

ARENA

# DER CUSTOMER INSIGHTS: VALUES & MOTIVATIONS

JULY 2020



Australian Government  
Australian Renewable  
Energy Agency

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## ABOUT THIS REPORT

This report is part of the Australian Renewable Energy Agency (ARENA) 'DER Customer Insights Series' which investigates the experiences of customers involved in twenty ARENA-funded Distributed Energy Resources (DER) projects ('projects'). A summary of the projects that were systematically analysed is in Appendix B

The Analysis was undertaken by UTS Institute for Sustainable Futures, who prepared the report in conjunction with ARENA.

The Institute for Sustainable Futures (ISF) is an interdisciplinary research and consulting organisation at the University of Technology Sydney. ISF has been setting global benchmarks since 1997 in helping governments, organisations, businesses and communities achieve change towards sustainable futures. For further information visit: [www.isf.uts.edu.au](http://www.isf.uts.edu.au)

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### Disclaimer

The authors have used all due care and skill to ensure the material is accurate as at the date of this report. ISF and the authors do not accept any responsibility for any loss that may arise by anyone relying upon its contents

# 1.0

## EXECUTIVE SUMMARY

This report is part of ARENA's 'DER Customer Insights Series' which investigates the experiences of customers involved in ARENA-funded DER projects. Customer insights were drawn and analysed from almost one-hundred reports from twenty projects.

This report aims to understand DER customer values. It does this by examining:

- 1. The types of customers targeted in the projects**, and how to find the right types of customers for future projects.
- 2. What motivates the type of target customer** and what engagement strategies could encourage customers to participate in future projects.

The overarching finding of this report is that future DER projects can benefit from better understanding their target customer base before developing and communicating the product offering.

The report proposes a values-based approach as an effective way to engage and tailor messages to many types of customers. Values are stable psychological structures that motivate behaviour, cutting across demographic characteristics. While appealing to customer values may not directly address all barriers to DER - such as cost, location factors and/or energy use constraints - they do allow projects to understand customer motivations better.

A simple way to survey customers' values is to use a 'values modes' method. This categorises the main set of customer values into three modes: Settlers, Prospectors and Pioneers:

VALUES MODES ARE CATEGORIES OF VALUES EXPRESSION. THERE ARE THREE VALUES MODES: SETTLERS, PROSPECTORS AND PIONEERS.

The research mapped eight of the nine motivators of DER customers against the values modes:



**Settlers** are sustenance driven, needing safety, security and belonging.

**Prospectors** want success, including the esteem of themselves and others.

**Pioneers** are focused on new ideas and self-actualisation.

### MOTIVATORS OF DER CUSTOMERS

SETTLERS	PROSPECTORS	PIONEERS
Financial/security benefits	Financial/security benefits	Financial/security benefits
Security of supply	Security of supply	Energy Independence
Maintaining the status quo	New technology	Environmental benefit
Community benefit	Aesthetics/status symbol	Community benefit
Trust	Energy Independence	Trust
	Trust	

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Values modes align with Maslow's hierarchy of needs<sup>1</sup> and can be used to target messages to particular groups of customers:

- 1. We all 'have a Settler inside of us'.** To maximise uptake in this group, products should minimise their threat to a customer's energy and financial security.
- 2. Two strategies for targeting Prospectors** include showing 1) how the DER option will be a smart investment, and 2) how it can be showcased as a status symbol.
- 3. Promoting the environmental and community benefits of DER projects or innovation of the DER product and/or service itself can help engage Pioneers,** however this should not come at the expense of customer's security.

Projects approaching the mass market are likely to be more successful if they communicate their product in multiple ways to appeal to all three values modes. This should be approached from the bottom (Settler) to the top (Pioneer) of the hierarchy.

Building trust, including ensuring fairness (or social equity), through design and implementation will help protect future projects from customer backlash and move the sector closer to a customer-centred energy future.

NB: This research has only considered a sub-set of ARENA projects, which are mostly focused on on-grid residential solar and storage. Though these core insights are likely to hold true in other situations, it is important to consider the nuances of other contexts such as those living in remote (off-grid) locations that can be islanded, DERs that do not require any extra equipment (e.g. load management), and the characteristics of renters and apartment dwellers and commercial & industrial customers.

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<sup>1</sup> Maslow's hierarchy of needs (1943) is theory of human motivation which states that there are five sets of basic needs (physiological, safety, love, esteem, and self-actualisation) that are arranged in a hierarchy meaning that higher needs emerge as lower needs are satisfied.

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# 2.0

## INTRODUCTION

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### 2.1 CUSTOMERS ARE KEY TO THE SUCCESSFUL DEPLOYMENT OF DER

This report forms part of ARENA's 'DER Customer Insights Series' which investigates the experiences of customers involved in twenty ARENA-funded Distributed Energy Resources (DER) projects (projects). A summary of the projects that were systematically analysed is at Appendix B.

The DER projects that ARENA funds are cutting edge. They typically feature sophisticated technology that is new to customers and installers, often with inherent complexity in the equipment and business models. Because DER are renewable energy units or systems commonly located in homes to provide the occupants power, they rely on customers purchasing, owning, and operating them. Customers are therefore key to the successful deployment of DER.

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### 2.2 DER CUSTOMER VALUES & MOTIVATIONS

On the surface, the customers participating in the projects reviewed for this report are similar. Most customers are homeowners and most have enough disposable income to make subsidised investments e.g. in battery storage. However, these shared traits may be artificial, driven by the nature of ARENA's current investment portfolio, which has been largely residential solar and/or storage demonstrations.

As market forces drive Australia towards a more decentralised energy system<sup>2</sup>, it is important to more deeply understand the customers that DER products and projects are seeking to serve. Looking more closely at the ARENA-funded DER projects, the customers are quite different with diverse: geographical representation; energy needs; reasons for participating; and values that will drive their behaviour now and into the future.

This report seeks to interrogate these differences to determine:

1. **The types of customers that were targeted in the projects**, and how to find the right types of customers for future projects.
2. **What inherently motivates the type of target customer** and what engagement strategies could encourage these customers to participate in future projects.

The research uses a values-based framework that is a well-accepted method for understanding and motivating different groups of people. This report can be used as a guide by future proponents seeking to design more effective DER projects.

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<sup>2</sup> Bloomberg New Energy Finance (BNEF) forecasts that approximately one-third of Australia's electricity capacity will sit behind-the-meter by 2035 (BNEF New Energy Outlook, 2019)

# 3.0

## CHARACTERISTICS OF ARENA'S PROJECTS & CUSTOMERS

While ARENA's DER projects are geographically diverse (represented across all states and territories apart from the Northern Territory), they are often solving a similar problem. Most projects were trying to resolve electricity distribution issues (e.g. peak load and power quality) with residential solar and batteries. All but one project<sup>3</sup> that trialed new technologies or business models on-the-ground (either at pilot or demonstration-scale) were connected to the electricity grid. Of these trials, there was an even split of urban and regional trials, which provided useful comparisons between different demographics connected to different network configurations. A summary of the characteristics of the projects and the customers they engaged is provided in Table 1.

The type of target customer for the trials tended to be the same. Projects looked for households that had smooth or consistent energy demand ('load'), and an ability and/or interest to shift or shape it ('load flexibility'). In many cases this involved investing in battery storage systems that could be remotely controlled by a third party - e.g. a network business,

energy retailer or an independent aggregator - to provide a range of grid services. This load flexibility was often used to optimise or improve solar PV systems, from both the customer and the network's perspective. It also meant that the customers needed to be able to afford (generally >\$1,000) and accommodate a new battery unit, which was not always possible. Thus, it was often challenging to recruit the target number of target customers and, in some cases, keep them fully engaged and responsive over the life of the trial.

Most projects experienced delays in customer recruitment and many did not reach their original participant targets<sup>4</sup>. DER products needed to be communicated more broadly and deeply than anticipated, for example by holding community events and one-on-one (and sometimes face-to-face) conversations with prospective customers. This is understandable, given the nature of the new technologies and business models on offer. However, it was time consuming and budget intensive, which is unlikely to succeed in a commercial context. It was also apparent that few (<6) projects formally segmented their customer base prior to developing the product and engaging the target market. **DER projects stand to achieve better outcomes by better understanding their target customer base (for example, by customer segmentation) before developing and communicating the product offering.**

The sections below seek to support DER providers finding a better approach, facilitating a better understanding the target customer base by:

- > **Analysing the different targeting approaches taken by the existing projects**, to more deeply understand the customer types.
- > **Outlining the opportunity to use a value-based approach** for segmenting and engaging customers in future projects.

By taking these measures to develop a customer-centric product, it is likely that future DER projects will be more efficient (i.e. benefit from faster recruitment) and effective (i.e. enable bigger impact).

**“The customer load profile which presents the best economic value for the network from a Solar Storage perspective is one which is relatively consistent over a given peak period and is not lumpy.”**

- United Energy, Peak Demand Reduction using Solar and Storage Trial

3 The Carnarvon DER trials were off-grid, with a focus on a high solar community and a specific feeder (detail in **Table 1** and Appendix B).

4 For detail on challenges faced by projects in engagement and acquisition, see DER Customer Insights: *The Customer Journey*

PROJECT (LOCATION)	LEAD PARTNER	TECHNOLOGY	STAGE	NO. CUSTOMERS	TARGET POPULATION	TARGET GROUP AND/OR SEGMENTATION STRATEGY
Solar and Storage Trial at Alkimos Beach (WA)	Synergy (energy retailer)	Solar & storage (microgrid)	Study and demonstration	60-100 with 17 on the trial (ongoing and in-flux)	Residential Urban On-grid	Mosaic groups: - B. Knowledgeable success (commuting communities) - F. New homes and hopes (family connections, new bubs / new burbs, tykes and takeaways)
Latrobe Valley Microgrid Feasibility Study (VIC)	LO3 Energy (community organisation)	DER and DR with blockchain (microgrid)	Feasibility study	81 (37 resi, 23 farms, 21 comm)	Residential + C&I <sup>5</sup> Regional On-grid	Sought to approach all members of Latrobe City, South Gippsland Shire, Baw Baw Shire, and Wellington Shire
Indra Monash Smart City (VIC)	Indra Australia Pty Ltd (property developer)	DER and DR (microgrid)	Demonstration	1	Residential + C&I Urban On-grid	Customer-led (Monash University)
Intelligent Storage for Australia's Grid (ACT)	Reposit Power Pty Ltd (energy start-up)	Storage (VPP)	Pilot	6	Residential Urban On-grid	Targeted entire ACT population, assuming only early adopters would express interest, through media advertisements
Distributed Energy Market (AUS)	Australian Photovoltaic Institute (APVI) (research organisation)	DER (market/ regulation)	Feasibility study	61 focus groups, 2463 surveys	Residential Urban On-grid	Australia-wide engagement, seeking a cross-section of community
Higher Renewable Penetration in New Land & Housing Developments (NSW)	Brookfield Energy Australia Pty Ltd (property developer)	Microgrid	Feasibility study	7,500 homes	Residential Regional Off-grid	Customer-led - existing and prospective members of Huntlee Community. <i>NB: further segmentation may have been undertaken, however the referenced customer report was confidential and not provided for analysis.</i>
CONSORT Bruny Island Battery Trial (TAS)	ANU (research organisation)	Solar & storage [Reposit] (VPP)	Demonstration	34	Residential Regional Fringe-of-grid	Driven by a network constraint ( <i>NB: TasNetworks uses a customer segmentation model</i> ). All home owners on Bruny Island were offered the opportunity, and final participants selected with a points assessment including: location, property type, residential status, vacancy, connectivity, solar. They were not typical early adopters.
Increasing the Uptake of Solar PV in Strata Residential Developments (WA)	Curtin University (research organisation)	Solar & storage (microgrid)	Demonstration	50	Residential Urban On-grid	Customer-led - existing members of the White Gum Valley community with medium-density housing: Gen Y, SHAC (Sustainable Housing for Artists and Creatives) and Evermore
Networks Renewed (NSW, VIC)	UTS (research organisation)	Solar & storage (VPP)	Demonstration	98 (41 NSW : 57 Vic) (44 PV : 54 PV storage)	Residential Urban + regional On-grid + fringe-of-grid	Targeted constraint on distribution network feeders

5 C&I: Commercial & industrial

PROJECT (LOCATION)	LEAD PARTNER	TECHNOLOGY	STAGE	NO. CUSTOMERS	TARGET POPULATION	TARGET GROUP AND/OR SEGMENTATION STRATEGY
AGL Virtual Power Plant (VPP) (SA)	AGL Energy Limited (energy retailer)	Solar & storage (VPP)	Demonstration	1,000	Residential Urban On-grid	Mosaic groups: - A. Exclusive Environs (24% - overrepresented) - B. Knowledgeable success (19% - overrepresented) - D. Affluent Acreage (15% - overrepresented) - G. Middle Australia (12%)
Peak Demand Reduction using Solar and Storage (VIC)	United Energy (electricity network business)	Solar & storage (VPP) <i>[Reposit]</i>	Demonstration	42	Residential Urban + regional On-grid	Targeted constraint on distribution network feeder
Trialling a New Residential Solar PV and Battery Model (QLD)	Ergon Energy, (electricity network business)	Solar & storage (VPP)	Demonstration	33	Residential Regional On-grid	Targeted constraint on distribution network feeder
Carnarvon Distributed Energy Resources (DER) trials (WA)	Horizon Power (electricity retail and network business)	Solar & storage <i>[WW &amp; Reposit]</i>	Demonstration	82 (incl. 16 battery and PV systems)	Residential + C&I Regional Off-grid	Driven by network constraint with a focus on a high solar community and a specific feeder (Gibson St) - <i>NB: further segmentation may have been undertaken, however the referenced customer report was confidential and not provided for analysis.</i>
Battery Storage System Performance Standard (AUS)	DNV-GL (energy consultancy)	Battery storage	Study	n/a	Residential + C&I	Residential and small commercial storage system consumers (mass market)
Simply Energy VPP (SA)	Simply Energy (energy retailer)	Solar & battery storage (VPP)	Demonstration	191 committed participants, 48 in pipeline and 19 cancellations in last report	Residential + C&I	Residential + C&I customers of Simply Energy
Solar Analytics: Monitoring for Better Energy Outcomes (AUS)	Solar Analytics Pty Ltd (energy start-up)	Solar & battery storage, control & monitoring equipment	Demonstration	own customer base	Residential	Residential households that have installed solar PV in their customer base (mass market)
Decentralised Energy Exchange (deX) (AUS)	GreenSync (energy start-up)	Solar & battery storage	Demonstration	A 'selection of customers' (number unspecified)	Residential + C&I	Residential households that have installed solar PV in their customer base
Building the world's first consumer owned solar retail and services company (NSW, VIC, QLD, SA)	DC Power Co (energy start-up)	Solar & battery storage,	Demonstration	17,000 investors (crowd source equity funding campaign)	Residential	Residential households that have installed solar PV, and especially 'prosumers' (mass market): originally targeting early adopters (e.g. through online marketing) until received feedback that the product was more attractive to mainstream population (changed media tools e.g. to television)

### 3.1 APPLES AND ORANGES: PROJECTS TARGETED CUSTOMERS IN THREE WAYS

We all see the world from our own lived experience, and the same is true for organisations. The research found that energy retailers, distribution network businesses ('network businesses') and communities took different approaches to customer engagement. However, within each group, there was a lot of common ground. Common approaches used by these key stakeholders are outlined below.

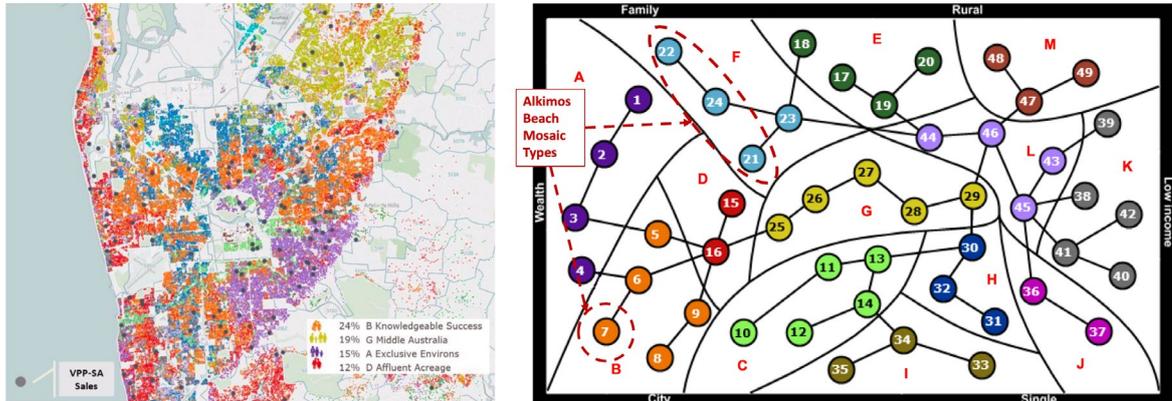


Figure 1: AGL and Synergy discovered five major customer segments in their DER trials Source: AGL and Synergy

**Energy retailers are customer-focused and can easily (and formally) segment their target populations.** Both AGL (Adelaide, SA) and Synergy (Alkimos Beach, WA) used the Mosaic market segmentation tool

that was developed by Experian<sup>6</sup>, classifying households into one of 13 “consumer lifestyle” groups. Within the areas of these trials, five groups dominated: Knowledgeable Success; Middle Australia; Exclusive Environs; Affluent Acreage; and New Homes and Hopes. The retailers used this information to more deeply understand the motivations of potential participants who were originally attracted to the project via launch media (Table 2).

TABLE 2. DOMINANT GROUPS OF CUSTOMERS IN DER TRIALS LED BY ENERGY RETAILERS (ADAPTED FROM AGL AND SYNERGY)

KNOWLEDGEABLE SUCCESS	MIDDLE AUSTRALIA	EXCLUSIVE ENVIRONS	AFFLUENT ACREAGE	NEW HOMES AND HOPES
Well educated family and couple households in suburban areas of major cities	Mixed family forms living on the outskirts of metropolitan areas	Families living in the most prestigious and affluent addresses in the country	Affluent retirees and older couples living in sought after coastal and regional location	Young families who have recently moved in to new homes in the fastest growing suburbs in Australia

**Network businesses were solutions-focused and approached the mass market.** In these trials, the location drove the engagement strategy mostly to address a network constraint on the electricity distribution network. This often required high levels of uptake (sometimes over 20 per cent) in a specific area<sup>7</sup>. Network businesses targeted the right type of “energy user” rather than the right type of personality e.g. early adopters. They rarely tailored messages and instead delivered a standard message in a variety of formats or forums such as online, phone, door-knocking and community events.

6 Experian’s Mosaic is a proprietary segmentation tool that defines, measures, describes and engages target customers. It segments the Australian population into 14 groups and 15 types: <https://www.experian.com.au/mosaic>

7 Most networks sought impact at the distribution feeder level, which is the most-granular level of network management before the house itself. Each house is connected to the distribution feeder by a service cable. The amount of households on a particular feeder varies depending on the location on the distribution network.

Most network businesses eventually reached their target uptake, after a longer-than-expected recruitment process (see: The Customer Journey report).

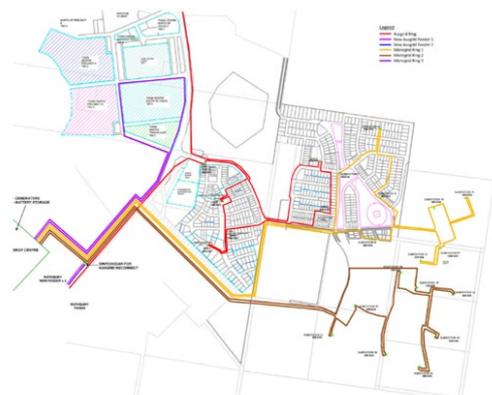
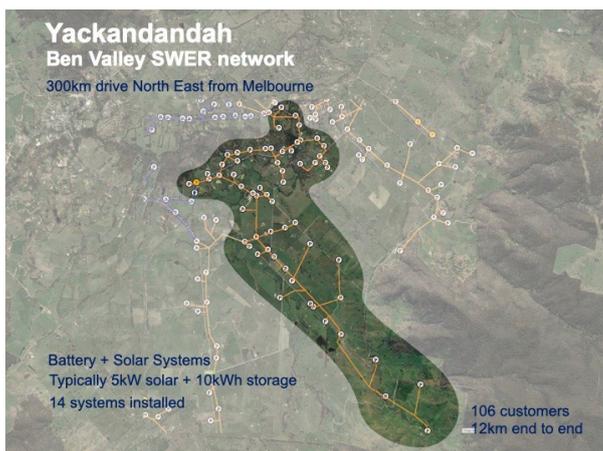


Figure 5: Microgrid reticulation network

Figure 2: Network-led projects (AusNet Services pictured) need customers to meet their need, while customer-led projects (Huntlee pictured) can build their own ideal

**KEY INSIGHT:**

Face-to-face engagement can yield strong uptake without formal segmentation; however it often comes at a high resource cost and may not be suitable for commercial offerings.

**Communities have a deep understanding of customers and their needs.** Projects led by communities or property developers had a strong grasp of the needs of their customers. These projects often investigated more innovative business models, which aligned with the unique context through different microgrid and energy-sharing approaches. The customers within these communities were more heavily involved in the design process, which improved customer satisfaction.

**KEY INSIGHT:**

A strong understanding of customers can achieve greater uptake with less effort and higher level of satisfaction, particularly when they involved are in project design.

### 3.2 THE OPPORTUNITY TO USE A VALUES-BASED FRAMEWORK

The 'gold standard' in understanding customers is segmentation, however it is costly and time consuming. Customer-facing energy retailers, such as AGL and Synergy, are experienced with segmentation techniques but this kind of marketing is less familiar or available to other businesses such as those that manage distribution networks.

**KEY INSIGHT:**

Values that cut across demographics can be an effective approach for engaging and tailoring messages to many types of customers.

A values-based method may offer an effective targeting approach for future projects that do not have the resources to formally segment their customer base. Values are stable psychological structures that motivate behaviour. Values cut across demographics so this approach can be more relevant when projects need to appeal to the mass market and acquire a high proportion of customers in a particular area.

Research shows that there are ten basic 'universal values' and the way a person ranks these will guide their action<sup>8</sup>:

- › **Self-direction:** seeking independent thought and action.
- › **Stimulation:** seeking excitement, novelty and challenge in life.
- › **Hedonism:** seeking pleasure or gratification for oneself.
- › **Achievement:** seeking personal success through demonstrated competence.
- › **Power:** seeking social status and prestige, control or dominance.
- › **Security:** seeking safety, harmony and stability.
- › **Conformity:** seeking restraint of actions likely to harm others or violate norms.
- › **Tradition:** seeking respect, commitment and acceptance of customs and culture.
- › **Benevolence:** seeking preservation/enhancement of the welfare of one's group.
- › **Universalism:** seeking to understand, appreciate and protect the welfare of all.

8 Schwartz, S. H. (2012). An Overview of the Schwartz Theory of Basic Values. Online Readings in Psychology and Culture, 2(1). <https://doi.org/10.9707/2307-0919.1116>

### 3.2.1 VALUES MODES OFFER A SIMPLE METHOD FOR UNDERSTANDING MANY CUSTOMERS

A values-based approach to engagement is an accepted strategy to drive change, particularly for environmental and social justice organisations (e.g. those who partner with Common Cause<sup>9</sup>). A simple way to survey customers' values in a particular place is to use a "values modes" method. This method outlines the main set of values that are present, easily categorised into three modes: Settlers, Prospectors and Pioneers:

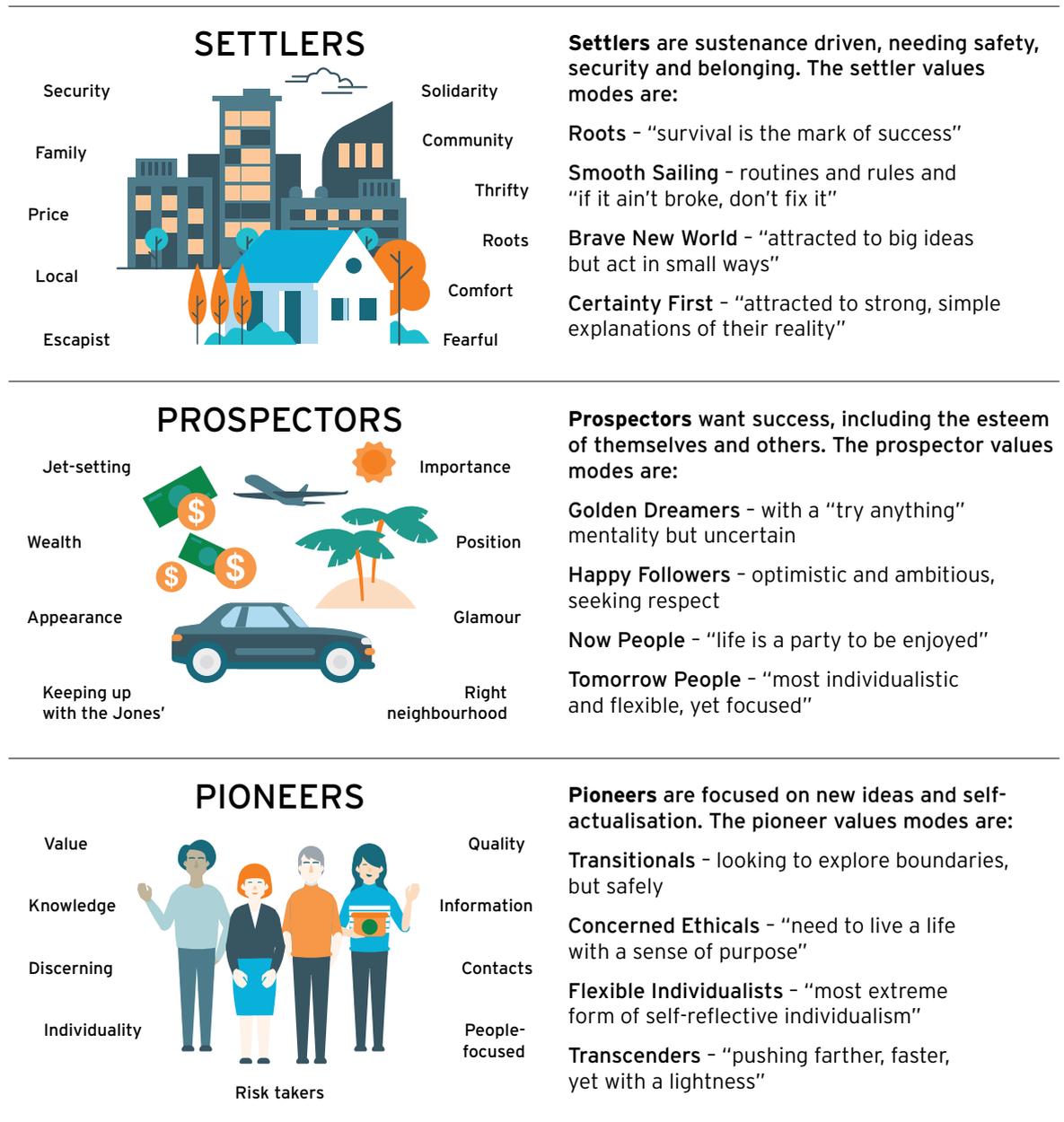


Figure 3. Values modes framework (Rose, C. (2011))<sup>10</sup>

<sup>9</sup> Common Cause is a network working with environmental and social justice organisations to engage cultural values for more effective public engagement. Common Cause Australia's website can be found here: <http://www.commoncause.com.au>

<sup>10</sup> Rose, C. (2011), What Makes People Tick: The Three Hidden Worlds of Settlers, Prospectors and Pioneers. *Troubador Publishing Ltd*. Further detail is at Appendix A: Values Modes. (NOTE: the ARENA design team would need to redo these images which are copyright)

Mapping values modes can be useful to better align projects, and the communication of these projects, with the target population and their priority values:

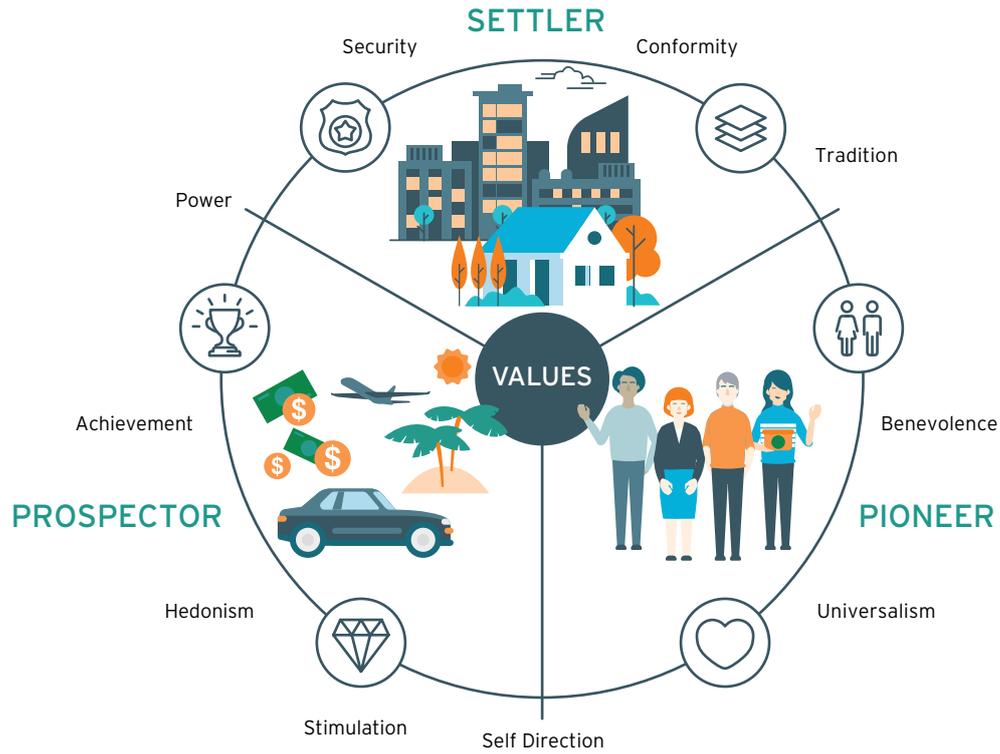


Figure 4. Values modes mapped to Schwartz's universal values<sup>11</sup>

\*Based on Schwartz's universal values (1992) and Rose's values modes (2011)

11 Peet, J. G. (2016) Charity campaigning based on peoples' unconscious motivational values: <https://medium.com/william-joseph/how-to-get-people-to-do-what-you-need-them-to-based-on-their-unconscious-motivational-values-fa715da2a8f2>

### 3.2.2 MAPPING VALUES MODES TO EXISTING ARENA PROJECTS

An example of what this may look like for the existing projects based on project reports is below, noting that evaluation is limited since no customers have been directly approached to measure values:

PROJECT	TARGETING STRATEGY	POSSIBLE VALUES MODES
Solar and Storage Trial at Alkimos Beach (WA)	Mosaic groups: B (Knowledgeable success) and F (New homes and hopes)	Settlers (F) Prospectors (B, F)
Latrobe Valley Microgrid Feasibility Study (VIC)	Sought to approach all members of Latrobe City, South Gippsland Shire, Baw Baw Shire, and Wellington Shire (mass market)	Settlers, Prospectors, Pioneers
Indra Monash Smart City (VIC)	Customer led (Monash University)	Pioneers
Intelligent Storage for Australia's Grid (ACT)	Targeted entire ACT population, assuming only early adopters would express interest, through media advertisements	Pioneers
Distributed Energy Market (AUS)	Australia-wide engagement, seeking a cross-section of community	Settlers, Prospectors, Pioneers
Higher Renewable Penetration in New Land & Housing Developments (NSW)	Customer led - existing and prospective members of Huntlee Community	N/A
CONSORT Bruny Island Battery Trial (TAS)	Targeted constraint on distribution network - approached entire community who were not all traditional early adopters	Settlers, Prospectors, Pioneers
Increasing the Uptake of Solar PV in Strata Residential Developments (WA)	Customer led - Gen Y, SHAC (Sustainable Housing for Artists and Creatives) and Evermore	Prospectors (Gen Y, Evermore) Pioneers (Gen Y, SHAC)
Networks Renewed (NSW, VIC)	Targeted constraint on distribution network feeder	Prospectors, Pioneers (Collombatti) Prospectors, Pioneers (Melbourne) Pioneers (Yackandandah)
AGL Virtual Power Plant (VPP) (SA)	Mosaic groups: A (Exclusive Environs), B (Knowledgeable success), D (Affluent Acreage), G (Middle Australia)	Settlers (G) Prospectors (A) Pioneers (B, D)
Peak Demand Reduction using Solar and Storage (VIC)	Targeted constraint on distribution network feeder	Prospectors, Pioneers
Trialling a New Residential Solar PV and Battery Model (QLD)	Targeted constraint on distribution network feeder: customers had large houses and large bills	Prospectors
Carnarvon Distributed Energy Resources (DER) trials (WA)	Targeted constraint on distribution network feeder with a focus on a high solar community	Prospectors
Battery Storage System Performance Standard (AUS)	N/A - no customers targeted as this was a standards study	N/A
Simply Energy VPP (SA)	Customer led - existing and prospective consumers	N/A
Solar Analytics: Monitoring for Better Energy Outcomes (AUS)	N/A - no customers targeted since the project was focused on data analysis	N/A
Decentralised Energy Exchange (deX) (AUS)	Customer led - existing and prospective consumers	N/A
Building the world's first consumer owned solar retail and services company (NSW, VIC, QLD, SA)	Originally targeted early adopters then, based on market feedback, changed target group to mainstream audience	Settlers, Prospectors

# LISTENING FOR SIGNPOSTS TO A PERSON'S VALUES MODE

YOU CAN ROUGHLY IDENTIFY VALUE MODES BY LISTENING TO WHAT CUSTOMERS SAY WHEN CONSULTED.

Examples of phrases that signpost a person's mode:

## SETTLERS:

"And I just can't be bothered looking at it because I'm not interested in it. If it's done it's done, I get paid so much, but I can't be bothered just checking it."

- CONSORT trial participant

"I guess I've relied on TasNetwork and the Reposit to make it fair and equitable so that they're calling on all the battery trial participants in approximately the same way"

- CONSORT trial participant

"Well, if I'm storing my day's excess, I'm then utilising and having - yeah, because it feels more truly efficient because I'm using in the evening what I've made in the day, and then I've got less risk on the grid..."

- CSIRO focus group participant

"...I don't like other companies controlling my devices and money..."

- CSIRO focus group participant

## PROSPECTORS:

"I'm using the solar from hybrid to power other half of house. Not happy with recommendation to leave in Bypass until advised otherwise. If I can't use it in a situation like this then we might as well remove it as this is really the only time it's needed"

- Ergon Energy trial participant

"I think it's clumsy and I would hope that in the not-too-distant future that'll become a lot more refined. So I think that I would be out of the market at the moment. It seems to me to be something that's in its infancy and is developing rapidly. I think there's going to be far better options in the not-too-distant future."

- CSIRO focus group participant

"Just the independence and I'd know it's mine. It's my home, my own electricity. There's a real sense of family and looking after ourselves, basically."

- CSIRO focus group participant

## PIONEERS:

"[I'm] attracted to the holistically sustainable and well thought through design of the building"

- Gen Y member of White Gum Valley trial

"I mean Bruny's got a very strong community, and I think it's good to give back to it. I don't see it's a major issue at all"

- CONSORT trial participant

"And I guess our interest probably in reducing electricity consumption is more environmental than cost, I would say, with our family."

- CSIRO focus group participant

### 3.2.3 CAVEATS TO FOCUSING ON VALUES

Understanding customer's values is not going to answer all the questions. The uptake of DER is influenced by other factors that must be taken into consideration: in particular, cost, technology readiness, locational factors (e.g. the type of grid, telecommunications connectivity), and the way customers need to use energy. For example, renters cannot yet easily invest in rooftop solar and dairy farms cannot shift their milking to different times of the day. However, outside of these factors, values are a useful way to predict motivations, which is explored in the following section.

#### KEY INSIGHT:

Cost, technology readiness, location, and energy profile are factors not related to values that may also preclude customers from investing in DER.

# 4.0

## THE MOTIVATORS OF DER CUSTOMERS

Deeply understanding customer values will reveal their motivations. This section investigates how customers' motivations, derived from their values, directly influence

their actions within DER projects. By understanding these motivations, future projects may be more successful e.g. by recruiting a greater number of customers more efficiently. Determining values-based motivations also helps to explain the findings of the existing projects, for example:

1. **CSIRO's six key influencing factors for DER preference**<sup>12</sup> - infrastructure-related, lifestyle, financial, information, environmental considerations/impacts, benefits for independence, and
2. **The University of Tasmania's exploration of DER customers' emotions**<sup>13</sup> towards (e.g. relaxation and enthusiasm) and against (e.g. anger and hostility) DER projects.

The research found nine common motivators for participation in the projects. We have listed these below (Table 3) and mapped eight of them against the universal values and values modes that they correspond to.

“Households are diverse, and greater awareness and appreciation of the context in which households make decisions about their energy is crucial to understanding their receptiveness to DER, and their DER preferences.

- University of Tasmania Social Science Report

TABLE 3. EIGHT OF THE NINE MOTIVATORS OF DER CUSTOMERS CAN BE MAPPED AGAINST THE VALUES MODES

MOTIVATORS OF DER CUSTOMERS	UNIVERSAL VALUES	PRIMARY MODE
1 Financial security/benefits	Security, power*, universalism*	Settler
2 Security of supply	Security, power, self-direction*	
3 Maintaining the status quo	Conformity, tradition	
4 New technology	Stimulation	Prospector
5 Aesthetics/ status symbol	Achievement	
6 Energy independence	Self-direction*	Pioneer
7 Environmental benefit	Universalism	
8 Community benefit	Benevolence*	N/A
9 Trust	N/A	

\*is aligned to another value mode

12 CSIRO's six focus groups with 61 participants across Brisbane, Melbourne and Sydney found that these were the most important factors influencing householder preference for accepting distributed energy options (Householder interest in active participation in the solar distribution energy market, 2012)

13 The University of Tasmania focused on the emotions of householders throughout the CONSORT Trial because “there is well established research that demonstrates that emotions and ethical intuitions are equally, or in some cases even more important than reason, in making moral decisions about technology” (CONSORT Social Science Report, 2019)

The key findings explored in the sections below are:

- › **Financial benefit is a core motivator for DER customers**, however it cuts across values modes and should be communicated in multiple ways.
- › **Settlers are motivated by security**, expressed as a desire for reliability and 'maintaining the status quo'.
- › **Prospectors who will be driving the first wave of mainstream DER adoption** are excited by 'getting ahead' or 'making a smart investment'.
- › Pioneers desire fairness and are willing to support 'the greater good'.
- › **Trust also cuts across the values modes** and is critical to successfully achieve a customer-centred energy future.

"...cost savings are the most important feature..."

"...in addition to reducing electricity costs, for some participants, environmental impact, levels of self-sufficiency, and levels of control and safety, are also important considerations when determining their preferences for accepting distributed energy options..."

"...respondents, who feel responsible for energy problems, have stronger personal norms and are generally more supportive towards distributed energy technologies..."

- Householder interest in active participation in the solar distribution energy market (CSIRO, 2012)

#### 4.1.1 MOST DER CUSTOMERS WERE DRIVEN BY FINANCIAL BENEFIT, WHICH IS A MOTIVATOR THAT CUTS ACROSS VALUES MODES

Financial benefit (including reducing costs and increasing revenue) was described as the strongest motivator for customers in all projects bar one.<sup>14</sup> However, financial motivations can cut across the value modes. For example:

- › Settlers value cost savings as a financial security measure
- › Prospectors see smart investments as a signal that they are successful and 'getting ahead'
- › Pioneers are motivated by fairness, expecting 'good value for money' and fair compensation for their efforts.

##### KEY INSIGHT:

Value propositions are likely to be more successful if they are carefully designed with the target customer in mind and, if approaching the mass market, are communicated in three ways to appeal to each values mode.

A single message on financial benefits is unlikely to appeal to all groups. Projects should carefully consider the motivations of each group to communicate a message effectively to the target customer group. A project may more effectively reach the mass market if the financial message is phrased in three ways that align with the three values modes (as above)

However, there is a chance that the type of DER product, or the way it was initially communicated, may have 'primed' customers' values towards financial factors. In other words, most projects promoted the cost-benefits as part of the initial engagement, which may have prioritised cost as the primary motivator for those customers. Priming financial motivation may lead to two missed opportunities:

- The chance that customers may be prepared to pay more** for (or ask less from) participating in projects if they feel it aligns with their more altruistic values.
- Turning away customers who are strongly motivated by conflicting values** (e.g. benevolence) and are turned-off by products that promote cost benefits, particularly if they are perceived to come at a cost to others.

<sup>14</sup> The case where cost was ranked as the second-highest motivator was an investigation of Citizen Utilities (shared ownership of solar and storage) in White Gum Valley. This development describes itself as "a modern, innovative and sustainable community". There was universal agreement that the primary benefit of solar in this case was environmental sustainability, described as "fighting climate change", "cleaner energy", "not burning fossil fuels", "emissions need to be reduced" or "better for the environment".

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**PRIMING:**

Research has shown that raising a motive from a person's memory can increase that person's drive towards that motive. This is known as 'priming'. Primed motivations can also come at the expense of other opposing motivations. For example, priming "money" can decrease "helpfulness".

*(Maio et al. 2009; Vohs, Mead & Goode, 2006)*

The priming of financial motivators is likely to have been exacerbated by the high-cost nature of the projects. Most of the on-the-ground technology trials required significant (>\$1,000) customer contributions. There were many references to customers not participating in the projects since the level of investment was prohibitive. For those customers who chose to participate, the significant upfront cost may have also increased the focus on a return on investment. Future projects could address this by:

- > **Investigating alternative DER technologies** and business models e.g. load management, solar gardens and community battery sharing,
- > **Including an in-depth design phase**, restructuring product offerings and/or value propositions after thoroughly investigating the needs of the target customers.

**KEY INSIGHT:**

Assuming the core motivations of target customers can be risky - e.g. by priming particular motivators - leading to missed opportunities. This could be addressed by involving customers at the design phase of the DER product offering.

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**"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."**

- APVI Focus Group Participant

#### 4.1.2 SETTLERS ARE MOST CONCERNED ABOUT SECURITY, EXPRESSED AS A DESIRE FOR RELIABILITY AND “MAINTAINING THE STATUS QUO”

Settlers are drawn to seek out safety, security, tradition, identity and belonging. Settlers are conservative, risk-avoidant and wary of change, with a tendency to believe that the world changes them, not that they can change the world. Effective communication with Settlers could emphasise traditional practices, thriftiness and the security that comes from being able to manage your own energy.

Theory assumes that people tend to start as Settlers and then, as basic needs are met, move on to the other values modes. Even when we express higher-level values, we still “all have a Settler inside of us”.

Security - a common trait of Settlers - was a commonly expressed value of customers. The two main security motivators were maintaining or increasing ‘security of supply’, and ‘maintaining the status quo’. These security motivations were found to sometimes trump the financial benefits (i.e. customers chose to forgo financial upside if they felt that their energy security was being threatened).

The most common DER type that triggered security motivations was battery storage to deliver more reliable energy supply. This was particularly relevant in fringe-of-grid and regional locations, where there were generally more outages. For example, customers in South Australia and Bruny Island valued reliability more highly and also experienced more regular power outages (planned and unplanned) than more connected regions of the National Electricity Market (e.g. inner-city Sydney and Melbourne). By comparison, the customers living in Alkimos Beach, 45km north of Perth with less regular outages, ranked the reliability benefits of a battery after the benefits of lower energy bills.

Even in cases where reliability of supply was not challenged, some customers still preferred to forego financial benefits to maintain the status quo (e.g. their existing billing arrangements). Three projects (CONSORT, Networks Renewed and United Energy) involving Reposit Power, an aggregator of network support services, experienced this in relation to tariff changes. To support its energy arbitrage business model, presented in a user-friendly app interface (Figure 5), Reposit Power requires customers to move to a time-of-use (ToU) tariff. Customers found that moving to a ToU tariff was complex and opaque, leading many to choose not to make the move even after they were shown that it would reduce their bills. This sometimes muted the impact of these trials since: customers could not always be called upon as easily to deliver the services the projects were testing; and/or the network business did not see as much day-to-day benefit of customers moving to a ToU tariff i.e. customers on ToU tariffs are better ‘grid citizens’ since they move their usage to off-peak times.



Figure 5: Reposit Power’s energy arbitrage app is how customers can see and act on financial opportunities

“Reliability may be a factor that is taken for granted and not well understood”

(Synergy Alkimos Beach Energy Storage Trial: Customer Insights Research, 2019).

“Reliability of supply was a big issue for CONSORT participants. Grid outages are above average on Bruny Island and many households in the Trial were really focused on managing outages.”

(CONSORT Trial: partner commentary)

#### KEY INSIGHT:

We all “have a Settler inside of us”. Therefore, to maximise uptake across a broad audience, it is important that all product offerings minimise their threat to a customer’s security, including energy reliability and financial risk.

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#### 4.1.3 PROSPECTORS, WHO OFTEN LEAD MAINSTREAM INVESTMENT IN NEW TECHNOLOGY, ARE EXCITED BY 'GETTING AHEAD'

**Prospectors yearn for success, the search for esteem of others, and self-esteem.** They like to acquire and display symbols of success, be the best at what they are doing and look good while they are doing it. They are trendy, fashion-conscious and always on the lookout for opportunities. Prospectors may be motivated by being able to display the latest eco-product and talk about it with their friends and colleagues.

Prospectors are mainstream adopters who are willing to make investments in new DER technologies if they see an opportunity to 'get ahead', financially or socially. This is an attractive segment to target since there is a higher appetite for financial risk in order to get a reward.

When targeting Prospectors, it is important that the product is attractive to drive the first wave of mainstream adoption. This is especially important if the product has a high cost, since it is likely to be sought after as a status symbol. For example, Reposit Power found that battery storage systems should have "similar aesthetics to a common household appliance (refrigerator, storage hot water heater, indoor heater and dishwasher) from a high-quality brand" and "easily audible noise from power conversion was deemed to be broadly unacceptable". This can go beyond personal preference and be related to increasing a property's value.

However, emerging technologies that are rapidly improving can also be a demotivator for some Prospectors (e.g. battery storage). Prospectors have a close eye on social norms and want to be involved in trends that are socially popular. They might wait until a technology is more mature before investing. It is unclear the extent to which this impacted the projects and the industry's current development (i.e. how quickly adoption will ramp-up when the technology is perceived as mature). This is an area that could be more fully explored by customer research.

##### **KEY INSIGHT:**

Two strategies for targeting Prospectors include showing 1) how the DER option will be a smart investment, and 2) how it can be showcased as a status symbol.

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**"It seems to me to be something in its infancy and is developing rapidly. I think there's going to be far better options in the not-too-distant future"**

- APVI focus group participant

#### 4.1.4 PIONEERS WILL WANT FAIRNESS AND TO SUPPORT THE 'GREATER GOOD'

**For Pioneers, the constant drive is for new ideas, the quest for connections waiting to be made, and living a life based on ethics.** They have a focus on aesthetic and cognitive needs, and self-actualisation. Pioneers like to explore ideas, experiment and feel that their actions are ethical. This makes them the classic 'early adopters', willing to try a technology for ethical reasons before it necessarily makes good financial sense. They want to understand the big picture and are the most concerned about environmental and social issues, fairness, justice and equality. They generally embrace change and believe that they can make a difference in the world.

Pioneers are intrinsically motivated by altruism and DER projects can appeal to them with messages of emissions reduction and fairness. Synergy's customer research supports this approach, finding that customers (once their basic financial needs are met) seem to be willing to 'do the right thing' over convenience and comfort. This aligns with the values modes theory, which expects people move up their hierarchy of needs<sup>15</sup> from Settlers to Pioneers. 'Doing the right thing' might be investing in renewables to reduce emissions, but also might mean supporting a business model that is perceived as 'fair'. Models or messages that may appeal to Pioneers include reaching '100 per cent renewables' targets and community solar and/or batteries, where more individuals can invest within their means.

Community-mindedness was apparent in projects that were community-led. It was of much higher importance in the Latrobe Valley, which has a historical economic dependence on coal-fired generation and participants were keen to continue being a major electricity producer in the clean energy transition. It was also a major motivator for Yackandandah, where the community is championing renewable energy via 'Totally Renewable Yackandandah'. But, even in these cases, the DER option needed to be cheaper to be attractive. This confirms the concept that "we all have a Settler inside us" and that, even in progressive communities, projects cannot ignore customers' needs for financial and/or energy security.

##### KEY INSIGHT:

Promoting environmental and community benefits can help engage Pioneers, however this should not come at the expense of customers' financial or energy security if mass market adoption is needed.

Fairness was not often referenced in the network and retailer-led projects, which may have led to some negative customer experiences. Several projects experienced minor customer backlash when aspects of the trial were perceived as 'unfair'. Examples included where a recruitment process was not considered equitable, or where the customer had misunderstood the benefits offered by the trial (e.g. did not realise that the battery storage would not provide back-up power when the grid disconnected). The most explicit example of social equity being considered in a network-led trial was in the CONSORT trial<sup>16</sup>, which investigated a model of "value-reflective pricing" that was partially implemented with customers on Bruny Island.

**"...respondents, who feel responsible for energy problems, have stronger personal norms and are generally more supportive towards distributed energy technologies..."**

- (CSIRO, 2012)

##### KEY INSIGHT:

Ensuring fairness (social equity) in the design phase will help protect a project from customer backlash.

<sup>15</sup> Maslow's hierarchy of needs is a theory in psychology that describes motivations in the form of a pyramid. The base of the pyramid are physiological needs (food, water, shelter), followed by: safety/security; belonging; esteem and, finally, self-actualisation. This aligns with the progress through the values modes from Settlers to Prospectors to Pioneers.

<sup>16</sup> The key innovation of the CONSORT trial was the NAC (Network Aware Coordination), which developed a means of coordinating DER that addressed constraints at least cost to the customer and network. The NAC consists of algorithms, techniques and software to achieve optimal power flow. The technology is still under development for widespread implementation across other networks.

# HOT BUTTONS

SEGMENT IF YOU CAN BUT, IF YOU CAN'T, HIT A 'HOT BUTTON' FOR EACH GROUP IN TURN.

It is difficult to understand customer values at a glance, therefore strategies that maximise customer motivation without isolating potential target groups can be useful. From a psychology perspective, it is perceived to be safest to move up Maslow's hierarchy of needs from Settlers to Pioneers (Rose, 2011). 'Hot buttons' are phrases that align with particular values. When trying to reach all three groups, try not to overuse hot buttons from any particular group, as the others may start to tune out. When seeking out a particular group, don't use motivators from the other groups, which will turn them off.

While this research did not fully investigate the most successful hot buttons for different values modes, examples of what these may look like are provided below. Further testing of these phrases is recommended (e.g. through focus groups with target customers).

## SETTLERS



Security	Solidarity	"Take control over your energy for less exposure to risks, or safe and reliable supply"
Family	Community	
Price	Thrifty	"Reduce your electricity costs to take care of your family"
Local	Roots	"Do what is normal / what everyone else is doing"
Escapist	Comfort	
	Fearful	"Do your duty, help the country"

## PROSPECTORS



Jet-setting	Importance	"Make a smart investment / choose the best energy option"
Wealth	Position	"Get ahead, be a winner"
Appearance	Glamour	"Have this symbol of success to show others that you have the latest thing"
Keeping up with the Jones'	Right neighbourhood	Celebrity endorsements

## PIONEERS



Value	Quality	"Choose the fairest, most ethical option, that will help others in the community"
Knowledge	Information	"Most environmentally friendly"
Discerning	Contacts	"A new, exciting innovation"
Individuality	People-focused	"An opportunity for energy independence, to do your own thing"
	Risk takers	

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## 4.2 ON TRUST

Social licence depends on trust. Trust cuts across the three value modes is critical to public acceptance and advocacy of new technologies, including DER uptake.

DER projects will have to work hard to gain trust. Customers' trust in our energy market is already low<sup>17</sup> – only 32 per cent of households believe that the market is working in their interests, which has been stable since 2016 (Energy Consumers Australia, 2019<sup>18</sup>). This is exacerbated for DER projects that have complex technical offerings and may encounter unforeseen issues when developing and testing new technology. There are already negative perceptions to overcome, for example the belief that one needs to look out for 'cowboy' or 'rogue' installers. Thus, building trust must be a core objective for DER projects.

To build trust, projects may want to consider models such as the "Trust Equation"<sup>19</sup>. The Trust Equation uses four objective variables to measure trustworthiness. These four variables are best described as: Credibility, Reliability, Intimacy and Self-Orientation. How these variables may align with the values modes approach is described below:

- › **Credibility** is about expertise and feeling that the people you are engaging with know their subject. Values are less relevant to building credibility.
- › **Reliability** is about track record. Have they performed well before? If customers have had bad experiences with faults then this will be low. Again, this is not influenced strongly by values.
- › **Intimacy** is about safety and security, which is strongly linked to the values modes. First, this is likely to be a more important variable for Settlers, who are more focused on safety and security. Second, customers are more likely to feel safe and secure with people that share their values.
- › **Self-Orientation** is about whether a customer feels like the organisation has their interests at heart or is being self-serving. Values is relevant in two ways. First, the different modes value different things, so their interests vary. Settlers will feel more trust if the utility shows it is focused on safety and security. Prospectors will feel more trust if the utility talks about helping them make money. Pioneers will feel more trust if the utility talks about environmental goals or innovation. Second, self-orientation will be reduced (and trust increased) if utilities express intrinsic values that are 'bigger than self' rather than self-focused extrinsic values.

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"I want to get something with a bit of quality about it. 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. And I hear that their after-sales service too, their maintenance service, falls really short from where it should be."

- CSIRO focus group participant

A key question for future DER projects is: "How does this project help build customer trust?"

If this can be answered positively, in good faith, we will be moving closer to a customer-centred energy future.

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<sup>17</sup> However, this may also be an opportunity for future projects to capitalise on the new desires for energy independence.

<sup>18</sup> Energy Consumers Australia (2019), *Energy Consumer Sentiment Survey Findings: December 2019*.

<sup>19</sup> Green, CH (2000), *The Trusted Advisor*

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# 5.0

## CONCLUSION

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A values-based framework may offer an effective targeting approach for future DER projects. Values are stable psychological structures that motivate behaviour, cutting across demographics. This report has analysed the values of DER customers and their motivations, which are consolidated into five key findings below. This can serve to help inform future DER projects, and other organisations interested in these projects.

**DER projects can benefit from better understanding their target customer base** before developing and communicating the product offering. Face-to-face engagement can still yield strong uptake without formal segmentation; however it often comes at a high resource cost and may not be suitable for commercial offerings.

**Values cut across demographics and can be an effective approach** for engaging and tailoring messages to many types of customers. Listening closely to customers during the engagement phase can give clues to their values base and what will drive their action. Assuming the core motivations of target customers can be risky (e.g. by priming particular motivators), potentially leading to missed opportunities.

**Value propositions are likely to be more successful if they are communicated in multiple ways** to appeal to all three values modes (from Settler to Pioneer), while remembering that we all “have a Settler inside of us”. To maximise uptake in this group, products should minimise their threat to a customer’s energy and financial security. Two strategies for targeting Prospectors include showing 1) how the DER option will be a smart investment, and 2) how it can be showcased as a status symbol. Promoting environmental and community benefits of DER projects can help engage Pioneers, however it is important to be mindful of customer security needs.

**Some factors may preclude customers from investing in DER**, regardless of their values (e.g. cost, location).

Building **trust**, including **ensuring fairness** (social equity), through design and implementation will help protect a project from customer backlash and **move the sector closer to a customer-centred energy future**.

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# 6.0

## APPENDICES

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### 6.1 APPENDIX A: VALUE MODES

The Values Mode framework is a proprietary motivational approach developed by a company called Cultural Dynamics Strategy and Marketing (CDSM) and applied by campaign strategists and market researchers including Chris Rose, KSBR and Futerra (Rose, 2011). It draws on survey research that maps individual values on the circular motivational continuum proposed by Schwartz (Rose, 2011). It also draws on Maslow's hierarchy of needs (Maslow, 1987). Maslow proposed that human motivations derive from our dominant needs, and that needs develop hierarchically as they are progressively satisfied. Our most basic needs are the physiological needs for food, water, sleep and warmth. Once these needs are satisfied, we become motivated by the satisfaction of safety needs, then needs for belonging and love, esteem needs, aesthetic and cognitive needs and the need for self-actualisation.

The Values Mode framework identifies 12 values-based market segments (or 'values modes'), grouped into three primary motivational levels - labelled as Settlers, Prospectors and Pioneers (Rose, 2011). These groups can be thought of as three different worlds, with fundamentally different values and motivations. All people start as Settlers, but if they meet their basic needs, they may move on to become Prospectors and then Pioneers.

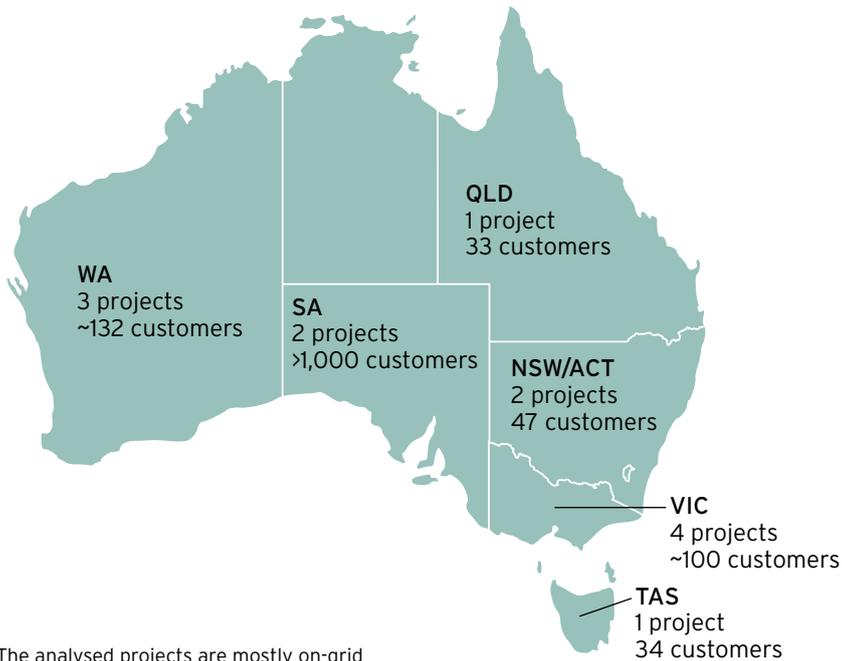
Settlers are drawn to seek out safety, security, tradition, identity and belonging. Settlers are conservative, risk-avoidant and wary of change, with a tendency to believe that the world changes them, not that they can change the world. Effective communication with Settlers could emphasise traditional practices, thriftiness and the security that comes from being able to manage your own energy.

Prospectors yearn for success, the search for esteem of others, and self-esteem. Prospectors like to acquire and display symbols of success, be the best at what they are doing and look good while they are doing it. They are trend and fashion conscious and always on the lookout for opportunities. Prospectors may be motivated by being able to display the latest eco-product and talk about it with their friends and colleagues.

For Pioneers, the constant drive is for new ideas, the quest for connections waiting to be made, and living a life based on ethics. They have a focus on aesthetic and cognitive needs, and self-actualisation. Pioneers like to explore ideas, experiment and feel that their actions are ethical. They want to understand the big picture and are the most concerned about environmental and social issues, fairness, justice and equality. They generally embrace change and believe that they can make a difference in the world. Pioneers are intrinsically motivated to adopt pro-environmental behaviours so communications can appeal to ethical reasons for action.

## 6.2 APPENDIX B: THE COHORT OF ARENA-FUNDED DER PROJECTS AND THEIR CUSTOMERS

19 ARENA projects\* across almost all states and territories hosted ARENA-funded projects. The demonstration projects involved over 1,300 customers who chose to have DER systems installed in their homes.



The analysed projects are mostly on-grid residential solar and storage trials therefore it is important to consider the nuances of other contexts when applying these findings.

Presentation to ARENA | Institute for Sustainable Futures

\*13 demonstration projects and 6 non-demonstration projects (including feasibility studies, standards development and market testing).

PROJECT			DESCRIPTION
Solar and Storage Trial at Alkimos Beach	Lendlease Communities, Synergy, DevelopmentWA	2014	The Solar and Storage Trial at Alkimos Beach Residential Development project involves developing, deploying and testing the commercial feasibility of a new energy retail model. It will combine community scale battery storage, high penetration rooftop solar PV and energy management within a new residential development at Alkimos Beach, Western Australia.
Latrobe Valley Microgrid Feasibility Study	LO3 Energy	2018	The Latrobe Valley Microgrid Feasibility Study will assess the viability of creating a local energy marketplace for dairy farms, residential participants and commercial/industrial customers in the Latrobe Valley. Participants will sell excess energy generation, demand response capabilities and network support services to improve integration of Distributed Energy Resources, such as rooftop solar. The Project will incorporate PV, storage, demand response and LO3 Energy's Exergy platform to deliver an optimal distributed energy model in the region.
Indra Monash Smart City	Indra Australia Pty Ltd	2018	The Indra Monash Smart City will demonstrate how smart and renewable technologies can be integrated at the Monash University Clayton embedded network to maintain power quality and test market driven responses and business models. Indra's Active Grid Management (InGRID AGM) platform will provide real-time monitoring and control over the grid-connected assets, and be optimised to add value to customers, market participants and the electricity grid.
Intelligent Storage for Australia's Grid	Reposit Power Pty Ltd	2014	The Intelligent Storage for Australia's Grid project involves piloting GridCredits, a battery storage control module that allows consumers to monitor electricity usage and access their solar power overnight and at peak times. Reposit will offer the 'GridCredits System' to volunteer households in Canberra. The pilot will demonstrate the value of smart storage and also increase the understanding of how residential solar and energy storage systems can operate in Australia's electricity grid. The project has the potential to increase the uptake of rooftop solar and may allow more renewable energy to be connected to the grid.

PROJECT		DESCRIPTION	
Distributed Energy Market	<b>Australian Photovoltaic Insitutute (APVI)</b>	2012	The Distributed Energy Market project assessed a range of ways in which customers and electricity utilities might participate in a distributed energy market.
Higher Renewable Penetration in New Land & Housing Developments	<b>Brookfield Energy Australia Pty Ltd</b>	2015	This project aims to explore the commercial viability and impact of renewable energy for large new housing developments with off-grid microgrids. Brookfield Energy Australia, through Flow Systems, will work with Siemens, Kinesis and CSIRO to determine whether renewables, battery storage and enabling technologies can reliably and cost effectively power new suburbs.
CONSORT Bruny Island Battery Trial	<b>ANU, TasNetworks, Reposit Power Pty Ltd, University of Sydney, University of Tasmania</b>	2016	The CONSORT Bruny Island Battery Trial successfully developed and demonstrated an innovative automated control platform that enables consumers with battery systems to provide support to a constrained electricity network. It continues to do so in a way that is of maximum benefit to both the consumer and the network. At the heart of CONSORT is a platform called Network Aware Coordination (NAC). The NAC's primary task is to automatically coordinate household energy systems (in a non intrusive way) enabling them to adhere to and alleviate network constraints. The trial effectively demonstrated the use of this approach to manage high renewable penetration and other constraints at a much lower cost than is conventionally possible.
Increasing the Uptake of Solar PV in Strata Residential Developments	<b>Curtin University, LandCorp, Electricity Networks Cooperation, CRC for Low Carbon Living, City of Freemantle, Balance Utility Solutions</b>	2016	The Increasing the Uptake of Solar PV in Strata Residential Developments project will develop governance models to allow shared solar photovoltaics (PV), battery and monitoring systems to be used in medium density apartments. The governance models will be tested at 50 units of the White Gum Valley development in Perth. The governance models developed will examine the shared benefits, risks and costs between developers, owners, tenants, strata bodies and utilities. The models will also include the energy system design, billing, legal addendums for dwelling purchasers and dwelling leases. The financial aspects of the governance models will be studied, tested and demonstrated in three different strata lot developments. The models developed are expected to be adaptable and scalable to suit different development types.
Networks Renewed	<b>UTS, Reposit Power Pty Ltd, Essential Energy, United Energy, AusNet Services, APVI</b>	2016	The Networks Renewed project investigated pathways to increase the amount of renewable energy in Australia by paving the way for small-scale solar photovoltaic (PV) and battery storage installations to improve the quality and reliability of electricity in Australia's distribution networks. Two demonstrations focussing on voltage management, recruited 90 customers in three locations across NSW and Victoria under new commercial models for network-related businesses. A key outcome of the project is a practical understanding of the commercial value of new smart inverter technology.
AGL Virtual Power Plant (VPP)	<b>AGL Energy Limited</b>	2017	The AGL Virtual Power Plant is a world-leading prototype of a virtual power plants (VPP) created by installing and connecting a large number of solar battery storage systems across 1000 residential and business premises in Adelaide, South Australia, to be managed by a cloud-based control system. The batteries will be able to 'talk' to each other through a cloud-based platform using smart controls, forming a connected system that will be able to operate as a 5 MW solar power plant.
Peak Demand Reduction using Solar and Storage	<b>United Energy</b>	2017	The Peak Demand Reduction using Solar and Storage project has successfully demonstrated a reduction in peak demand as an alternative solution for deferring network augmentation. United Energy: developed operating modes for the systems including automated control algorithms; and investigated business models that could facilitate the deployment of storage to address network issues. The outcomes from the dispatch events were complemented by ongoing market research in order to facilitate the provision of non-network solutions to system planners where network constraints are identified, and to feed into ongoing asset strategy development regarding the application of energy storage in a network context.
Trialling a New Residential Solar PV and Battery Model	<b>Ergon Energy, Sunverge, SunPower</b>	2015	The Trialling a New Residential Solar PV and Battery Model project involves Queensland energy provider Ergon Retail undertaking a pilot demonstration to test a commercial and operational model for providing grid-connected solar photovoltaic (PV) and battery storage systems to residential customers.  The demonstration will involve installing and testing 33 systems in Cannonvale, Toowoomba and Townsville.

PROJECT		DESCRIPTION	
Carnarvon Distributed Energy Resources (DER) trials	Horizon Power	2017	This project aims to resolve the technical, operational and transitional barriers to a high penetration DER business future. It also aims to leverage Horizon Power's experience and pioneering use of distributed energy storage to build capabilities in the management and optimisation of high penetration renewable energy generation in remote microgrids. Held over three years, the Distributed Energy Resource (DER) trials will test distributed energy systems through a variety of behind-the-meter energy systems tests, with the aim of better understanding how to manage the variability of renewable energy and its impact on the network, and ultimately increasing PV system penetration throughout our remote networks.
Battery Storage System Performance Standard	DNV-GL	2018	The Battery Storage System Performance Standard project aims to produce a proposed Australian Battery Energy Storage System (BESS) Performance Standard (ABPS) for batteries connected to residential or small-scale commercial solar photovoltaic (PV) systems. The intention is for this proposed ABPS to be submitted to the Standards Australia standard creation process. A Guideline based on the proposed ABPS will also be produced for use by industry stakeholders prior to a final ABPS being agreed and finalised via Standards Australia.
Simply Energy VPP	Simply Energy, GreenSync, SAPN, AEMO, Tesla, Flextronics	2018	The Simply Energy Virtual Power Plant (VPP) project will deliver up to 1200 Tesla Powerwall 2 batteries to Adelaide households. This represents 6 MW of residential energy storage, while a further 2 MW of demand response capacity will be deployed across 10 commercial businesses.
Solar Analytics: Monitoring for Better Energy Outcomes	Solar Analytics Pty Ltd, APVI	2016	The project aims to accelerate deployment of an Australian-developed technology designed to monitor the performance of residential solar PV systems and provide low cost analytics and fault diagnostics. The technology compares energy generation against performance expectations, reporting system data back to the residential user, while also identifying faults and providing corrective actions.
Decentralised Energy Exchange (deX)	GreenSync, United Energy, ANU, Mojo Power, ACT Environmental Planning Directorate, Victorian DELWP, ActewAGL	2017	Decentralised Energy Exchange (deX) is a prototype online marketplace that will provide a way for households and businesses with rooftop solar and battery storage systems to be paid for allowing electricity network businesses to access their rooftop solar and stored electricity to strengthen the grid.
Building the world's first consumer owned solar retail and services company	DC Power Co	2018	DC Power Co. is a disruptive business planning to launch the world's first solar focused, customer owned energy retailer and services company. Taking account of the 1.8m+ Australian homes with rooftop solar that are ripe for disruption in the current energy retail market, the DC Power Co. model proposes to deliver: <ul style="list-style-type: none"> <li>&gt; A disruptive electricity retail solution focused on solar prosumers</li> <li>&gt; Customer engagement through ownership</li> <li>&gt; Enhanced savings by divorcing profits from consumption</li> </ul>

Further information is available at  
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