third largest positive of renewable energy.

When you think about the idea of renewable energy... does each of the following feel like a positive, a negative, a neutral factor or an unknown?

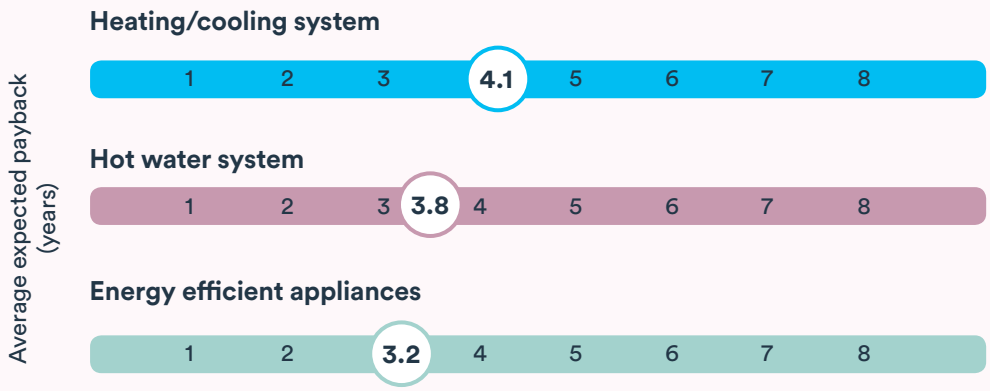


Source: Ginninderry Community Workshop 1, 2016.
Responses from 45 participants.

Initial setup costs were seen as the greatest barrier to uptake of renewable energy, with 18 of 42 participants taking a negative view.

Regarding payback periods, workshop participants looked to pay off investments in energy efficient appliances in around 3 years for smaller purchases and 4 years for larger ones.

How quickly would you need to pay off an investment in energy efficient appliances to make it seem appealing?

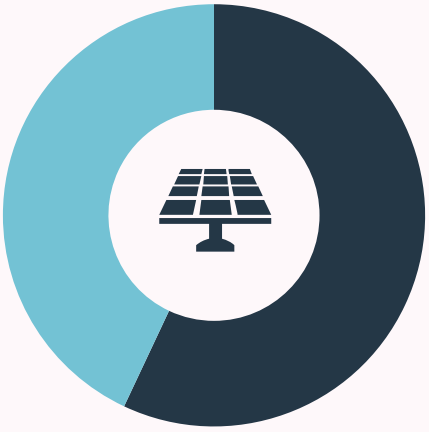


Source: Ginninderry Community Workshop 1, 2016.
Responses from 45 participants.

Accenture's international energy consumer research[4] found that 50% of those who are interested in investing to 'become energy self-sufficient' expect a payback period of less than 5 years, with 43% expecting a longer period of between 5 and 10 years.

More than half of consumers are looking for a short investment payback period for becoming power self-sufficient.

Would you consider investing in becoming power self-sufficient so you would not have to buy energy from your energy provider (e.g. by nstalling solar panels and storage)?



57%
Yes

What would be the acceptable payback period (i.e. the time it takes to recover your initial investment) for you to invest in technologies to become power self-sufficient?

50%
Less than five years

43%
Between five to 10 years

7%
Beyond 10 years

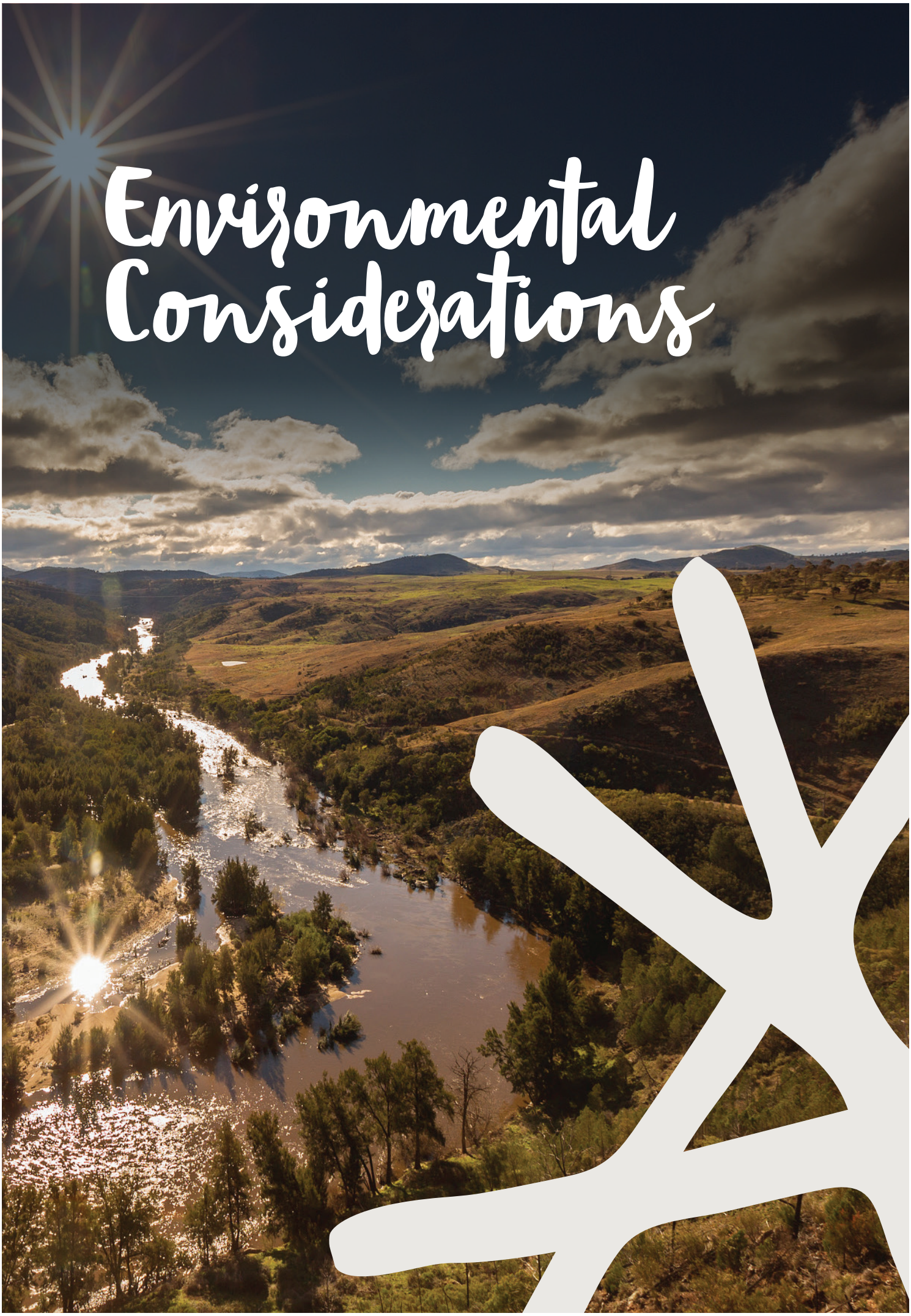
Source: Accenture, 2015[4]

IMPACT ON PROPERTY VALUE

Beyond short term cost recovery through reduced energy bills, renewable energy assets can also deliver longer term returns. Ginninderry workshop participants rated the impact on property value as the second-most positive attribute of renewable energy assets.

A 2015 study[8] of the Perth property market found that rooftop solar PV added a 2.3-3.2% premium to the property price. This finding is similar to a number of US studies[9,10,11] that found solar PV delivered a price uplift in the range of 3.5-5.4%.

Environmental Considerations



FINDINGS

ENVIRONMENTAL CONSIDERATIONS

Alongside financial considerations, the environmental benefits of renewable energy and its ability to deliver lower greenhouse gas emissions are seen by most consumers as an important consideration.

MULTIPLE PRIORITIES

Whilst financial matters are a near-universal concern for householders, environmental concerns are more value-based and somewhat less widespread.

CSIRO's national survey[7] indicated that 40% of Australians have a view that cost of living and protecting the environment should be on an equal footing, but amongst the remainder more people place cost of living as a higher priority.

Attitudes towards environment versus economic priorities

Which of the following statements best describes your view?	Frequency	Percentage
In Australia, the highest priority should be given to protecting the environment, even if it increases the costs of living for my household.	**271**	**11.01%**
In Australia, both the environment and maintaining the costs of living to my household are important, but the environment should come first.	**524**	**21.27%**
Both, the environment and maintaining the costs of living, are equally important in Australia.	**988**	**40.11%**
In Australia, both maintaining the costs of living to my household and protecting the environment are important, but the costs of living to my household should come first.	**680**	**27.61%**
In Australia, the highest priority should be given to decreasing the costs of living to my household, even if it hurts the environment.	**271**	**11.01%**

Source: CSIRO, 2013[7]

For participants of the Ginninderry Community Workshop 1, when asked about renewable energy the overall environmental impact was rated as the most positive (over cost), with 36 of 44 respondents seeing it favourably.

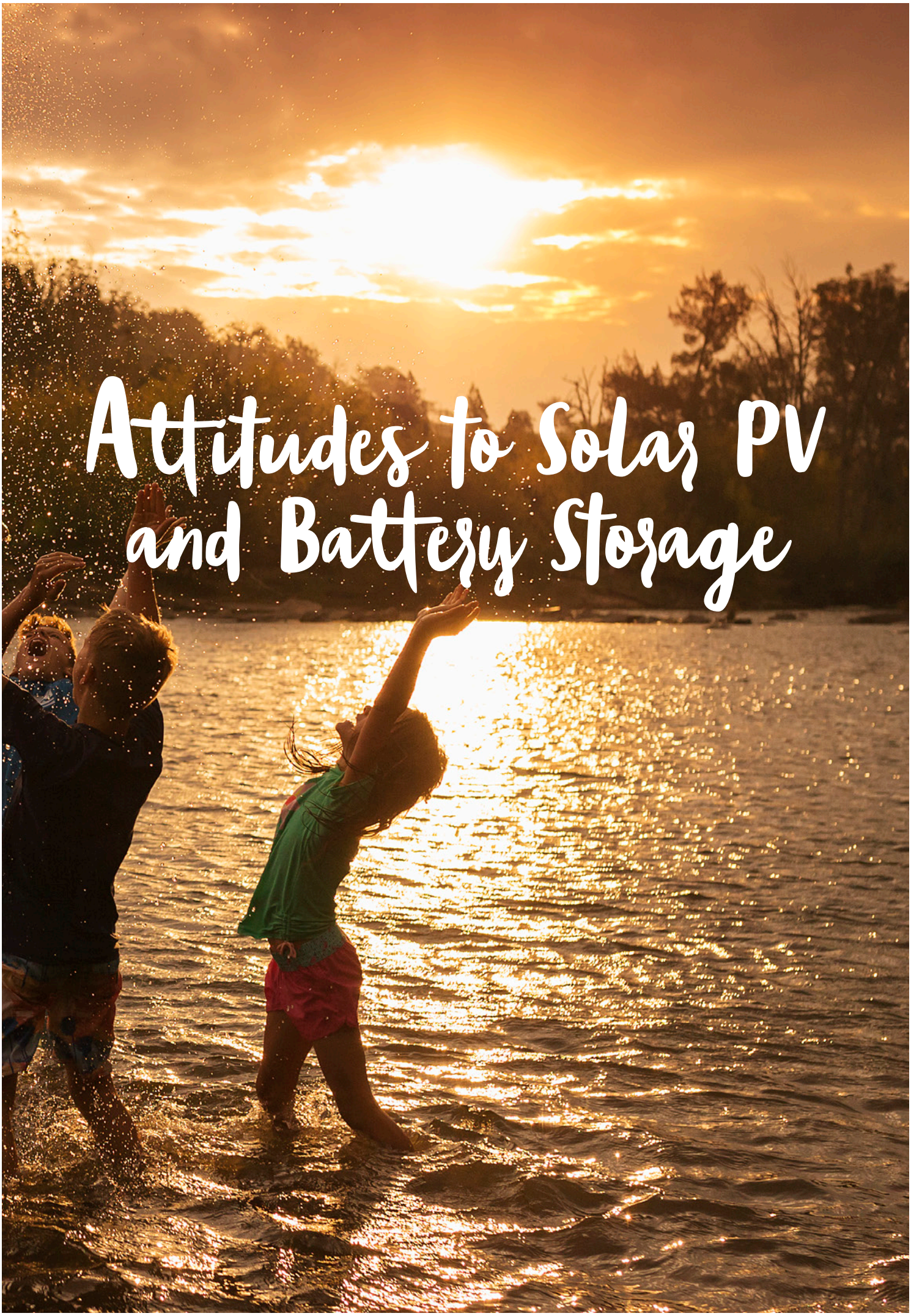
The CSIRO study[7] also found that some householders supportive of renewable energy technologies valued the environmental benefits of the system more highly than reliability. This indicates a complex interplay between environmental attitudes and other factors for householders considering renewable energy options.

ATTITUDES VS BEHAVIOURS

It is widely acknowledged that, for a variety of reasons, pro-environmental attitudes do not necessarily translate into pro-environmental behaviours, resulting in the so-called 'knowledge-action gap'.

Research[12] indicates that while people report that they are concerned about climate change and understand the significance of saving energy, this concern does not necessarily translate into practical, ongoing efforts to reduce household energy consumption. Likewise while many customers are supportive of renewable energy and say they are willing to pay a price premium, only a small segment move from interest to purchase of 'green power'.

Lastly, renewable energy is not seen as entirely environmentally positive. Concerns were raised in the Ginninderry workshop about the life cycle and recyclability of renewable energy assets, particularly batteries.



Attitudes to Solar PV and Battery Storage

FINDINGS

ATTITUDES TO SOLAR PV AND BATTERY STORAGE

This section considers consumer attitudes towards residential solar PV and battery storage. Investigating attitudes towards these technologies is a useful starting point because:

- Ginninderry is exploring a range of energy options of which a microgrid is but one, whereas solar PV and energy storage are likely to feature in most scenarios.
- There is a lack of research into the social dimensions of a renewable energy microgrid, while research on more established component technologies such as solar PV is readily available.

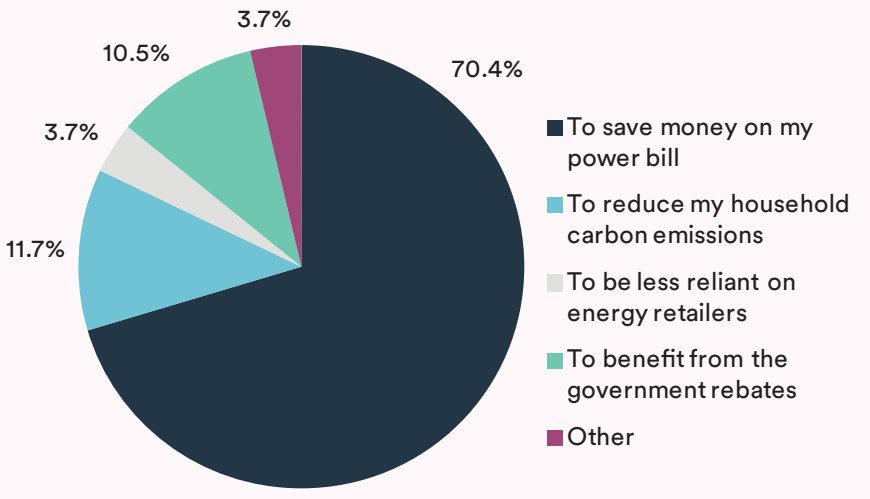
UPTAKE OF SOLAR PV

Australia currently enjoys the highest uptake of residential rooftop solar in the world with the Australian Energy Council[14] reporting that 15% of all households currently have installed solar PV on their homes.

The Energy Consumers Australia's (ECA) 2016 survey[15] provides state and territory figures with 17% of ACT residents reporting they 'already have' solar installed and a further 43% are 'considering' it.

Australian developers are increasingly considering precinct-wide renewable energy solutions to complement house and land packages in new suburbs. In October 2015, Capital Estate Developments, the developers of the ACT suburb of Denman Prospect set a new standard by becoming the first large-scale Australian suburb to mandate a 3kW solar PV array for every detached home.

MOTIVATIONS TO INSTALL SOLAR PV



Motivations for households already using solar PV
Source: CSIRO, 2013[7]

70% motivated by a desire to reduce their energy bill

12% motivated by environmental considerations

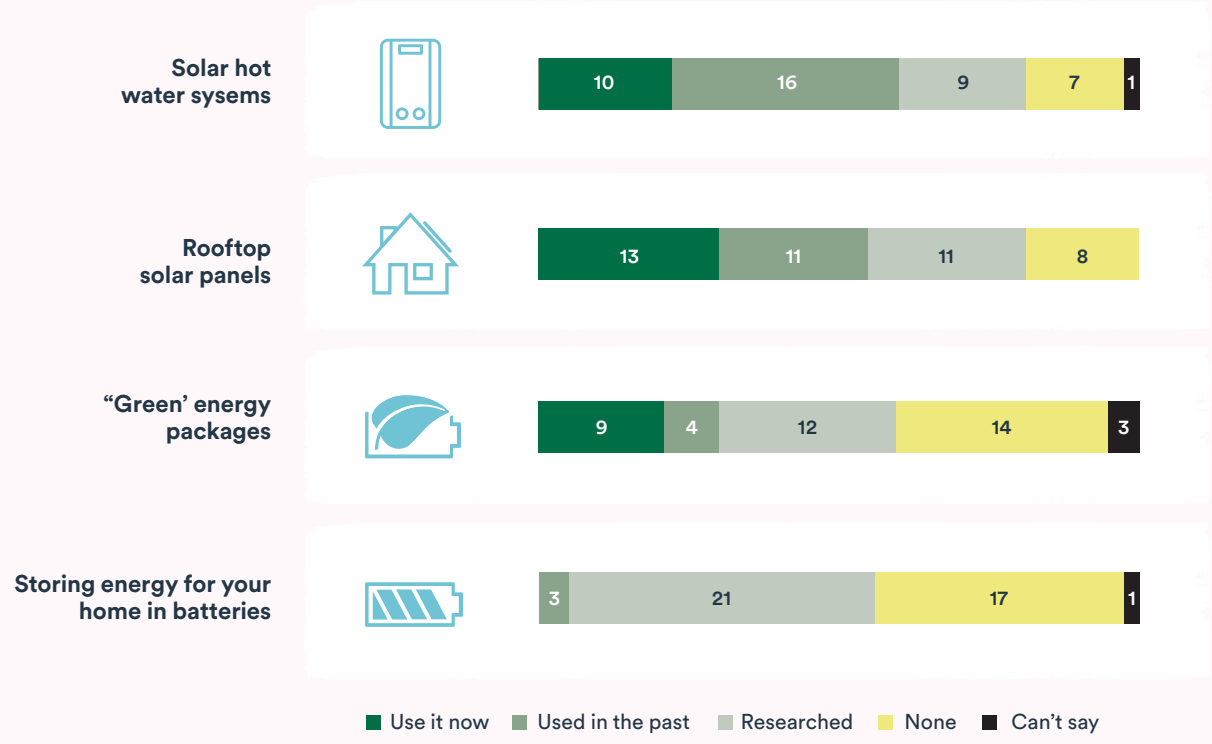
The CSIRO study[7] found that:

- Amongst those yet to install there was a high interest in and acceptance of renewable energy options. These householders were most interested in the option of solar PV plus batteries with a grid connection.
- Householders considering installing solar and/or battery systems valued cost savings, reliability and durability of the technologies, meeting electricity needs and the provision of uninterrupted power as the most important attributes.
- Home owners and those living in free-standing houses had higher levels of interest compared with renters or those living in apartments.

GROWING INTEREST IN BATTERY STORAGE

The ECA's 2016 report[15] found that 41% of ACT respondents are 'considering' battery storage. This statistic mirrored the experience of Ginninderry's workshop participants, half of whom (21 of 42) said that they had researched battery storage.

What is your personal experience of...



Source: Ginninderry Community Workshop 1, 2016.
Responses from 45 participants.

Attitudes towards the concept of a microgrid

FINDINGS

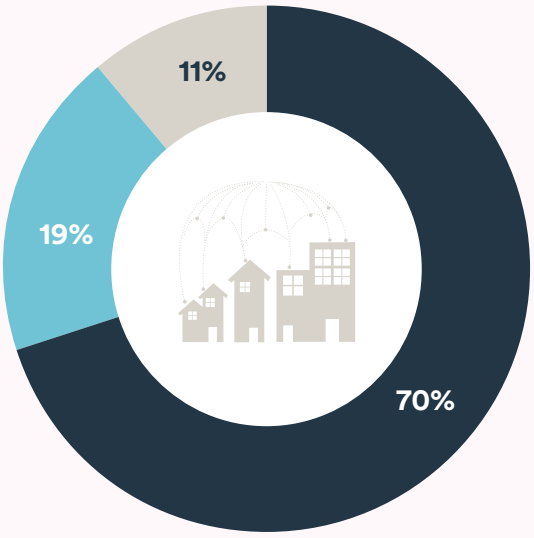
ATTITUDES TOWARDS THE CONCEPT OF A MICROGRID

Distributed energy solutions such as microgrids disrupt the traditional centralised energy system and they also represent a major change in how people interact with their energy. It is a transition that sees people moving from being consumers to becoming prosumers (producers & consumers) and even sharers of energy. The model of a residential microgrid is predicated on community buy-in, acceptance and involvement and will only gain traction if it is something that works well for and meets the needs of the people it is created to serve.

CRITICAL KNOWLEDGE GAP

Residential microgrids are at the frontier of energy system innovation, consequently there is little academic or industry research specifically exploring community or householder attitudes to them. Awareness and understanding of the concept is low with Accenture's 2015 survey[4] indicating that 70% of Australians haven't heard of a microgrid while 19% have heard of it but don't know what it is.

Have you heard of or are you aware of what a microgrid is?

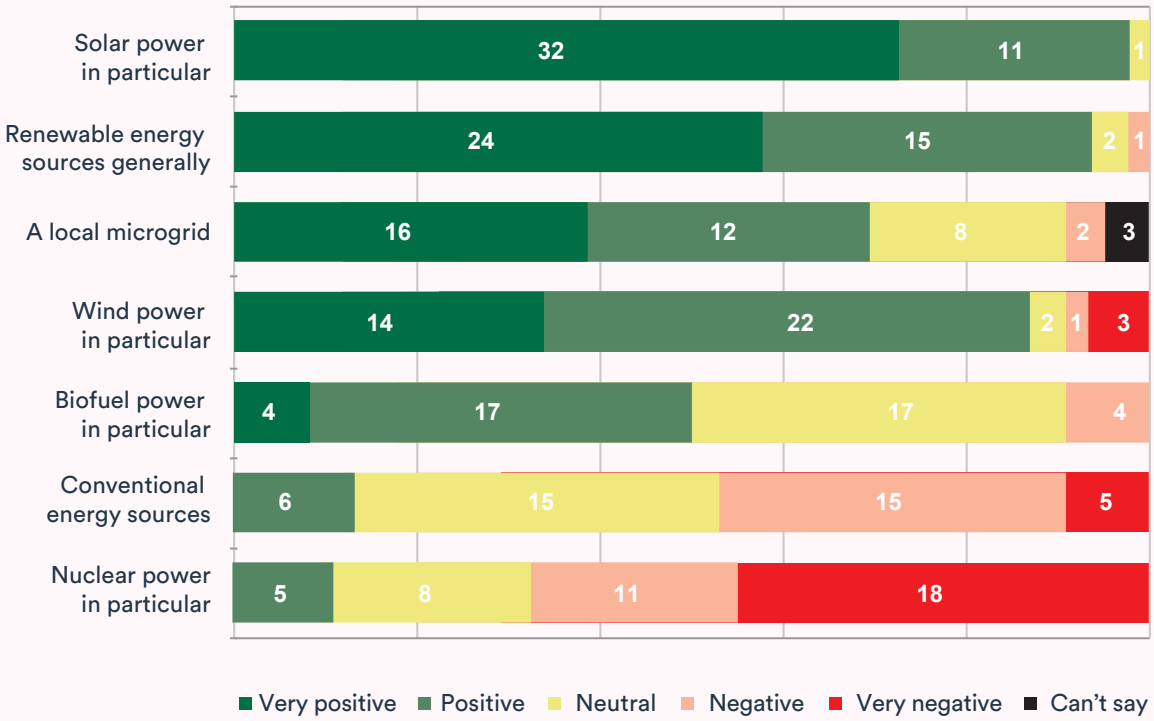


Source: Accenture (2015)[4]

POSITIVE INITIAL DISPOSITION

Before the microgrid concept was introduced workshop participants ranked their response to a range of energy supply options. Over half (28 out of 44) felt positively disposed to the concept of a local microgrid, indicating an initial level of awareness.

How do you feel about each of the following in relation to the power supply for your household?

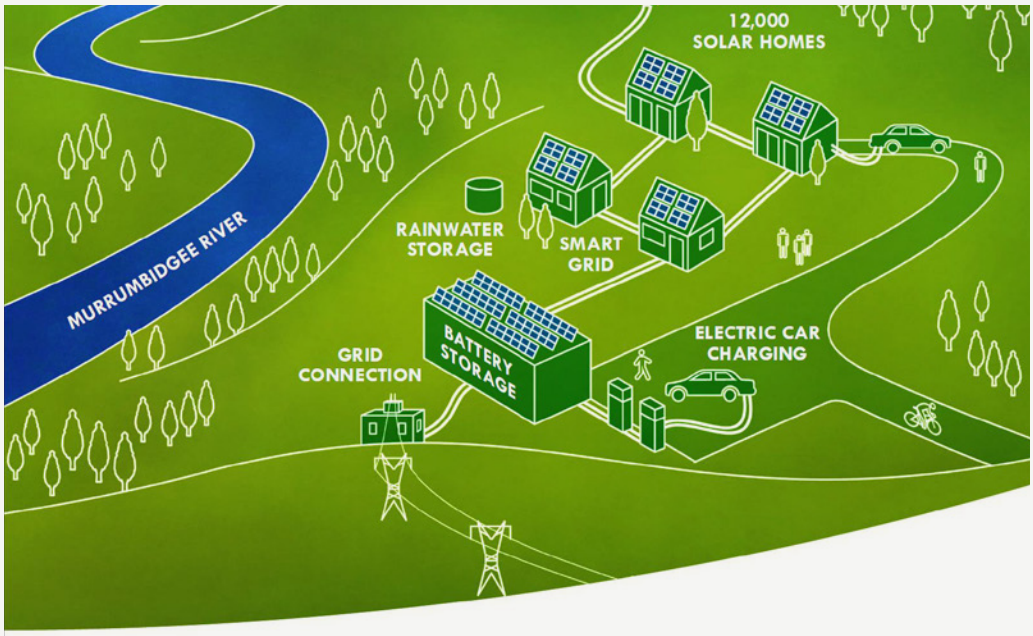


Source: Ginninderry Community Workshop 1, 2016.
Responses from 45 participants.

INTRODUCING A RESIDENTIAL MICROGRID CONCEPT

The concept of a microgrid was then described and outlined as likely containing the following:

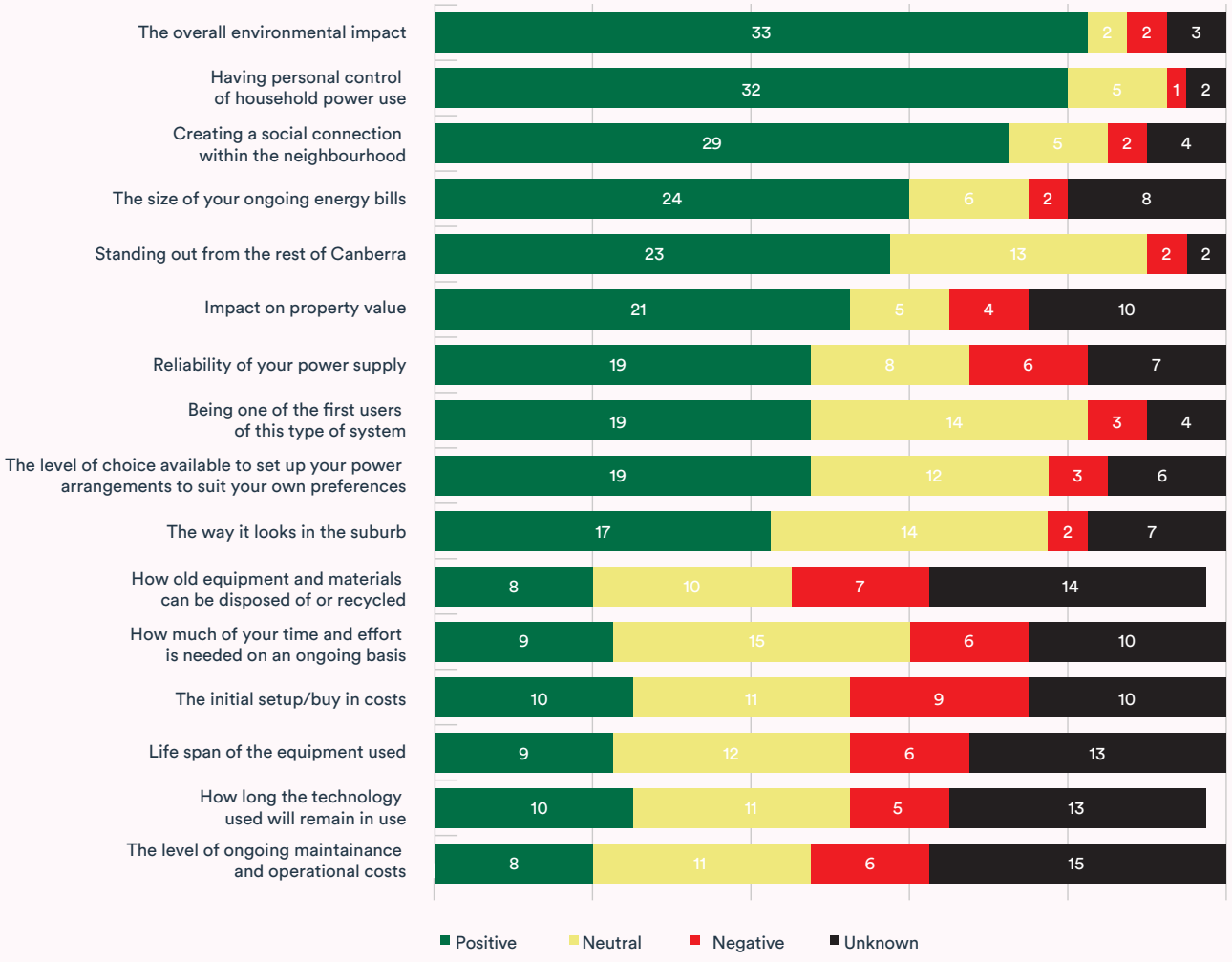
- Solar PV on roof (mandated)
- An in-home Energy Management System (wall display/smart phone app)
- Electric vehicle charging point in garage
- In-home battery storage (if desired)
- Centralised battery storage within neighbourhood
- Energy shared and optimised across participating households
- Reduction in energy bill
- Retail choice



POSITIVES AND CONCERNS

Once the microgrid concept was explained, the workshop participants were then asked what they thought about the idea in relation to a number of its characteristics. The four main positives were the environmental impact, ability to control your own power, the social connectivity that a microgrid could facilitate amongst neighbours. The major concerns related to the set-up costs, ongoing maintenance and operational costs and the equipment's life span.

When you think about the idea of the microgrid... does each of the following feel like a positive, a negative, a neutral factor or an unknown?

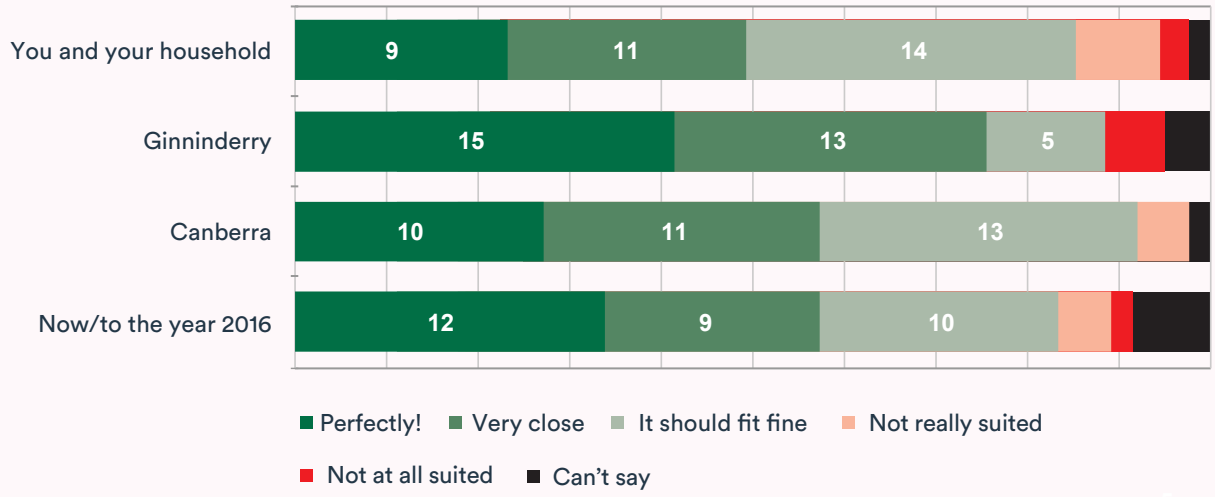


Source: Ginninderry Community Workshop 1, 2016.
Responses from 45 participants.

While a deeper understanding of the microgrid concept appears lacking there seems to be both interest and support once people are provided with information. This was reflected by the predominantly positive response of participants in the Ginninderry community workshop towards the microgrid concept.

In asking participants about the perceived relevance of the microgrid concept, nearly 80% felt that the microgrid was suited to their household, and more still that it was suited to the Ginninderry development.

How well does this microgrid idea feel it's suited to...



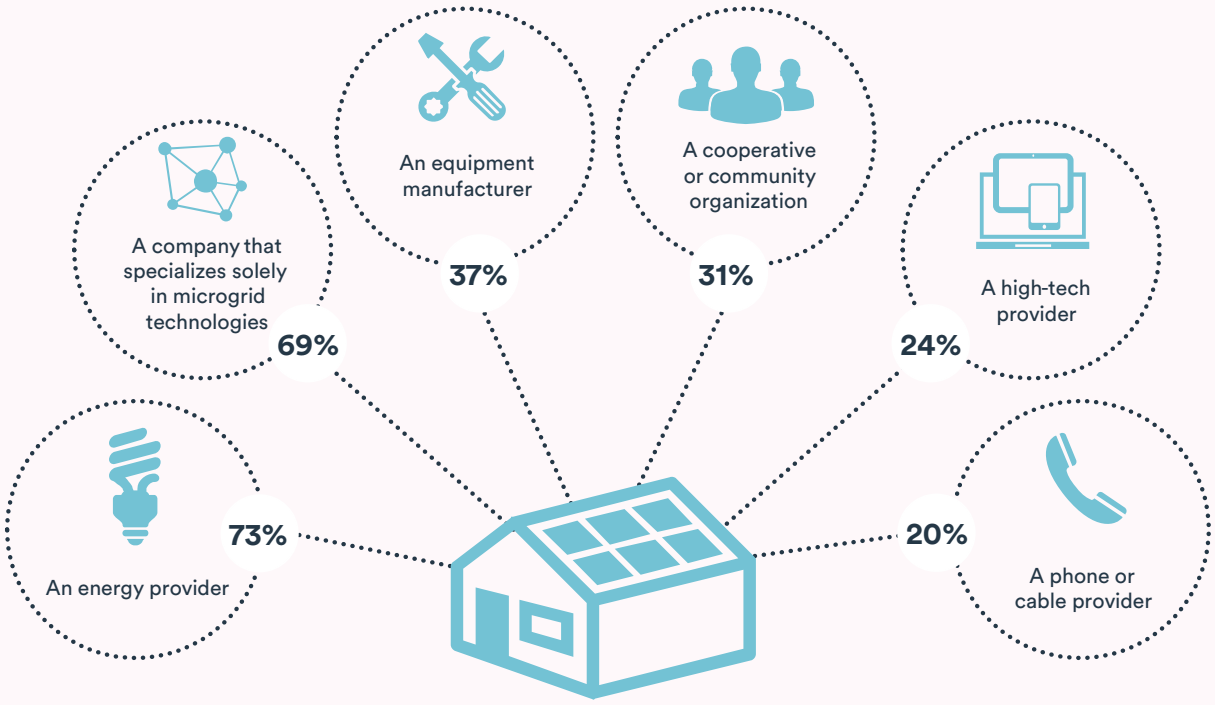
Source: Ginninderry Community Workshop 1, 2016.
Responses from 45 participants.

However it should be noted that participants also displayed a lack of confidence regarding their understanding of the benefits and possible obligations, of living in a household within a microgrid. This is likely the result of the unfamiliarity and complexity of the microgrid concept.

GOVERNANCE

Accenture's 2015 New Energy Consumer report[4] indicates that at this early stage of microgrid awareness Australian consumers expressed a preference for energy providers and/or microgrid specialists to install, maintain and manage a local microgrid.

If a microgrid was developed in your area, who do you believe should install, maintain and manage it?

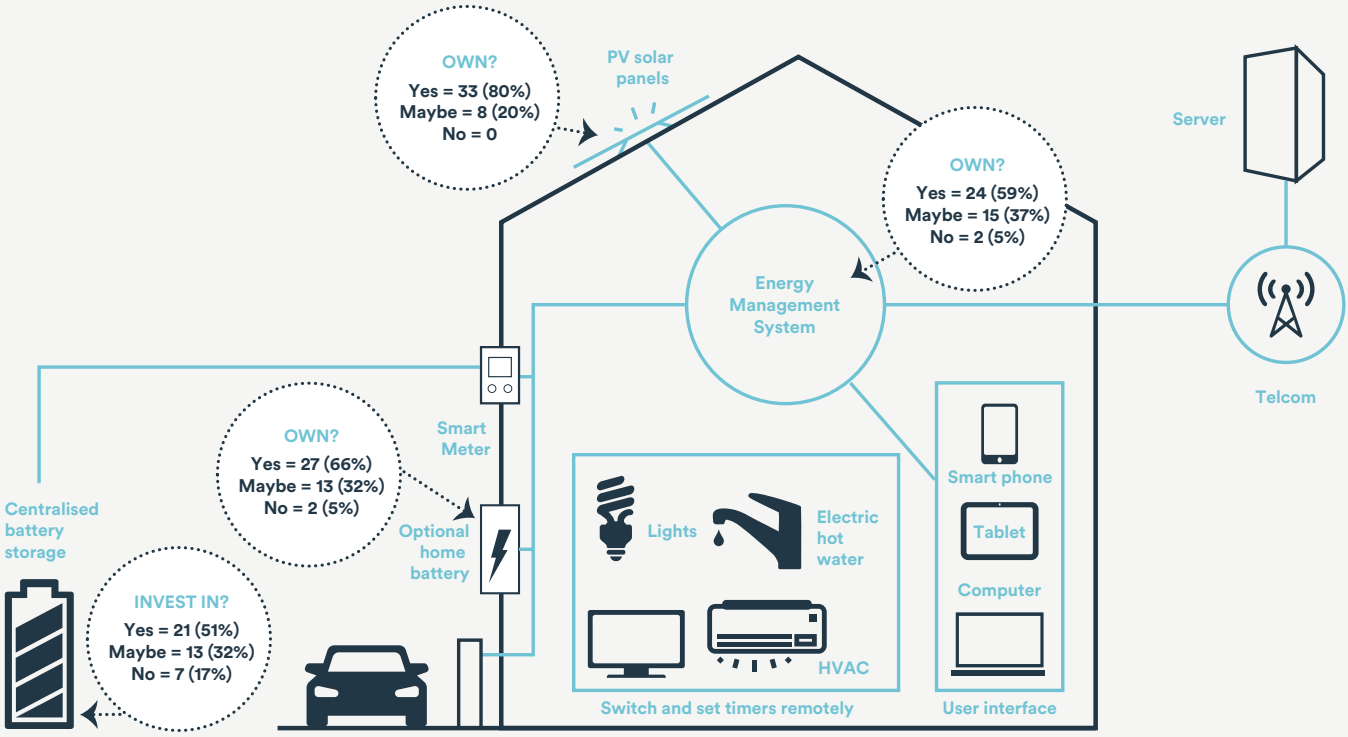


Source: Accenture, 2015[4]

Issues of governance and ownership were raised numerous times by Ginninderry workshop participants. When asked unprompted about their concerns or the potentially negative aspects of a residential microgrid, 6 of 7 workshop groups mentioned governance and ownership. Concerns centred on what kind of entity would control the microgrid, the potential for conflict between the community and operating entity, and the ability for community members to participate in decision making.

OWNERSHIP OF ASSETS

Nonetheless there was strong interest from participants in owning or investing in the infrastructure and equipment of a microgrid. Interest in owning or investing was highest for solar PV panels and individual home battery storage.

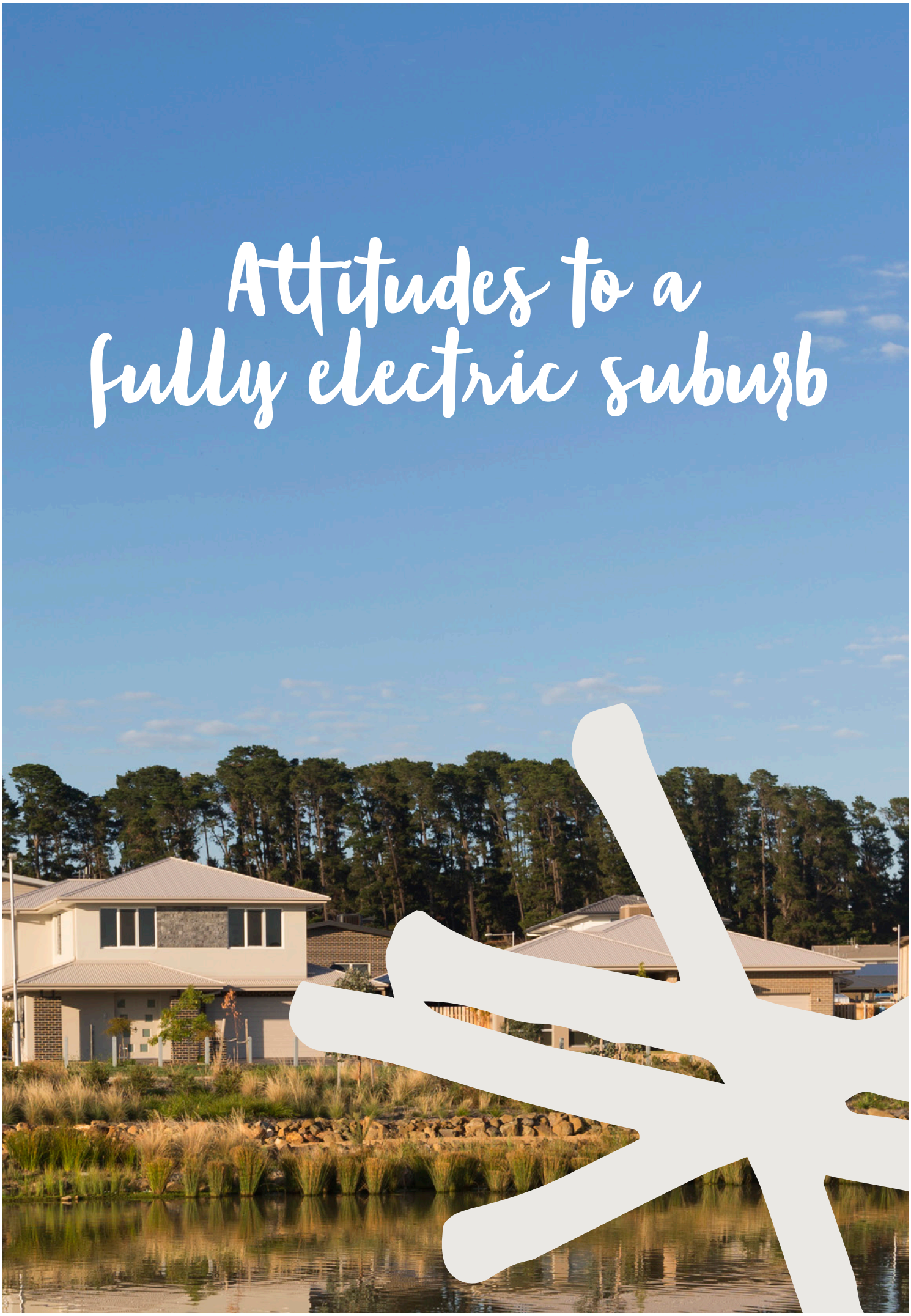


Source: Ginninderry Community Workshop 1, 2016

DATA PRIVACY

Microgrids and other interconnected renewable energy systems require the sharing and aggregation of consumer energy data which raises issues regarding data privacy. Research by Accenture[16] indicates that two thirds of surveyed Australians would not be deterred from signing up to such programs provided they had given consent and there was perceived value.

Attitudes to a fully electric suburb



FINDINGS

ATTITUDES TO A FULLY ELECTRIC SUBURB

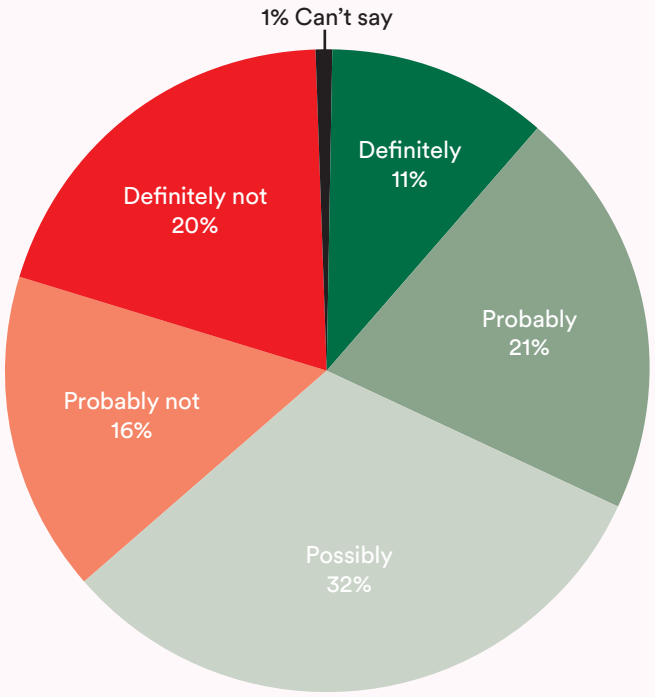
In most of the energy scenarios being explored for Ginninderry, solar PV and high efficiency electric appliances are being considered. If these are mandated and/or incentivised this would result in minimal uptake of mains gas connections across the suburb. In turn this may lead to gas infrastructure being built that is underutilised and becomes a stranded asset unable to make a financial return. In order to assess the option of not rolling out gas infrastructure, and to understand how consumers would respond to 'no mains gas' in the context of a fully electric renewable energy solution, the second phase of Ginninderry community research was designed to focus squarely on this issue.

Whilst there are a significant number of Australian suburbs, particularly in Queensland that are not reticulated with mains gas, in the ACT gas is currently standard. There is no national study or research that directly investigates consumers' attitudes towards not having mains gas as an option, consequently this section relies entirely on Ginninderry's survey and workshop results.

PREFERENCES & WILLINGNESS TO CONSIDER NO MAINS GAS

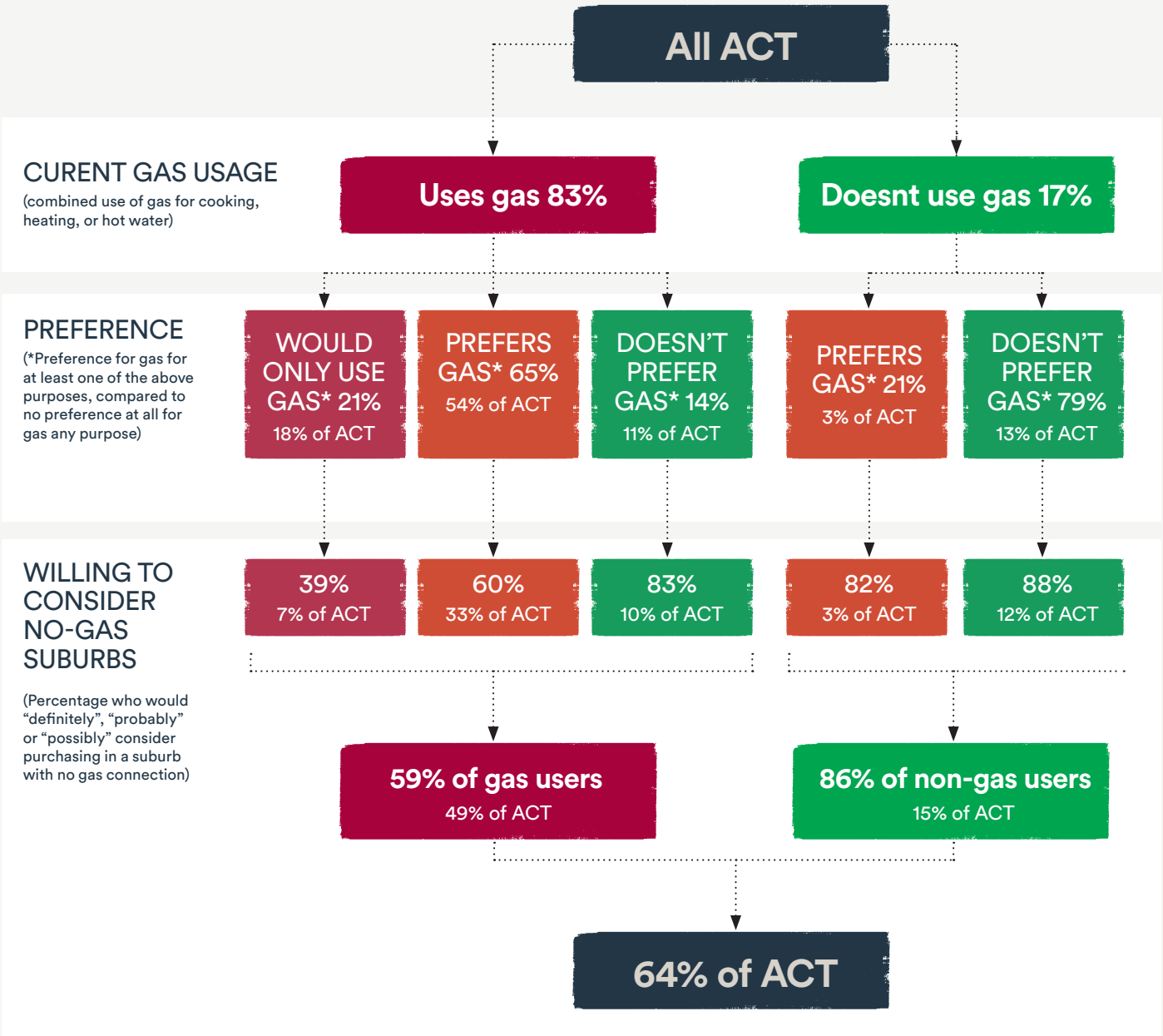
The first part of this research was a quantitative telephone survey of 301 Canberrans, (weighted to population). It shows that 64% of people would consider a suburb without mains gas. Note that survey respondents were not provided with any context on this being part of an overall energy solution.

Would you consider buying a house in a suburb you like that only had electricity connections, but not gas?



Source: Ginninderry telephone survey, 2016.
301 participants

The flowchart below shows the responses and the interaction between respondent's current gas usage, preferences and willingness to consider a no mains gas suburb.

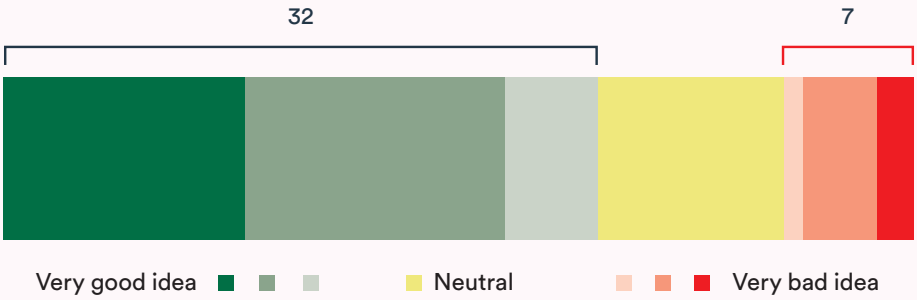


Source: Ginninderry telephone survey, 2016.
301 participants extrapolated to all of ACT.

INITIAL DISPOSITION OF WORKSHOP PARTICIPANTS

Two 90-minute interactive workshop sessions were held at the Foodish cooking school in Belconnen with a total of 51 participants attending across the two sessions. Participants were asked at the beginning of the workshop how they felt if gas was not incorporated into the new suburb at Ginninderry. Participants were generally positive about the idea with two thirds of participants (32 of 51) considering it a good idea. Just 7 participants surveyed felt it was a bad idea.

How do you personally feel about the idea of not building gas into the new suburb at Ginninderry?



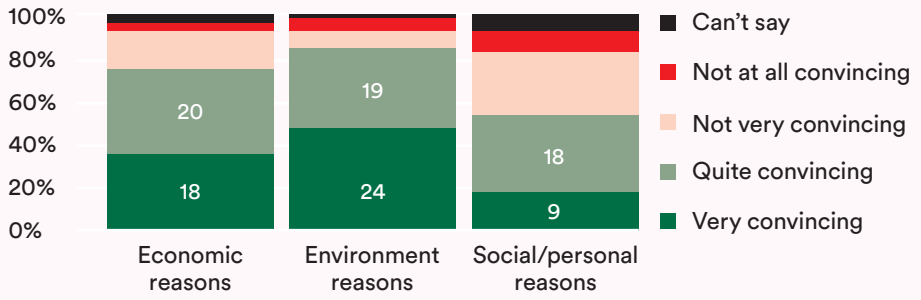
Source: Ginninderry Community Workshop 2, 2016.
Responses from 51 participants.

ATTITUDE SHIFT THROUGH EDUCATION AND DEMONSTRATION

The purpose of the workshops was to see whether those people who had a predisposition towards use of gas would be moveable in their opinions if provided relevant information about electric options. The workshops included an introduction to the concept of a solar PV and energy efficient suburb and the reasons (economic, environmental and social) for considering no mains gas. Information was provided about electric alternatives for the three main uses of gas (heating, hot water and cooking) including a 30-minute demonstration of induction cooking.

When presented with the economic, environmental and social reasons for having no gas, the environmental and economic reasons were most persuasive to participants.

How convincing do you personally find each of the reasons we are considering not building a gas network?



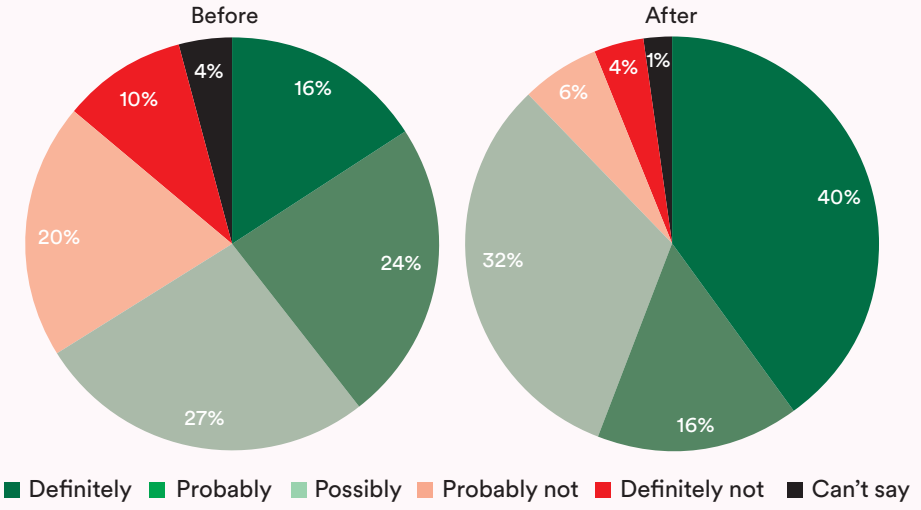
Source: Ginninderry Community Workshop 2, 2016.
Responses from 51 participants.

Participants were asked at the beginning of the workshop if they would consider buying a house in a suburb that they liked if it only have an electricity connection (and no gas). Prior to any eduction, it was found that 10% of the 51 participants would 'definitely not' consider buying a house in a fully electric suburb.

In contrast, after listening to the reasons for a fully electric suburb, and the alternatives to gas for heating, cooking and hot water, only 4% of the 51 participants were still against the idea.

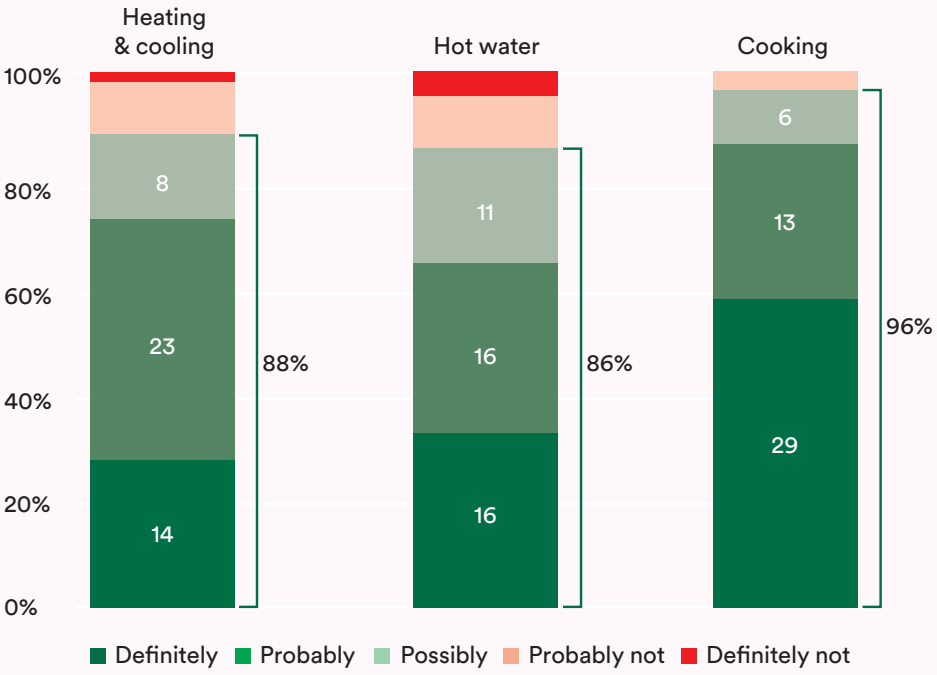
Where initially only 67% of participants would at least possibly consider buying a house in a suburb that was fully electric, this percentage increased to 88% of participants throughout the workshop.

Would you consider buying a house in a suburb you like that only had electricity connections, but not gas?



Source: Ginninderry Community Workshop 2, 2016.
Responses from 51 participants.

Given what we just talked about, if you were to build a new house sometime soon – how likely would you be to consider using this electric technology for your...



Source: Ginninderry Community Workshop 2, 2016.
Responses from 51 participants.

In terms of the 'proof-of-concept' that the workshop wanted to see if it could achieve – this result strongly suggests that it is possible to sway at least some people who are initially less disposed to the concept to at least consider a gas network-free suburb through the types of fairly simple information provided in the workshop.

BUILDERS ATTITUDES TO A FULLY ELECTRIC SUBURB

13 Ginninderry display village builders attended a workshop in October 2016. All 13 builders currently offer their customers instantaneous gas hot water and gas stove-tops as part of their base inclusions list, with 9 out of 13 offering ducted gas heating.

How do you feel about the idea of not building gas into the new suburbs at Ginninderry?

Source: Ginninderry Builder's Workshop, 2016.
Responses from 13 participants.
Each hat represents one response

Heating - 6 builders reported that they would now recommend electric over gas heating to their clients, 6 stated that they already do and only 1 participant said they would still recommend gas.

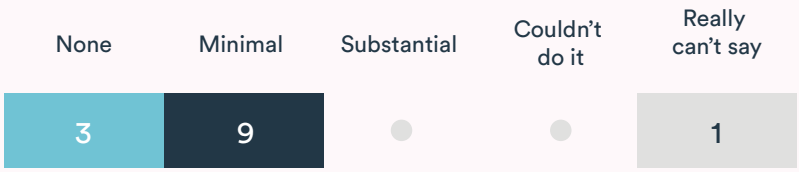
Hot Water - 3 builders reported that they already recommend electric heat pumps to their clients, 8 stated they would now make this recommendation as a result of the information provided. Only one builder remained unconvinced and would still recommend gas.

Cooking - All of the builders reported that they either already do or would now recommend electric induction cooking with 10 having been persuaded by the information provided.

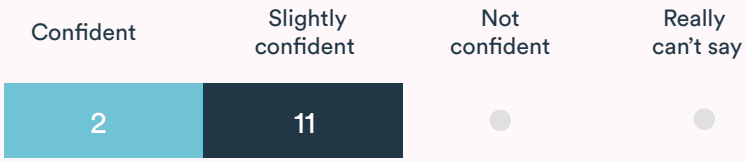
Will it pose a barrier or an advantage for sales?

Having been presented with this information, how significant a barrier/advantage do you believe that the Ginninderry Energy Solution will pose for sales?

How much extra hassle, if any, would it be to your business to offer house designs that would work in a suburb with no mains gas connection?



Based on the information presented, how confident are you that you will be able to sell the benefits of an all-electric home to you purchasers?



Source: Ginninderry Builders Workshop, 2016.
Responses form 13 participants.

Conclusion

Australian householders are encountering and coming to terms with renewable energy futures that differ significantly from their traditional household energy systems. While awareness of precinct level solutions such as local microgrids remains low, rooftop solar PV is well established and now starting to become mandated in new developments and battery storage is increasingly on people's radar.

The combination of energy efficiency, energy management and renewable energy provides developers and householders with a range of smart solutions that can reduce ongoing energy costs and deliver low to zero emission homes. At the same time the accelerating pace of innovation in this field underscores the importance of ensuring that today's solutions are designed thoughtfully to serve their users now and into the future.

Ginninderry's community consultation process highlighted the value of involving the community in decisions about their energy futures at the early design stage. It provided a doorway into people's excitement and positive disposition towards their renewable energy futures as well as their concerns. It also underscored the benefits of clear, targeted education and demonstration programs to support them in making informed decisions as they navigate this changing world of energy.

For Ginninderry the next logical phase of research will be to explore how potential buyers respond to marketing and information provided for Ginninderry's Stage 1 homes and to follow this up with an exploration of the lived experience and attitudes of the first wave of residents living in their smart energy homes.

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