Project EDGE
Customer insights public webinar

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This research has been conducted with the support of:

Acknowledgement of country

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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

Background

Background: Project EDGE

- **Project EDGE** (Energy Demand and Generation Exchange) was a multi-year field trial aimed at demonstrating a proof-of-concept Distributed Energy Resource (DER) marketplace
- Through the marketplace, customers' DER were aggregated to deliver wholesale and network support services
- The Project EDGE field trial occurred within the AusNet Services distribution network in Victoria and involved **three DER aggregators**: Discover Energy, Mondo, and Rheem

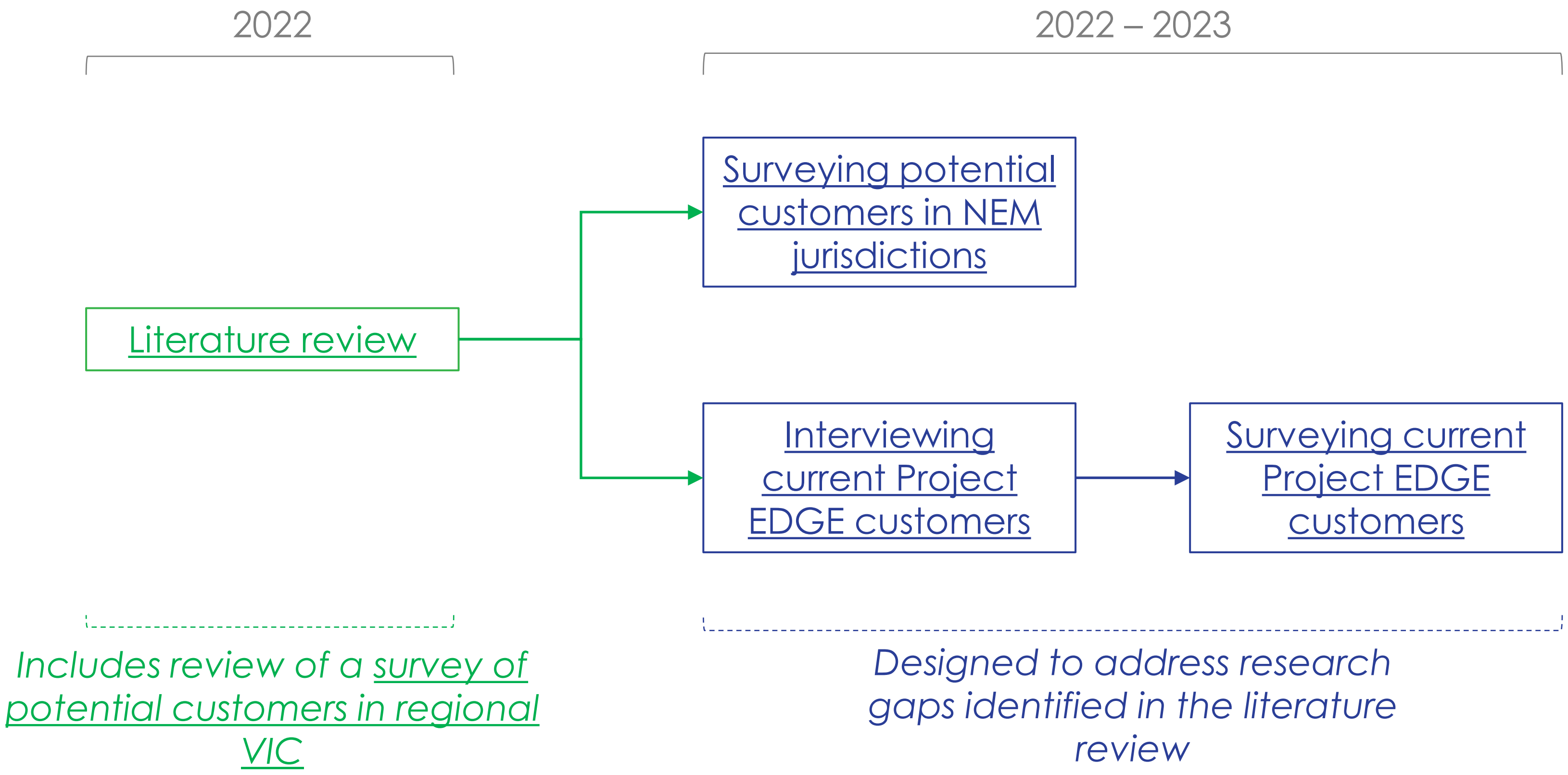
Background: Research aim

The broad aim of the Project EDGE customer insights research undertaken by Deakin University’s Better Consumption Lab was to understand how to:

- Accelerate the adoption of Virtual Power Plants (VPPs)
- Enhance VPP customer satisfaction and retention
- Build trust in the aggregators managing customers’ DER
- Encourage additional VPP exports
- Develop policies that fairly facilitate DER exports

Background: Program of research

The customer insights that will be presented in this webinar were identified through a multiyear program of research conducted by Deakin University's Better Consumption Lab



Background: Research gaps

The literature review identified a range of research gaps, including:

- An over-emphasis on early adopters
- Limited understanding of customers' expectations for financial returns
- An unresolved tension around how ease of use can be reconciled with a desire for customisation
- Uncertainty about how perceptions of DERs and VPPs compare with the status quo or to other energy products
- Limited information on how best to communicate with customers
- How trust in aggregators can be increased and risk perceptions reduced
- What is required to develop relational interactions with customers

Background: Research gaps

The Project EDGE customer insights research was designed to address these research gaps

Potential customers

Potential customers: Overview

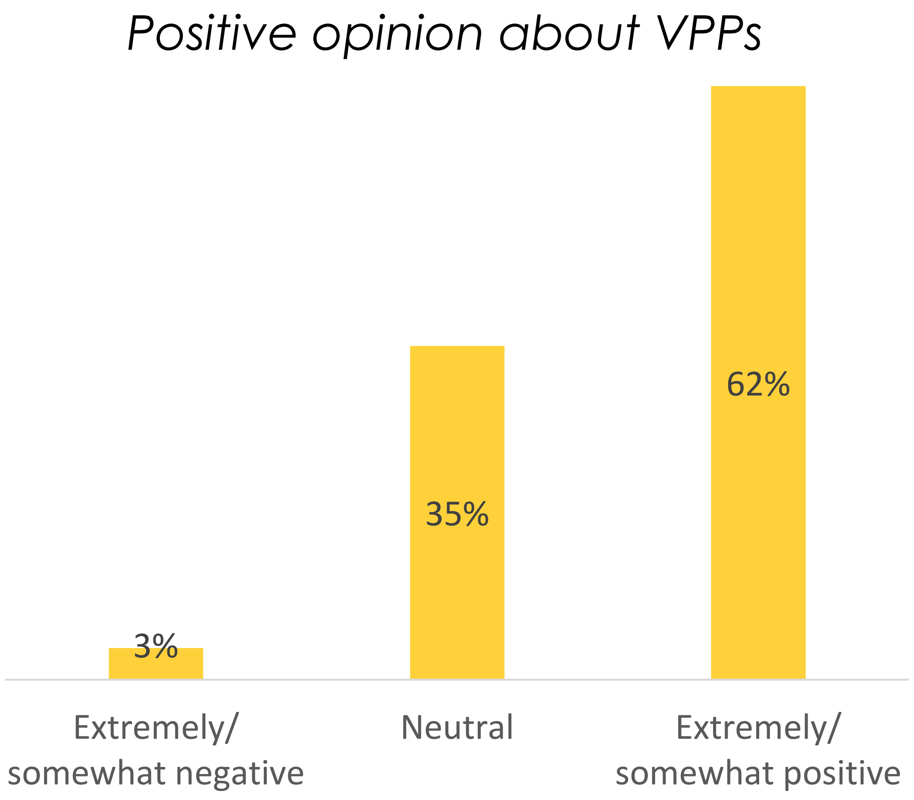
399 regional Victorians surveyed

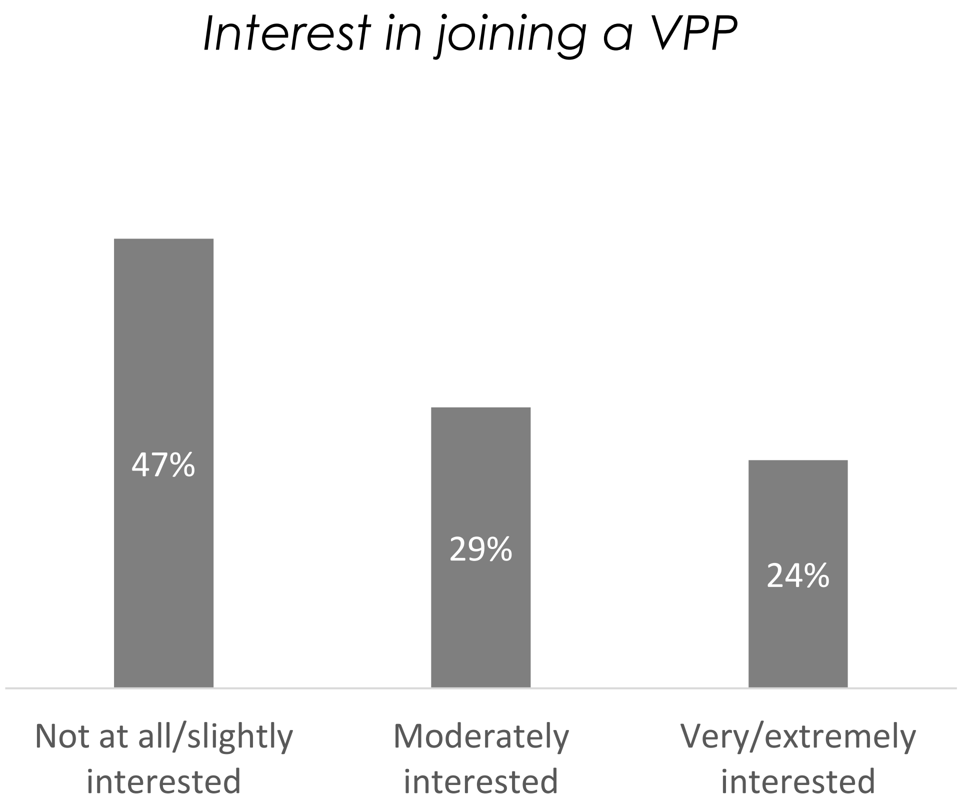
893 Australians in NEM jurisdictions (excluding Victoria) surveyed

Reports Surveying potential customers in regional VIC
Surveying potential customers in NEM jurisdictions

Potential customers: Overview

Consumers might like the concept of a VPP, but they're lukewarm about joining a VPP

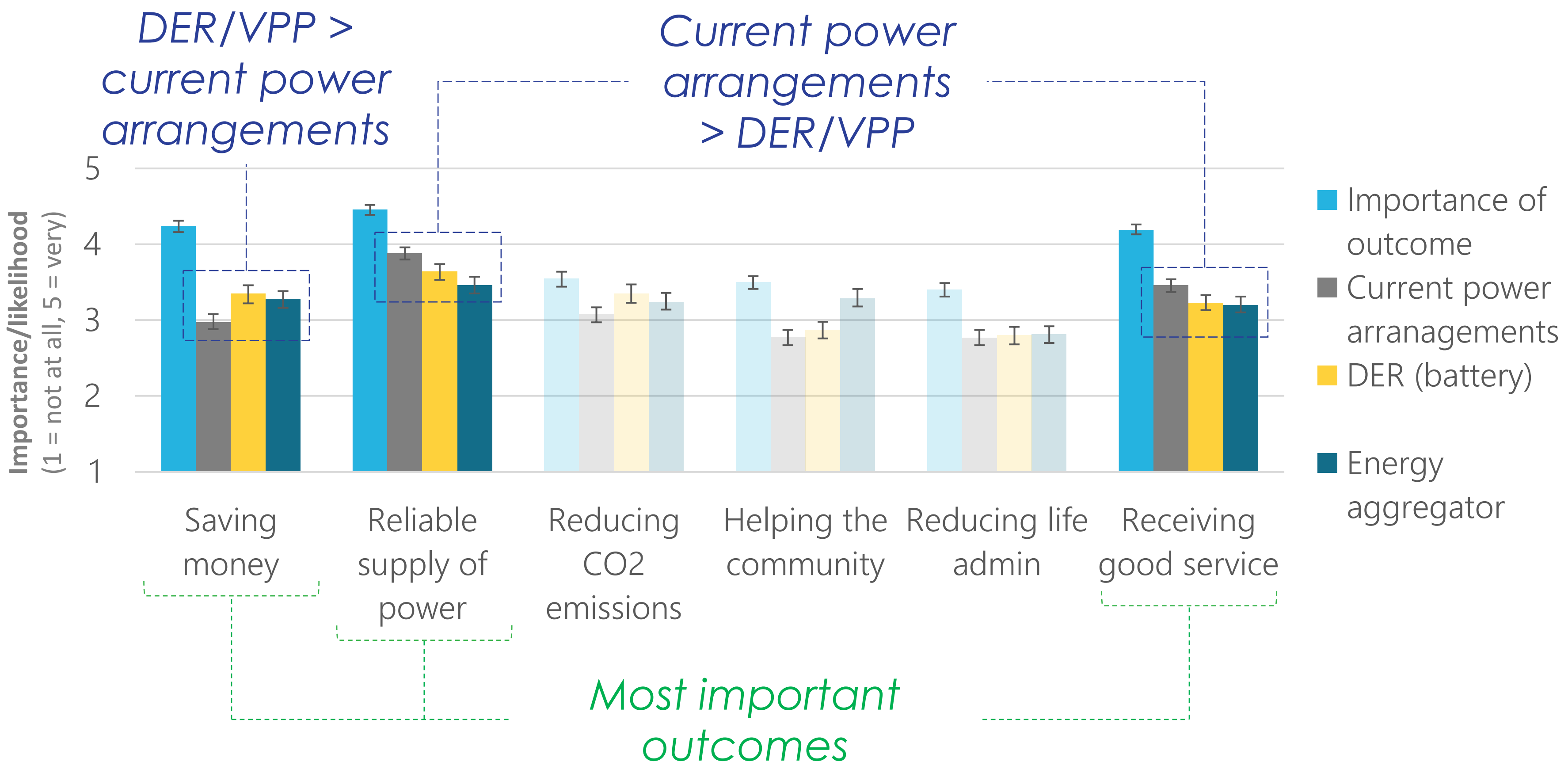




Reports Surveying potential customers in regional VIC

Potential customers: What do they want?

Of the outcomes that mattered most to consumers, DERs and VPPs were seen as helping to achieve only one: **saving money**



Reports Surveying potential customers in NEM jurisdictions

Potential customers: What do they want?

Consumers who saw VPPs/DER as saving them money and/or providing a more reliable supply of power reported stronger intentions to adopt DER/VPP

Predictors of interest in adopting…	…DER	…VPP
Saving money	**Yes**	**Yes**
Receiving a reliable supply of power	**Yes**	**Yes**
Reducing CO_2 emissions	No	No
Helping the community	No	No
Reducing life admin (routine tasks)	No	No
Receiving good service	No	No

Reports Surveying potential customers in NEM jurisdictions

Potential customers: What do they want?

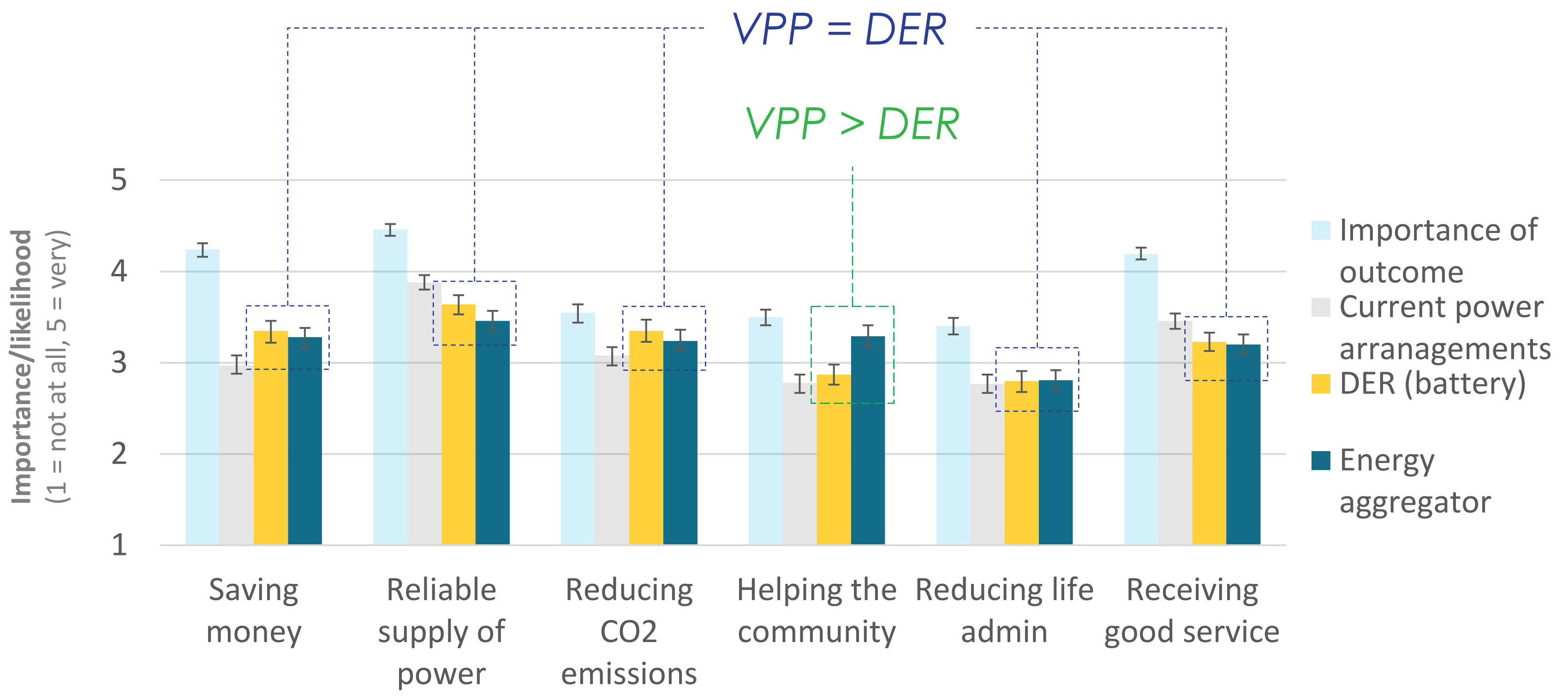
Consumers had very high expectations about how much money they would save from joining a VPP

Desired annual savings from…	Solar PV: No	Solar PV: Yes
…installing solar panels	$1,093	n/a
…installing a battery	$933	$1,006
…joining a VPP	$945	$992

Reports Surveying potential customers in NEM jurisdictions

Potential customers: What other views do they have?

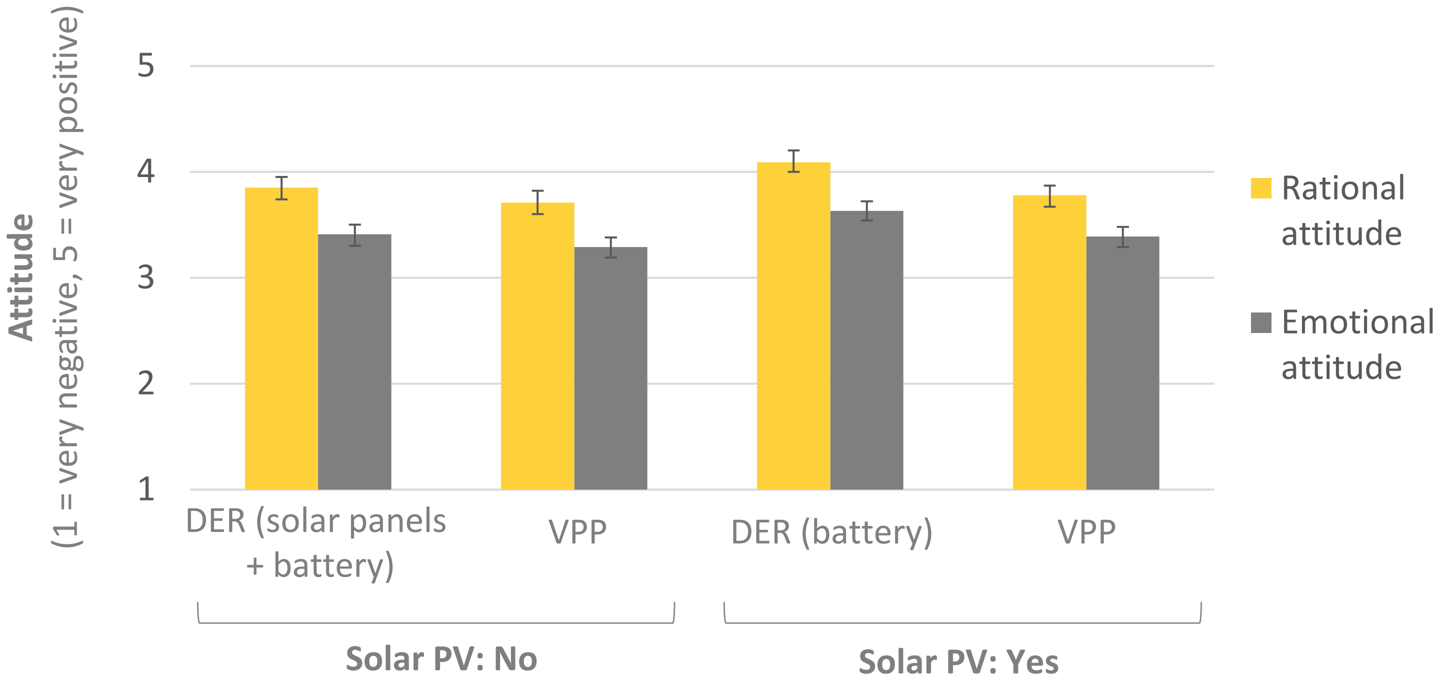
Consumers could see little clear benefit in joining a VPP, over and above adopting DER



Reports Surveying potential customers in NEM jurisdictions

Potential customers: What other views do they have?

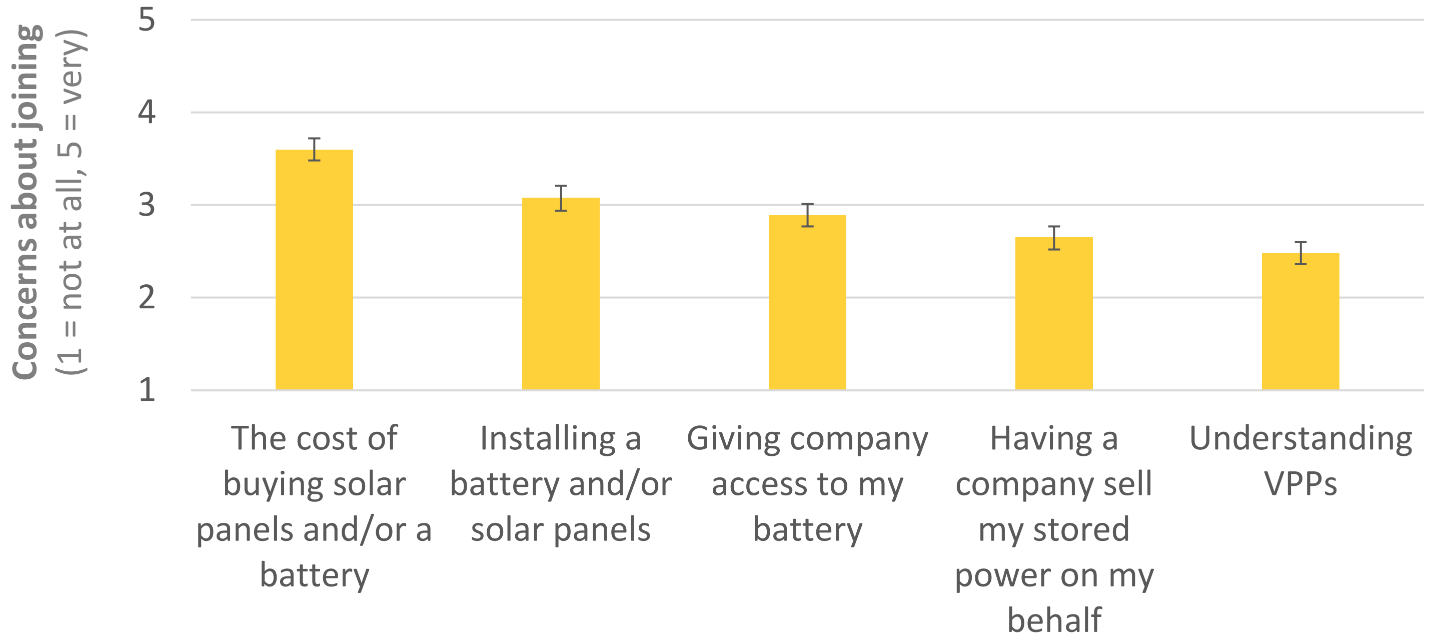
Consumers saw DERs and VPPs as delivering more rational than emotional benefits



Reports [Surveying potential customers in NEM jurisdictions]

Potential customers: What other views do they have?

The biggest perceived barrier to joining a VPP was the cost of purchasing the necessary DER

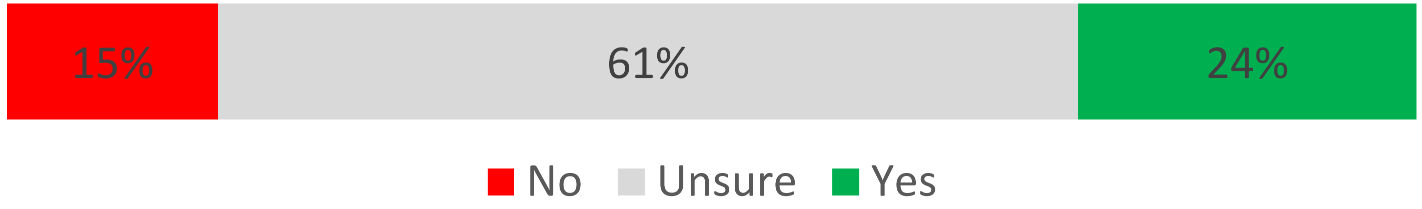


Reports [Surveying potential customers in regional VIC]

Potential customers: How can trust be built?

Most consumers were reserving judgement about whether aggregators could be trusted…

Can an aggregator be trusted to access and export power on your behalf?



Reports [Surveying potential customers in NEM jurisdictions]

Potential customers: How can trust be built?

…but the following proportions of consumers believed that these features would enhance their trust in an aggregator:

66% consumer controls how much stored power an aggregator can export

65% aggregator guarantees earnings

63% consumer controls when an aggregator can export stored power

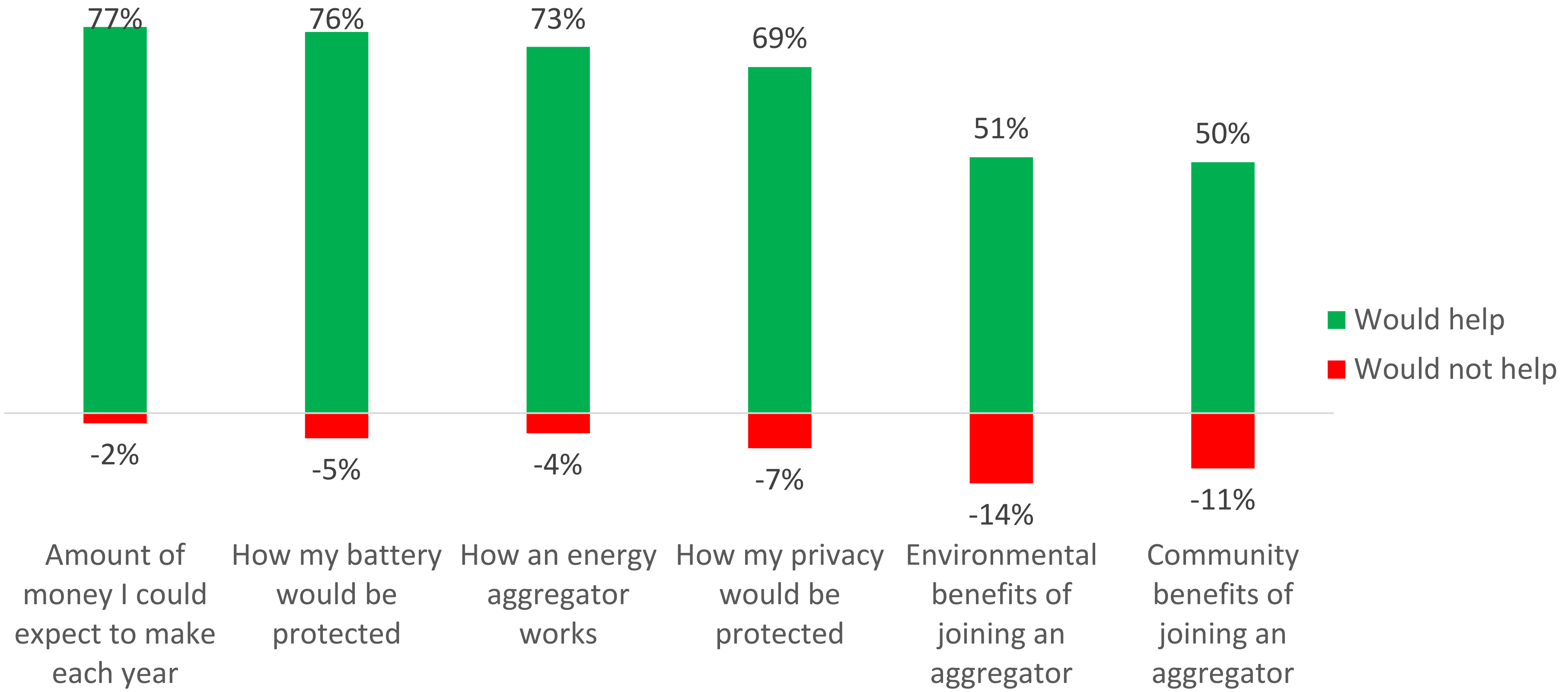
59% consumer notified before every export takes place

54% consumer notified after every export has taken place

Reports [Surveying potential customers in NEM jurisdictions]

Potential customers: How can trust be built?

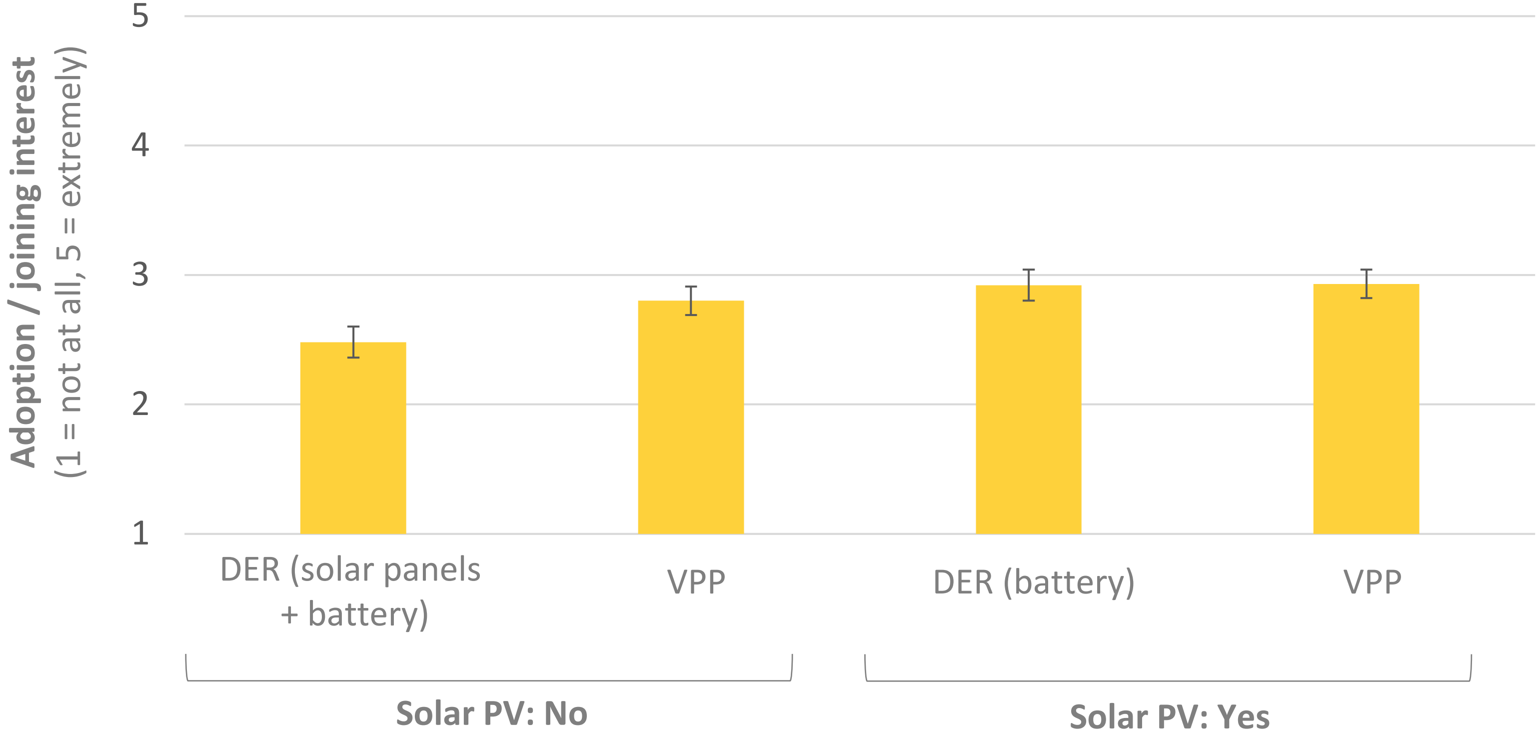
Information about financial benefits and consumer safeguards were deemed useful in helping decide whether to join an aggregator



Reports [Surveying potential customers in NEM jurisdictions]

Potential customers: Who is most interested?

Consumers with solar PVs were more interested in adopting DER (battery) than consumers without solar PVs were in adopting DER (battery + solar PV)



Reports Surveying potential customers in NEM jurisdictions

Potential customers: Who is most interested?

Younger, university-educated, politically progressive consumers who resided in larger, middle-income households tended to be more interested in adopting DER and/or joining a VPP

Predictors of interest in adopting...	...DER		...VPP	
	Solar PV: No	Solar PV: Yes	Solar PV: No	Solar PV: Yes
Younger age	**Yes**	**Yes**	No	No
University educated	**Yes**	No	No	No
$80k - $119k income	No	No	**Yes**	**Yes**
3+ household occupants	No	**Yes**	No	No
Politically progressive	**Yes**	No	**Yes**	No

Reports Surveying potential customers in NEM jurisdictions

Potential customers: Who is most interested?

Background

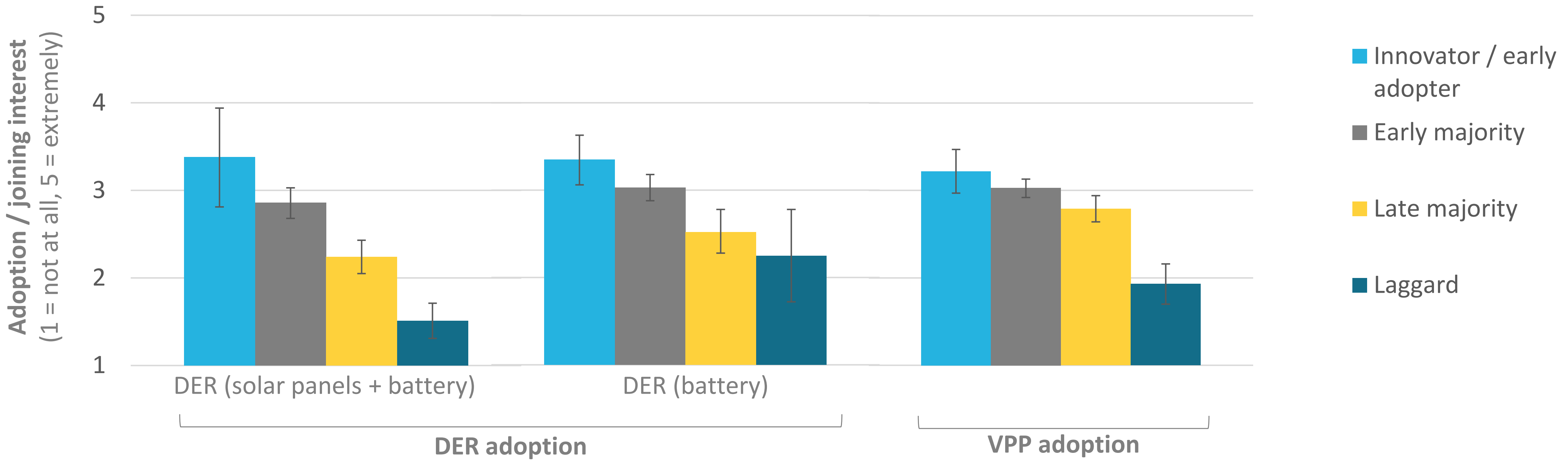
Consumers fell into different adopter categories:

- **Innovator/early adopter (11%):** like to be one of the first, or a leader, in trying new energy technologies
- **Early majority (53%):** like to hear about other peoples' experiences before trying new energy technologies
- **Late majority (26%):** only try new energy technologies when the people they trust have already done so
- **Laggard (11%):** not interested in new energy technologies

Reports Surveying potential customers in NEM jurisdictions

Potential customers: Who is most interested?

Consumers who self-rated themselves as **early adopters** or the **early majority** with respect to new energy technologies were most interested in adopting DER and joining a VPP



Reports Surveying potential customers in NEM jurisdictions

Potential customers: What do non-early adopters think?

EDGE

The **early majority** were unsure about whether they could trust aggregators

Trust aggregator	Innovator / early adopter	Early majority	Late majority	Laggard
No	12%	**11%**	12%	**44%**
Unsure	**49%**	**65%**	66%	**48%**
Yes	**40%**	25%	23%	**7%**

Green *= over-represented relative to the other adopter groups*
Red *= under-represented relative to the other adopter groups*

Reports Surveying potential customers in NEM jurisdictions

Potential customers: What do non-early adopters think?

EDGE

Trust-enhancing strategies that resonated with the **early majority** included guaranteed earnings, control over the size of exports, and being notified before exports occurred

Strategy for enhancing trust in an aggregator	Innovator / early adopter	Early majority	Late majority	Laggard
Aggregator guarantees earnings	59%	**70%**	68%	**42%**
Consumer controls how much stored power aggregator can export	64%	**71%**	65%	**47%**
Consumer notified before every export takes place	54%	**64%**	57%	**47%**
Consumer notified after every export has taken place	52%	**58%**	54%	**39%**
Friends/family have joined aggregator	32%	42%	**47%**	**21%**
Aggregator endorsed by trusted community group	42%	**44%**	43%	**20%**

Green *= over-represented relative to the other adopter groups*
Red *= under-represented relative to the other adopter groups*

Reports Surveying potential customers in NEM jurisdictions

Potential customers: What is a fair DER export policy?

Background

- To help them understand the policy scenarios, consumers were first presented with a metaphor equating:
  - Transmission lines to big pipes
  - Distribution lines to small pipes
- The metaphor also stressed that grid safety and stability depended on 'pipe' capacity not being exceeded
- Consumers were then presented with four scenarios describing different DER export policy options

Reports Surveying potential customers in NEM jurisdictions

Potential customers: What is a fair DER export policy?

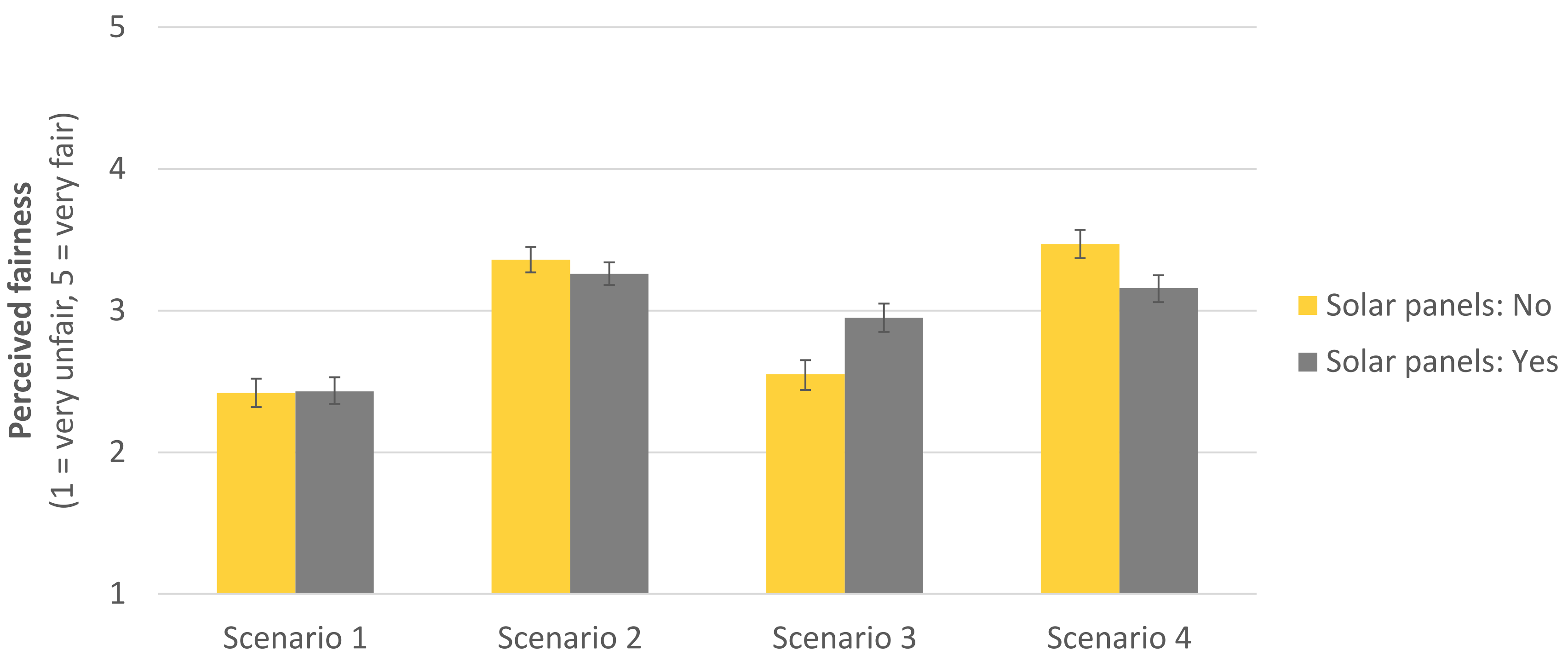
Scenarios

1. No upgrades to ‘small pipe’ capacity
2. No upgrades to ‘small pipe’ capacity; dynamic export limits
3. Upgraded ‘small pipe’ capacity; upgrade costs borne by all consumers
4. Upgraded ‘small pipe’ capacity; upgrade costs borne by consumers with exporting DER

Reports Surveying potential customers in NEM jurisdictions

Potential customers: What is a fair DER export policy?

A ‘fair’ policy was one that delivered the greatest benefits to one’s own household



Reports Surveying potential customers in NEM jurisdictions

Current Project EDGE customers

Current customers: Overview

35 Project EDGE customers interviewed

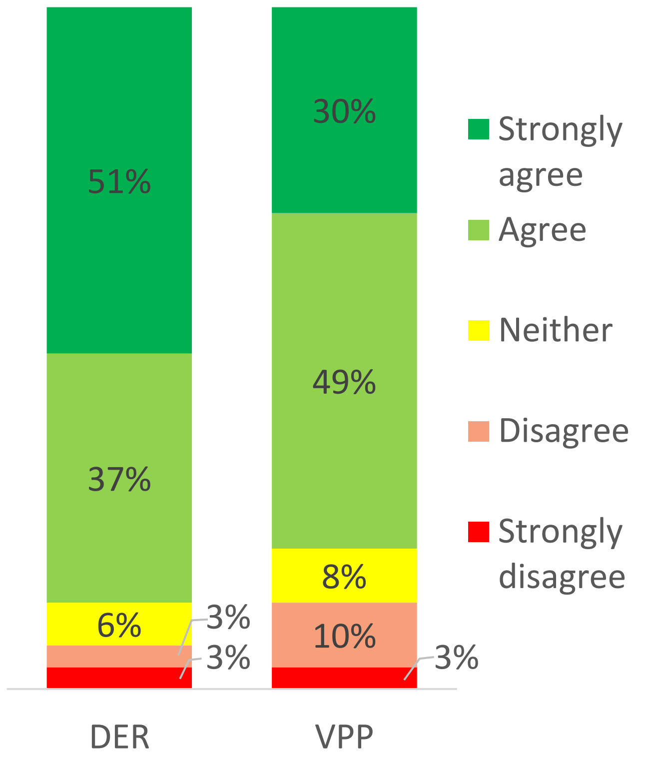
63 Project EDGE customers surveyed

Reports Interviewing Project EDGE customers
Surveying Project EDGE customers

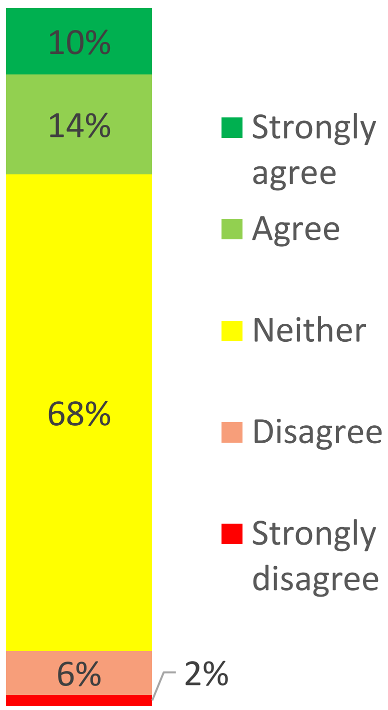
Current customers: How satisfied were they?

Overall satisfaction was broad but fragile

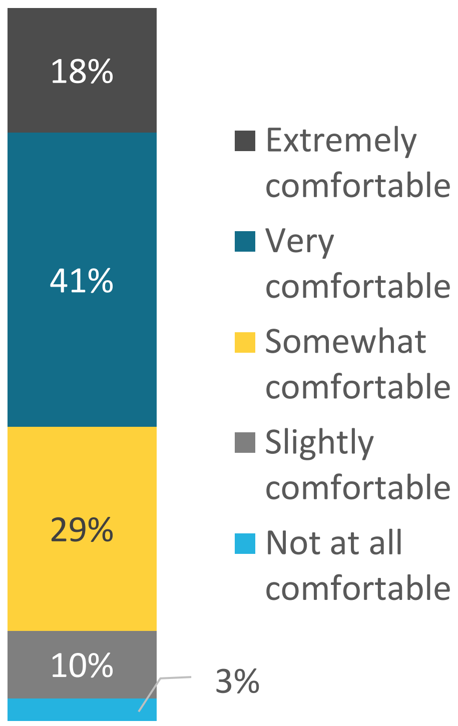
Satisfaction with DER and VPP



VPP is competitive relative to other VPPs



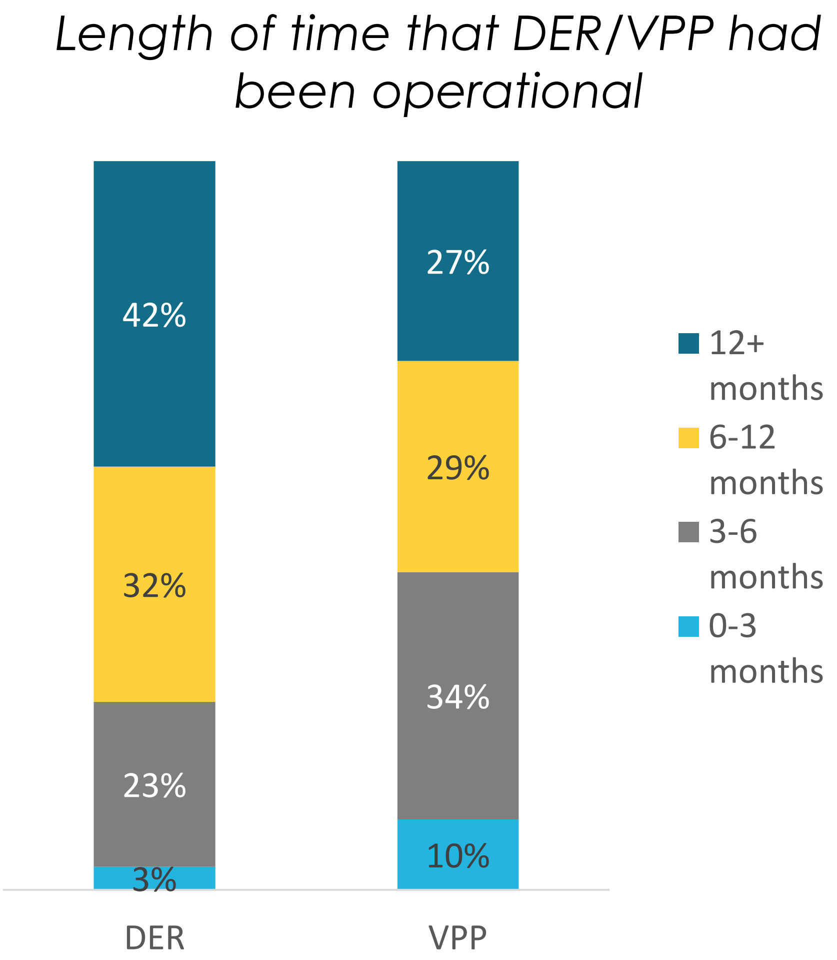
Comfort with aggregator managing DER



Reports [Surveying Project EDGE customers]

Current customers: Who were they?

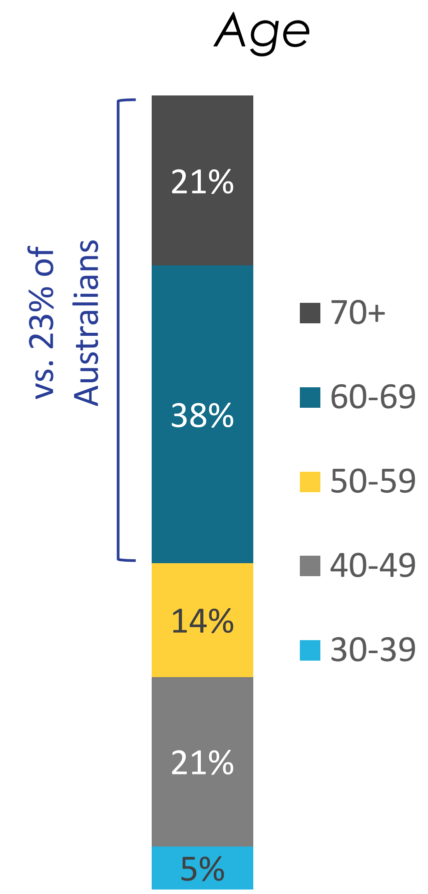
56% of customers had purchased DER as part of joining the VPP

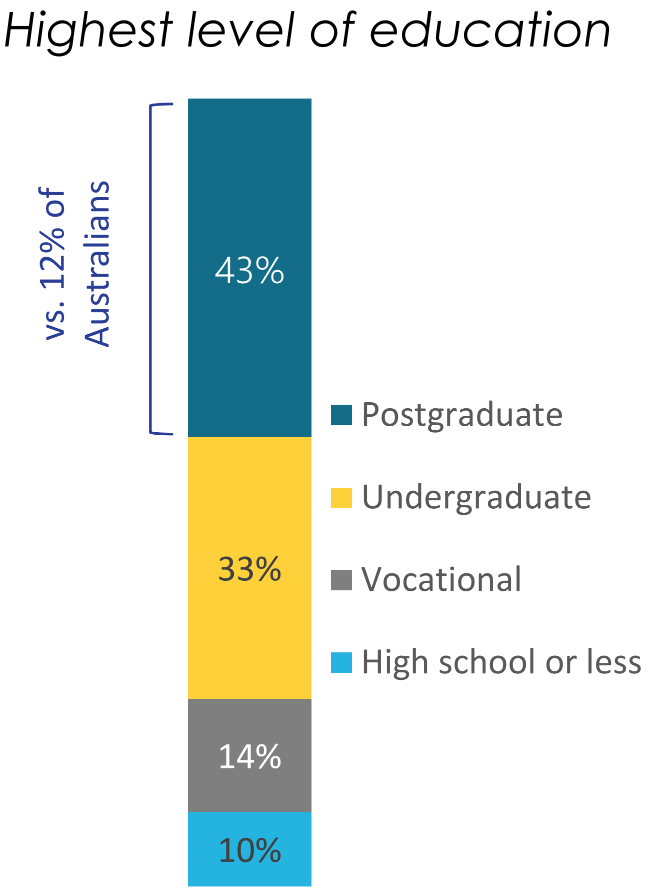


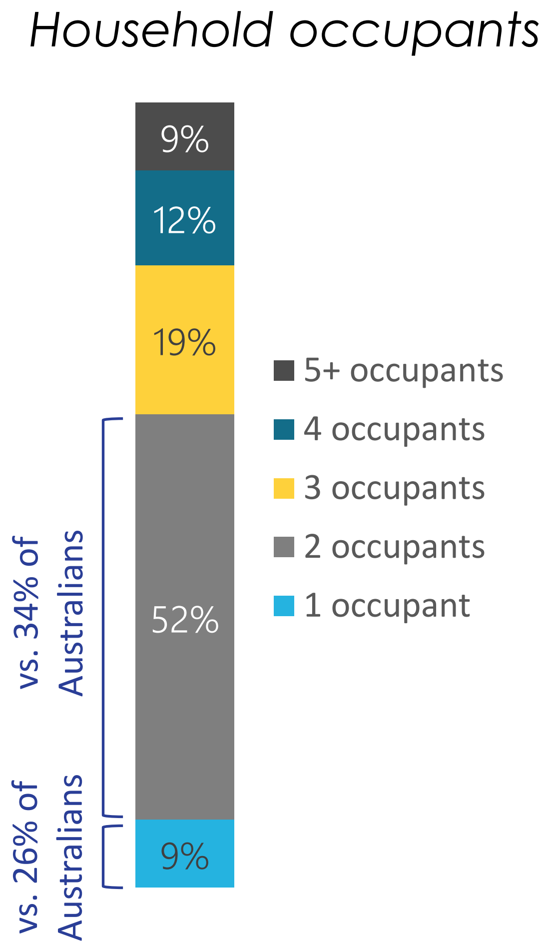
Reports Surveying Project EDGE customers

Current customers: Who were they?

Project EDGE customers demographically differed to the Australian pop.







Reports [Surveying Project EDGE customers]()

Current customers: Why did they join?

Customers considered multiple factors when evaluating whether to adopt DER and join the VPP

Motivators for adopting DER and joining a VPP

- Financial benefits
- Energy independence
- Energy resilience
- Environmental benefits
- Supporting domestic innovation
- Peace of mind
- Bundling

Potential barriers to adopting DER and joining a VPP

- Unfair financial returns
- Insufficient stored energy available for own use
- Data privacy and security

Reports Interviewing Project EDGE customers

Current customers: Why did they join?

Some customers were not deeply invested in energy

> *“One of the thing that attracted me to [aggregator], it wasn’t the VPP that attracted me so much, but it was quite useful because they said that they could manage our electricity and our gas, and then if we had credit in the electricity account, they said, ‘You can use that credit in the electricity account to offset your gas bill.’*

For this cohort, bundling VPPs into an attractive, integrated service may represent an alternative strategy to trying to drive the adoption of VPPs as a standalone service

Reports Interviewing Project EDGE customers

Current customers: Why did they join?

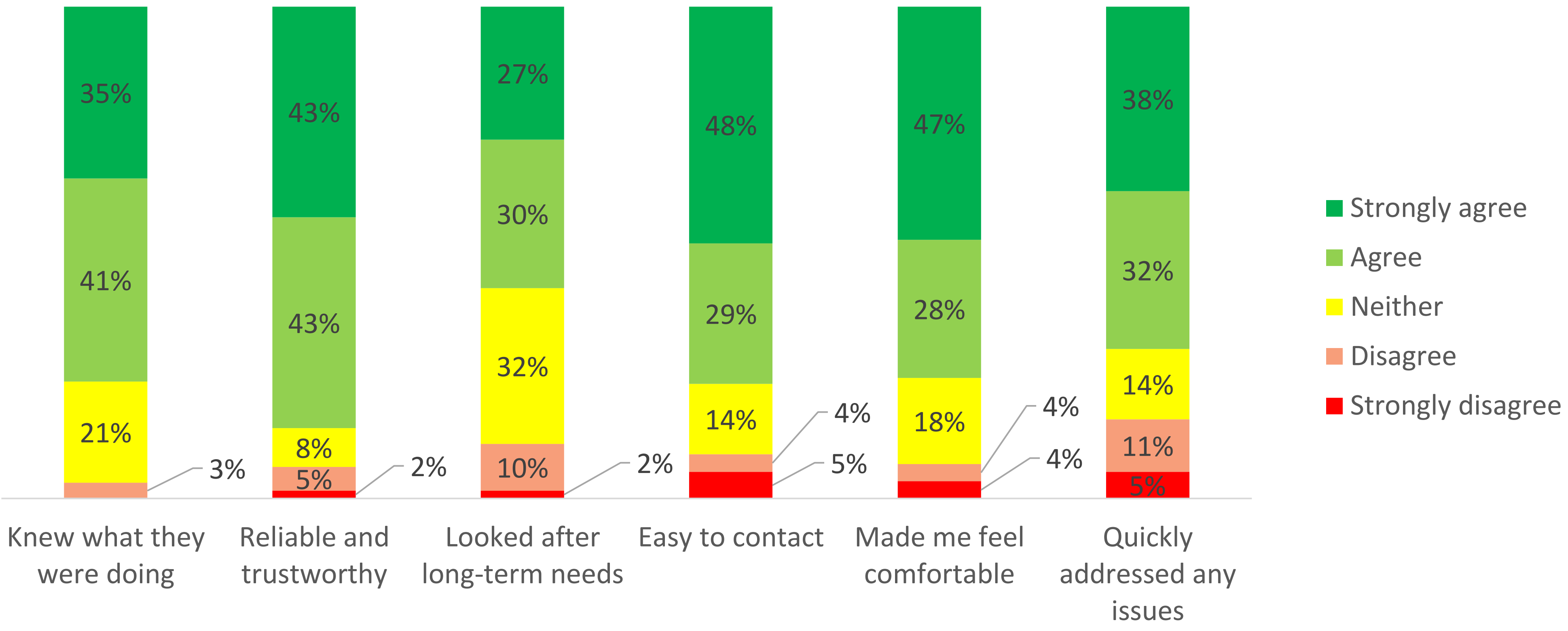
Actively managing customers' expectations so that they are better aligned with their eventual experiences will be key to maintaining longer-term customer satisfaction

- Some customers had unrealistic expectations about what their DER could achieve or how it would interact with the VPP
- Others had hoped that joining a VPP would deliver greater direct benefits to their community than were achieved

Reports Interviewing Project EDGE customers

Current customers: What did they experience?

While customer service was generally seen as good, opportunities for improvement were identified



Reports Surveying Project EDGE customers

Current customers: What did they experience?

- While some customers were keen to customise their VPP settings (if the option to do so was available), most preferred for **VPP activities to be automated**
- One consequence of this preference was that the VPP remained a **'black box'** for many customers in that they were not always aware of when – or even if – active management of their DER asset was occurring

Reports Interviewing Project EDGE customers

Current customers: What did they experience?

- Customers were seeking improved comms and transparency

51% of customers who recalled receiving comms from their VPP were satisfied with those comms

- Suggestions for improving VPP comms included:
  - Real-time impact of VPP activity
  - Forewarning of VPP activity
  - Information about Project EDGE learnings

- These suggestions were also identified as ways to **enhance comfort with an aggregator** managing their DER

Reports Surveying Project EDGE customers

Current customers: What did they experience?

For some, joining had been a **leap of faith**

- Some customers reported struggling to understand the charges and terminology used to describe the VPP or wanted (and failed to find) information about the net financial implications of joining the VPP

> *The last thing anyone wants to do is know that they're participating in a program that's actually costing their household more money. I did it knowing that it could because there was, actually, really no guarantee.*

Reports Interviewing Project EDGE customers

Current customers: Who shared the benefits?

Financial rewards were satisfying but difficult to contextualise

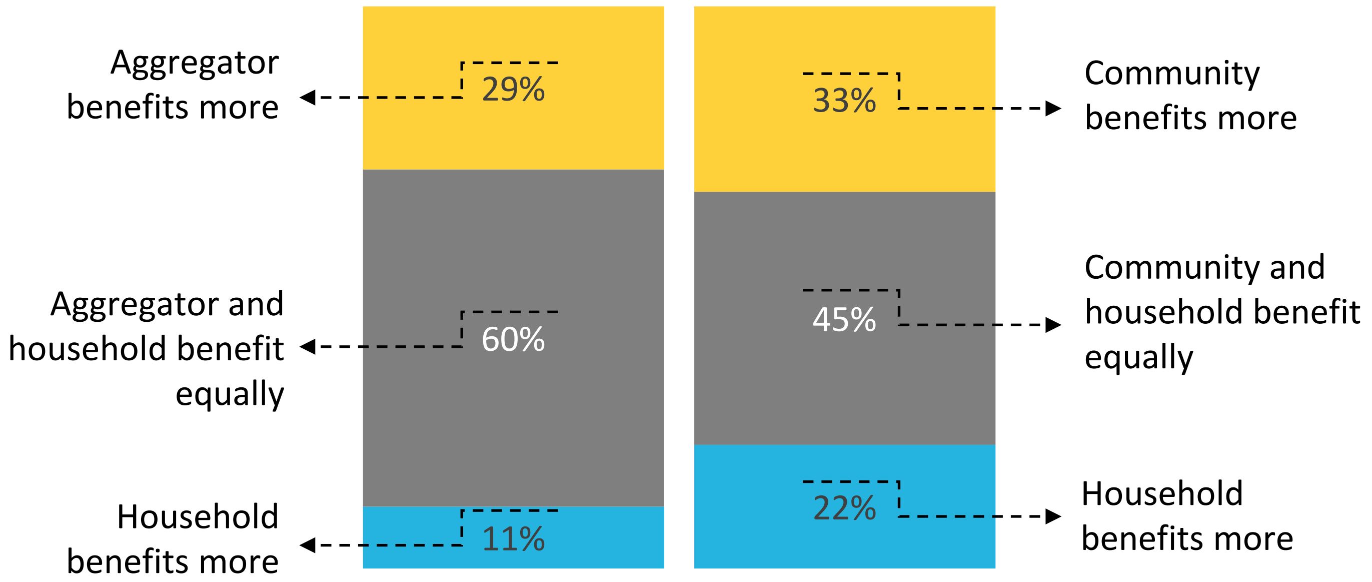
71% were somewhat or very satisfied with the financial rewards received for participating in the VPP

30% were unsure what financial impact their VPP participation had had on their energy bills

Reports Surveying Project EDGE customers

Current customers: Who shared the benefits?

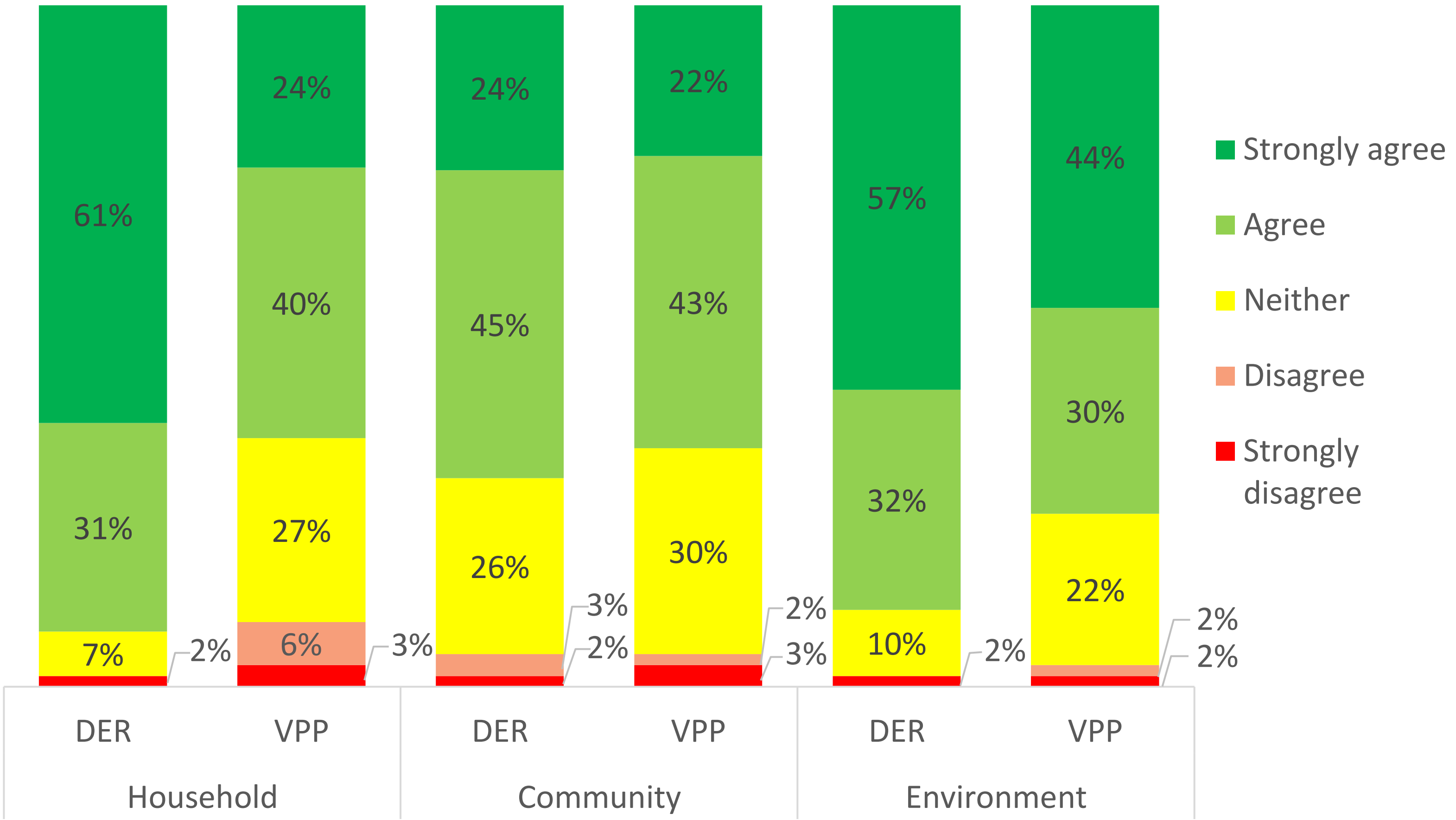
Aggregators were seen to benefit more from VPP participation than households



Reports [Surveying Project EDGE customers]

Current customers: Who shared the benefits?

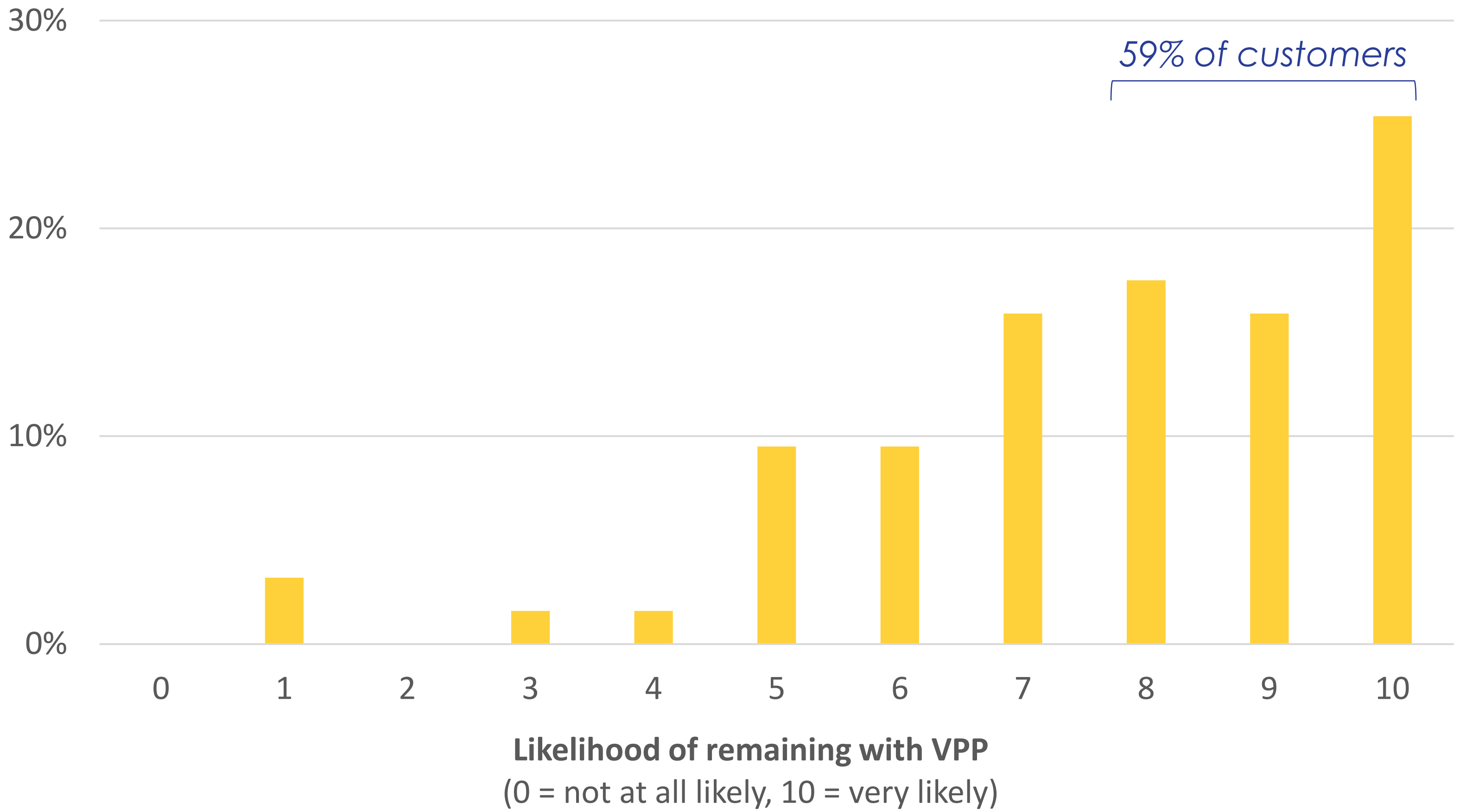
Value proposition for joining a VPP requires work



Reports Surveying Project EDGE customers

Current customers: Would they remain?

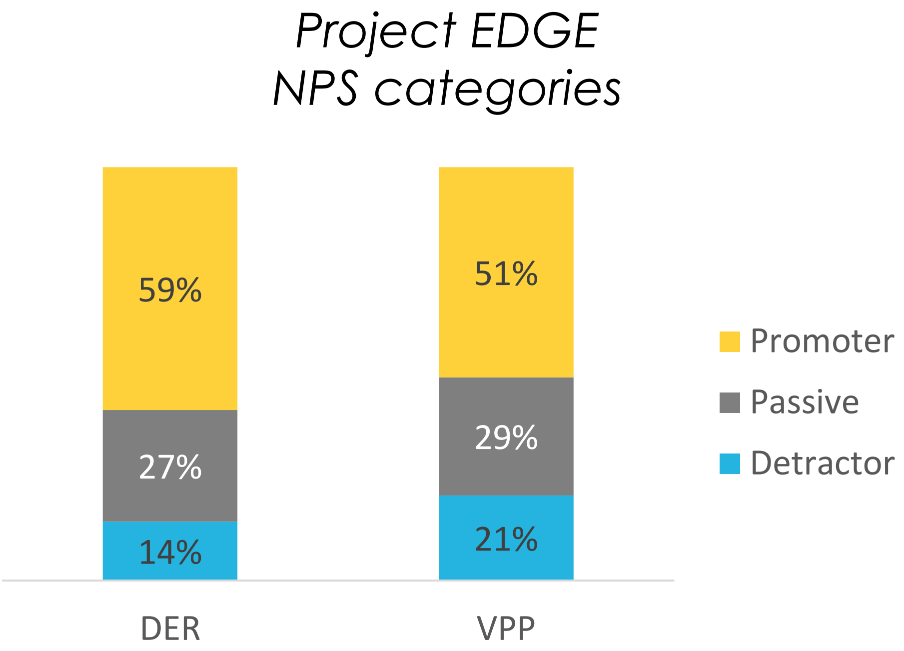
Majority of customers reported a high likelihood of remaining with the VPP



Reports Surveying Project EDGE customers

Current customers: Would they remain?

Net Promoter Score (NPS) is an industry metric used to assess the likelihood that a customer would **recommend a product or service to others**



+30 NPS for Project EDGE VPPs

+11 comparison NPS (seven Australian VPPs)

+65 comparison NPS (Simply Energy VPPx)

Reports Surveying Project EDGE customers

Current customers: Can more exports be motivated?

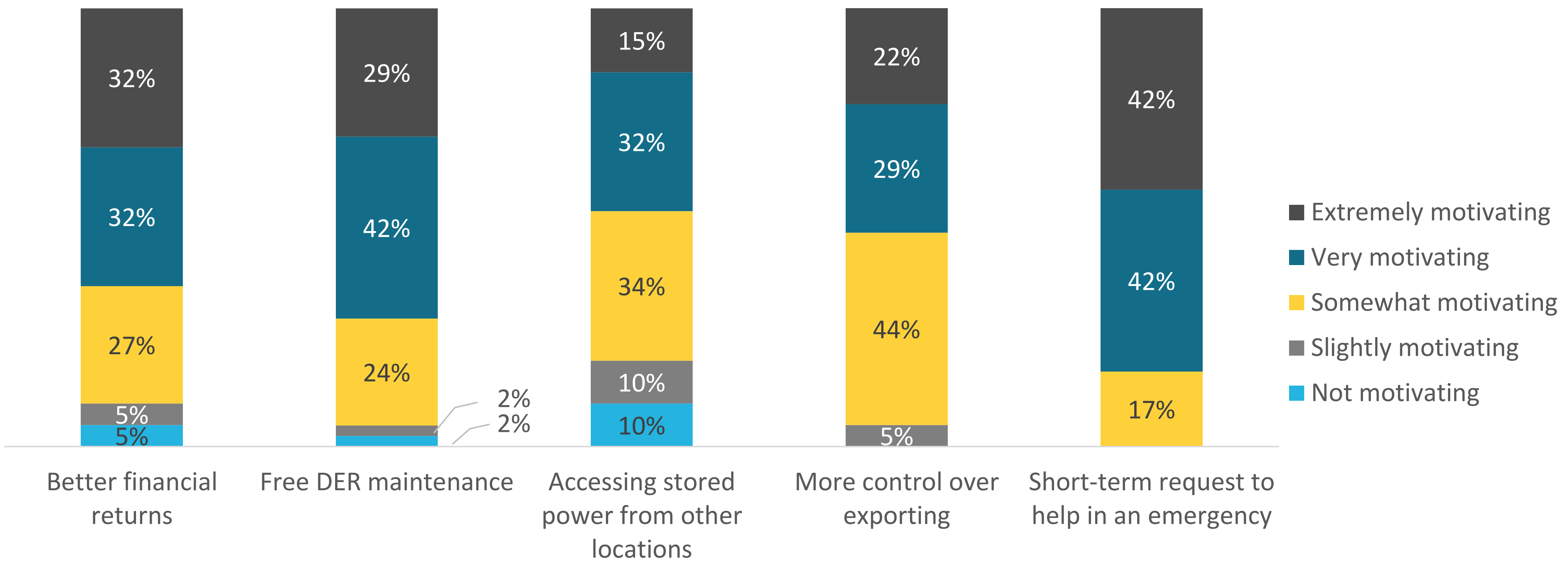
Customers were not averse to increasing the amount of energy they exported through a VPP, so long as it passed a **'better off overall test'**

- Customers wanted assurances that additional export activity would not accelerate DER depreciation
- Customers also wanted certainty about the financial implications of engaging in additional VPP exporting activity relative to benefitting from self-consumption

Reports Interviewing Project EDGE customers

Current customers: Can more exports be motivated?

Financial and non-financial strategies may be successful in motivating additional export activity



Reports Surveying Project EDGE customers

Current customers: Can more exports be motivated?

If short-term, philanthropically-focused requests for additional VPP exports are implemented, customers would want to be kept appraised of the tangible impacts of those philanthropic exports

> “ *I think it needs to be something that you can quantify that's not tonnes of greenhouse gases, because no one knows what that looks like.*

Philanthropically-focused exports didn't negate the need for exports to still pass the 'better off overall test'

Implications

Implications: Aggregators

Value proposition

- Potential customers expect VPPs to save (or generate) them money, so the value proposition for joining a VPP should include tangible financial benefits
- Potential and current customers struggle to see the personal benefits of joining a VPP over and above adopting DER, highlighting that the value proposition for joining a VPP requires further refinement

Implications: Aggregators

Communication and trust

- Customers expect transparency from aggregators, both when considering whether to join a VPP (e.g., estimates of the financial implications of joining) and after joining a VPP (e.g., information about how their DER assets are being used; linking VPP participation to financial benefits)
- Aggregators that can provide customers with sought-after transparency are well-placed to develop the trust of customers
- While customers may desire information about how their DER assets are being used, most do not want to be involved in the day-to-day management of the VPP, so how aggregators balance this potential tension will be key

Implications: Aggregators

Motivating additional exports

- Customers are not averse to increasing the amount of power they export through a VPP, provided they will be better off overall
- Short-term, irregular requests for additional VPP exports to address an emergency need could be motivated by philanthropically-framed requests
- For more regular export requests, relational strategies that deliver longer-term value for customers (e.g., free DER maintenance, better financial returns) may prove motivating

Implications: Policy makers

- Consumers consider the personal costs and benefits of DER export policies when assessing the fairness of those policies
- Of the examined DER export policies, the one deemed most fair involved no costly distribution upgrades (benefits all households) and included dynamic export limits (benefits households with solar PV)

Implications: Future research

- What is a VPP value proposition that is equally attractive to potential and current customers while also being financially sustainable for aggregators to operate?
- What will motivate more customers to join a VPP: bundling the VPP with a broader package of energy services or developing a standalone VPP offering?
- What algorithms can be developed to help potential customers obtain a reasonable estimate of the potential financial implications associated with joining a VPP?
- What is the most effective way to transparently communicate with customers about how their VPP is being used while simultaneously respecting the desire that most customers have of not being involved in the day-to-day functioning of the VPP?

Knowledge sharing

Knowledge sharing

- Links to all reports referred to in this webinar have been embedded in the slide pack
- All Project EDGE reports are also available via https://aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge/project-edge-reports-1
- Finally, a sneak-peak at the customer insights summary report…

Background: Context and research gaps

New energy technologies

- Distributed Energy Resources (DERs) are technologies that allow households to generate, store, or distribute energy
- Examples of DER include rooftop solar photovoltaics (solar PV), household batteries, solar hot water systems, and electric vehicles
- Third-party providers have started to offer energy services that aggregate the distribution capabilities of many household DERs through the formation of virtual power plants (VPPs)
- Through these VPPs, aggregators can control when connected DERs import or export power to the National Electricity Market (NEM), allowing them to trade in this market and deliver a range of network services

Project EDGE

- Project EDGE (Energy Demand and Generation Exchange) was a multi-year field trial aimed at demonstrating a proof-of-concept DER marketplace
- Through the marketplace, customers' DER were aggregated to deliver wholesale and network support services
- The Project EDGE field trial occurred within the AusNet Services distribution network in Victoria and involved three DER aggregators: Discover Energy, Mondo, and Rheem

Reports ① Literature review

Research gaps ①

- There is a growing awareness of the potential network benefits that VPPs can deliver
- What is less clear are the VPP perceptions and experiences of current and potential customers
- A literature review conducted by Deakin University's Better Consumption Lab identified a range of gaps in the existing literature on DERs and VPPs, including:
  - An over-emphasis on early adopters at the expense of other customer segments
  - Limited understanding of customers' expectations for financial returns
  - An unresolved tension around how ease of use can be reconciled with a desire for customisation
  - Uncertainty about how perceptions of DERs and VPPs compare with the status quo or to other energy products
  - Limited information on how best to communicate with customers
  - How trust in aggregators can be increased and risk perceptions reduced
  - What is required to develop relational interactions with customers
  - Unsophisticated segmentation analyses for understanding customer perceptions

Guide to the notation used in this report

exports ④ ← Study report being summarised

Research gap (from the list above) that a summarised finding addresses

Potential customers: Overview

Method

399 regional Victorians surveyed ②

893 Australians in NEM jurisdictions (excluding Victoria) surveyed ③

Key learnings

- Consumers might like the VPP concept, but they're lukewarm about joining a VPP
- Of the outcomes that mattered most to consumers, DERs and VPPs were seen as helping to achieve only one: saving money
- Consumers had very high expectations about how much money they would save from joining a VPP
- Consumers could not see a clear benefit for joining a VPP, over and above adopting DERs
- Most consumers were reserving judgement about whether aggregators could be trusted
- Information about financial benefits and consumer safeguards were deemed useful in helping consumers decide whether to join an aggregator

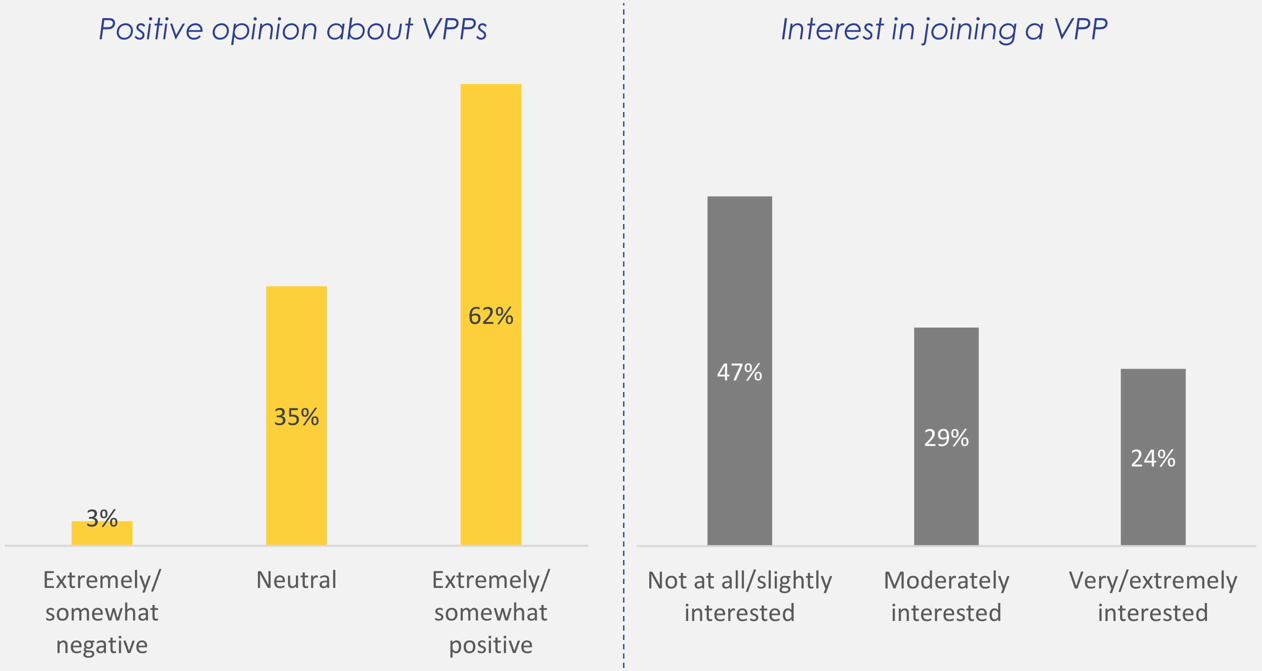
Reports ② Surveying potential customers in regional VIC
③ Surveying potential customers in NEM jurisdictions

VPP awareness was low ②

92% were either unaware of VPPs or aware of VPPs but knew nothing about them

Consumers might like the concept of a VPP, but they're lukewarm about joining a VPP ②

Most (62%) consumers were positive about VPPs after reading a summary about them, but this positive perception did not automatically translate into an interest in joining a VPP



Potential customers: What do non-early adopters think?

Adopter categories ③

Consumers fell into different adopter categories:

- **Innovator/early adopter (11%):** like to be one of the first, or a leader, in trying new energy technologies
- **Early majority (53%):** like to hear about other peoples' experiences before trying new energy technologies
- **Late majority (26%):** only try new energy technologies when the people they trust have already done so
- **Laggard (11%):** not interested in new energy technologies

The early majority were unsure about whether they could trust aggregators ③

- Innovators/early adopters were more likely to trust aggregators to manage their DER, while the early majority were more likely to be unsure

Trust aggregator	Innovator / early adopter	Early majority	Late majority	Laggard
No	12%	11%	12%	44%
Unsure	49%	65%	66%	48%
Yes	40%	25%	23%	7%

Green = over-represented relative to the other adopter groups
Red = under-represented relative to the other adopter groups

Reports ③ Surveying potential customers in NEM jurisdictions

Control, transparency, and consumer safeguards are trust-enhancing strategies that particularly resonate with the early majority ③

- The table below shows the proportion of each adopter category that endorsed a given strategy as likely to enhance their trust in an aggregator
- Trust-enhancing strategies that resonated with the early majority included guaranteed earnings, control over the size of exports, and being notified before exports occurred

Strategy for enhancing trust in an aggregator	Innovator / early adopter	Early majority	Late majority	Laggard
Aggregator owned by community group	37%	33%	29%	16%
Aggregator owned by commercial company	25%	14%	13%	8%
Aggregator guarantees earnings	59%	70%	68%	42%
Consumer controls how much stored power aggregator can export	64%	71%	65%	47%
Consumer controls when aggregator can export stored power	59%	67%	60%	55%
Consumer notified before every export takes place	54%	64%	57%	47%
Consumer notified after every export has taken place	52%	58%	54%	39%
Friends/family have joined aggregator	32%	42%	47%	21%
People in community have joined aggregator	39%	42%	43%	19%
Aggregator endorsed by trusted community group	42%	44%	43%	20%
Aggregator endorsed by government agency	54%	53%	53%	27%
Aggregator has a lock-in contract	33%	30%	28%	17%

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Questions?