

Interim update - Project Symphony social research insights

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Introduction

This social (customer) research interim update shares selected initial insights emerging from social research underway for the Project Symphony pilot. This update is the first social research reporting output (of in-process research) to the broader Project Symphony team and is intended to support Synergy's reporting to ARENA (for Milestone Two). This update relates research aims and questions guiding social research for the pilot; lists people involved in the social research; notes completed, current and forthcoming activities; provides some policy context; relates emerging insights from literature reviews undertaken in response to research question one (RQ1); notes implications of recruitment procedures; and provides some takeaway points to conclude.

A project description prepared for the ethics approval stage of this research is attached. It provides substantial supporting details about the social research scope, team roles, background information (including literature), methods, data management and participant processes.

Social research aims, approach and guiding questions

The social research primarily aims to identify customers' responses to Project Symphony pilot activity and the implications of these responses for the further deployment of Project Symphony tested virtual power plant (VPP) technologies, systems and processes. Insights from this social research contribute to Work Package 3.3 (examining the customer journey of Project Symphony). This social research uses a 'before and after' activity assessment approach. Data captured before substantive involvement with the pilot assists us to assess customer responses after involvement with critical activities of the pilot. The social research is guided by four research questions, which are listed in the table directly below.

RQ	Purpose of the question	Research Question (RQ) to be answered
1	To understand customer research findings from other VPP pilots	Regarding Australian VPP pilots, what are the key insights Synergy, Australian industry, government and academia have identified about customer responses to relevant new energy technologies? What knowledge gaps remain?
2a	To understand customer sentiment (including perceptions and values) and customer responses to Project Symphony.	How do small use residential and commercial customers, in different socio-economic situations and locations, view, value and respond to the Project Symphony pilot technologies, systems, product offerings and pricing?
2b	Investigating further detail of an element of 2a, 2b is to understand implications of pricing and incentives used in Project Symphony, to inform design of pricing and incentives for optimal deployment and use of VPPs in the South West Interconnected System (SWIS).	How did incentive types and incentive-related factors, particularly pricing and pricing communications, affect customer acceptance, use and engagement of Project Symphony DER technologies and systems? Did customers perceive prices / incentives as fair? What factors affected these perceptions? What does this understanding tell us about wider deployment of the VPP technologies, systems and processes tested in Project Symphony?
3	To better understand the social equity implications of Project Symphony activity, particularly relating to mass market deployment and adoption.	What are the social equity implications for residential and small use commercial customers of Project Symphony VPP technologies, systems and pricing? How can understanding of these social equity

		implications inform larger scale roll-out of VPP's and DER aggregation?
4	To understand government policy implications that emerge during the social / customer research to inform energy policy settings, market design and regulatory reform that will enable optimal deployment and use of VPPs.	What aspects of policy do the findings from the above three RQs indicate need to be considered? What new or amended policies, market rules or regulations may be required, at what level and in which organisations, to address the findings and support successful and wider implementation of the VPP technologies, systems and processes tested in Project Symphony?

Critical activities from a customer perspective include: establishing their interest and having Synergy assess whether they can be involved; signing on processes and paperwork; visits from installers to their premises; installation of a 'gateway' device (that provides a communication/decision making node between appliances or assets at customers premises, the pilot platform and the electricity grid); connection of some existing assets, or installation of some assets at customer premises (to support demand management/curtailment processes and energy sharing during the pilot); access to energy use feedback information; communications with Synergy on behalf of the pilot; experiences of demand management/curtailment, and energy trading events that use customer assets during the pilot; incentive payments; and possible shifts in energy bills related to pilot activity.

The social science research team

UTAS is conducting this social research with Synergy as the customer facing electricity retailer of the pilot, and with contributions from ANU. Synergy's key social research collaborator is Dion Parera and other Synergy staff provide important contributions as needed. The UTAS research team is Dr Phillipa Watson, Dr Ben Parr, Mr Cameron Atkinson, Professor Martin Grimmer, Dr Louise Grimmer, and Professor Heather Lovell. Dr Hedda Ransan-Cooper, from ANU, will provide input beginning later in 2022. Each academic contributes in various capacities aligned with their expertise. Further social research team detail is provided in the Project Description (attached).

Social research activities completed, current and future

Up to 28th March 2022 the social research team have completed contract agreements; undertaken social research planning; submitted the ethics application and received ethics approval; developed and checked the pre-installation survey (now online ready for use); and drafted and refined the post-install survey. Social research ethics documentation included:

- A detailed project description relating scope, team involvement, background reasoning, research approaches, all research activities, recruitment processes; data management and customer participant protections (this document is attached to this update).
- Participant information sheets and consent forms for all potential surveys and interviews.
- Draft questions for all potential surveys and interviews.
- Support text for anticipated communications with participants.

Pre-installation survey activity included iterative drafts, checks, transferring the draft to an online platform, further survey performance checks and developing all supporting communications.

Key current activities of the team are:

- Reviewing pre-install interview processes and questions (near complete).
- Reviewing business related survey/interview questions (near complete).
- Progressing reviews of other projects and literature.

Forthcoming social research activities include:

- Finalising pre-install interview processes and questions, and business-related survey/interview questions.
- Final checks of post-install survey performance online, related communications and procedures.
- Conducting surveys and reviewing responses.
- Booking in and conducting pre-installation interviews.
- Beginning analysis processes.
- Attendance at quarterly Symphony information forum.

Social research team meetings (UTAS-Synergy and UTAS internal) are regular and ongoing and weave through all other activities. UTAS also attend Synergy's sprint (planning) review meetings as required.

Policy context

This research will ultimately explore policy implications of findings, through RQ4. Policy context therefore provides important background in this research, and we present a brief overview of some important policy contexts here.

Western Australia's (WA) energy sector is strongly orientated towards fossil fuels. According to 2020 figures, fossil fuels produced roughly 80% of WA's electricity (oil 5%, coal-fired 18%, gas 57%), and 97% of its total energy (coal 10%, oil 30%, gas 57%). Only the NT is less reliant on renewables for electricity and energy. To boost its renewable energy credentials and keep pace amid the global push to decarbonise energy systems, the WA government is supporting renewable hydrogen expansion and has committed to the Energy Transformation Strategy. The first stage of the Strategy was led by the Energy Transformation Taskforce over the period May 2019 to May 2021. In April 2020, the Taskforce produced a Distributed Energy Resources (DER) Roadmap. The DER Roadmap is an Australian first, a five-year plan that outlines the actions that WA 'must take' over the next five years in order to harness the potential for cleaner, more affordable energy.

Project Symphony is a key DER Roadmap action (and key deliverable of the State Government's DER Roadmap and Energy Transformation Strategy) and involves a consortium of industry, government and research organisations piloting a large-scale distributed energy resource on an arm of the suburban electricity supply network, the Southwest Interconnected System (SWIS).

Customer participation is critical to the success of the pilot. UTAS, ANU and Synergy social and customer researchers have been mobilised to research and prepare insights of the customer experience throughout the pilot. The Project Symphony pilot is planned to run until mid-2023.

Preliminary insights for RQ 1 – review of existing literature

Here we report insights emerging from literature and document reviews conducted for RQ1. The stated aim of RQ1 is "To understand customer research findings from other VPP pilots". Two key operational research questions flow from this aim, as stated in the agreement: "Regarding Australian VPP pilots,

- What are the key insights Synergy, Australian industry, government and academia have identified about customer responses to relevant new energy technologies?
- What knowledge gaps remain?"

To formulate answers to these questions, UTAS social researchers have undertaken a structured review of scholarly literature (which is peer-reviewed and often by academics) and a review of other relevant documentation (which is often not peer reviewed and can be by industry, government, and civil society, among others) that is about social research for VPPs. This section presents emerging insights from the literature review, beginning with a brief description of methods.

Literature review methods

Scholarly articles were sourced using key words in three relevant international databases. Search terms were listed in groups and then searched in combination. Group 1 terms were prosumer* OR consumer* OR customer* OR owner*; group 2 terms were ("Virtual Power Plant" OR VPP OR "distributed energy") AND (renewable*); and group 3 terms were social OR behavior OR practices OR acceptance OR trust OR communit*. Other relevant documentation can be harder to find in a structured way and has therefore been sourced using working knowledge of academics familiar with this research area and via requests of others working in the field. Non-scholarly documentation of particular interest for this research are reports from applied projects where multiple stakeholders, including industry organisations, may be involved. A further, final more structured search may be undertaken for reports from applied industry projects if suitable relevant databases can be identified.

All relevant documents and articles found that included social research in VPP or DER projects were included for thematic analysis. A total of 191 scholarly articles were identified as relevant. Scholarly data base lists of articles were migrated into a program called 'Covidence' which allows management of structured reviews. Screening of abstracts showed that only 44 articles had any relevant social research and/or social theory. Upon detailed examination of these only 26 articles contained directly relevant content for the purposes of RQ1 and this research. In relation to other relevant documentation, there was total of 7 industry reports relevant from 45 documents reviewed. Detailed examination of all documents is underway, and they are being reviewed for key content and key themes. Multiple categories and themes are relevant for this review. Emerging insights follow about a selection of key categories.

Academic/scholarly literature review

This sub-section relates emergent themes from the 26 academic/scholarly articles identified as directly relevant after a structured search. Here we relate *geographic locations*, *evidence types* (trials, programmes, and surveys/interviews) and *elements of demand response* (eg consumer motivations, barriers and enablers) reported, in sequence.

Please read insights below keeping in mind that initial searches found only 191 articles mentioning relevant terms together; abstract checks then showed only 44 of these as broadly relevant; and, more particular checks showed only 26 articles included social research or theory related to VPPs or distributed energy

resources (DER) in any real depth. Therefore, we found only a small group of in-depth social research articles focusing on DER and VPPs. Articles excluded from the original 191 articles were commonly modelling and simulation papers looking only at technical aspects of VPP and DER systems, but briefly mentioning prosumers and consumers. (Technical articles on modelling and simulating technical aspects of systems that included real life energy use data were kept as part of the 44 broadly relevant articles.)

The overwhelming majority of the studies were conducted in Europe, for example, Soland (2016) studied consumers in the Swiss energy system, Binod Prasad Koirala (2016) studied Integrated Community Energy Systems in the Netherlands, Kalkbrenner (2017) energy “prosumers” in Germany, Kock (2018) community energy projects in Zurich, Halstrup (2018) attitudes towards Energy Storage Solutions in German manufacturing, (Joensuu et al 2019) superblock ICESs in Finland, Seidl (2019) DES social acceptance in Switzerland, Germany and Austria, Orberst (2019) on energy prosumers across Germany, Ableitner (2020) investigated household behaviour in Swiss peer-to-peer energy markets, and Dong (2020) investigated energy storage options in the UK. One publication, Nakano (2020), focused on Demand Side Management behavioural change in Japan, Lenhart (2020) studied localised electric cooperatives in the US, and Gui (2018) presented research findings on ‘clean energy communities’ in Australia.

Consumer surveys and interviews were a popular method of data collection. For example, Morgan et al (2021) analysed survey data from 195 online participants, Nakano et al (2020) conducted a questionnaire-based survey of 10,000 households, Li et al (2020) analysed data from 409 households, Orberst et al (2019) drew findings from a nationwide online survey among homeowners in Germany, Seidl et al (2019) based their findings on a survey of 2104 participants, Halstrup (2018) sampled 101 German manufacturing companies, and Koch (2018) generated conclusions based on semi-structured telephone interviews. Some used mixed methods, for instance, Ableitner et al (2020) collected data from energy system logs, combined with consumer surveys and interviews.

Most of the scholarly work aimed to better understand the forces that constrain and enable DER expansion, with the bulk offering suggested actions to accelerate rollout. Some authors identified structural “background” forces as barriers to uptake. For example, Wainstein (2016) suggested that a central constraint comes from entrenched shared government-business interests that seek to protect centralised high emissions energy providers. Similarly, Lenhart (2020) found that DER is a threat to status quo political and industry power relations and shared interests. Quite a few researchers identify values and culture as a determining factor. For instance, Morgan (2021) implies that individuals are more likely to participate in energy sharing when the effects of participation align with individuals’ values. Most scholars however tend to identify a singular or multitude of proximate “foreground” constraining and enabling factors. For example, based on consumer concerns about transparency, privacy and trust, Soland (2016) identified a need to develop enhanced social acceptance of the transition from centralised to decentralised energy systems. For Wainstein (2016) financially innovative business models that limit customer costs can overcome political constraints. Similarly, Kalkbrenner (2017) focuses on consumer experiences of tariffs and suggests business-focused solutions. Koch (2018) identifies consumer finances, knowledge and interest as barriers. Wolsink (2019) raises concern about the lack of social acceptance across all elements of DER integration; followed in 2020, by calling for enhanced social licence for the transition itself from centralised to decentralised systems. Joensuu 2019 identify a range of enabling forces under economic and environmental imperatives, while the key barriers to DER expansion are legislative and policy-related. Interestingly, Moroni (2019) seems to suggest that more effort put in to defining key terms in this new area of energy, and applying them consistently, will help improve government policy development and implementation. By contrast, Orberst 2019 finds that there is no need for government intervention of any sort. Gui (2018), Seidl (2019), and Dong (2020) suggest that DER expansion will be complex and varied, and identify a variety of government (ie policy, bureaucratic, legislative, and political), financial, technological, and cultural processes

interacting at different levels (local national and international) as potential constraining and enabling factors.

Other documentation/literature review (Australian-based)

Reports and other documents/literature that investigates consumer attitudes and other social aspects of VPPs and DER in Australia is sparse. This is unsurprising given the innovative nature of VPP technology. Here we relate findings from relevant literature in relation to geographical location, evidence types (method), and results and are insights are sequenced according to years of publication.

In March 2019, RMIT (with Monash University) published an interim report of stage one (of three) “household research” findings. Titled Engaging Households Towards the Future Grid, it reported conducting in-depth and at-home interviews (lasting 1-2 hours) and short questionnaires with 51 Australian households in five National Energy Market (NEM) states and territories (VIC, SA, NSW, ACT and QLD).¹ The study captured customers’ present experiences and expectations of future experiences, with emphasis on the latter. This report, and its subsequent final report², is different to the present research because of its east-coast and NEM focus (excluding WA), concerns relating broadly to energy technology such as EVs (not VPP specific), and anticipatory nature of questioning (not ‘real-time’ findings).

Several major consumer studies were published in 2020. In May 2020 the Australian-based not-for-profit, RENEW, published a report titled Enabling Distributed Energy in Electricity Networks. Unlike reports of 2019, RENEW’s report had a narrower focus on consumer experiences of distributed energy resources (DER). This report described ‘multiple rounds of industry and consumer sector consultation’ related to technical and consumer issues. Data collection and analysis was by a consultancy, Energeia.³ Energeia’s research was limited to ‘desktop research’ of scholarly and grey literature, and industry stakeholder workshops. Consumers were not directly engaged, and Energeia framed consumers as being engaged via ‘consumer advocates’ from industry. This study is significantly different from this present research in terms of location (NEM focused), method (no direct consumer engagement), and results (anticipatory study).

In July 2020, ARENA published two reports under the title, DER Customer Insights.⁴ The reports investigated experiences of customers involved in twenty ARENA-funded DER projects in Australia, including three WA projects.⁵ The studies used a variety of engagement methods including community workshops, surveys and home visits, in pre and post installation phases. However, ‘customer insights were drawn and analysed from almost one-hundred reports from twenty projects’, suggesting that this ARENA work generated insights using secondary, not primary data (ie direct engagement with the customer). Additionally, these reports cover projects Australia-wide, necessarily leading to generalities being made that cover important local contexts that are commonly understood to influence outcomes. Findings appear to focus on

¹ Engaging households towards the Future Grid: Interim Report Experiences, expectations and emerging trends, RMIT with Monash, Interim Report, March 2019.

² Engaging households towards the future grid: an engagement strategy for the energy sector, Final Report, Monash University with RMIT, July 2019

³ Distributed Energy Resources Enablement Project – Discussion and Options Paper, Report, Energeia prepared for RENEW, May 2020.

⁴ Der customer insights: the customer journey, ARENA, July 2020; Der customer insights: values & motivations, ARENA, July 2020.

⁵ Solar and Storage Trial at Alkimos Beach; Carnarvon Distributed Energy Resources (DER) trials; Increasing the Uptake of Solar PV in Strata Residential Developments (Perth)

recommendations for future improvements. The ARENA reports, however, do involve consumer interactions (albeit mediated by 100 reports) and cover DER projects in WA, including two in Perth.

Also in July 2020, Horizon Power, a regional energy provider in WA, published a report on their Carnarvon DER trials.⁶ This project collected data from 82 residents and businesses with solar photo voltaic (PV) systems. Customers participating in the trial had various technical products installed (eg Solar Analytics / Wattwatchers) to accompany their existing solar infrastructure, in order to monitor and collect data on energy consumption. Data collection was only of technical aspects and aside from some broad observations of customer responses, no other social research appeared to be undertaken.

Between 2020 and 2021, as part of the AEMO VPP Demonstrations project, a variety of findings related to the Demonstrations were published in a series of publications/reports.⁷ In July 2019 Customer Service Benchmarking Australia (CSBA) conducted a customer experience research program. CSBA published two reports: a Virtual Power Plant Consumer Insights Interim Report in February 2021, and a Virtual Power Plant Demonstrations Consumer Insights (Final) Report in September 2021.⁸ The research captured pre-and-post instalment consumer attitudes, with different methods capturing consumer attitudes at during different phases of the demonstrations. Pre-instalment methods involved an online survey with 75% of participating consumers (the interim report states that 470 digital surveys were received). This survey was followed with in-person (online) interviews with 50 consumers lasting up to 1 hour. Post-instalment there was another survey that compared the full range of data collected by CSBA with AEMO's internal (technical) data. The Interim Report primarily reports on participating consumers living in South Australia and reports that 23 interviews are included. The final report includes findings of the pre-instalment (baseline) survey of 993 consumers, a longitudinal qualitative study with 50 consumers, and a post-Demonstration survey of 1451 consumers. This is a significant study that draws many parallels with the present study (ie, a large multi-year qualitative study using surveys and interviews to glean consumer insights into VPP Demonstrations). However, there are several key differences. First, the AEMO VPP Demonstrations and the CSBA study are limited to states and territories connected to the NEM (our study investigates WA). Second, the thrust of the CSBA report is skewed towards delivering anticipatory conclusions. Indeed, the opening sentence of the CSBA final report states: 'This report details the experience of consumers within the Australian Energy Market Operator (AEMO) Virtual Power Plant (VPP) Demonstration, exploring how best to improve it in the future and how consumers feel about letting VPP operators utilise their assets [emphasis added].'⁹ Our study mainly focuses on 'real-time' impressions and responses.

Since 2020, Monash University has been publishing periodic reports as part of a *Digital Energy Futures* (DEF) series.¹⁰ A July 2021 publication summarises research findings from the second stage of the DEF series, based on qualitative research with 72 households who are customers of Ausgrid and AusNet Services distribution networks in NSW and Vic. A December 2021 publication reports ethnographic research with the

⁶ Lessons Learnt Report #1 – Infrastructure Deployment and Consumer Onboarding, Horizon Power: Carnarvon Distributed Energy Resources (DER) Trials, July 2020. This project was funded by ARENA.

⁷ AEMO Virtual Power Plant Demonstrations: Knowledge Sharing Report #1, AEMO, March 2020

AEMO Virtual Power Plant Demonstrations: Knowledge Sharing Report #2, AEMO, July 2020

AEMO Virtual Power Plant Demonstrations: Knowledge Sharing Report #3, AEMO, February 2021

AEMO Virtual Power Plant Demonstrations: Knowledge Sharing Report #4, AEMO, September 2021

⁸ Virtual Power Plant Consumer Insights Interim Report, CSBA, February 2021; Virtual Power Plant Demonstrations Consumer Insights (Final) Report, CSBA for AEMO, September 2021

⁹ Virtual Power Plant Demonstrations Consumer Insights (Final) Report, CSBA for AEMO, September 2021, p 2.

¹⁰ See <https://www.monash.edu/emerging-tech-research-lab/research/research-programmes/energy-futures/digital-energy-futures>

same 72 households in NSW and Vic focusing on everyday lives of people and their visions for the future across seven practice domains where most energy consumption (and peak demand) occurs or is expected to change soon. The location, scale and thoroughness of the data set are significantly different from the present study.

In June 2021, The Energy Charter – a national CEO-led collaboration that supports a more customer focused energy sector – published a report titled, *Customer Voice at Board Level*.¹¹ The report was developed as a collaboration between Energy Charter signatories, customer representatives and advocates and the Australian Institute of Company Directors; and led by board members and senior representatives from Powerlink Queensland, CleanCo, Stanwell and Horizon Power. This report proposes how Boards can engage with customers. For example, it presents a “Better Practice Customer Engagement Toolkit”, but it doesn’t present any findings from customer engagement itself. However, it does point to several ‘direct customer engagement’ projects undertaken by signatories to the Charter and workshops previously held with energy advocates to capture their insights. In a follow-up report, The Energy Charter presents the findings from Energy Consumers Australia (ECA) that undertakes periodic online surveys of energy consumers’ sentiments and behaviour. ECA undertakes regularly consumer polling and analysis on energy topics and publishes results from regular surveys throughout the year. These surveys are about broader issues than just DER and VPP but do consider future grid implications in their questions.¹²

Project Symphony's *Lessons Learnt Report (Milestone 01)* provides a high-level overview of the lessons learnt during the scoping and planning phases of the pilot. Given the infancy of DER application globally, and the pathbreaking nature of this pilot, these lessons are helpful both from technical and social (including customer receptiveness) perspectives. Overarching lessons learnt relating to customer research included:

- Understanding characteristics of customers, at relative scale, is important early on.
- Benefit-driven communication with customers ensures engagement and a reduction in customer management time needed.
- Selecting locations on network characteristics alone may not be enough, population and tenure characteristics are important.
- Enhanced collaboration and coordination between organisations will assist in the early stages.
- There is an absence of ‘off the shelf solutions’ and this may stretch out preparations and project timelines.
- DER participation data is not available and/or accurate and recruitment plans need to identify type, location and concentration of DER assets, supported by DER assets registration.

Observations on recruitment as it relates to customer inclusion and exclusion

Customer inclusion and exclusions processes are being considered as part of RQ3 which seeks to understand social equity implications of Project Symphony activity. Social researchers have identified project set up, location and scope decisions that may also affect the selection of customers for involvement in future scaled projects.

1. **Location based, technical inclusions/exclusions** - Via a series of technically focused decisions Project Symphony partners reduced the preferred locations where customers can be recruited from (this decision was made before the main rounds of recruitment began). Previously there was a wider area where customers (mainly householders) could be recruited from. The wider area was the Southern River

¹¹ Customer Voice @ Board Level Resource for Company Directors, *The Energy Charter*, June 2021,

¹² Energy Consumers Australia. See www.energyconsumersaustralia.com.au

suburbs of Harrisdale and Piara Waters. It is likely that future VPPS will also have technically driven requirements, and these may also lead to only having certain areas, or streets involve in scaled VPPs.

2. **The 'health' of meter boards and electrical wiring may guide inclusion/exclusion** – There is a preference for good quality meter boards, advanced meters and healthy electrical wiring in participating customer homes. This is likely for both safety and timing reasons (it would take much longer to upgrade a meter board). Poor quality electrical issues are likely to exclude customers from involvement in this pilot and are also likely to be a problem for scaled programs.
3. **Lack of assets may lead to lack of involvement** - The areas originally noted for this pilot were selected because they have a high proportion of households with solar panels. Almost half of all homes in the areas originally chosen have solar systems installed, and these areas also include high proportions of average-to-upper median income households. Solar panels tend to be more prevalent where there are higher incomes and households/customers with existing solar are understood to be preferred participants for this pilot. Poorer suburbs with families without the financial means to install rooftop solar are likely not included in this pilot rollout. Additionally, this pilot aims to connect approximately 900 DER assets across 500 homes and businesses. Only some assets will be offered to be installed. This means that households with assets/appliances, and multiple assets/appliances, are likely to be more attractive than those who have no assets/appliances. Additionally, if a battery is being installed it needs to be placed in a shaded area and it is more likely that affluent customers will have outdoor shaded areas, or sheds and garages, where batteries can be installed. Therefore, the pilot will give preference to people who have previously been able to afford assets, including solar PVs, external shading and sheds.
4. **Language exclusion** - All surveys are in English and all researchers speak English as their first language. English may be a second language for households in the selected location for the pilot. Contracts are relatively detailed and are also in reasonably sophisticated English. It is unlikely that households where literacy is low or where English is second language will be able to be easily involved in this pilot. It is the expectation that high proportions of households who have difficulty with English will self-exclude from this pilot and its related processes.
5. **Preference for owned households** – As with most pilots of new technology behind the meter, in houses, it is much easier for owners to agree to take part than for renters to. Renters would have to communicate with landlords and perhaps also ask as for financial input from landlords. Previous studies of tenure and split incentive barriers suggest it is unlikely that many renters will take part in this pilot.

The exclusions noted above are mostly generated through technical requirements of the pilot and are not intentionally exclusive. However, it must be acknowledged that these requirements will have bearing on the distribution of the types of households involved, and that they consistently favour higher income households.

Take aways from insights

The Project Symphony pilot is responding to what will likely be significant changes in the WA energy system over the next two decades amid the global push to decarbonise energy systems and due to the WA government's moves to expand renewable energy projects.

The preliminary review of the global academic literature found that:

- The overwhelming majority of studies were conducted in Europe, with only one Australian-based study.

- Consumer surveys and interviews were a popular method of data collection for the small group of articles and reports found that had in-depth social research on DERs and VPPs.
- Most of the scholarly work aimed to better understand the forces that constrain and enable DER expansion, with the bulk offering suggested actions to accelerate rollout.

In summation: there is little deep social research on DER and VPPs and only a handful of relevant studies have been found. Knowledge gaps are significant and were expected given the technologies involved and the pilot's novelty.

The preliminary review of the Australian-based grey literature found that:

- The majority of studies were conducted in NEM states and territories, with only two in Perth.
- Consumer surveys and interviews were popular, but so to were mediated customer analysis (eg understanding customers through peak bodies or energy data harvesting). Large scale direct consumer engagement studies are rare.
- Most of this body of literature sought to offer insights about how to improve future DER programs, not provide 'real time' feedback.

In summation: the present Industry-led study is especially novel in the sense that it is a large-scale methodologically thorough study that engages directly with prosumers located in WA, and it provides real time feedback into the broader project (Project Symphony).

Key insights from recruitment found that:

- Technical (including locational) and procedural requirements of the pilot have created potential for substantial exclusions of low-income households and renters. It is therefore unlikely, for example, that the pilot will attract a diverse range of household incomes or tenure types.

Next update

The next update is planned to be at the end of September 2022. It is anticipated that there will be significant field data collected by then which we can report via the September update.