DER Market Integration Consultative Forum

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

27 October 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

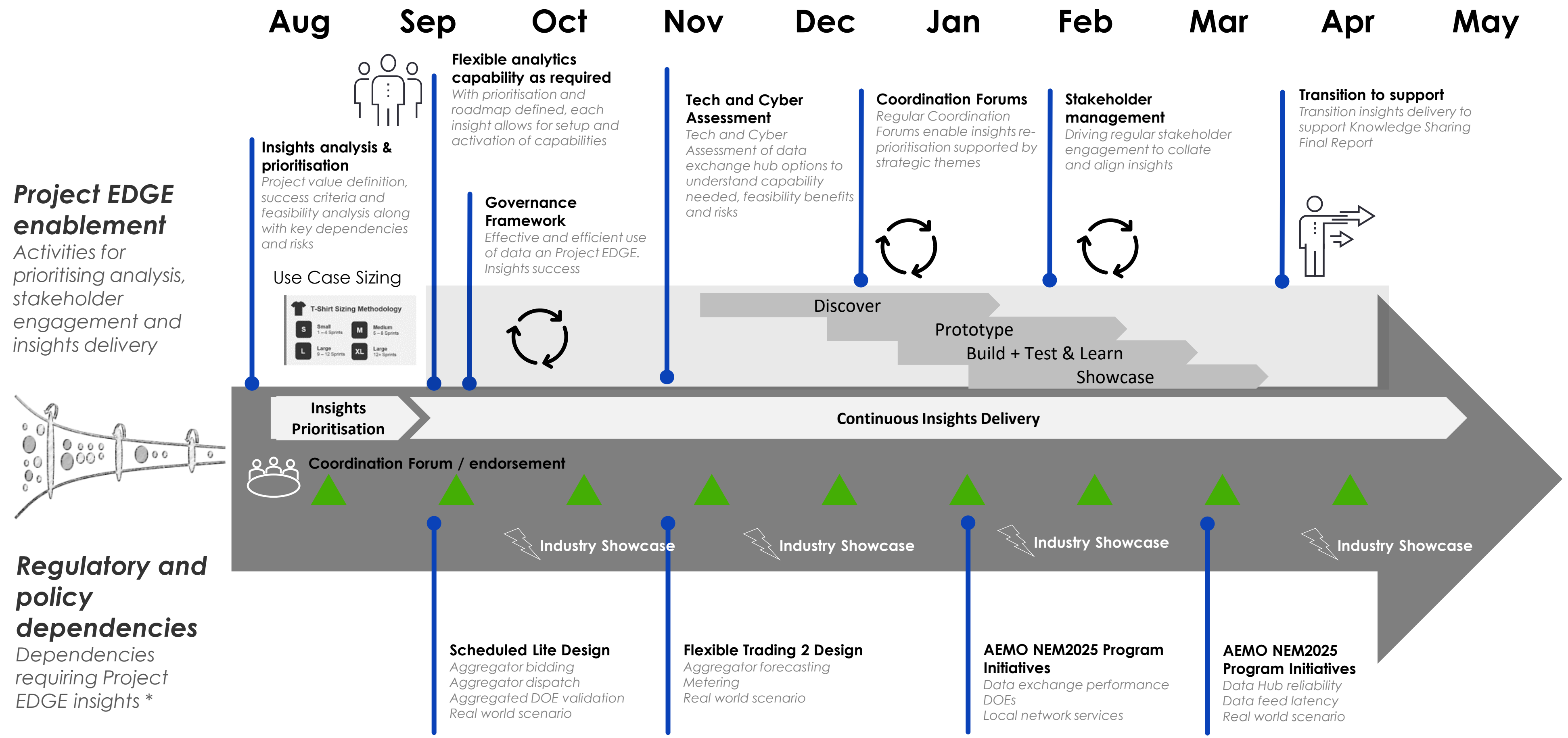
Time	Item	Speaker
11:00 – 11:05	Welcome and Introductions	Rachel Rodrigues McGown (AEMO)
11:05 - 11:15	Project EDGE Trial Update	Nick Regan (AEMO)
11:15 – 12:15	Customer Insights Study Update	Associate Professor Josh Newton (Deakin University)
12:15 – 12:25	Q&A	All
12:25 – 12:30	Future Meetings & Close	Rachel Rodrigues McGown (AEMO)

Project EDGE Trial Update

Nick Regan (AEMO)

Project EDGE Insights and Alignment plan on a page

An approach that considers the whole-of-life Operational Research Plan to group analysis activities, assess data readiness and value to prioritise and sequence both analytics as well as stakeholder engagement activities and drive the best outcomes and meet project objectives.



* The full view of all relevant dependencies will be outlined in the reform map. These will be monitored to reassess priority if anticipated dependency dates change.

Additional customer insights
Project EDGE

A/Prof Josh Newton, Deakin University

This research has been conducted with the support of:

Overview

Today's presentation will focus on select findings from two recently completed reports:

- Literature review of consumer insights research on different DER offerings
- Survey of potential residential customers

Literature review

Overview

Several reports have recently reviewed the literature on consumer perceptions of DER-related offerings

- ACIL Allen (2022). *Barriers and enablers for rewarding consumers for access to flexible DER and energy use: Rapid evidence review*
- ARENA (2020). *DER customer insights: The customer journey*
- ARENA (2020). *DER customer insights: Values and motivations*

The purpose of our literature review was not to replicate these reports but instead to identify those areas where insufficient or insufficiently detailed research has been conducted to date

The aim was to provide a roadmap for future DER-focused consumer insights research

Findings

We identified 21 research gaps. What follows here is therefore only a subset of the broader gaps we identified in our review

- We know more about:
  - Early adopters than about other customer segments
  - How to motivate adoption of DER-related offerings than on how to retain customers long-term
- Our understanding of how different consumer segments perceive DER-related offerings remains limited
- Rational DER benefits been examined at the expense of more emotional DER benefits
- Consumer expectations about what would be an attractive financial return from adopting DER-related offerings remain unclear

Findings

We identified 21 research gaps. What follows here is therefore only a subset of the broader gaps we identified in our review

- From a perceptual perspective, how do DERs compare with the status quo or to other energy products?
- What can organisations do to:
  - Communicate with consumers of varying levels of expertise?
  - Increase trust and reduce risk perceptions?
  - Develop relational (vs. transactional) interactions with customers?
- When considering whether to adopt DER-related offerings, who are the voices that consumers listen to and trust?
- What must a DER aggregator do to ensure a smooth onboarding experience?

Survey of potential residential customers

Sample

We surveyed 893 participants who:

- Resided in New South Wales, Queensland, South Australia, or Tasmania
- Lived in a detached or semi-detached dwelling
- Owned their primary place of residence, either outright or with a mortgage

Recruitment took place in September 2022

Segmentation variable: Solar panel status

Whether participants had rooftop solar PV (henceforth referred to as solar panel status) was used as a consumer segmentation variable because:

- Consumers with some DER may have different perceptions about adopting additional DER or joining an aggregator
- Consumers who already have rooftop solar panels are closer to having the DER necessary to join aggregators focused on solar panel + battery offerings

Segment	n	%
Solar panels: No	417	46.7%
Solar panels: Yes	476	53.7%

Segmentation variable: Adopter category

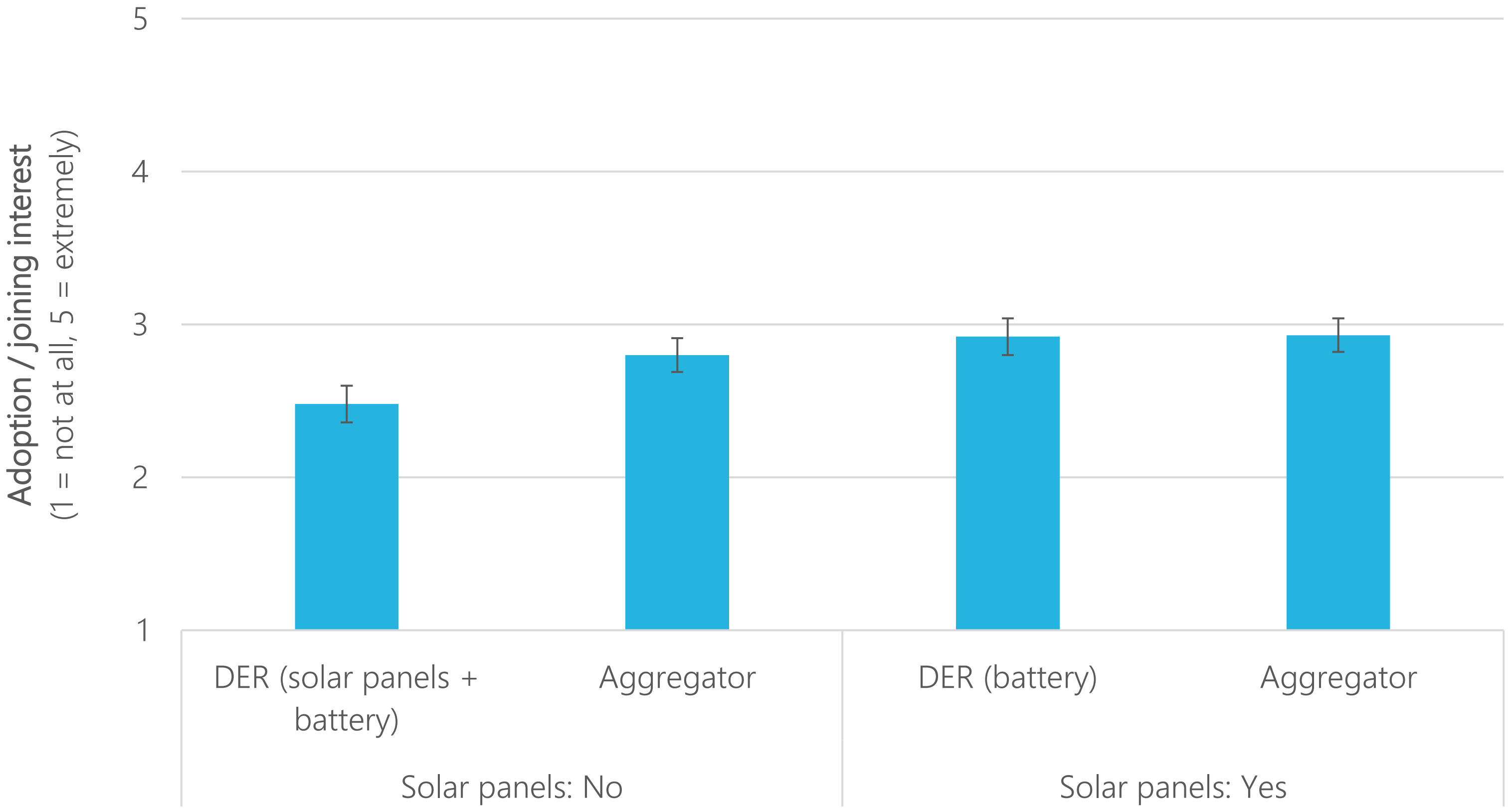
Our second segmentation variable was self-identified adopter category, which we used to better understand how to motivate consumers who are <u>not</u> innovators or early adopters

Category	Label	n	%
Innovator	I like to be one of the very first to try new energy technologies	31	3.5%
Early adopter	I like to be a leader in trying new energy technologies	65	7.3%
Early majority	I like to hear about other peoples' experiences before I try new energy technologies	473	53.0%
Late majority	I only try new energy technologies when the people I trust have already done so	229	25.6%
Laggard	I don't see much need for trying new energy technologies	95	10.6%

Due to their small group sizes, participants in the innovator and early adopter categories were combined in all subsequent analyses

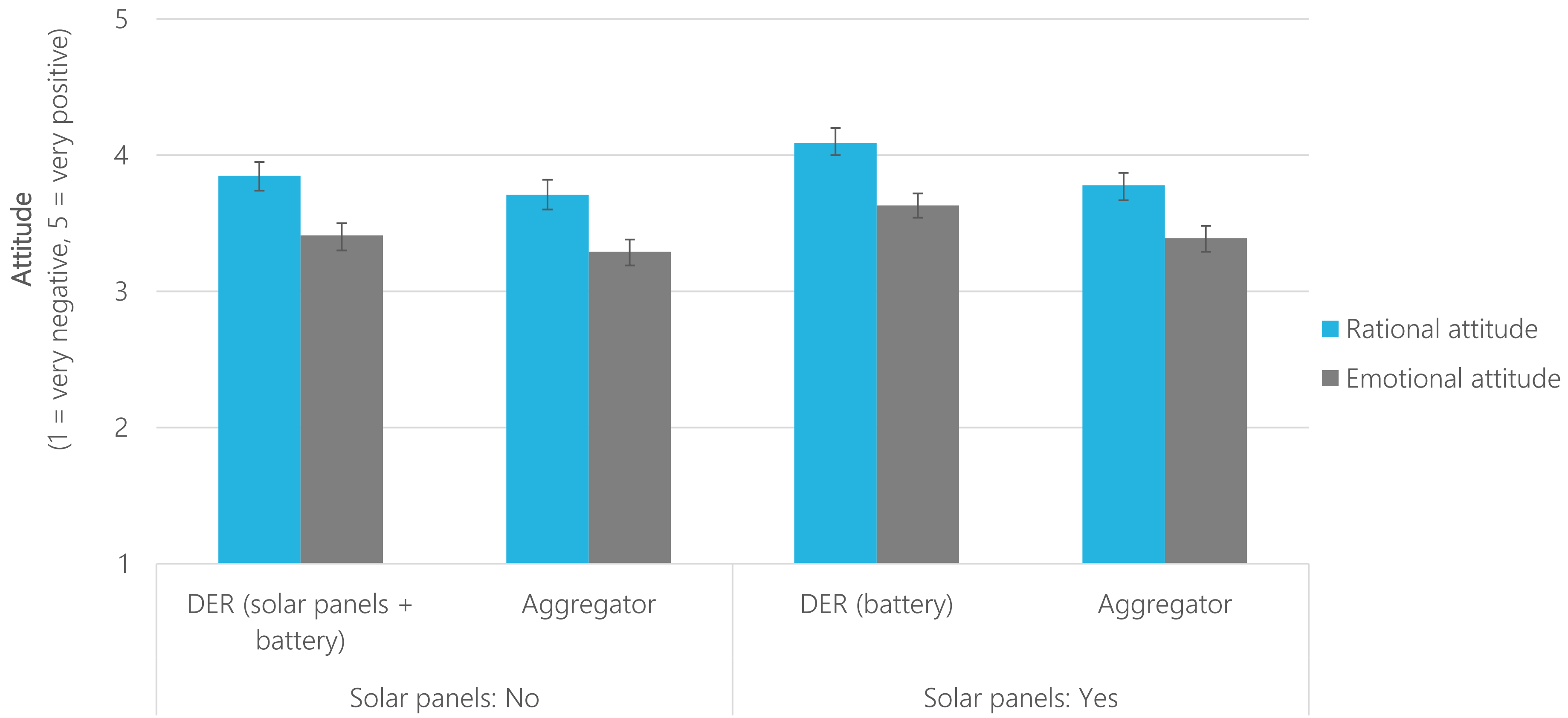
Interest: Adopting DER vs. joining an aggregator

Interest in adopting DER/joining an aggregator was lukewarm



Attitude: Adopting DER vs. joining an aggregator

Rational attitude (useful, wise) toward adopting DER/joining an aggregator was more favourable than **emotional attitude** (exciting, enjoyable)



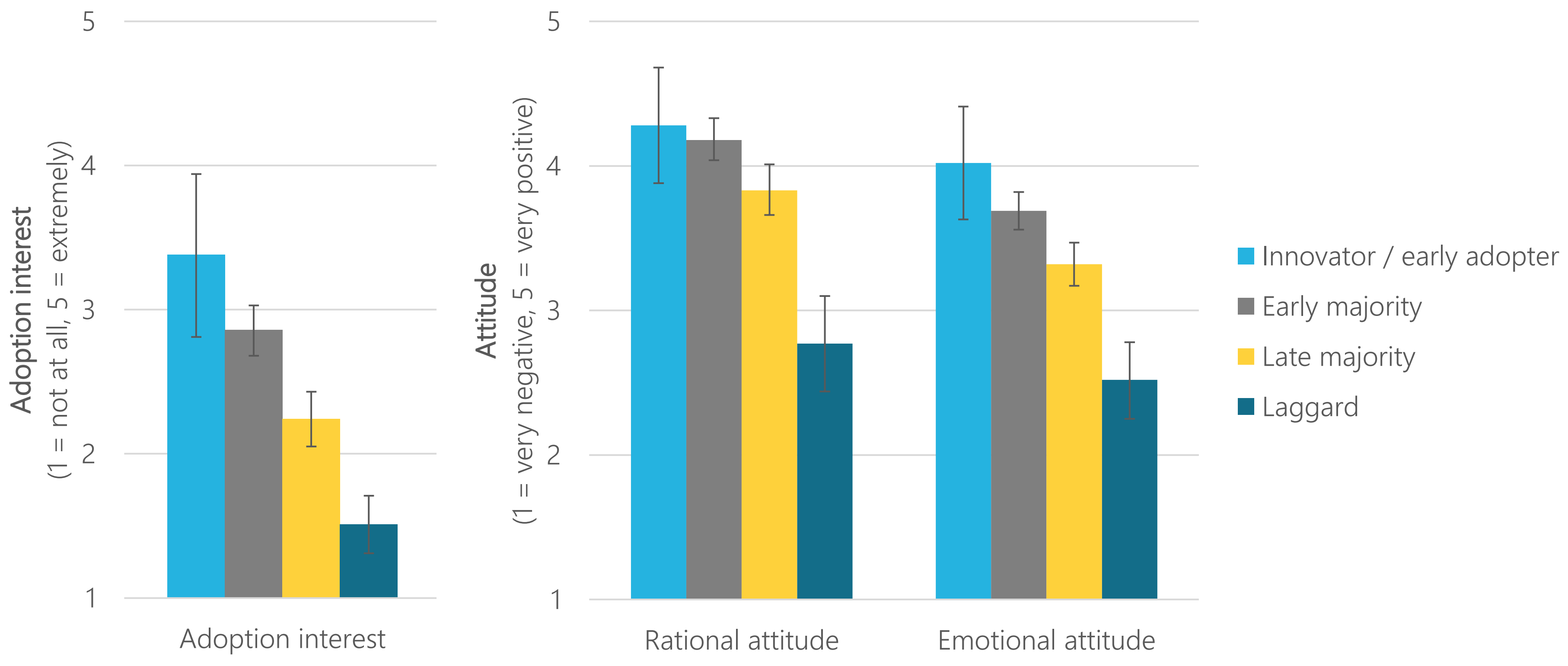
Attitude: Predictors of adoption/joining interest

When evaluating whether to join an aggregator, participants thought more with the head (rational attitude) than the heart (emotional attitude)

Attitude dimension	Interest in adopting DER		Interest in joining an aggregator	
	Solar panels + battery	Battery	Solar panels: No	Solar panels: Yes
Rational attitude	$\beta = 0.48$	$\beta = 0.43$	$\beta = 0.67$	$\beta = 0.59$
Emotional attitude	$\beta = 0.21$	$\beta = 0.28$	$\beta = 0.09$	$\beta = 0.21$

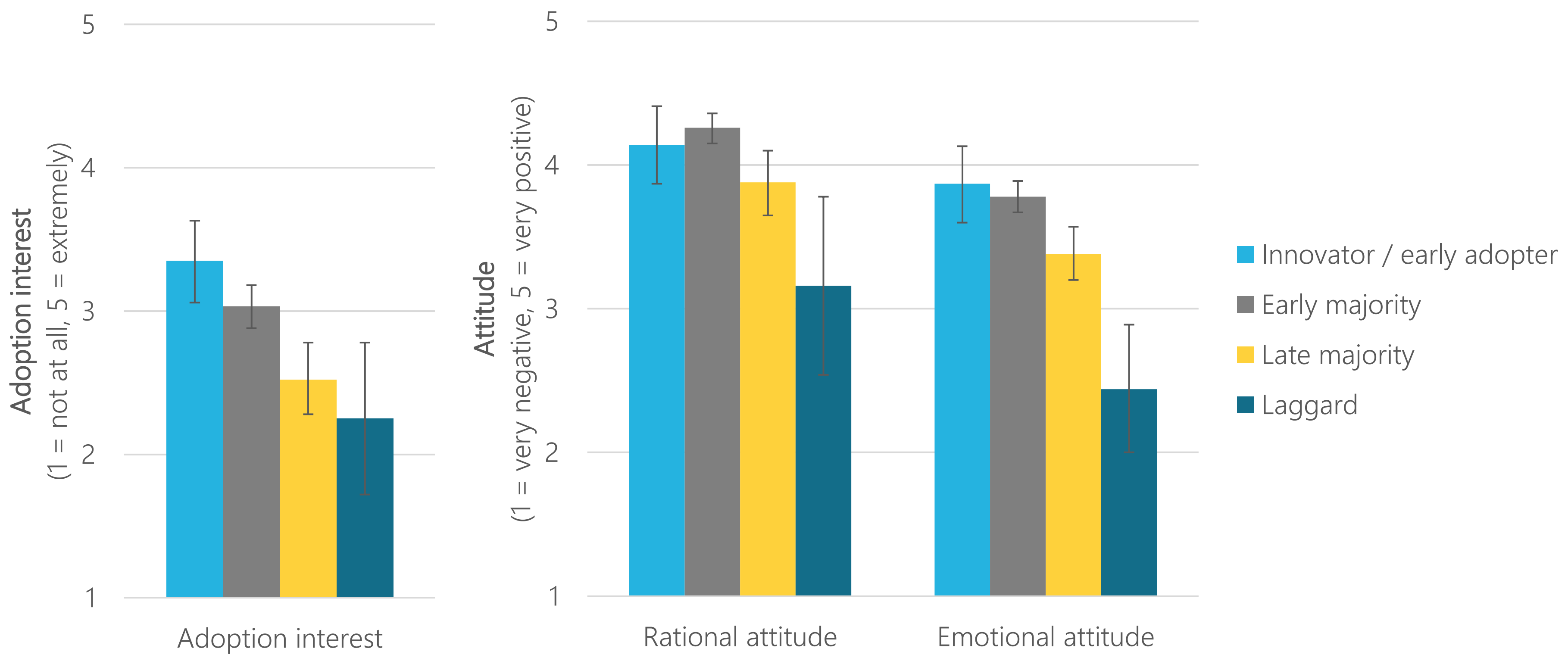
Attitude and interest: Adopting DER (solar + battery), segmented by adopter category

Innovators/early adopters and the early majority reported **stronger adoption interest** and **more favourable emotional attitude** for adopting DER (solar + battery) than the other adopter categories



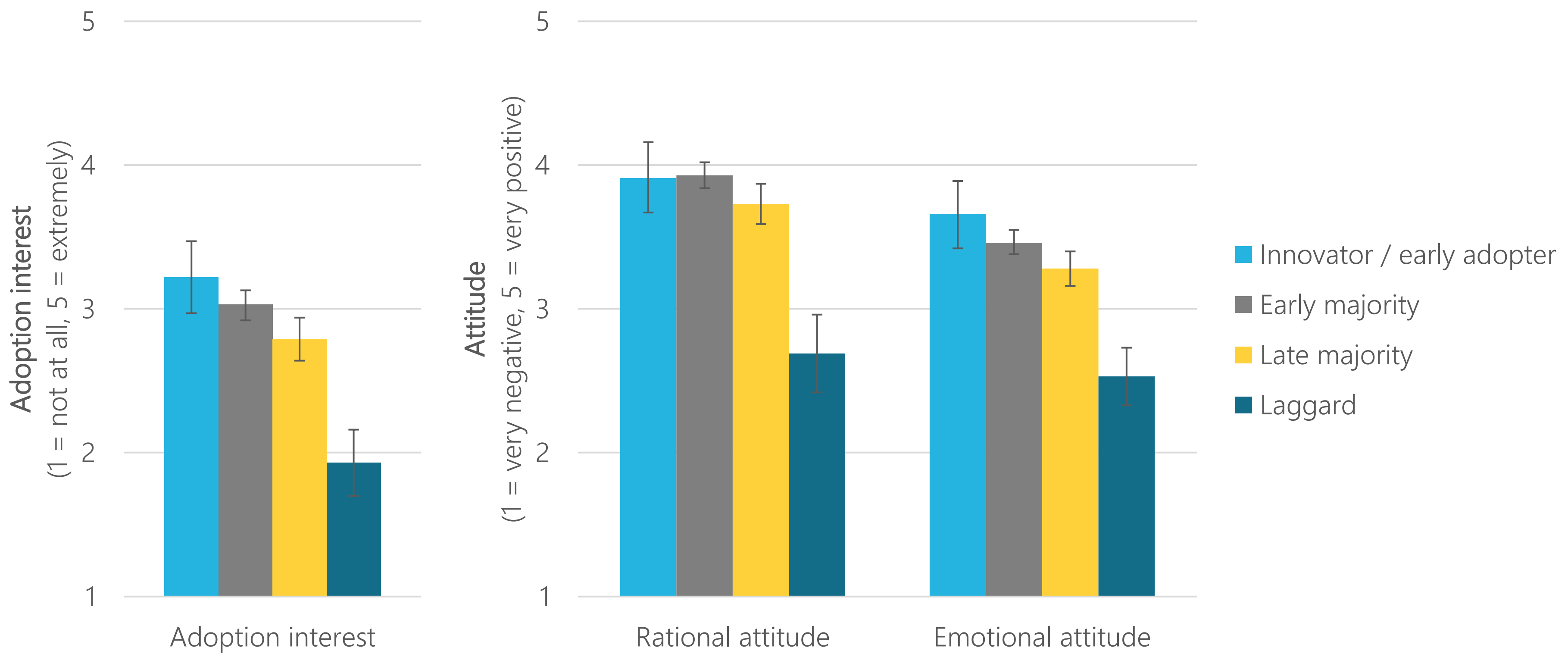
Attitude and interest: Adopting DER (battery), segmented by adopter category

Innovators/early adopters and the early majority reported **stronger adoption interest** and **more favourable emotional attitude** for adopting DER (battery) than the other adopter categories



Attitude and interest: Joining an aggregator, segmented by adopter category

The innovator/early adopter category reported **stronger adoption interest** and **more favourable emotional attitude** than those in the late majority and laggard categories



Goal outcomes: Background

"People don't want a quarter-inch drill, they want a quarter-inch hole"

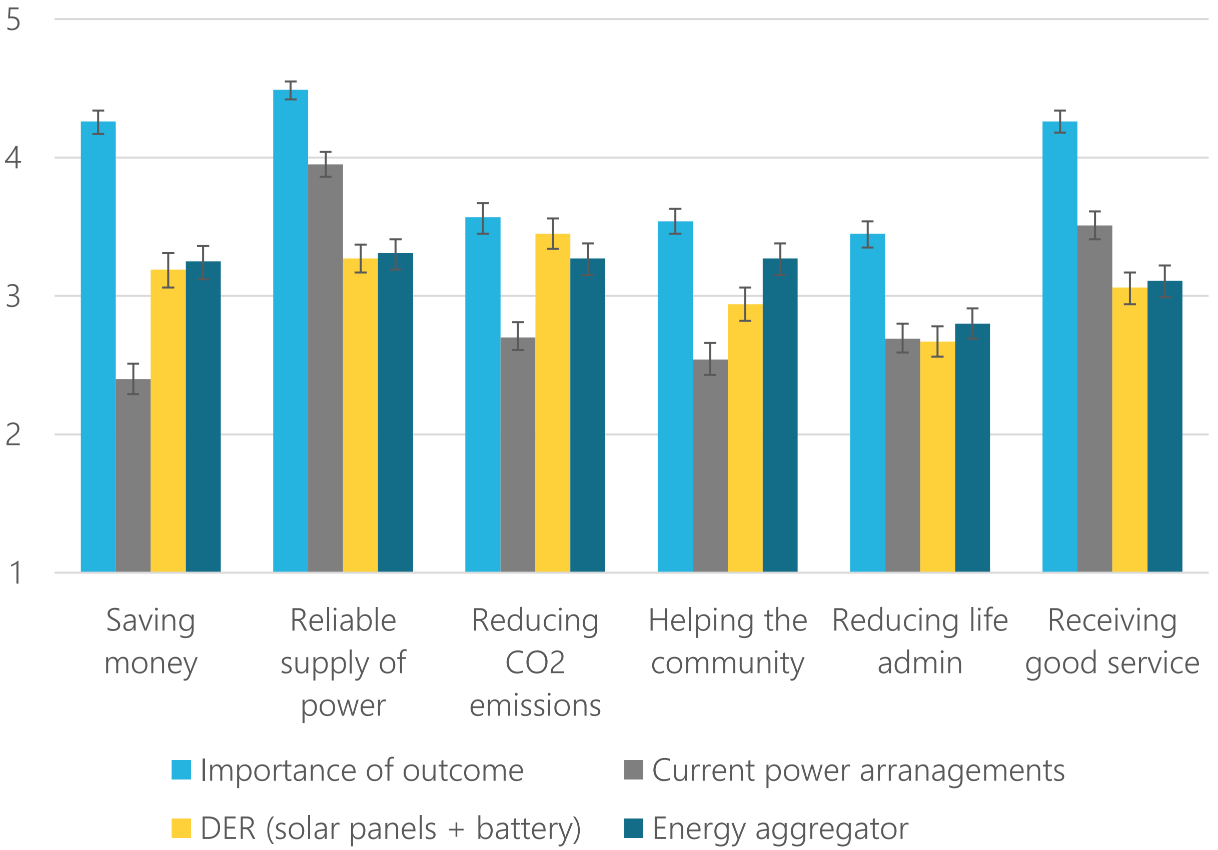
Theodore Levitt

In other words, we need to understand:

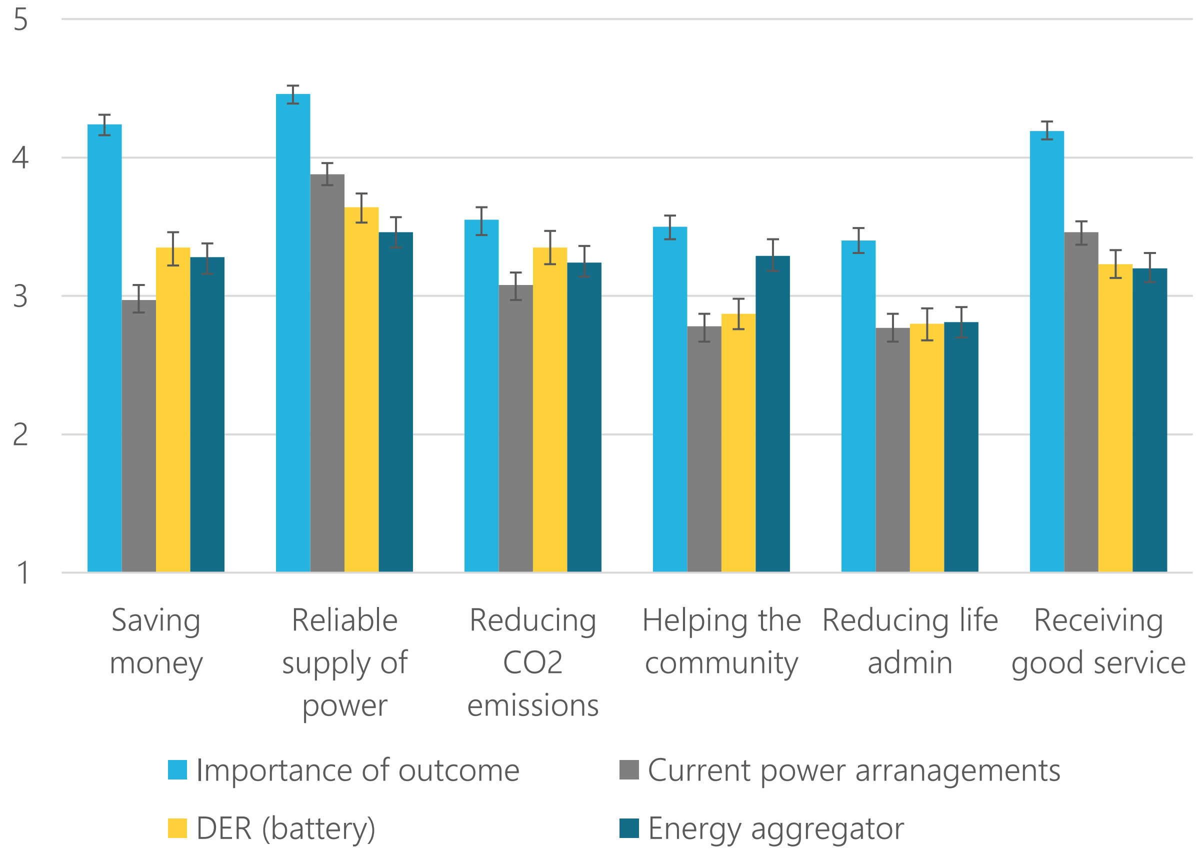
- The goals that consumers are looking to satisfy
- The extent to which different energy-related offerings are seen as satisfying those goals

Goal outcomes: Segmented by solar panel status

Solar panels: No



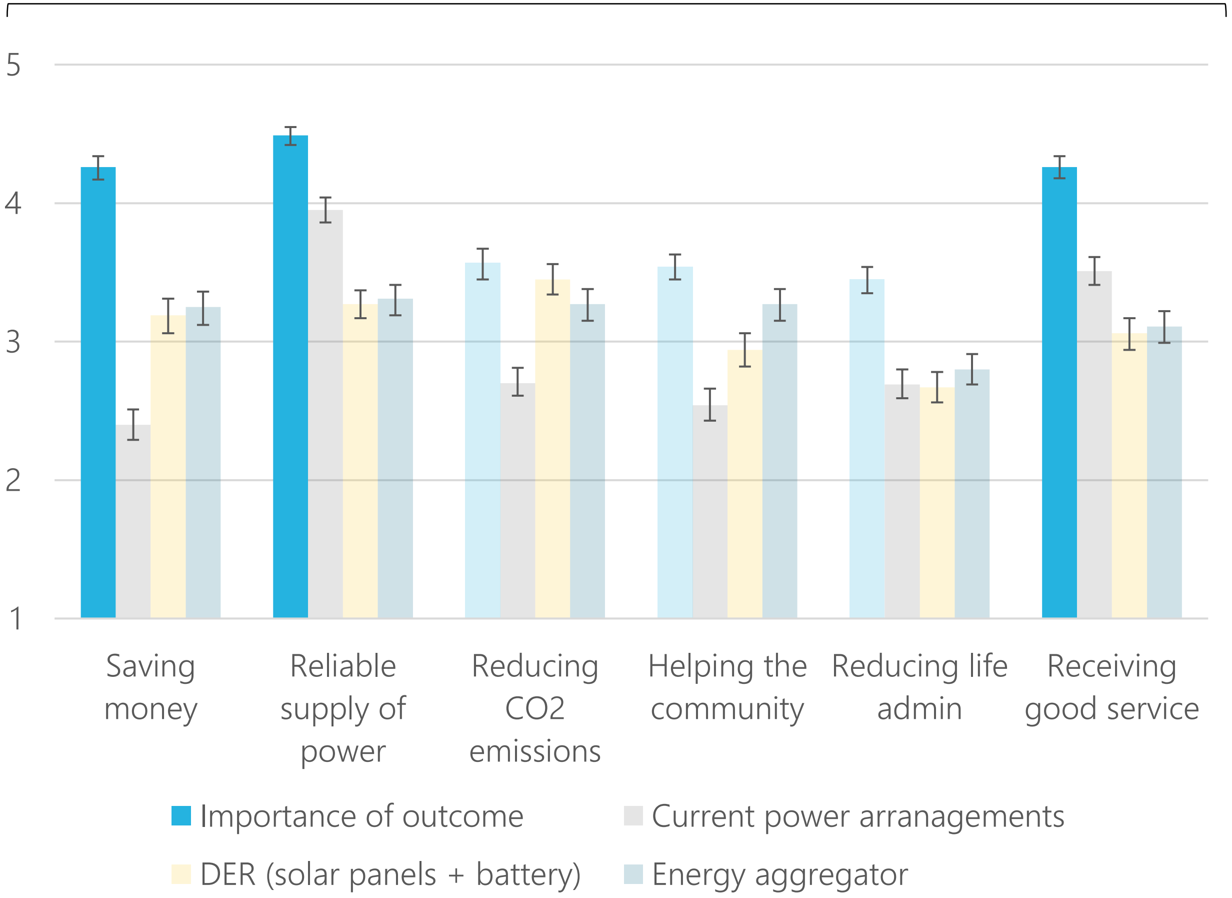
Solar panels: Yes



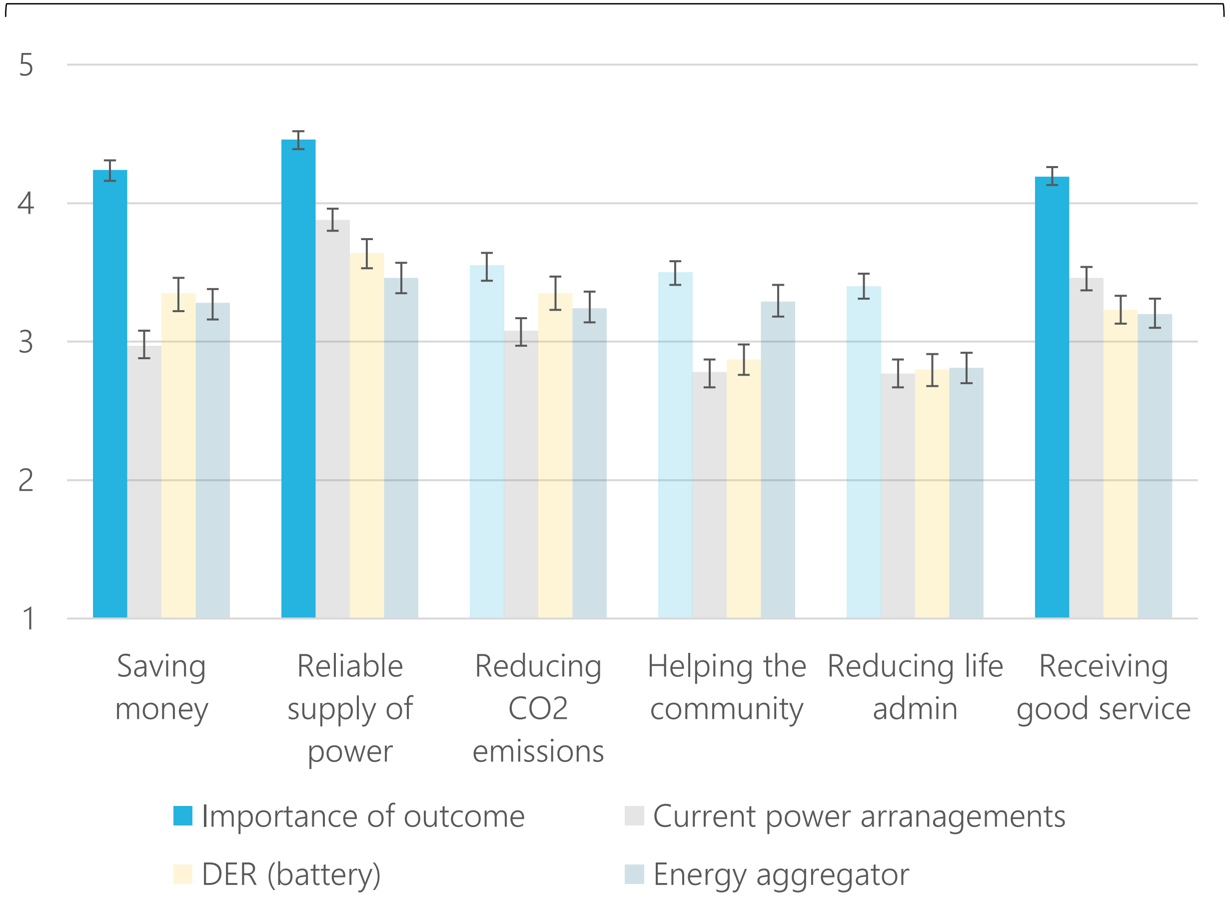
Goal outcomes: Segmented by solar panel status

The most important goals were **saving money**, having a **reliable supply of power**, and **receiving good service**

Solar panels: No

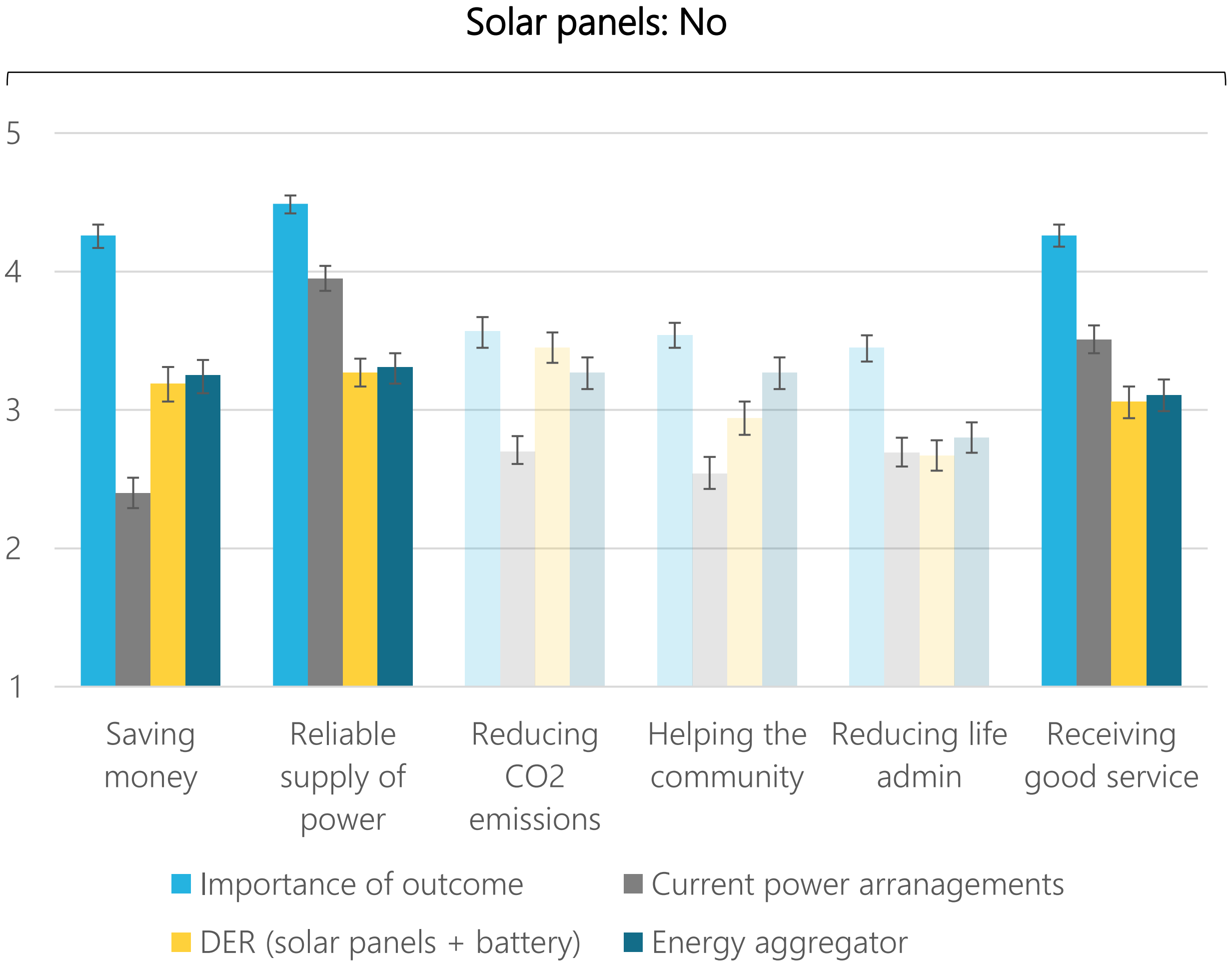


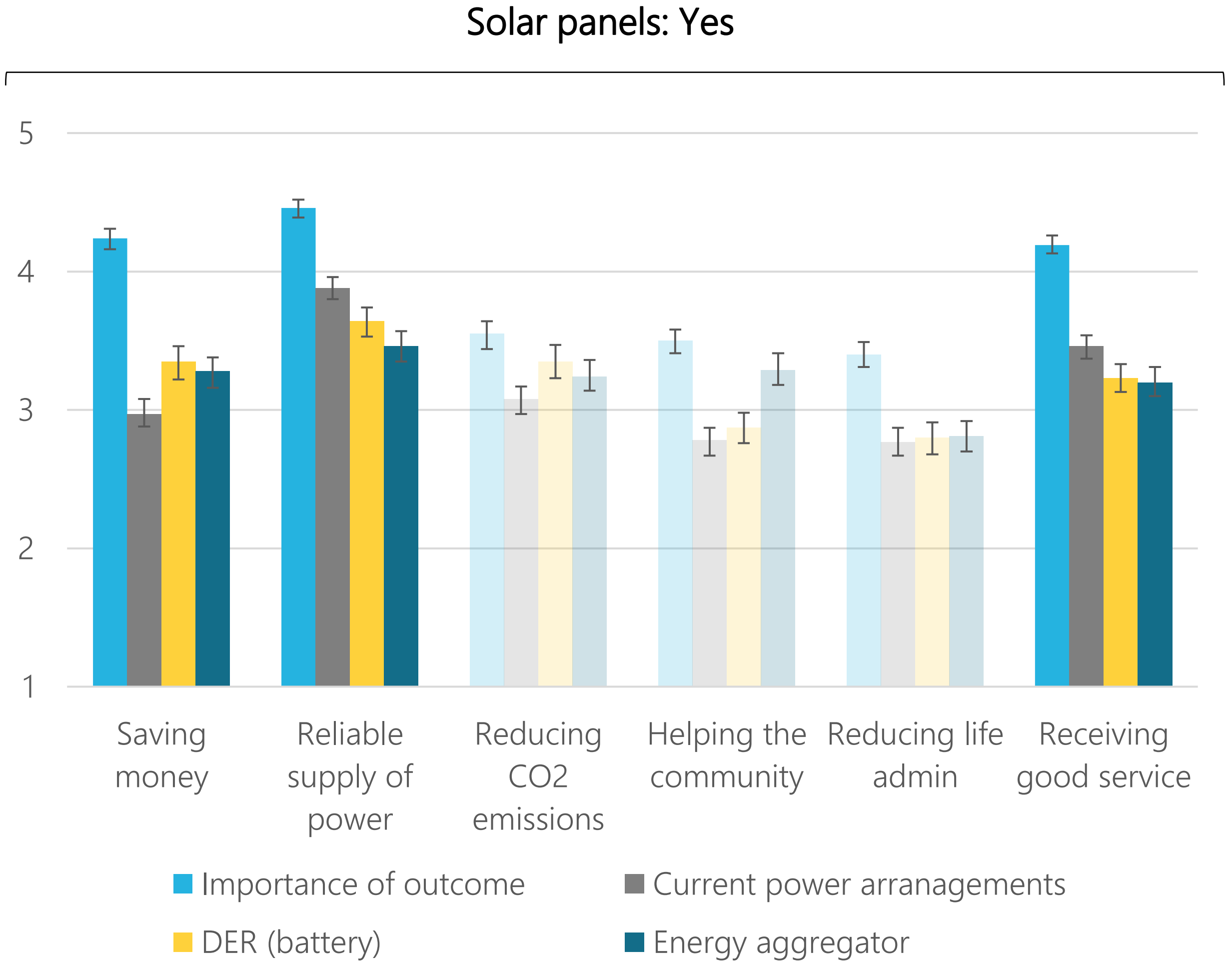
Solar panels: Yes



Goal outcomes: Segmented by solar panel status

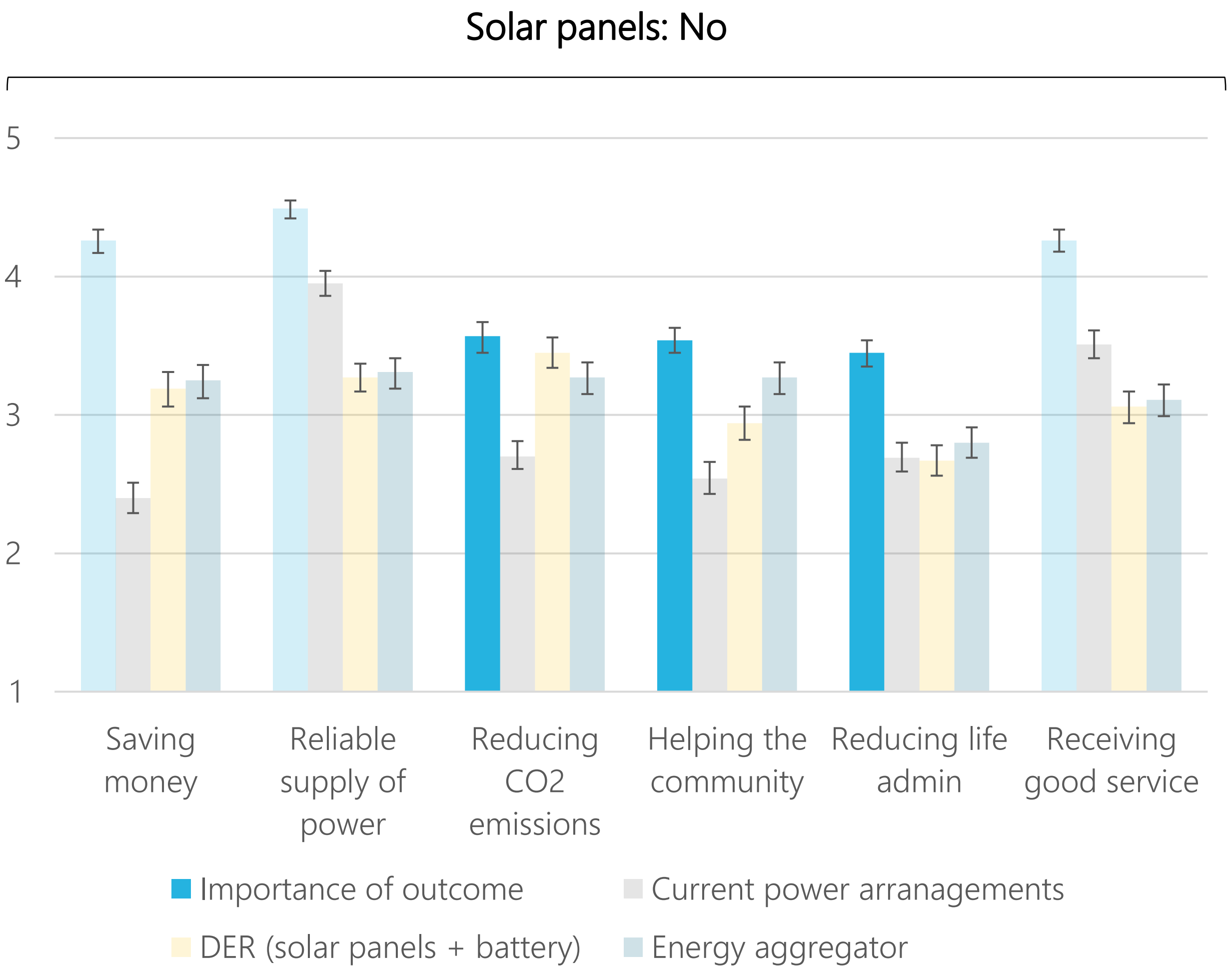
Relative to current power arrangements, adopting DER/joining an aggregator was seen as more likely to satisfy only one (**saving money**) of the three most important goals

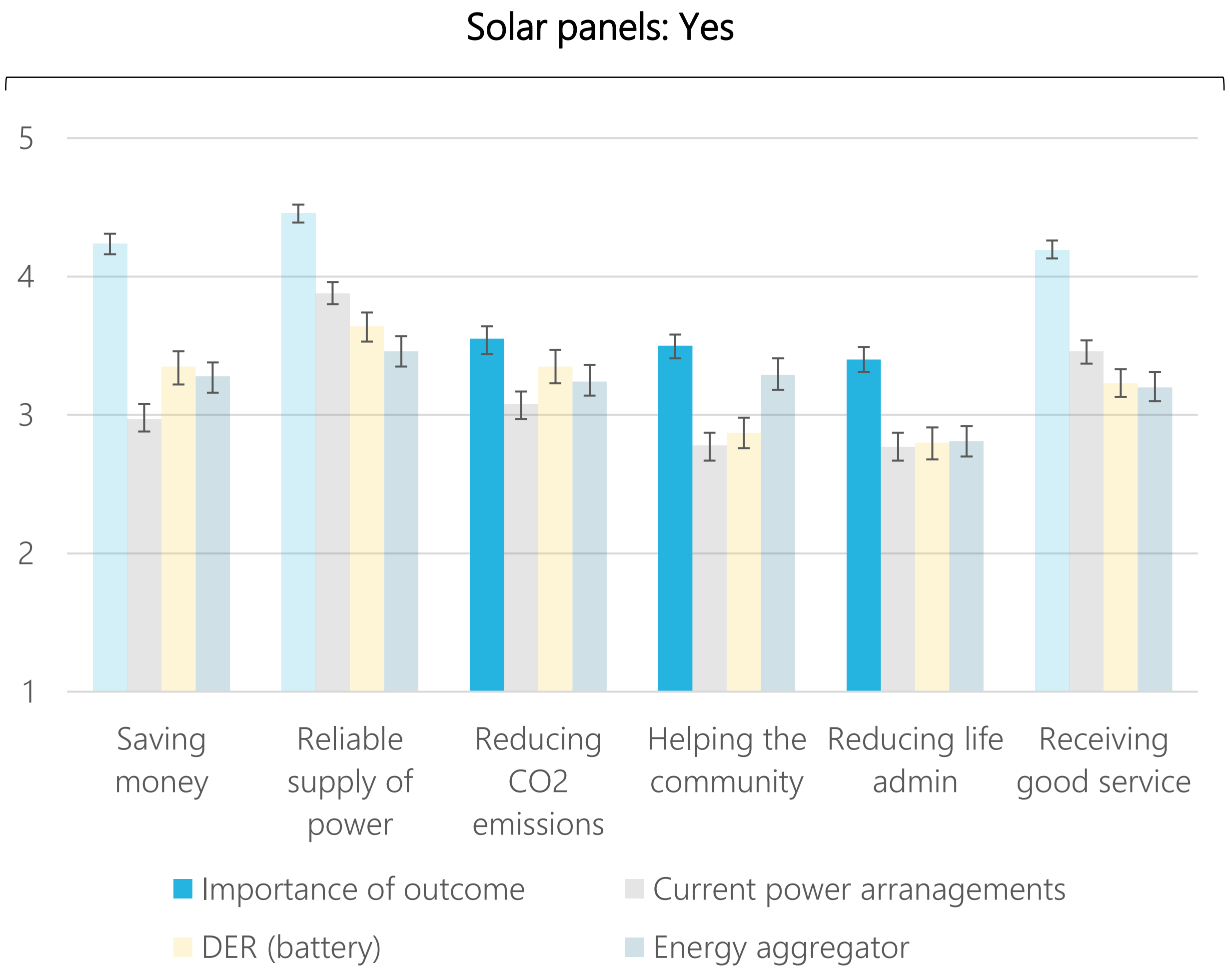




Goal outcomes: Segmented by solar panel status

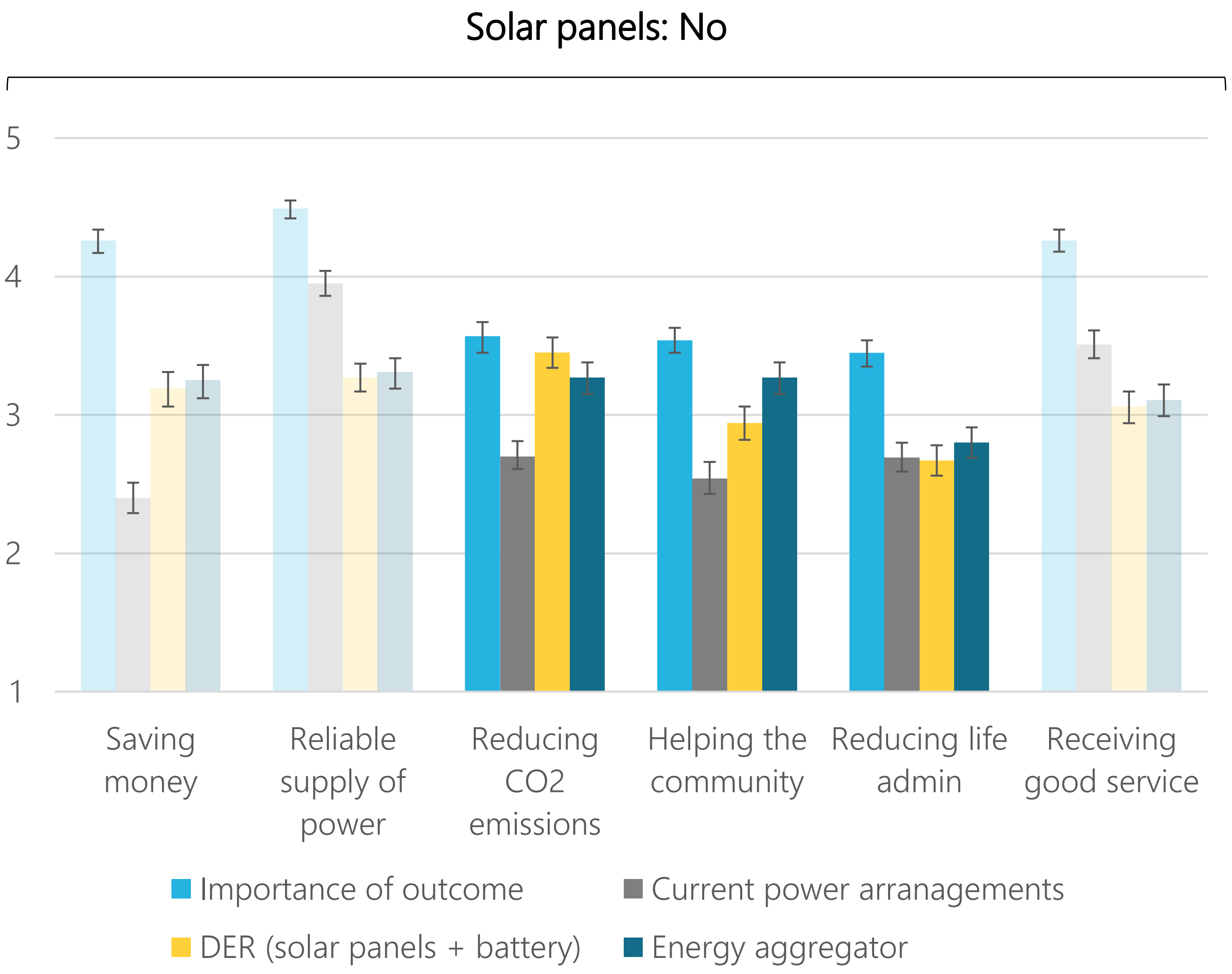
Less important goals were **reducing CO_2 emissions**, **helping the community**, and **reducing life admin**

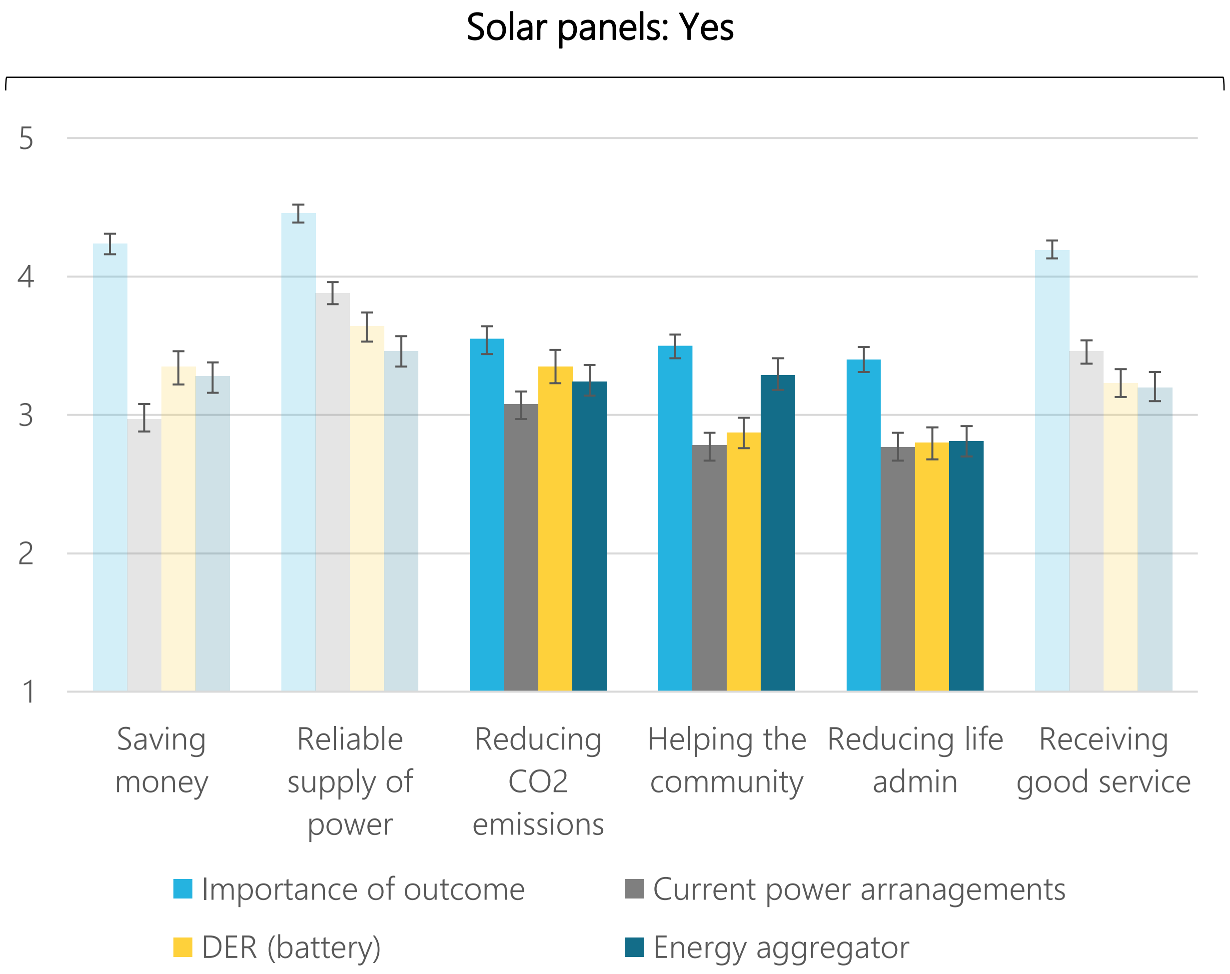




Goal outcomes: Segmented by solar panel status

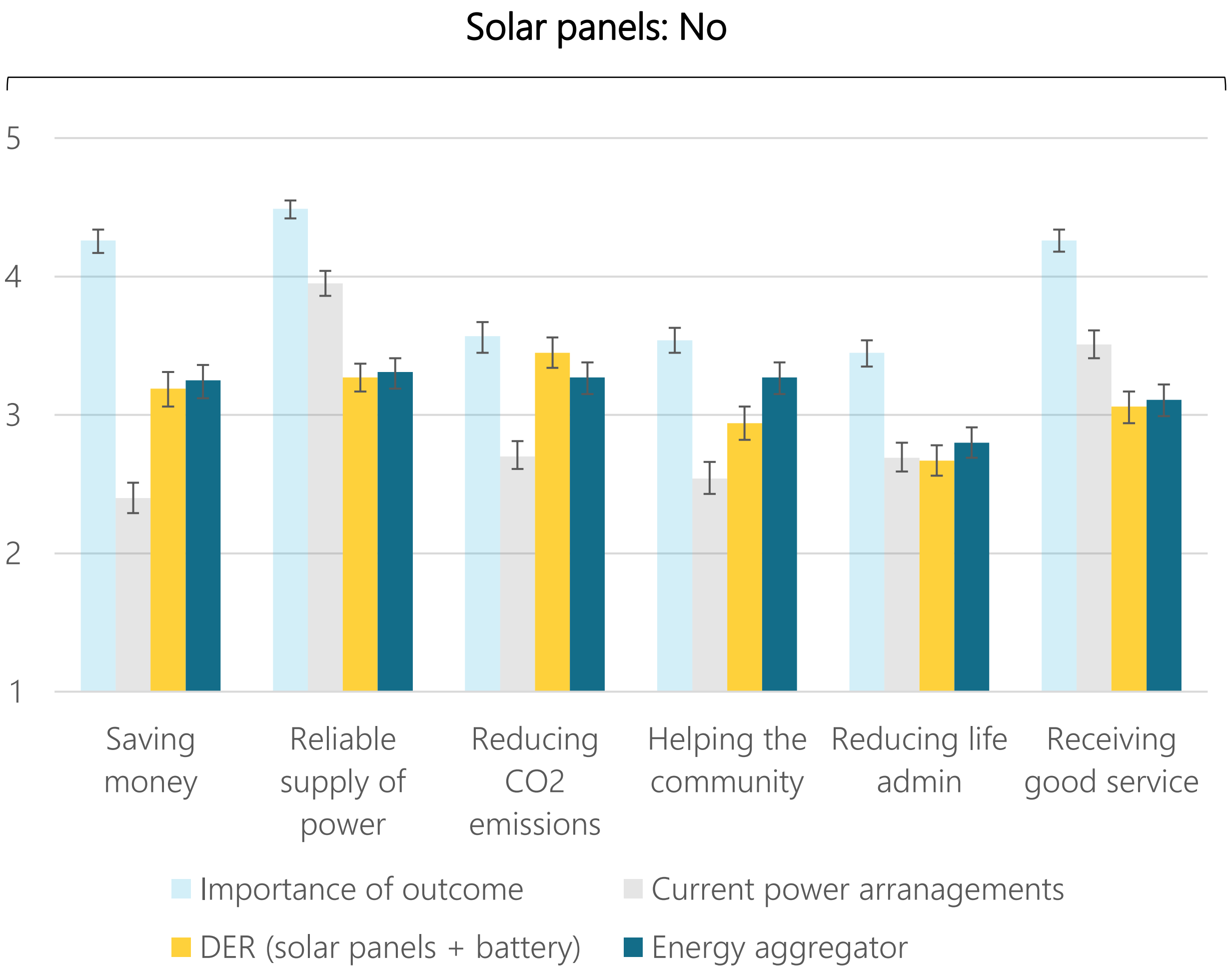
Relative to current power arrangements, adopting DER/joining an aggregator was seen as more likely to satisfy two (**reducing CO_2 emissions, helping community**) of the three less important goals

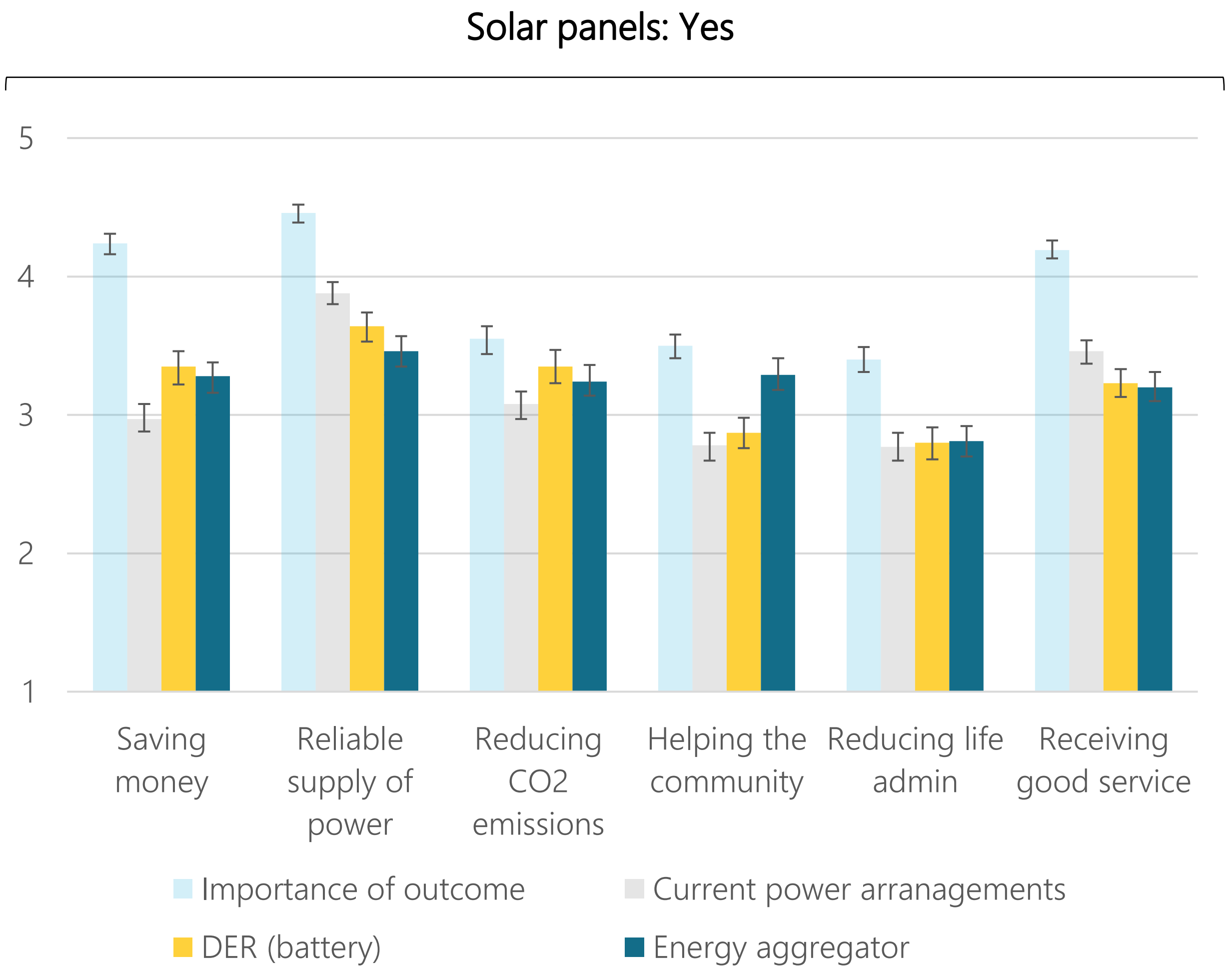




Goal outcomes: Segmented by solar panel status

With one exception (**helping the community**), joining an aggregator was not seen as helping to satisfy any additional goals relative to adopting DER





Goal outcomes: Predictors of adoption/joining interest

Perceived financial savings and energy reliability were key predictors in whether participants were interested in adopting DER and joining an aggregator

Perceived goal outcomes	Interest in adopting DER		Interest in joining an aggregator	
	Solar panels + battery	Battery	Solar panels: No	Solar panels: Yes
Saving money	$\beta = 0.17$	$\beta = 0.28$	$\beta = 0.46$	$\beta = 0.39$
Receiving a reliable supply of power	$\beta = 0.26$	$\beta = 0.34$	$\beta = 0.20$	$\beta = 0.23$
Reducing CO_2 emissions	-	-	-	-
Helping the community	-	-	-	-
Reducing life admin (routine tasks)	-	-	-	-
Receiving good service	-	-	-	-

Financial: Price sensitivity for purchasing rooftop solar panels

Participants tended to underestimate the price of purchasing rooftop solar panels

Consumer segment	Acceptable price range	Optimal price point
Overall	$2,200 - $3,600	$2,200
Adopter category		
Innovator / early adopter	$1,600 - $2,500	$1,800
Early majority	$2,200 - $4,100	$2,800
Late majority	$2,200 - $3,200	$2,200
Laggard	$2,000 - $2,500	$2,100

Financial: Price sensitivity for purchasing a battery

Participants also tended to underestimate the price of purchasing a battery

Consumer segment	Acceptable price range Solar panel: No	Optimal price point Solar panel: No	Acceptable price range Solar panel: Yes	Optimal price point Solar panel: Yes
Overall	$900 - $1,300	$1,100	$2,200 - $4,000	$3,000
Adopter category				
Innovator / early adopter	$800 - $1,500	$900	$2,600 - $3,200	$3,000
Early majority	$1,100 - $2,000	$1,200	$2,800 - $4,500	$3,100
Late majority	$800 - $1,100	$1000	$2,000 - $3,700	$2,200
Laggard	$700 - $1,100	$900	$1,000 - $1,200	$1,100

Financial: Desired annual savings from adopting DER

Although sizeable differences in desired annual savings were observed across consumer segments, these differences were not statistically significant

Consumer segment	Solar panels	Battery Solar panel: No	Battery Solar panel: Yes
Overall	$1,093	$933	$1,006
Adopter category			
Innovator / early adopter	$1,010	$870	$1,197
Early majority	$1,201	$1,029	$1,042
Late majority	$1,064	$856	$834
Laggard	$849	$809	$800

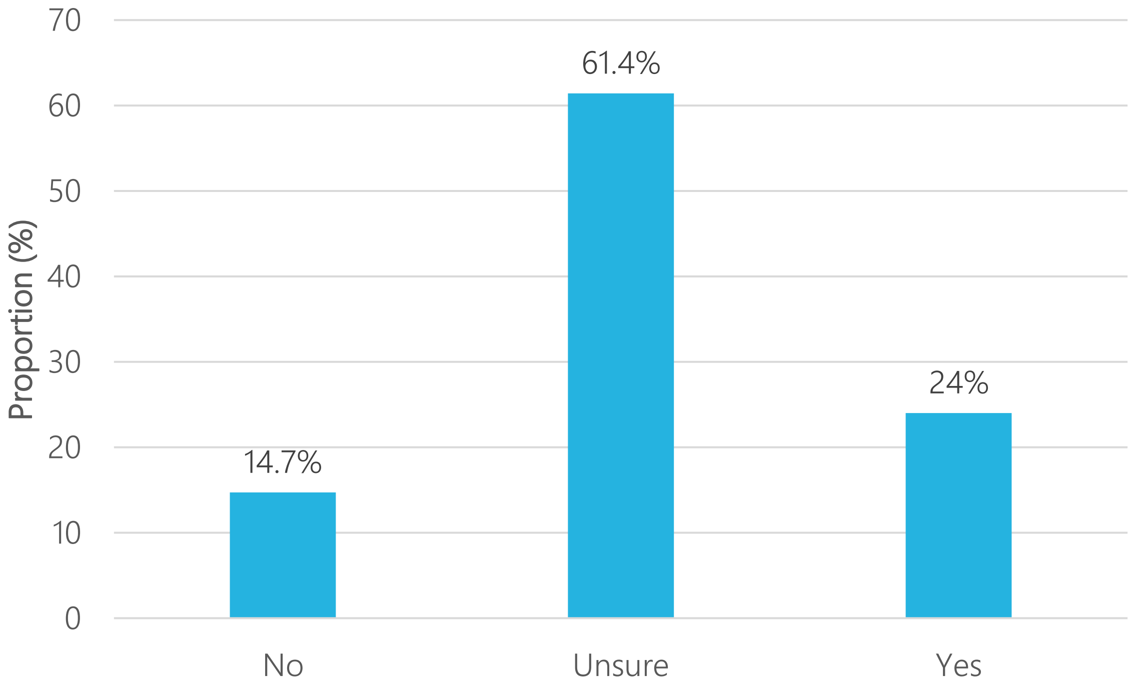
Financial: Desired annual savings from joining an aggregator

Desired annual savings from joining an aggregator were relatively consistent across consumer segments

Consumer segment	Annual savings
Overall	$970
Solar panel status	
Solar panels: No	$945
Solar panels: Yes	$992
Adopter category	
Innovator / early adopter	$998
Early majority	$961
Late majority	$970
Laggard	$986

Trust

Most participants were withholding judgement about whether they could trust an aggregator to trade stored power on their behalf



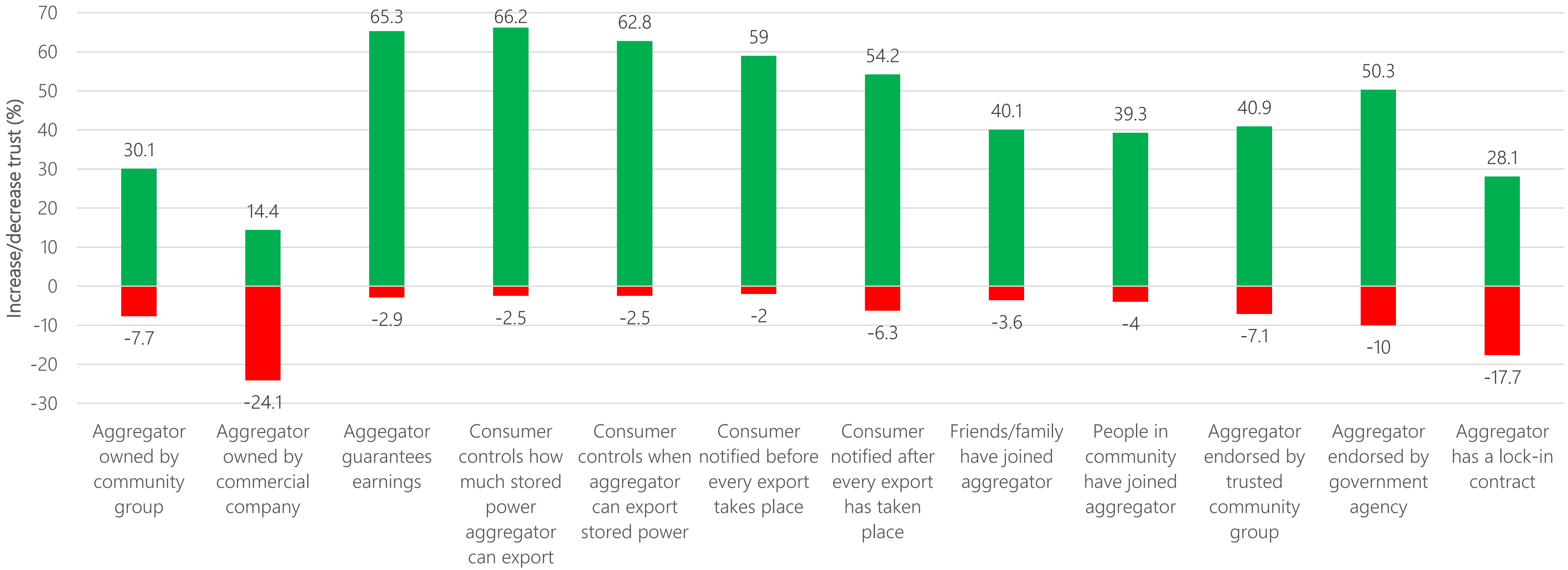
Trust: Segmented by adopter category

The innovator/early adopter category were more likely than the other categories to trust an aggregator, while the early majority were more likely to report being unsure

Trust aggregator to access and export stored energy	Innovator / early adopter	Early majority	Late majority	Laggard
No	11.5%	10.8%	11.8%	44.2%
Unsure	49.0%	64.5%	65.5%	48.4%
Yes	39.6%	24.7%	22.7%	7.4%

Trust: Strategies for enhancing aggregator trust

Consumer control, **transparency**, and **consumer safeguards** were perceived by participants as activities that would enhance their trust in an aggregator



Trust: Strategies for enhancing aggregator trust, segmented by solar panel status

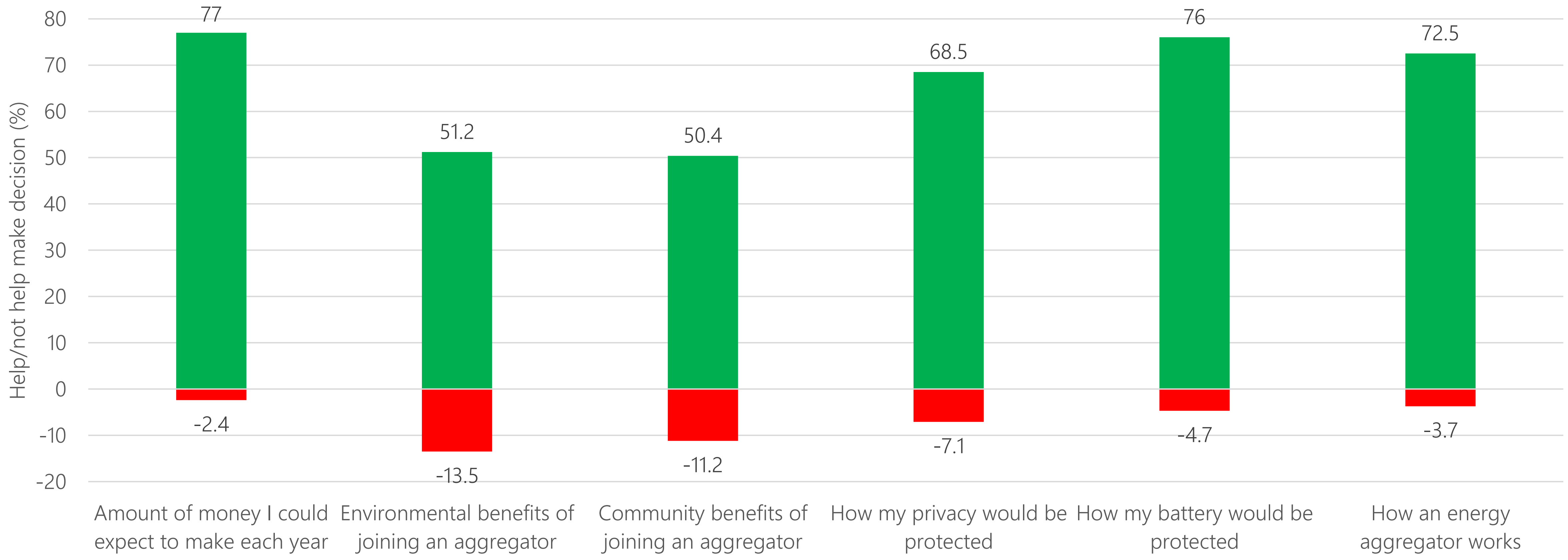
Potential ways to enhance trust in an aggregator	Solar panels: No	Solar panels: Yes
Aggregator owned by community group	31.4%	29.1%
Aggregator owned by commercial company	14.2%	14.7%
Aggregator guarantees earnings	61.4%	68.7%
Consumer controls how much stored power aggregator can export	64.3%	67.9%
Consumer controls when aggregator can export stored power	63.1%	62.7%
Consumer notified before every export takes place	61.5%	57.1%
Consumer notified after every export has taken place	53.0%	55.3%
Friends/family have joined aggregator	42.2%	38.3%
People in community have joined aggregator	38.6%	40.0%
Aggregator endorsed by trusted community group	43.4%	38.7%
Aggregator endorsed by government agency	50.6%	50.0%
Aggregator has a lock-in contract	26.1%	30.0%

Trust: Strategies for enhancing aggregator trust, segmented by adopter category

Strategy for enhancing trust in an aggregator	Innovator / early adopter	Early majority	Late majority	Laggard
Aggregator owned by community group	36.5%	32.6%	28.5%	15.8%
Aggregator owned by commercial company	25.0%	14.2%	13.2%	8.4%
Aggregator guarantees earnings	59.4%	69.8%	68.1%	42.1%
Consumer controls how much stored power aggregator can export	63.5%	71.0%	65.1%	47.4%
Consumer controls when aggregator can export stored power	59.4%	66.6%	60.1%	54.7%
Consumer notified before every export takes place	54.2%	63.6%	56.8%	47.4%
Consumer notified after every export has taken place	52.1%	57.7%	54.1%	38.9%
Friends/family have joined aggregator	32.3%	42.3%	46.9%	21.1%
People in community have joined aggregator	38.5%	41.7%	43.2%	18.9%
Aggregator endorsed by trusted community group	41.7%	44.2%	42.5%	20.0%
Aggregator endorsed by government agency	54.2%	52.6%	53.3%	27.4%
Aggregator has a lock-in contract	33.3%	29.7%	27.6%	16.8%

Information to aid decision-making

Information about consumer safeguards and financial benefits was seen as being helpful in deciding whether to join an aggregator



Information to aid decision-making: Segmented by adopter category

The early majority were especially eager for information to help them decide whether to join an aggregator

Type of information	Innovator / early adopter	Early majority	Late majority	Laggard
Amount of money I could expect to make each year	68.8%	82.8%	78.6%	55.8%
Environmental benefits associated with joining an aggregator	53.1%	56.9%	48.9%	26.3%
Community benefits associated with joining an aggregator	59.4%	55.4%	46.1%	27.4%
How my privacy would be protected	64.6%	73.8%	68.6%	46.3%
How my battery would be protected	71.9%	82.0%	77.7%	46.3%
How an energy aggregator works	69.8%	78.0%	72.9%	46.3%

Next steps and further information

Next steps

Research currently underway or soon to commence includes:

- Interviewing energy aggregator customers and non-customers to identify:
  - Experiences to date
  - Discrepancies between expectations and reality
  - How to motivate enhanced exporting vs. self-consumption
  - Equitable sharing of value

- Surveying energy aggregator customers to evaluate:
  - Experiences to date
  - Satisfaction with the aggregator
  - Perceptions of information, notifications, and incentives received by the aggregator
  - How to motivate enhanced exporting vs. self-consumption

Further information

Reports will continue to be made available via AEMO's Project EDGE news and knowledge sharing page:

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?

Any other business

Next meeting:
17 November 2022

Future Meetings & Close

Project EDGE Publications

Publications	Publication Date
Project EDGE: Literature Review : DER Customer Insights Research	October 2022
Project EDGE CBA Methodology Consultation Paper	July 2022
Project EDGE Public Interim Report	June 2022
Project EDGE Customer Insights Study	June 2022
Project EDGE Research Plan	March 2022
Project EDGE MVP Showcase	December 2021
Project EDGE Lessons Learned Report #1	May 2021
Project EDGE Public Webinar #1	March 2021
Project EDGE Factsheet	January 2021

For further news and knowledge sharing publications, please visit the Project EDGE website

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