



# Australian householders' interest in the distributed energy market

## Focus groups and National survey results

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## Acknowledgements

### CSIRO Project Team

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### Reviewers

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## Research objectives

- Investigate Australian householders':
  - Knowledge and awareness of solar and distributed energy market
  - Perceptions of solar and distributed energy technologies
  - Interest to participate in the solar and distributed energy market
  - Preferences for finance options
- Explore main demographic and attitudinal factors that influence householders' interest to participate in the solar and distributed energy market

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## Technology and finance options explored

### Six technology options:

1. Solar hot water systems (SHW)
2. Grid connected solar PV systems (SPV)
3. Grid connected solar PV systems with battery (SPVB)
4. Battery alone systems (BA)
5. Off-grid PV solar systems (OGPV)
6. Community PV systems (CPV)

### Four finance options:

1. Buying upfront
2. Buying with finance
3. Leasing
4. ESCOs

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## Section 1: Findings from focus groups

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### Methodology

- Six groups conducted in October 2012
  - Brisbane, Sydney and Melbourne
- Facilitated discussions
  - Understand existing knowledge
    - electricity prices
    - experience with solar PV systems
- Expert presentation
  - Distributed energy options
  - Payment options
- Hypothetical exercise
  - Contract sign-up options

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## Participants' profile

- 61 participants
- 52% were male, 48% were female
- Between 23 and 74 years of age, average age 45 years
- Education attained
  - 47% completed a university degree
- Employment status
  - 59% employed either full-time or part-time
  - 20% self-employed
  - 10% retired
- Home ownership
  - 77% were homeowners
  - 21% were tenants

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## Findings

- In general, positive attitude towards solar energy technologies
- Desire to adopt solar energy driven mainly by cost
- Desire to reduce electricity demand from electricity retailers
- Environmental considerations also a driver for adoption
- Knowledge about different distributed energy technology required to assist decision-making

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## Factors influencing preferences

- Infrastructure
  - Tenancy, housing type, and roof suitability
- Lifestyle
  - Mobility, aesthetics, household energy use, current bill value, being home during the day and age group
- Financial
  - Return on investment, competing priorities, quality and improvements
- Information
  - Lack of clear information material and trust in source of information
- Environmental benefits
  - Reduced GHG as the main environmental impact
- Other benefits
  - Energy independence and/or self sufficiency

## Payment option preferences

- Low level of awareness payment options available
  - Leasing and ESCOs especially
- Influencing factors

- Incentives vs actual behaviour

*Yeah, it's definitely of interest....I'm annoyed at myself for not making the time to research it when all the rebates and everything were in.... So yeah, it's something I definitely want to make time for.*

- Rising electricity costs
- PV cost

*(...) getting solar installed, and the cost that it is, as a family, we could not afford that. We just don't have the funds available to pay that upfront. I'd rather pay an extra few hundred dollars on my bills than to pay thousands of dollars upfront at this point in time.*

## Trust

- Quality of service and product:

*I'm just cautious of, there is a lot of new players on the market, and there's some cowboys. And there is some offering some really cheap deals. But sometimes the systems don't work properly, (...) And you've got a system that doesn't work. And so I'm just - I'm not sort of - I want to get something with a bit of quality about it.*

- Transparency:

*And some of the quotes too don't include the inverter and it's in fine print once you read their contract. That's dishonest to begin with. You haven't even started and they're not being upfront with their information. How can they earn your trust? You couldn't do business like that.*

## Non-financial considerations

- Type of information available
- The source of information
- Reputation of company
- Quality of product
- Timing of decision

## Section 2: Findings from National survey

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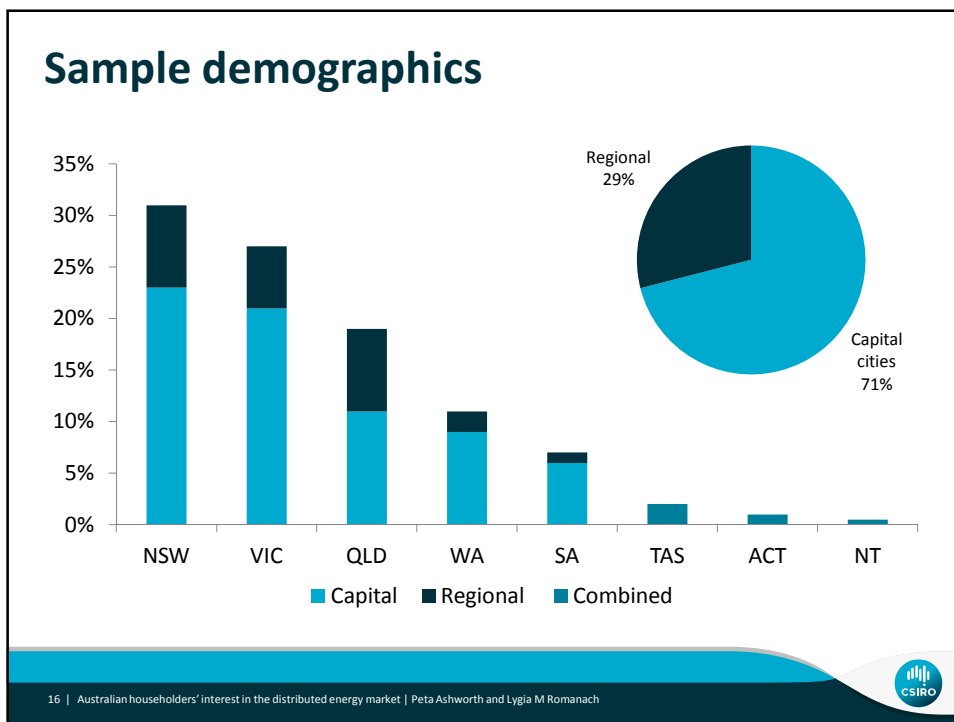
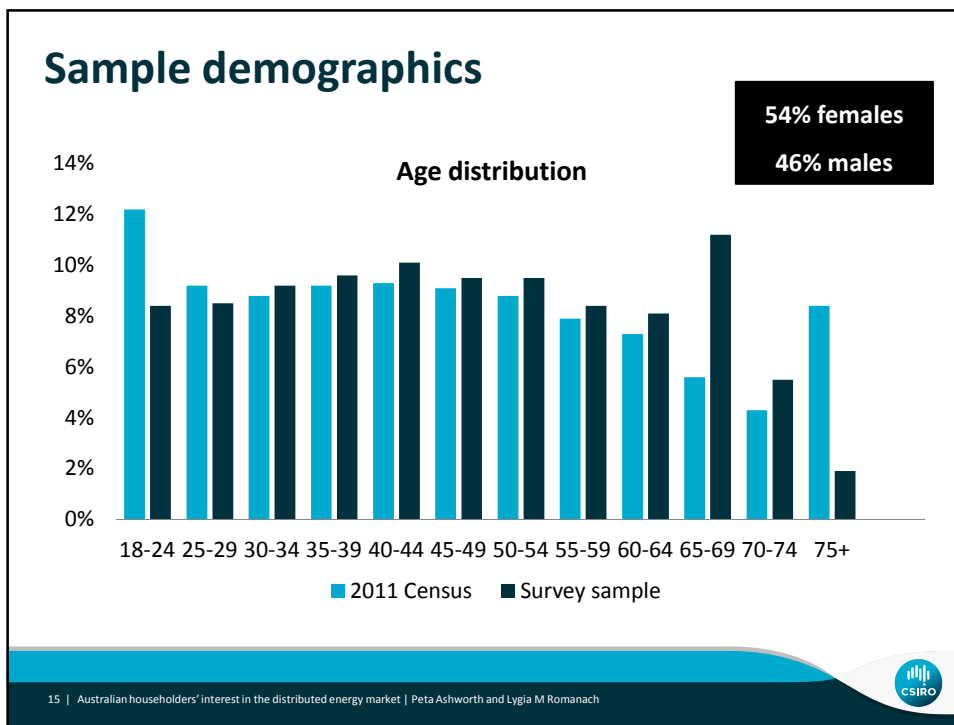


### Methodology

- Survey developed from relevant literature and Focus Groups findings
- Online survey with panel participants
  - February 2013: Pilot survey with over 200 responses
  - March 2013: Final survey with 2,463 usable responses
- Quotas by state, gender and age to ensure a representative sample
- Surveys presented 2 technology options (out of 6):
  - Technology options were randomly assigned
  - Brief description of each technology was provided

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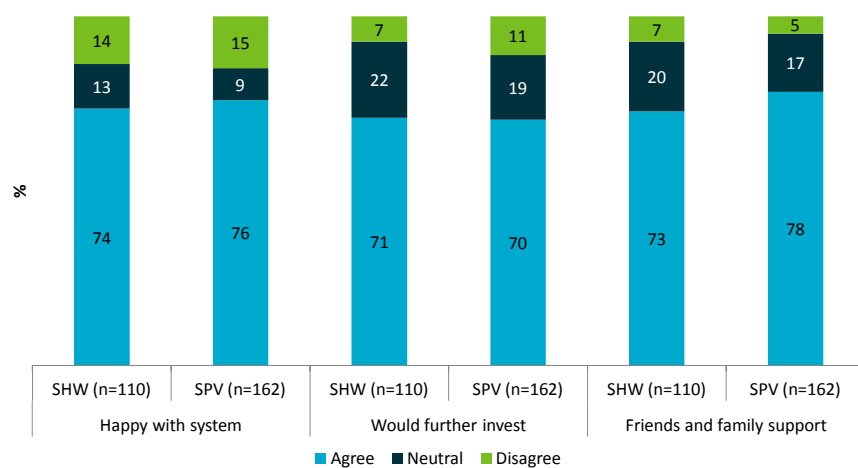


## Sample demographics

- Home-ownership:
  - 69% own home
  - 25% are tenants
  - 2% living in public housing
  - 2% living in shared accommodation
- Property type:
  - 73% live in houses
  - 18% live in units/apartments
  - 9% live in townhouses/semi-detached houses



## Householders' existing SHW & SPV experience

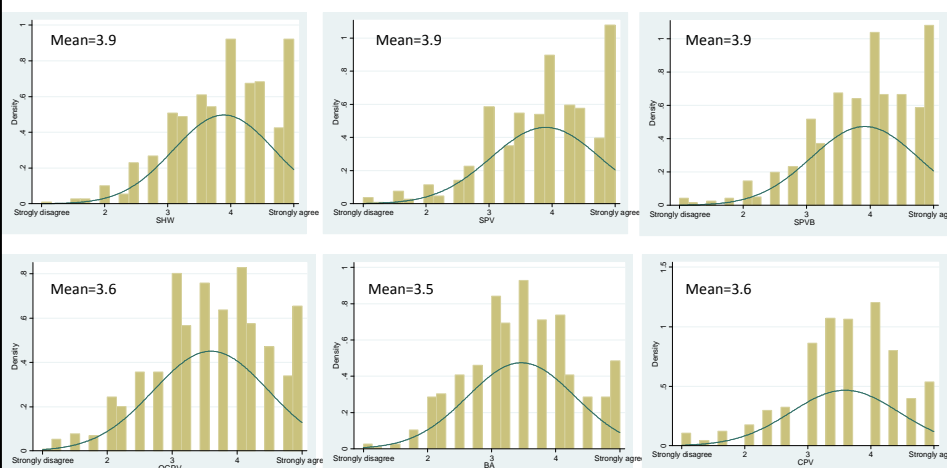


## Reasons for installing solar energy

- Economic
  - save money on power bills (SHW:55% & SPV:70%)
  - benefit from government rebates (SHW: n/a & SPV:10%)
- Environmental
  - reduce household carbon emissions (SHW:9% & SPV:12%)
- Energy security
  - decrease reliance on energy retailers (SHW:10% & SPV:4%)



## Support for technology options: non-users



## Support for technologies and demographics

- Support for all technologies similar across
  - Age groups (18-39, 40-59, and 60+)
  - Gender
  - Income groups (Below \$60K, \$60-100K, Above \$100K)
- Support SHW, SPV and SPVB
  - Higher: living in houses
- Support SPVB
  - Higher: home owners

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## Technology attributes

TECHNOLOGY ATTRIBUTES	MOST IMPORTANT	LEAST IMPORTANT
Reduces electricity costs	32%	1%
Technology is reliable and durable	16%	3%
Meets my current electricity needs	15%	5%
Provides uninterrupted power (-)	11%	6%
Benefits the environment (+)	10%	13%
Reduces reliance on energy retailers	9%	12%
Easy to install and maintain	4%	13%
Increased safety levels	2%	9%
It has visual appeal (-)	1%	38%

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## Objective knowledge

Quiz questions	Percentage of correct answers
Households in Australia are mostly responsible for electricity peak demand (TRUE)	49%
The largest cost of providing electricity to households comes from building and maintaining the electricity poles and wires (TRUE)	45%
Most solar energy in Australia is used for residential water heating (TRUE)	40%
Transport is the largest contributor to greenhouse gas emissions generated by households in Australia (FALSE)	26%
Most renewable energy in Australia comes from solar energy (FALSE)	23%

No association between objective knowledge and support for the technology options presented in the survey

## Subjective knowledge

I could easily explain to a friend...	Mean	SD
...what solar energy is about	3.88	1.00
...what a solar water heater is	3.76	1.08
...what solar power or photovoltaic (PV) panels are	3.33	1.24
...what a battery storage system is	2.97	1.30

Where 1 = strongly disagree; 5 = strongly agree

Respondents with higher levels of self-assessed knowledge in solar energy were more likely to express support towards distributed energy systems (except BA)

## Attitudinal variables: VBN Theory

Values Beliefs and Norms Theory (Stern 2000; Steg *et al.* 2005)

Previous studies show that the VBN Theory is successful in explaining judgements of acceptability of energy and environmental policies

- Awareness of consequences: 'Climate change is a problem for society'
- Ascription of responsibility: 'I feel partly responsible for climate change'
- Personal norms: 'I feel morally obliged to use green instead of regular electricity'

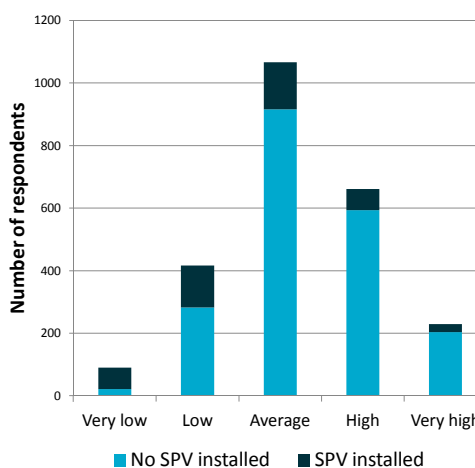
Positive correlation with support for DE technologies: measures could contribute to predicting support for these technologies

	SHW	SPV	SPVB	OGPV	BA	CPV
Ascription of consequences	0.34***	0.35***	0.35***	0.19***	0.22***	0.38***
Ascription of responsibility	0.26***	0.28***	0.23***	0.15***	0.23***	0.28***
Personal norms	0.29***	0.31***	0.26***	0.17***	0.22***	0.35***
Sample size	704	661	810	803	807	797

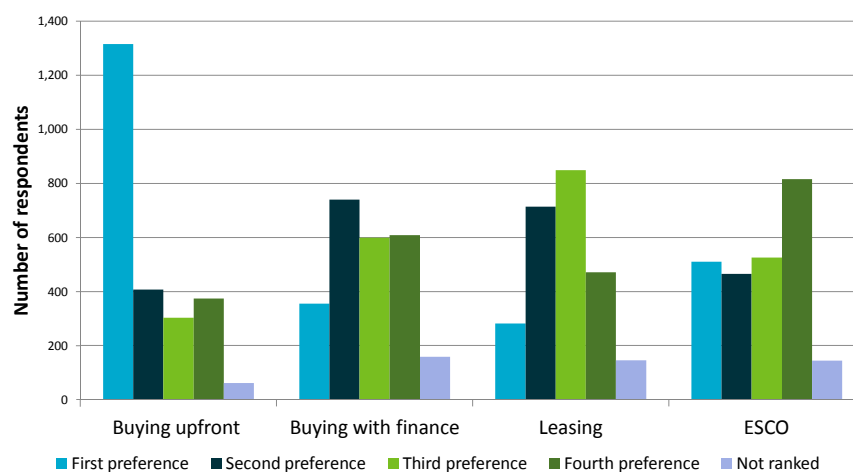


## Attitudinal variables: Power bill

- Current SPV owners
  - Negative association between power bills cost and support for SPV
  - SPV systems owners have lower bill perception
- BA
  - Weak positive correlation between power bills cost and support for BA
  - Households with a perception of higher than average bills could be more supportive of BA systems



## Payment preferences



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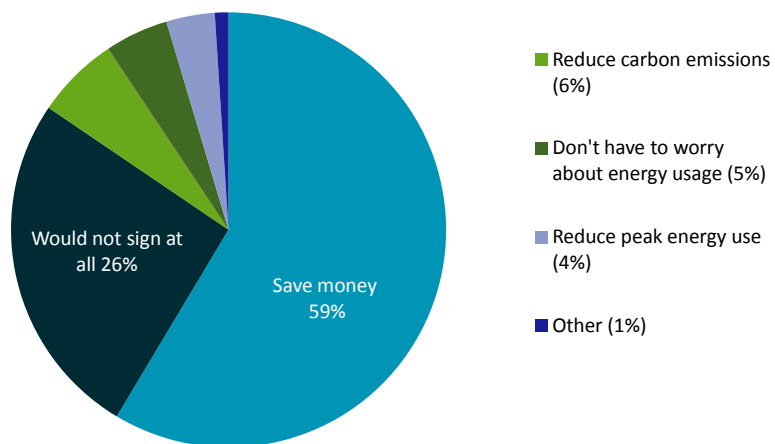
## Payment preferences and demographics

- Buying upfront :
  - Higher: older respondents
- Buying with finance:
  - Lower: older male respondents
- Leasing:
  - Higher: younger respondents
  - Higher: respondents' income below \$60k
- ESCO:
  - Higher: older respondents
  - Higher: respondents' income below \$60k

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## Reasons for considering signing to ESCO package



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## Appliances chosen for demand controlling

Appliances	Percentage
Clothes dryer	62%
Pool pump	55%
Dishwasher	51%
Washing machine	39%
Electric heater	39%
Air-conditioner	37%
Electric water heating system	33%
Deep freezer	13%
Refrigerator	9%
Other	5%

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## Moving forward

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## Upcoming research outcomes: regression analysis

Dependent variables	Solar energy	SHW	SPV	SPVB	OGPV	BA	CPV	ESCO
Female								✓
Living in house		✓	✓	✓				
Home owner						✓		
Children at home						✓		
Regional areas	✓							✓
Number people at home								✓
SPV installed	✓							
Energy bill	✓				✓	✓		✓
VBN_AC	✓	✓	✓	✓			✓	
VBN_AR	✓							
VBN_PN	✓							✓
Energy security						✓		
Financial incentive	✓							
Objective knowledge								
Subjective knowledge	✓			✓	✓		✓	
Benefits of solar		✓	✓	✓	✓	✓	✓	✓

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# Thank you

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