

DER Market Integration Consultative Forum



26 May 2022



We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.

We pay respect to their Elders past, present and emerging.

AEMO Competition Law Meeting Protocol

AEMO is committed to complying with all applicable laws, including the Competition and Consumer Act 2010 (CCA). In any dealings with AEMO regarding proposed reforms or other initiatives, all participants agree to adhere to the CCA at all times and to comply with this Protocol. Participants must arrange for their representatives to be briefed on competition law risks and obligations.

Participants in AEMO discussions **must**:

- Ensure that discussions are limited to the matters contemplated by the agenda for the discussion
- Make independent and unilateral decisions about their commercial positions and approach in relation to the matters under discussion with AEMO
- Immediately and clearly raise an objection with AEMO or the Chair of the meeting if a matter is discussed that the participant is concerned may give rise to competition law risks or a breach of this Protocol

Participants in AEMO meetings **must not** discuss or agree on the following topics:

- Which customers they will supply or market to
- The price or other terms at which Participants will supply
- Bids or tenders, including the nature of a bid that a Participant intends to make or whether the Participant will participate in the bid
- Which suppliers Participants will acquire from (or the price or other terms on which they acquire goods or services)
- Refusing to supply a person or company access to any products, services or inputs they require

Under no circumstances must Participants share Competitively Sensitive Information. Competitively Sensitive Information means confidential information relating to a Participant which if disclosed to a competitor could affect its current or future commercial strategies, such as pricing information, customer terms and conditions, supply terms and conditions, sales, marketing or procurement strategies, product development, margins, costs, capacity or production planning.

Today's meeting

Time	Item	Speaker
11:00 – 11:05	Welcome and introductions	Rachel Rodrigues McGown [AEMO]
11:05 - 11:15	Project EDGE Update – 1st month of Trial	Nick Regan [AEMO]
11:15 - 11:45	Project EDGE Public Interim Report	Nick Regan [AEMO]
11:45 - 12:15	Customer Insights Study Results	Associate Professor Josh Newton [Deakin University]
12:00 – 12:25	Q&A	All
12:25 – 12:30	Future Meetings & Close	Rachel Rodrigues McGown [AEMO]



Project EDGE - Trial Update

Nick Regan [AEMO]



The Trial has started

- **Current position**

- The EDGE trial has formally started with go-live on May 2.
- The basic functionality of the marketplace is being tested (DOE generation, boffers, dispatch, telemetry)
- The project is finalising discussion with three additional aggregators to come on board for participation in the EDGE in September 2022.
- Techno-economic modelling work supporting DOE design and CBA underway
- Now known as “The award winning” Project EDGE: [Gold award from APEC 2022 Energy Smart Communities Initiative \(ESCI\) Best Practices Awards Program!](#)

- **Key upcoming activities**

- Release of the Public Interim Project Report and Public Customer Insights and Engagement Study
- Public webinars for each of these public reports.
- Incrementally develop platform capability and sophistication.
- Progress customer acquisition for next phase (including additional) C&I customers

Lessons learned will be included in the Public Interim Report to be published early June 2022.

Project EDGE | Schedule

Based in AusNet region of Victoria

Five Phases, from July 2020 – March 2023



What are we testing in practice?

We will cycle the trial through a number of pre-determined modes that test permutations on DNSP operating envelopes and aggregator bidding.

Mode	OE Frequency	DOE calculation	OE Active vs. Reactive	DOE Objective function	Bidding Type	Bidding	Bidding Qty	Dispatch instruction
1	Day ahead	Network + approximation	Active only	Equal allocation	Scheduled bidding	Visibility	Net NMI	Not actioned
2	Day ahead	Network only	Active only	Max service	Scheduled bidding	Visibility	Net NMI	Not actioned
3	Day ahead	Approximation only	Active only	Max service	Scheduled bidding	Visibility	Net NMI	Not actioned
4	Day ahead	Network + approximation	Active only	Max service	EFL	Self-dispatch	Net NMI	Actioned
5	Day ahead	Network + approximation	Active only	Max service	Scheduled bidding	Scheduled	Net NMI	Actioned
6	Day ahead	Network + approximation	Active only	Max service	Scheduled bidding	Scheduled	Flex	Actioned
7	Intra-day	Network + approximation	Active only	Max service	Scheduled bidding	Scheduled	Net NMI	Actioned
8	Intra-day	Network + approximation	Active + Reactive	Max service	Scheduled bidding	Scheduled	Net NMI	Actioned
9	Intra-day	Network + approximation	Active + Reactive	Max service	Scheduled bidding	Scheduled	Flex	Actioned

How will we ensure relevance and robustness of results?

We will be actively testing several scenarios to ensure test results include data with these important market conditions

	Scenario 2: DER Energy Arbitrage	Scenario 5: Market response to communication failures
Scope	<ol style="list-style-type: none"> 1. Sudden unforeseen price spike to ceiling (e.g. gen trip) 2. Sudden unforeseen price spike to floor (e.g. loss of load) 3. Administered Price Cap (APC) 4. High volatility day (e.g. saw tothing) 5. Lack of Reserve (LOR1) days 6. Minimum System Load (MSL1) days 	<ol style="list-style-type: none"> 1. Loss of connection between DNSP and AEMO <ul style="list-style-type: none"> • (e.g. cease DOE, use remaining 48hrs) 2. Loss of connection between Aggregator and AEMO <ul style="list-style-type: none"> • (e.g. cease boffer, use remaining 48hrs) 3. Loss of connection between Aggregator and DER assets <ul style="list-style-type: none"> • (e.g. cease dispatch, DER default control) 4. Loss of connection between AEMO and Aggregator <ul style="list-style-type: none"> • (e.g. cease dispatch instruction, maintain last instruction)
Purpose	<ul style="list-style-type: none"> • Demonstrate Aggregators’ ability to respond to price events with a high level of accuracy to their scheduled dispatch target • To understand if Aggregators’ can coordinate DER fleets to respond instantaneously to negative/high price events • Better understanding of contingency events for improved forecastability of VPPs 	<ul style="list-style-type: none"> • Determine how resources/systems perform during communication outages • Inform what the optimal default arrangements should be under loss of communications (e.g. DOEs, boffers, dispatch instructions) • Understand impact of communication failures on market outcomes (spot price, customer resource utilisation)



Project EDGE - Public Interim Report

Nick Regan [AEMO]

Public Interim Project Report and webinar

Public Interim Project Report

- Overview of project EDGE
- Definition of market roles and responsibilities
- Detailed description of:
 - Scalable data exchange
 - Market Operator lessons learned
 - DSO lessons learned
 - Aggregator lessons learned
- Summary of the Cost Benefit Analysis methodology

Public Interim Project Webinar

- Presentation by the EDGE project team to summarise the Interim Report
- Opportunity for questions and feedback

The report will be published on the EDGE project site
<https://aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge>

Report publish date:

~ Start of June

Webinar date:

~ Early June

MAY



Today



JUNE



Public reports released



Webinars

JULY

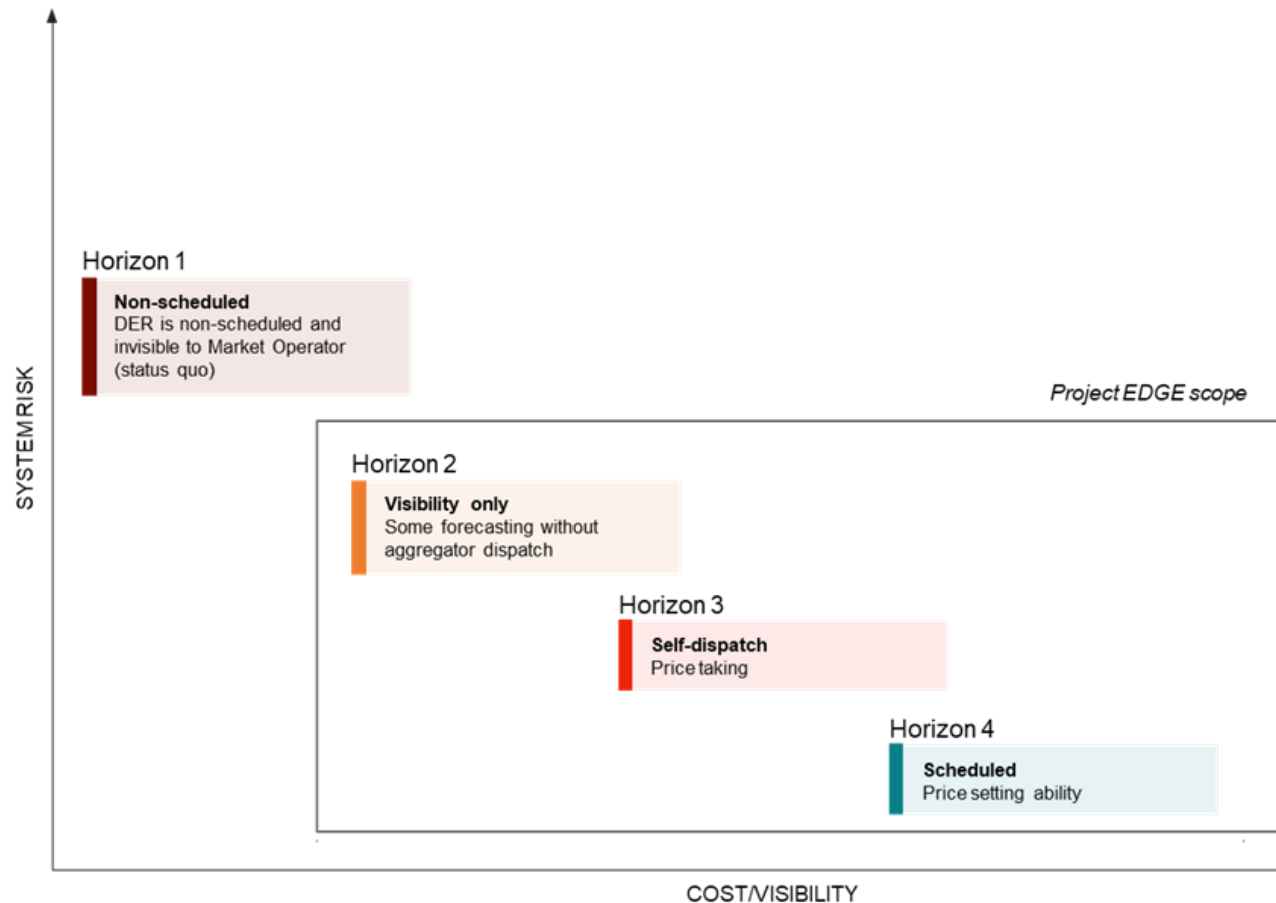


Wholesale integration insights



The project will test a progression of options for obtaining visibility and dispatch of DER fleets

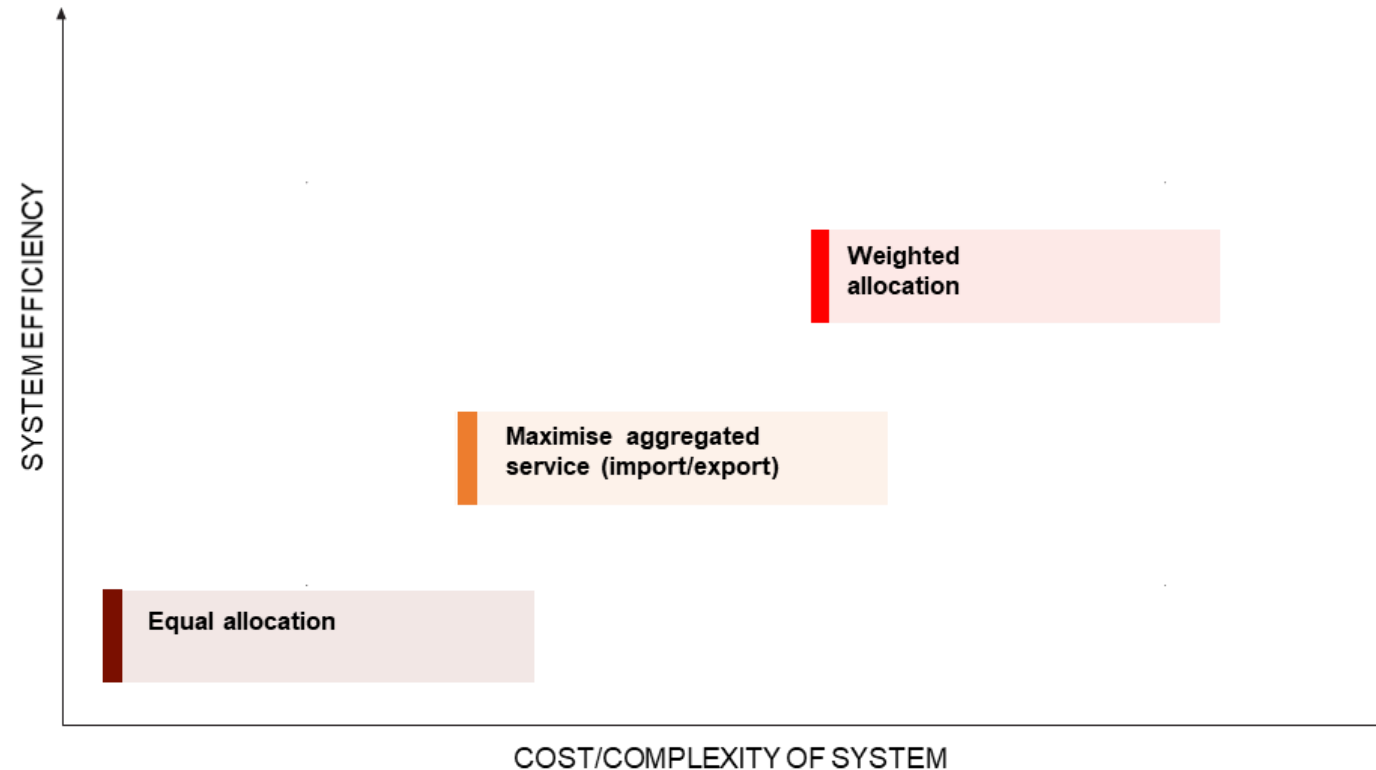
Project EDGE is exploring a spectrum of approaches that span a simplicity-efficiency trade-off continuum, from relatively simple and lower cost to implement, but relatively inefficient, to more complex, higher cost to implement and more efficient.



- **Open questions on dispatch compliance**
- 'Flex' bidding provides AEMO with required visibility but DOEs will be introduced at grid connection point (Net NMI). How can aggregators manage? What if multiple aggregators at a site?
- What is an appropriate DOE compliance mechanism? The project has identified 3 assuming aggregators bid constrained
 - 1) AEMO dispatch within sum of portfolio DOEs (simple but coarse, individual sites invisible)
 - 2) High penalties for non-compliance ex-post (may stunt nascent market, high system operability risk based on trust especially as active DER scales)
 - 3) Real time conformance monitoring (more complex and costly, who's responsibility?)

Three objective functions for DOE implementation were considered by the project

The DOE implementation process includes the development of the objective function of the calculation. EDGE is testing three objective functions.



- **Equal allocation:** Initial modelling indicates 'Equal allocation' results in material underutilisation of the network compared to 'Maximise aggregated service'.
- This means DER resources may be constrained unnecessarily, reducing whole of system benefits to all consumers.
- **Maximise aggregated services:** Avoiding voltage problems may result in unequal DOEs
- **Weighted allocation** has potential to enable maximum DER participation opportunity (increase efficiency).
- However, it is more complex and costly.
- The cost may not be worth the benefit, particularly at scale.

* System efficiency = network and market efficiency



Project EDGE – Customer Insights Study

A/Prof Josh Newton

Deakin University



Overview: Studies

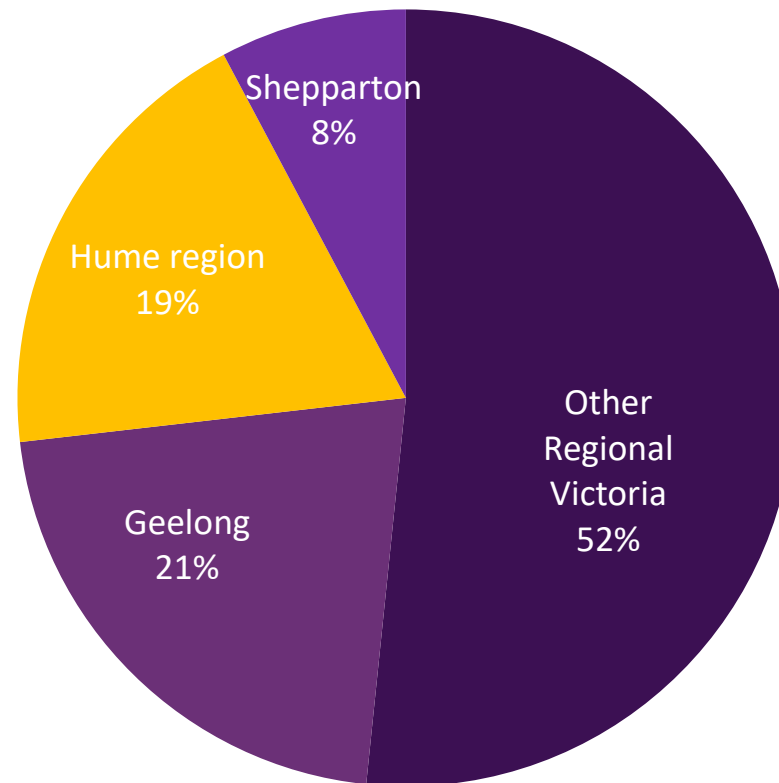
We have examined perceptions of – and decision-making around – virtual power plants (VPPs) among:

- Potential residential customers
- Current residential battery owners
- Potential organisational customers (business, local government)

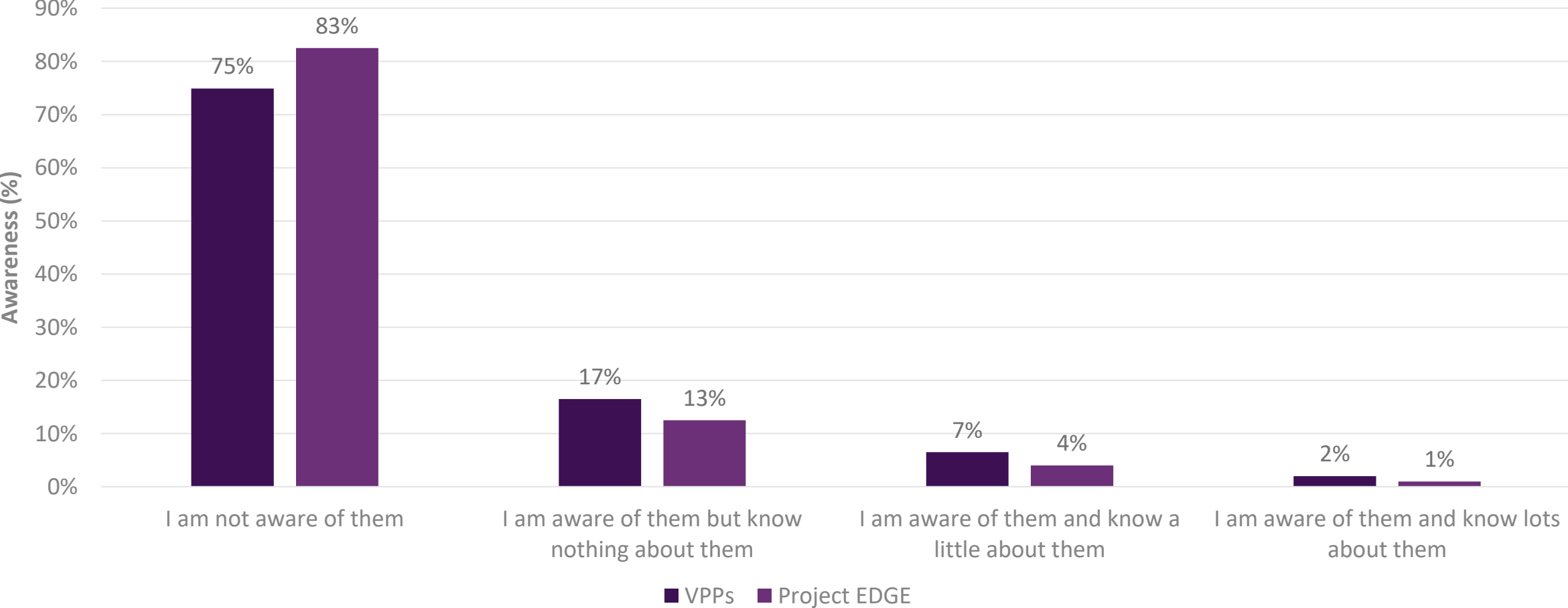
This presentation will provide a brief snapshot of some of the insights we found among potential residential customers

Overview: Sample

We recruited 399 participants residing in regional/rural Victoria



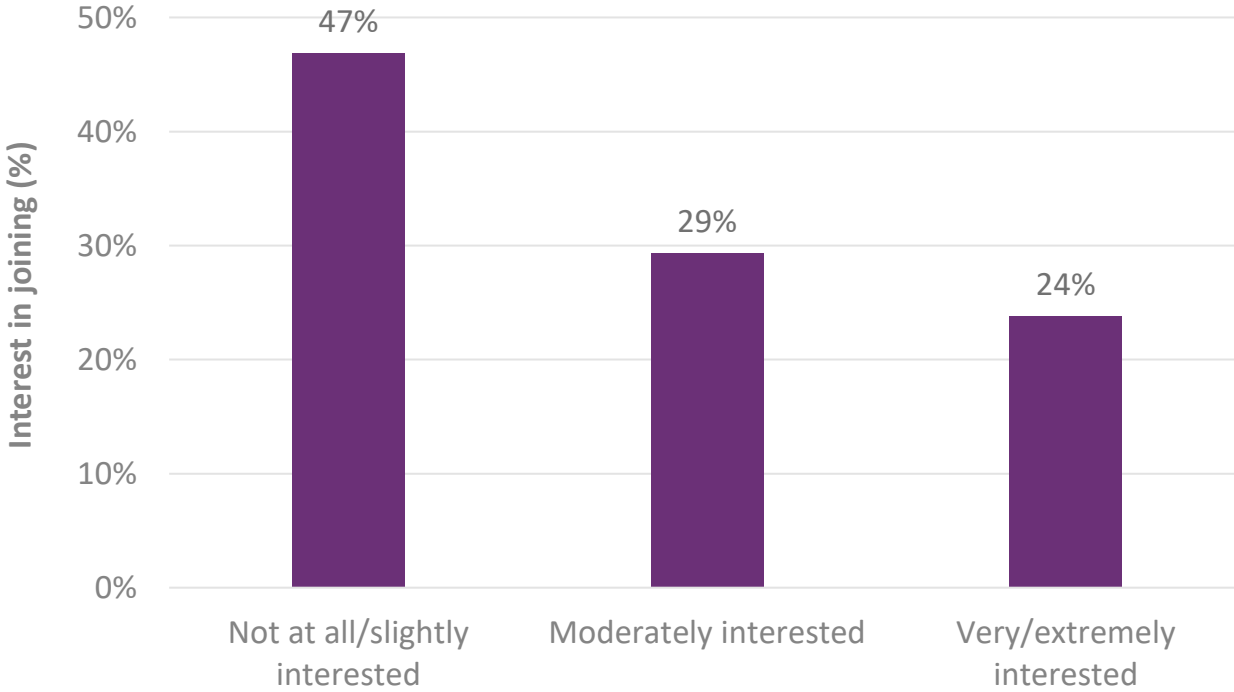
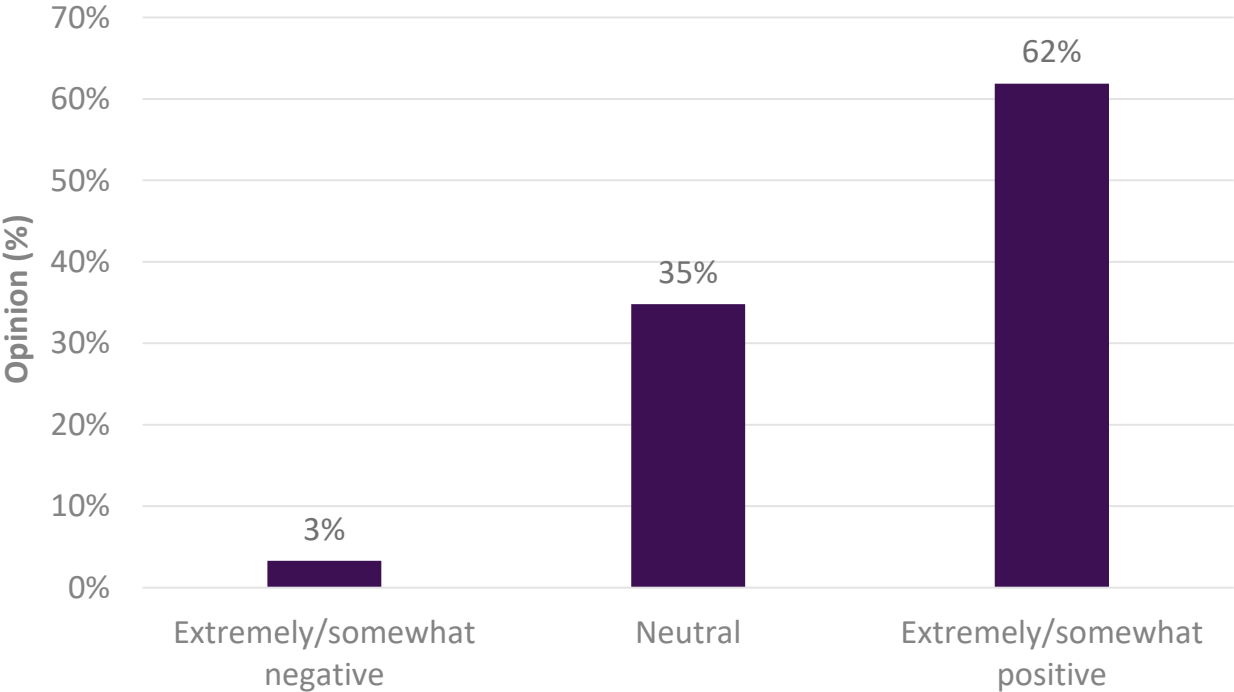
Results: Awareness



Results: Awareness

- 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 provide opportunities for first-movers who are able to paint a compelling brand image around VPPs

Results: Opinion vs. interest



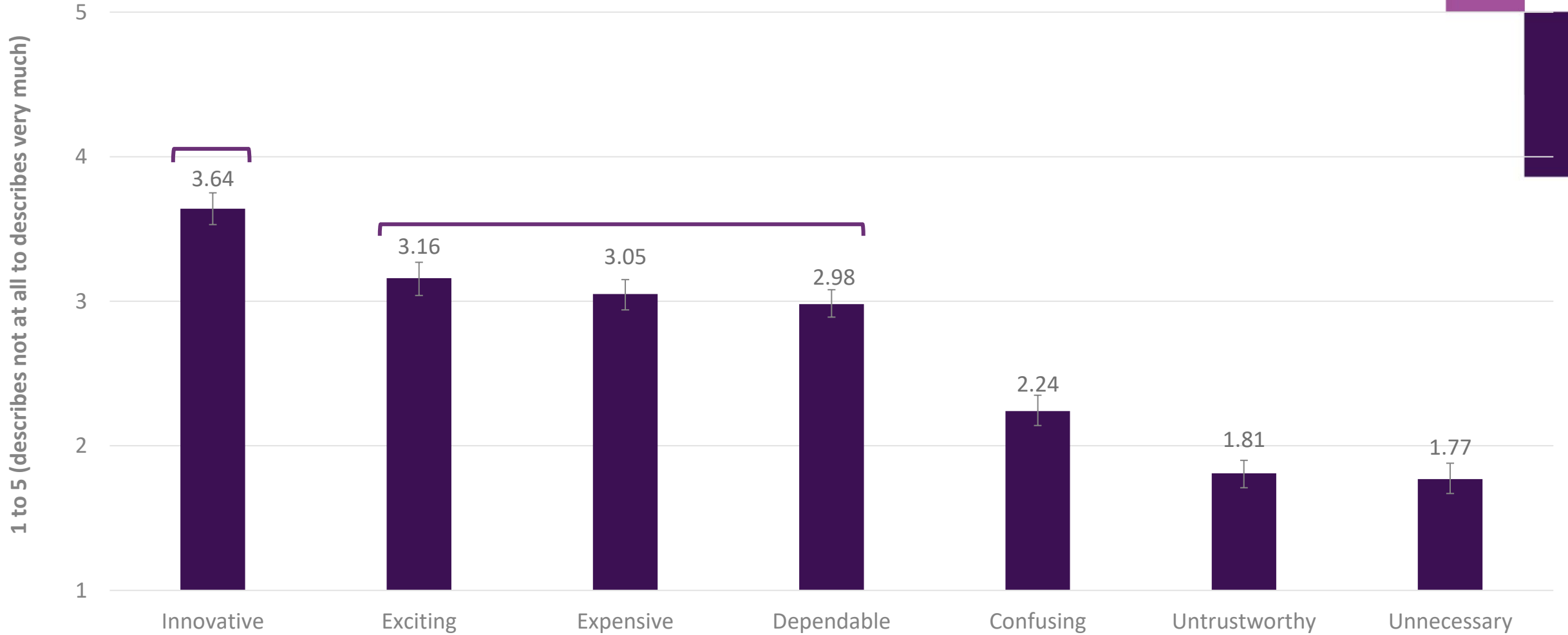
Results: Opinion vs. interest

- Glass half-empty
 - Favourable opinions \neq interest in joining
 - If we draw on other behavioural contexts, interest in joining \neq actual sign-ups
- Glass half-full
 - Exposure to a brief summary of VPPs was enough for 24% of participants to indicate being very/extremely interested in joining

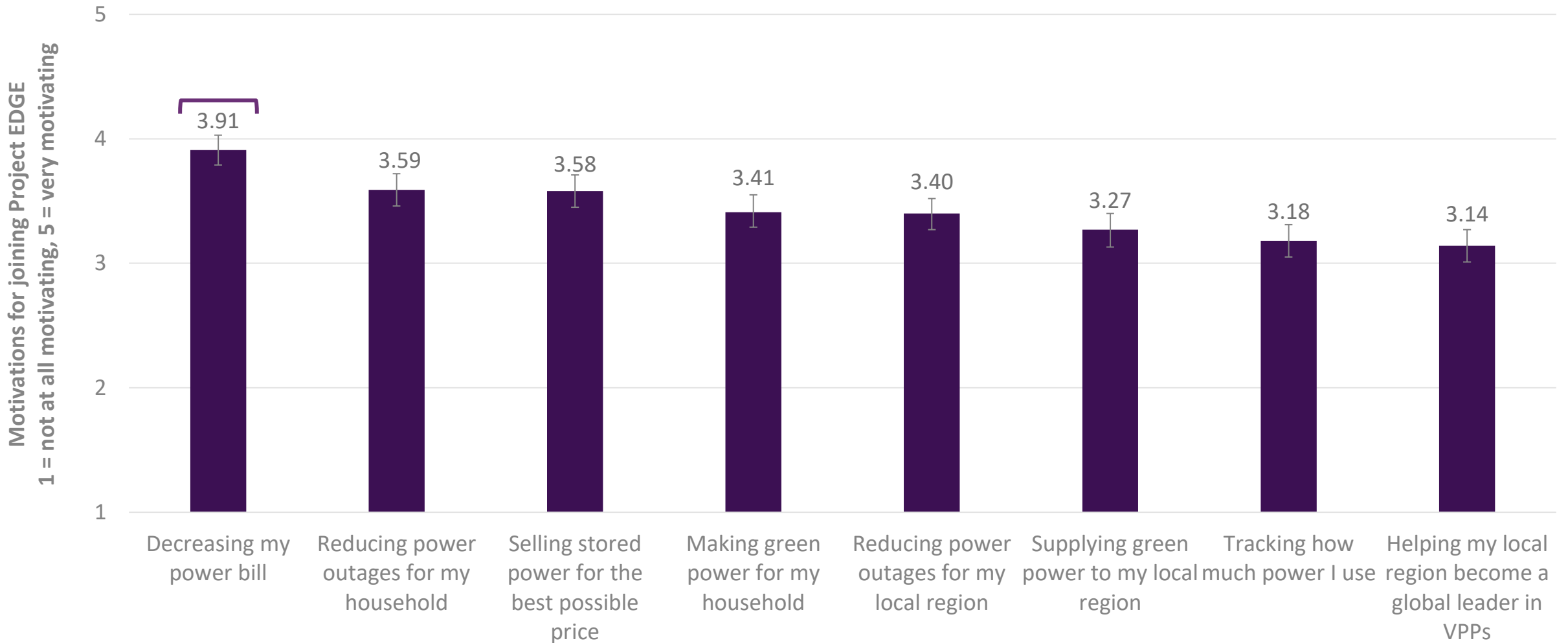
Results: Customer segmentation

- 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

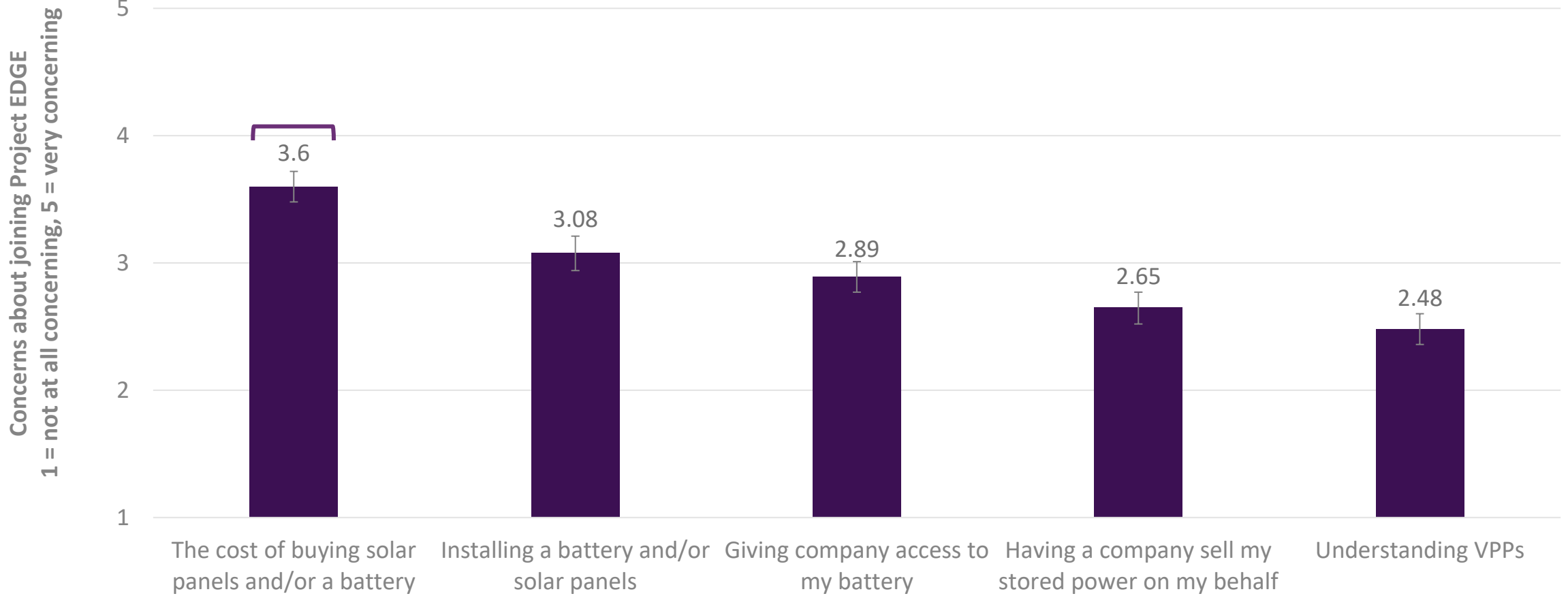
Results: VPP brand image



Results: Motivations for joining



Results: Concerns about joining



Results: 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: Predicting opinion & interest

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

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

Q&A

Raise a hand to speak
Use the Teams chat function



Any other business





Next meeting: 23 June 2022

Future Meetings & Close

Questions & contact

DERProgram@aemo.com.au

For further information for Project EDGE, please visit:

<https://aemo.com.au/en/initiatives/major-programs/nem-distributed-energy-resources-der-program/der-demonstrations/project-edge>



For more information visit

aemo.com.au