



Customer insights Project EDGE

A/Prof Josh Newton, Deakin University

This research has been conducted with the support of:



Acknowledgement of country



Photo by [Rat Whelen](#) on [Unsplash](#)



Housekeeping

Recording in progress

- This webinar will be recorded for the benefit of those who are unable to attend
- The recording will be available on the AEMO website

Questions and answers

- There will be an opportunity for questions at the end of the webinar



Overview

- Project EDGE is a proof-of-concept trial that:
 - Is being conducted in the Hume region of Victoria
 - Aims to demonstrate a market-based trading mechanism for virtual power plants (VPPs)
 - Allows customers to choose an energy aggregator that acts as an intermediary between customer-owned energy resources (e.g., batteries, rooftop solar) and the electricity services required by a distribution network service provider



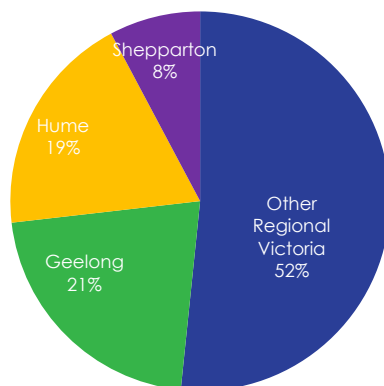
Overview

- Today's webinar will focus on findings from three reports examining VPP perceptions and decision-making among:
 - Potential residential customers
 - Current residential battery owners
 - Potential organisational customers (business, local government)

Potential residential customers

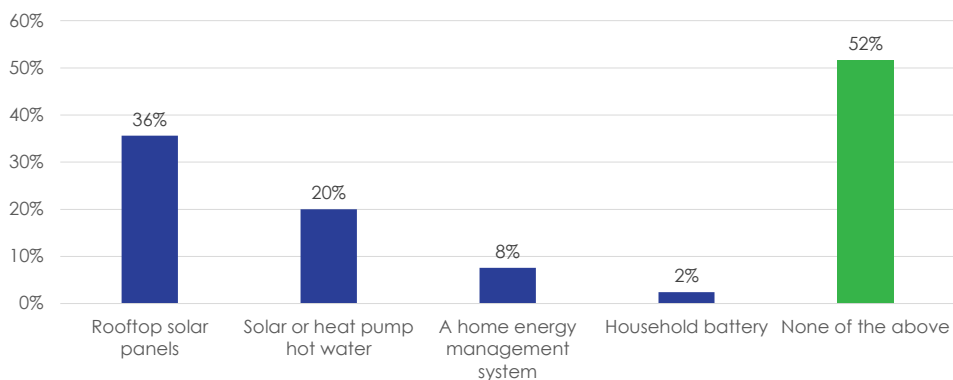
Potential residential: Sample characteristics

We recruited 399 participants residing in regional/rural Victoria



Potential residential: Sample characteristics

Approximately one-third had rooftop solar installed at their primary place of residence



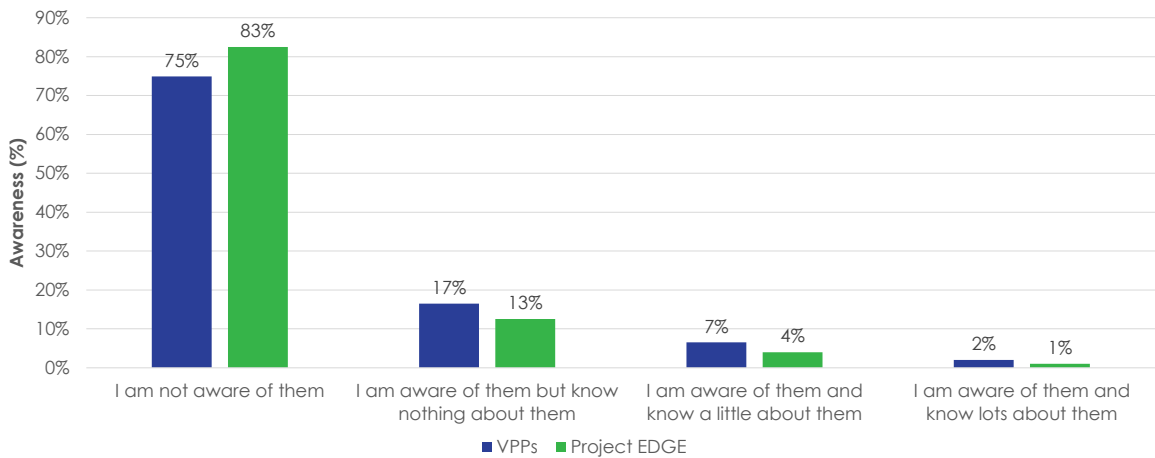


Potential residential: Sample characteristics

Almost half experienced common and/or major power disruptions

		Frequency of power outages	
		Rare	Common
Severity of power outages	Major	24%	11%
	Minor	53%	12%

Potential residential: Awareness



Results summary

- VPP awareness was virtually non-existent
 - Not necessarily surprising given that VPPs are new and often referred to by other names (e.g., Distributed Energy Resources)
 - May even provide opportunities for first-movers who are able to paint a compelling brand image for VPPs

Potential residential: Opinion vs. interest

- After completing the awareness question, participants received a short summary describing VPPs

Some households have solar panels for making power and a battery to store this power for later use. However, these households can't sell their stored power to the grid. A Virtual Power Plant lets them do this. In a Virtual Power Plant, households give a power company access to their battery. This company acts on their behalf to:

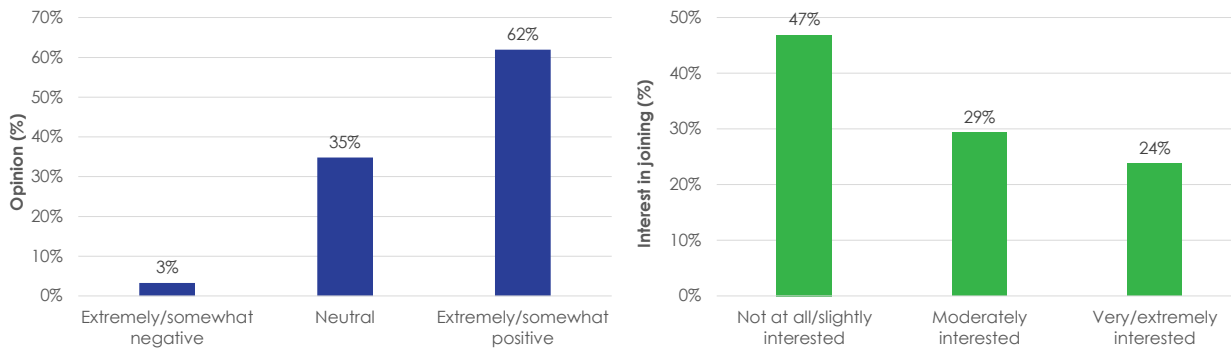
- *Sell stored power for the best possible price.*
- *Supply green power to their community.*
- *Reduce power outages in their community.*

Households must buy solar panels and a battery to sell power in a Virtual Power Plant. Buying this equipment also lets them:

- *Decrease their own power bills.*
- *Make and store their own green power.*
- *Reduce their own power outages.*
- *Track their power usage.*

Project EDGE will be developing a Virtual Power Plant in the Hume region and in other regions of Victoria.

Potential residential: Opinion vs. interest



Results summary

- Glass half-empty
 - Favourable opinions \neq interest in joining
 - If we draw on other contexts, interest in joining \neq actual sign-ups
 - Highlights the importance of developing attractive value propositions that resonate with customers
- Glass half-full
 - A short summary about VPPs was sufficient for approx. one-quarter of participants to indicate being very/extremely interested in joining

Potential residential: Segmenting opinion & interest

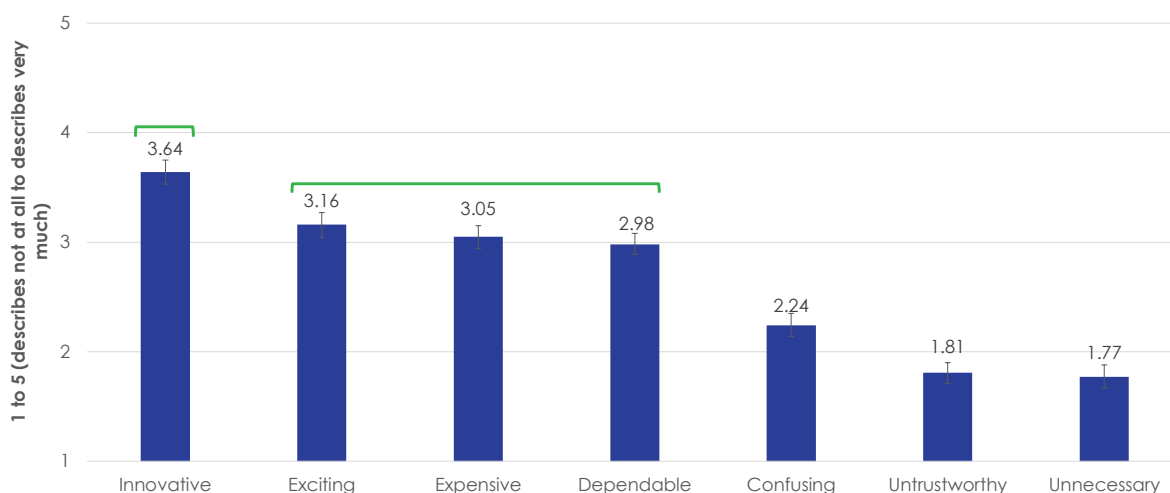


Segmentation variable	Favourable opinion	Interest in joining
Older age	-	Negative $\beta = -0.26$
Female	-	-
Highest education (Reference: high school or less)		
- Vocational training	-	-
- University	-	Positive $\beta = 0.14$
Annual income (Reference: \$0 – \$39,999)		
- \$40,000 – \$79,999	-	-
- \$80,000 or more	-	-
Progressive political views	Positive $\beta = 0.23$	Positive $\beta = 0.15$
Owner of primary residence	-	-
Have solar panels	-	Positive $\beta = 0.16$
Common and/or major power outages	-	Positive $\beta = 0.11$

Results summary

- Residential customers who expressed an interest in joining Project EDGE tended to:
 - Be younger
 - Be university educated
 - Hold politically progressive views
 - Own rooftop solar
 - Experience common and/or major power outages

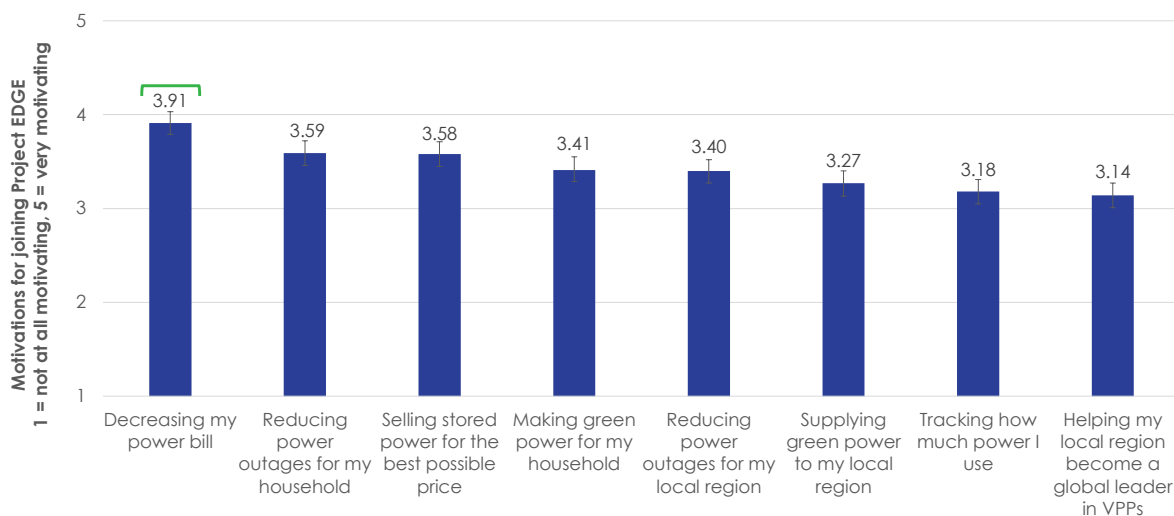
Potential residential: Brand image



Results summary

- Project EDGE was mostly seen in a positive light ('Innovative', 'Exciting', 'Dependable')
- However, Project EDGE was also seen as 'Expensive', even though no direct pricing information was given to participants

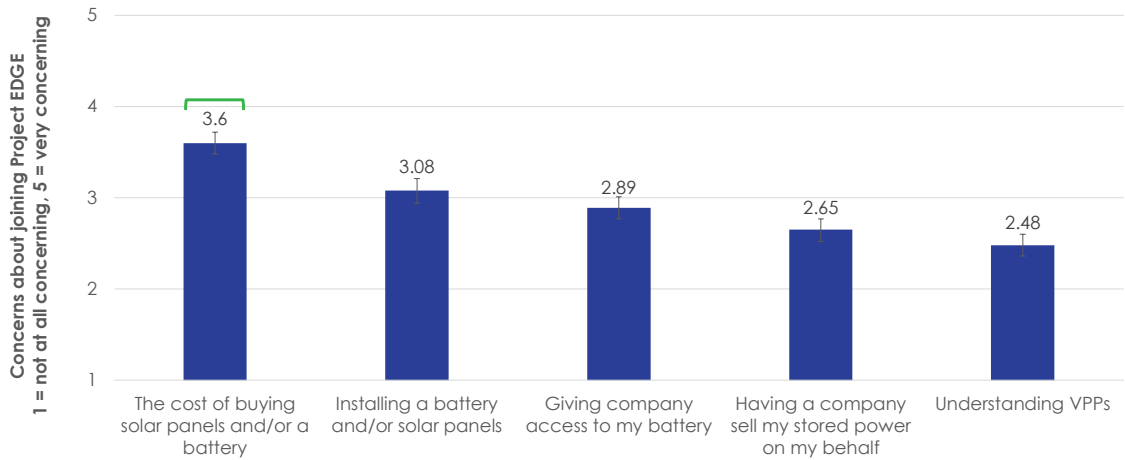
Potential residential: Motivations for joining



Results summary

- All of the examined factors were seen as being at least somewhat motivating
- However, one factor was seen as being significantly more motivating than the others: reducing power bills

Potential residential: Concerns about joining



Results summary

- Purchase costs were seen as being a significantly greater cause for concern than any of the other examined factors

Potential residential: Predicting opinion & interest



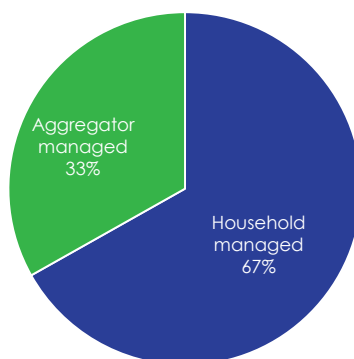
Variable	Favourable opinion	Interest in joining
Potential descriptors		
- 'Innovative'	Positive $\beta = 0.15$	-
- 'Exciting'	Positive $\beta = 0.40$	Positive $\beta = 0.32$
- 'Expensive'	Negative $\beta = -0.14$	-
- 'Dependable'	-	Positive $\beta = 0.20$
Potential motivations		
- Decreasing my power bill	Positive $\beta = 0.19$	Positive $\beta = 0.14$
Potential concerns		
- Cost of buying solar panels and/or battery	-	Negative $\beta = -0.10$
Energy system perceptions		
- Satisfaction with current retailer	-	Negative $\beta = -0.13$
- Satisfaction with current distributor	-	-

Results summary

- Project EDGE might excite the mind, but hip pocket concerns remain
 - Perceiving Project EDGE as 'Exciting' was the strongest predictor of opinion and interest
 - Financial factors are key, but they manifest in complex ways
 - Immediate cost-related concerns ('Expensive', Cost of buying solar panels/batter) decrease opinion/interest
 - Longer-term financial benefits (Decreasing power bills) increase opinion/interest

Potential residential: Trading preferences

Preference for who should manage trading criteria

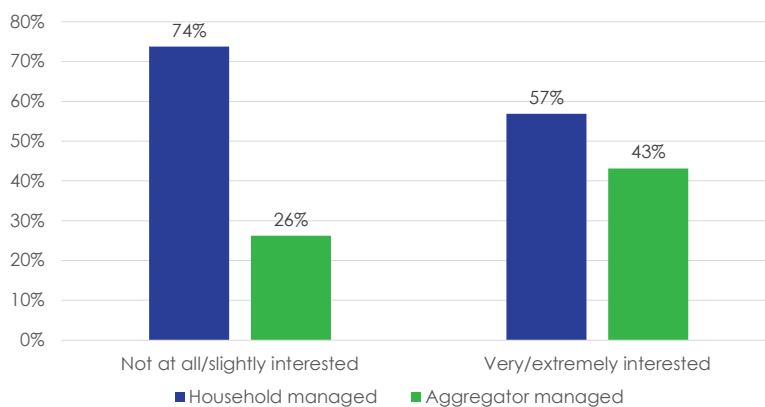


Results summary

- The majority of participants wanted to maintain control over their trading preferences

Potential residential: Trading preferences

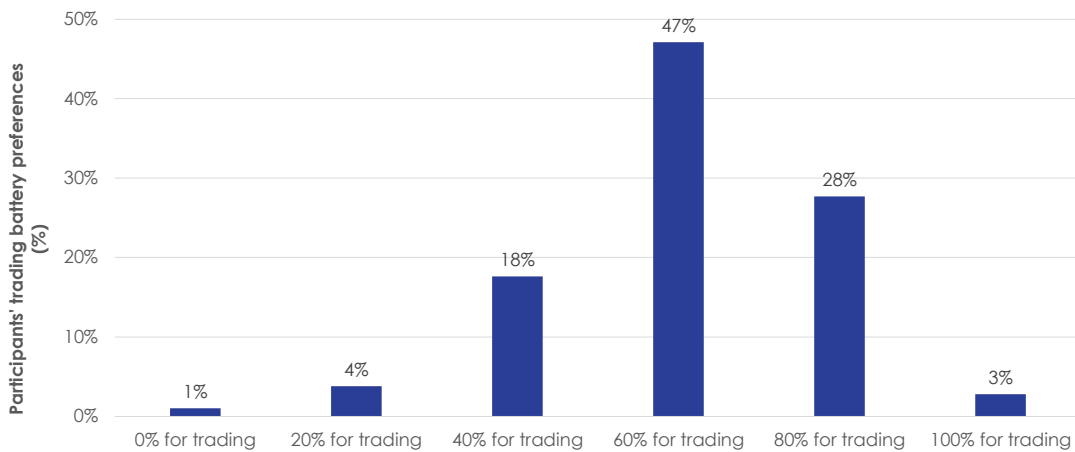
Preference for who should manage trading criteria, split by interest in joining (low vs. high)



Results summary

- A slightly more nuanced picture emerges when the results were examined by interest in joining; those who were interested in joining were significantly more likely to prefer aggregator management than those who were not (43% vs. 26%)
- May point to differences in trust between the two groups

Potential residential: Battery trading preferences



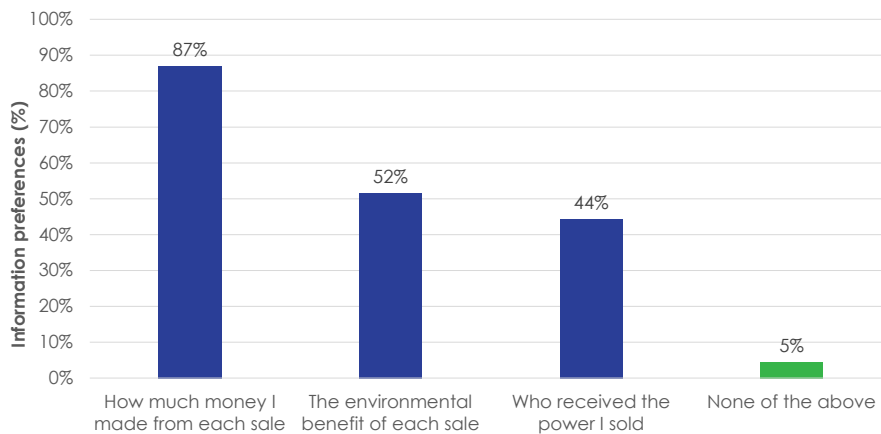
Results summary

- Participants wanted to maximise the financial benefits of their battery asset
 - More than three quarters were prepared to have at least 60% of their battery available for trading
- However, and as we will see later in this webinar, participants who currently have a household battery tend to be far more protective of their stored energy

Potential residential: Information preferences



Preference for receiving different types of information

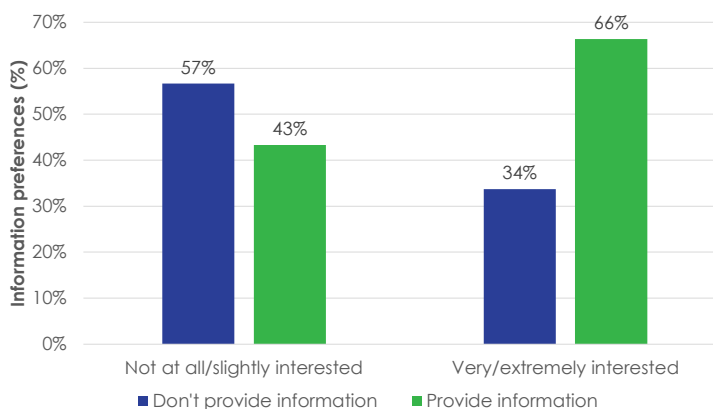


Results summary

- Participants' information preferences reflected their motivation for joining
- For example, information about the financial benefits emerging from each trade were desired by all participants
- This aligns with our earlier findings, where financial motivations were identified as being central to adoption decisions

Potential residential: Information preferences

Preference for receiving information about the environmental benefits of each trade, split by interest in joining (low vs. high)



Results summary

- Participants' information preferences reflected their motivation for joining
- Participants who were interested in joining also wanted to receive information about the environmental benefits emerging from each trade
- This potentially aligns with an earlier finding in that participants with a progressive political stance tended to have greater adoption intentions and more favourable opinions about Project EDGE

Current residential battery owners



Current residential: Sample

- We interviewed 19 participants from 16 households
- Participants comprised three distinct groups:
 - Purchased a battery as part of a previous Mondo trial and had subsequently agreed to join Project EDGE (n = 8)
 - Purchased a battery as part of joining Project EDGE (n = 5)
 - Considered purchasing a battery as part of joining Project EDGE but had ultimately decided not to do so (n = 3)
- Note: Energy trading for financial returns had not been implemented at the time the interviews were conducted



Current residential: Themes

Community, sustainability, and energy self-sufficiency were primary motivators for joining Project EDGE

- Community
 - *"We're in a very privileged position that we can afford solar panels and we can afford batteries, and so how then do we become a part of a bigger social movement to support those who can't afford this sort of infrastructure in their house?"*
- Sustainability
 - *"I'm really, really concerned about climate change, so this [joining Project EDGE] is just one thing that we can do to make me feel better that I'm actually doing something."*



Current residential: Themes

Community, sustainability, and energy self-sufficiency were primary motivators for joining Project EDGE

- Energy self-sufficiency
 - *“But one of the reasons we wanted a battery was because of this water issue. When we have no electricity we have no water... I’m hoping that when the power goes out we still have our battery. We’ve asked specifically for a battery that will be able to do that.”*

Current residential: Themes

Financial benefits were of secondary importance

- Participants recognised that joining Project EDGE couldn't be justified on financial grounds alone
 - *"We'll probably never get the costs of batteries for this house back in the timeframe, but that's okay. We're doing it because we figure there's a lot to be learnt through participation in Project EDGE."*

Current residential: Themes

Cost was seen as the primary barrier to participation

- Cost of battery (vs. solar panels) was seen as particularly burdensome
 - *"Initially, the cost of batteries was a dealbreaker when we weren't getting the solar rebate. As I said, we'd already turned away from that a bit, not because I didn't believe in batteries or anything, but just because the whole cost; it's a big cost."*
- Subsidies/incentives helped to 'de-sting' these costs
 - *"Yeah, I thought that [subsidising hardware costs] was a good idea. It certainly was something that would get a lot of people over the line when you look at it and go "Well, yep, that's an incentive. Let's go with that." ... I think if they hadn't of done that, they may have struggled to get the number of people [to participate]."*



Current residential: Themes

Cost was seen as the primary barrier to participation

- Those who didn't join Project EDGE tended to seek out more cost-effective solutions to satisfy their underlying needs
 - *"[H]aving solar panels of course prompted me to think to the next step with a battery and to investigate costs and benefits of that, and my conclusion at this point in time is that it's – for us individually, it's not a cost-effective thing to do. My trade-off for that is that I purchase 100% renewable. Because I have access to retailers who provide a product of 100% renewable electricity, I feel less pressure ethically to be putting a battery in, because I feel I can get that product through another source."*
 - *"[Batteries are] still \$17,000 for maybe one major blackout every couple of years, so that's where we started thinking... that if we had a decent sized generator at \$5,000, that would make us independent, and we wouldn't be subject to these fairly long outages."*

Current residential: Themes

Trading power with the local community resonated, but within strict limits

- Trading was viewed positively, so long as it didn't affect battery owners
 - *"One of the key parts of the pitch was that you should be able to share your power when you're generating more. That seemed a no-brainer, that if I go away for a month and my solar is still generating, my battery's still in use, if I've got one, then other members of the grid should be able to benefit from that."*
 - *"Well, clearly, I think they would have to access it whenever it is least affecting us. So, they're not going to be it on a dull, wintery day, whenever we desperately need the power to keep us going inside. So, it would have to be in a particular time of the year whenever it has the least likely effect on our current running of the battery... You'd only be foolish if you were to take power when you need it most yourself."*



Current residential: Themes

Trading power with the local community resonated, but within strict limits

- Indeed, participants often felt quite possessive of the power stored in their batteries
 - *"I thought the battery's there for our use mainly and if we generate more than what goes in – like if the battery's fully charged and there's more power generation – that goes in and can get sold off, but I don't know about selling off what's in our battery."*

Current residential: Themes

Aggregator trust was variable

- Some participants doubted the motives of for-profit companies
 - *"I think there's a small amount of me that has a degree of cynicism about any commercial organisation wishing to trade. They're not altruistic, that's not their driver, their driver is dollars really, I guess. Hopefully there's a little bit of integrity there somewhere."*
- Others were more trusting, provided they were fairly compensated
 - *"I'm fine with it as long as at the end of the day, it provides some kind of benefit, whether that's financial or something else. But if they can show that it does, if you're prepared to forgo a load during peak times but you'll be compensated for that and then it's just personal decisions about how much you value it and how much compensation you think it's worth to give it up."*

Current residential: Themes

Aggregator trust was variable

- Some participants took a 'wait and see' approach. For them, trust had to be earned over time
 - *"Well, I guess it's a wait and see how it goes, really. Because it is a kind of a bit – what can I say – strange that somebody's controlling what goes in and out of your battery. And I guess that's where the trust is, but if we see how it works for us, and it's working for us and it's working for them, then yeah, I mean that's fine."*

Potential organisational customers

Potential organisational: Sample

- We interviewed:
 - Senior managers from five commercial/industrial (C&I) organisations operating in the Hume region
 - Elected representatives and staff from five local government areas across the Hume region

Potential C&Is: Key insights

The VPP technology stack was evaluated favourably...

- Interviewees recognised the broad benefits of VPPs in terms of:
 - Sustainability
 - Energy resilience
 - Sharing power across dispersed facilities
 - Sharing power with the community
 - Receiving better energy consumption insights

Potential C&Is: Key insights

...but the financial case for VPP investment must stack up

- In most cases, the financial case was not clear
 - Was not currently seen as meeting desired payback periods
- Opportunity costs and the 'early adopter tax' were also recognised as barriers
- Cashflow constraints often made large, upfront purchases hard

Potential C&Is: Key insights

Strategies for accelerating VPP adoption

- Sweetening the deal
 - Grant funding
 - Community support
- Having successful case studies to emulate
 - Proves technical feasibility
 - Demonstrates financial case for investment
- Identifying champions within the organisation

Potential LGAs: Key insights

LGA investment is complex and risk averse

- LGA decision-making requires alignment across:
 - Policy
 - Price
 - Personality
 - Public

Potential LGAs: Key insights

Soft leadership

- LGAs saw they could provide leadership in other ways
 - Easiest: Supporting local community energy groups
 - More difficult: Facilitating bulk-buy arrangements



Potential LGAs: Key insights

Strategies for accelerating VPP adoption

- Finding champions in local government
- Having successful case studies to emulate
- Receiving support (e.g., grant funding) from other tiers of government
- Active community engagement

Next steps and further information



Next Steps

- Preparing to conduct further customer insights research, including:
 - Conducting a literature review of existing customer insights research
 - Further examining the perceptions and decision-making of potential and actual Project Edge customers
 - Focus on understanding drivers of customer decision making at critical times for grid security
 - Understand customer views on compensation and how value is shared between aggregators and customers



Further Information

- Reports will continue to be made available via the following link:
<https://aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge/project-edge-news-and-knowledge-sharing>
- If you have any queries about the research, please email me at j.newton@deakin.edu.au

Questions?