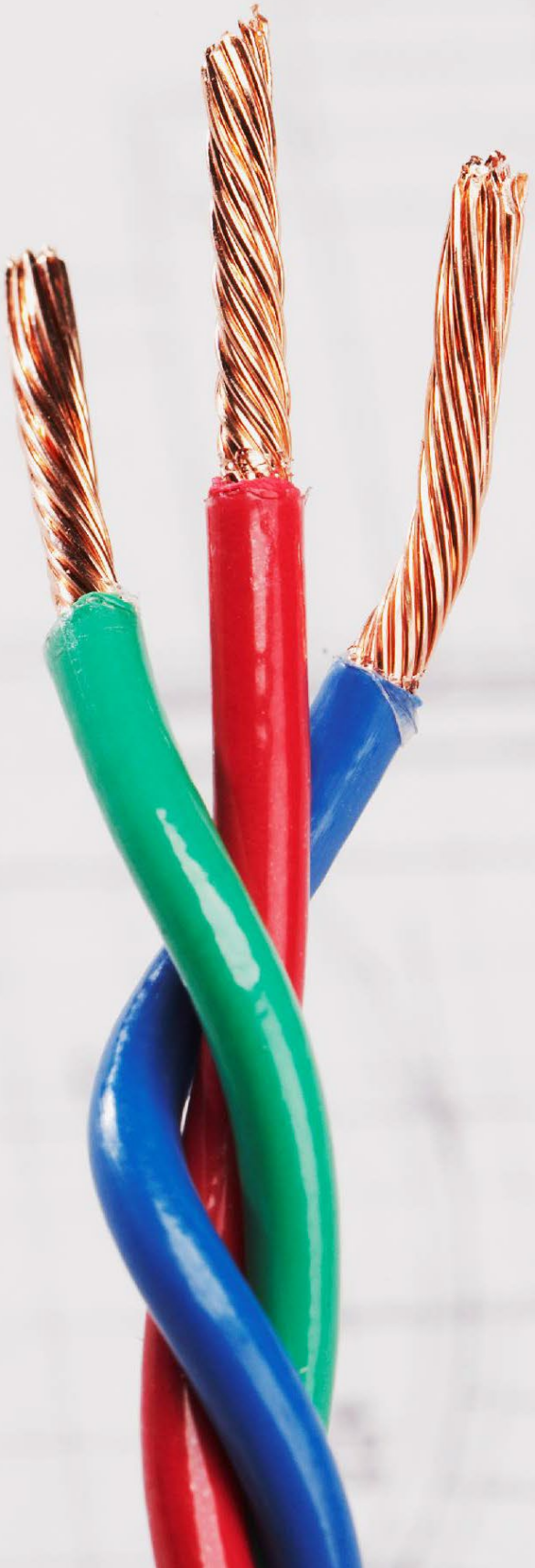
Sharing community batteries with customers



Report summary prepared for Ausgrid

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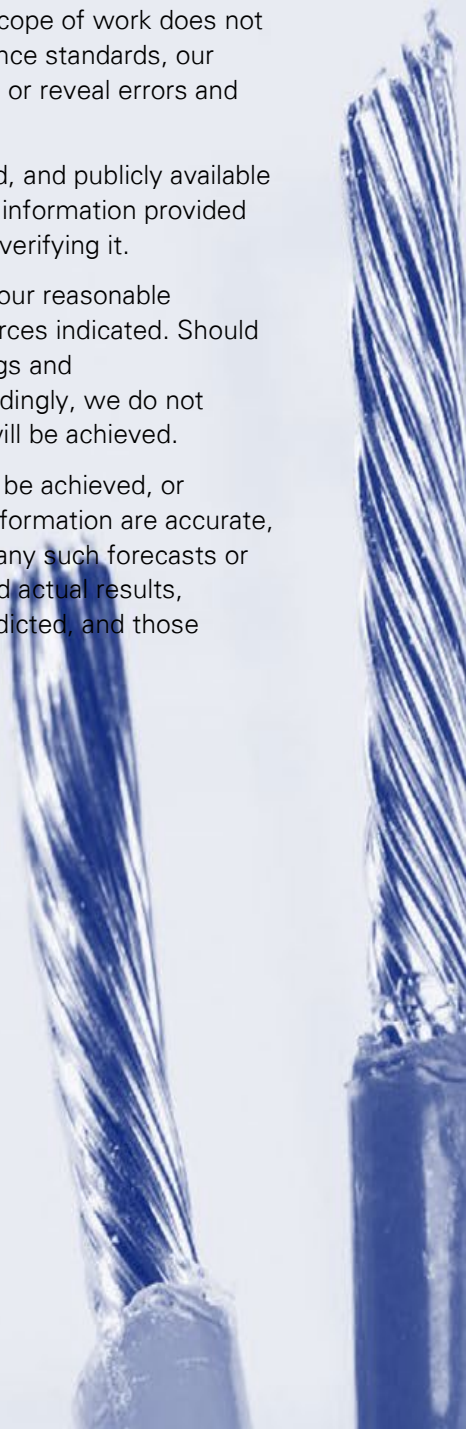


Contents

Glossary

Term	Description
AEMO	Australian Energy Market Operator
DER	Distributed energy resources
FiT	Feed-in tariff
PV	Photovoltaics
LUOS	Local Use of System
NEM	National Electricity Market
NMI	National Metering Identifier

1. Introduction

A 'community battery' refers to a concept of a shared resource through which customers are able to store excess solar photovoltaics (**PV**) energy which they can then access at a later time to offset their energy import. This is enabled by having a locally-based battery operating on a distribution network 'in front of the customers' meter' thereby avoiding the need for the customer to invest in their own battery systems. In parallel, the community battery can also be used to support network operations and, potentially, trade in wholesale markets. As demonstrated in *Ausgrid Community Battery Feasibility Report* prepared by KPMG in February 2020, community batteries can provide many benefits to customers, the network and the wider energy market.[1]

Ausgrid is currently collaborating with partners to trial community batteries paired with an innovative operating model as a competitive alternative to traditional network investment. A key feature to be trialled is a shared customer storage service that would enable customers to access capacity in the battery to store their excess solar PV generation for use at a later time. In embarking on this trial, Ausgrid identified a threshold issue in the design of any customer storage service: **how to identify the flows to and from the customer and the community battery in order to measure and settle the storage service used by the customer.**

Under the current arrangements in the national electricity market, end-use customers are billed by retailers for their energy consumption and for network charges. Customers may also receive feed-in-tariffs (**FiT**) from their retailer for energy exported from their connection point to the grid. There is no existing regulatory or commercial mechanism to recognise the flows from a customer to a community battery, or vice versa, and all flows are assumed to go via the retailer and settled in the wholesale market.

Ausgrid's current approach to overcoming the above settlement and measurement issue in a trial is to compensate participating customers for the retail tariff they would incur for local flows and adjust FiT received by participating customers. This approach is a workable solution as part of the trial to prove the concept and is possible in the short-term with funding allocated for trial purposes. However, the approach carries financial risk and is not viable as a business-as-usual solution for customers, network providers, retailers and the market as it impacts on capturing the full value from the community battery concept. Therefore, a need was identified to also trial alternative long-term solutions to support customer storage service.

[1] KPMG, Ausgrid Community Battery Feasibility Report, February 2020: https://www.ausgrid.com.au/-/media/Documents/Reports-and-Research/Battery/Ausgrid-Community-Battery-Feasibility-Study-Report-2020.pdf

2. Scope and approach

KPMG was engaged to articulate and assess the potential options to measuring and settling a community storage service between customers and a battery (and their retailer/battery operator), and to recommend an approach which could underpin a future community storage service. It is expected that Ausgrid will trial the recommended approach and its variations in collaboration with one or more retailers as part of their community battery trial that is already underway.

KPMG's report presents a recommended solution and summarises a suggested pathway forward to support testing and implementation of a customer storage service model. This includes an analysis of what elements to the solution (or combination of elements) could achieve the objectives of the project. We also identify areas of the existing regulatory arrangements that may need to change to implement the recommended option. This document is a summary of the detailed report prepared by KPMG and delivered to Ausgrid.

The metering and settlement arrangements for community batteries is only one of a number of areas crucial to supporting viable business models for community batteries. This work will inform future projects which may be initiated by Ausgrid that seek to address other priority areas such as customer protections and local use of system network tariffs.

To deliver the detailed report and this summary, we adopted the following methodology.

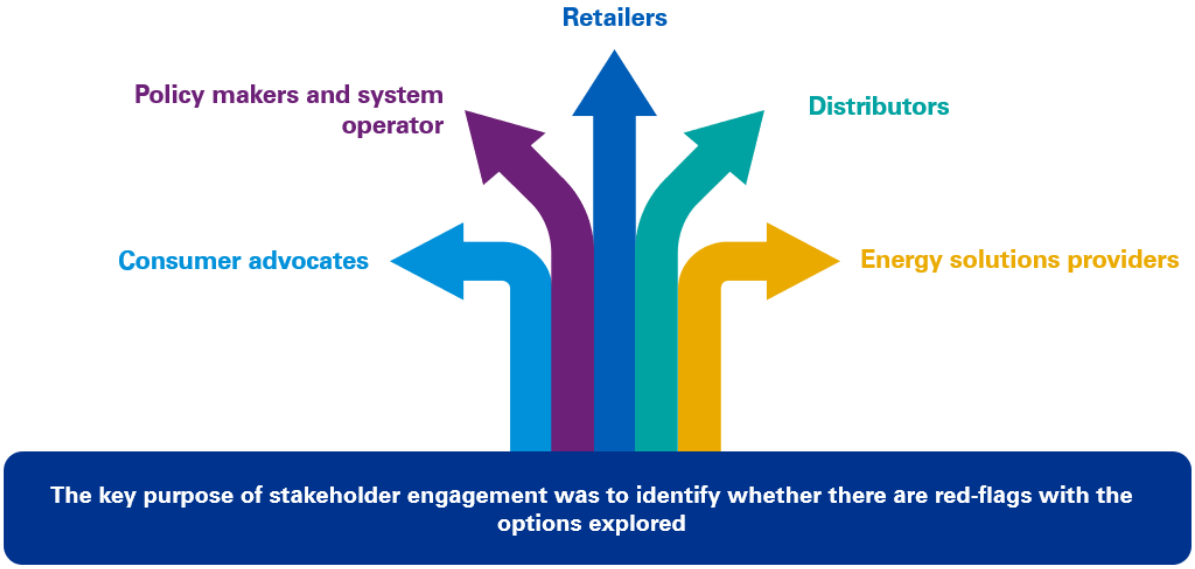
Table 1: Methodology to assess options and provide recommendations

Part of report	Stage	Description
A	**Assessment approach**	Two-staged assessment approach was developed in collaboration with Ausgrid. This options assessment involves considering the workability of the option and applying assessment criteria covering commercial implications, customer acceptance, technical integration and regulatory consistency.
B	**Identifying components to the solution**	The components to the various options and sub-options within each component were identified, including measurement and allocation of flows between the community battery and market, customer flows settlement and community battery settlement. Stakeholders were consulted throughout this process.
C	**Options specification**	A list of workable options for assessment was specified, and the relative advantages and disadvantages of these were tested with Ausgrid and stakeholders.
	Options assessment	Detailed assessment of options against the agreed criteria. Stakeholders and Ausgrid inputted into the assessment.
D	**Recommendations and reporting**	Identification of recommended pathway, including discussion of implementation considerations and timing.

3. Stakeholder engagement

As part of options specification and assessment, we engaged with stakeholders to understand the viability of the options explored and identify whether there are any substantial barriers or risks associated with these options. Figure 1 below shows stakeholder groups we have engaged with.

Figure 1: Stakeholders we engaged with as part of this project



Among others, the messages from stakeholders were:

- Any product for consumers should be simple and easy-to-understand.
- Stakeholders prefer a commercial (not physical) off-market solution (i.e., outside the existing Australian Energy Market Operator (**AEMO**) systems) to identifying and settling customers flows to and from the battery.
- Dynamic rule book allocation would be an appropriate approach to distinguish between customer imports from the wholesale market and imports from the community battery.
- Local network tariffs will be an important part of the solution.
- Battery operation should not be overly tied to customer behaviour through their imports and solar exports. There should be flexibility for the battery operation to capture value from the wholesale and ancillary markets.

4. Recommended option

Based on KPMG analysis and stakeholder views, the optimum model identified involves:

- **Off-market solution.** The overwhelming commentary from stakeholders was that attempting any centralised market solution to integrate a community battery storage service into the wholesale energy market would be prohibitively costly given the initial scale. At the same time, it may limit the battery's ability to maximise its returns through requiring the battery operation (i.e., charging and discharging) to mirror customer behaviour.

  An off-market approach based on a commercial (unregulated) service would require an incentive for retailers to participate but would need less funds and time to be implemented. This approach would provide the community battery operator with flexibility to maximise revenues across different use cases and to test different solution variations. Stakeholders strongly supported an off-market approach.

  Stakeholders also supported the possibility of local markets settlement where distributed energy resources (**DER**) related transactions are settled in a local context instead of the current regional markets in the National Electricity Market (**NEM**). This option would provide additional flexibility for local flows and new business models in addition to community battery settlement while avoiding disproportionate regulatory and operation visibility of transactions within a community.

  At this stage, any localised market solution may be considered a long-term solution. We consider that trialling off-market approaches could become a steppingstone towards a transition to local markets and peer-to-peer trading. Different concepts and off-market variations should be trialled to inform and test the potential development of local markets.

- **Dynamic flows allocation.** While two-meter options were considered, we found that relying on existing metering installation, effectively having one meter at customer premises, is a simple and most cost-efficient approach for the customer storage service. Therefore, the question is how to allocate customer net consumption profile over a day between the battery and market (i.e., retailer).

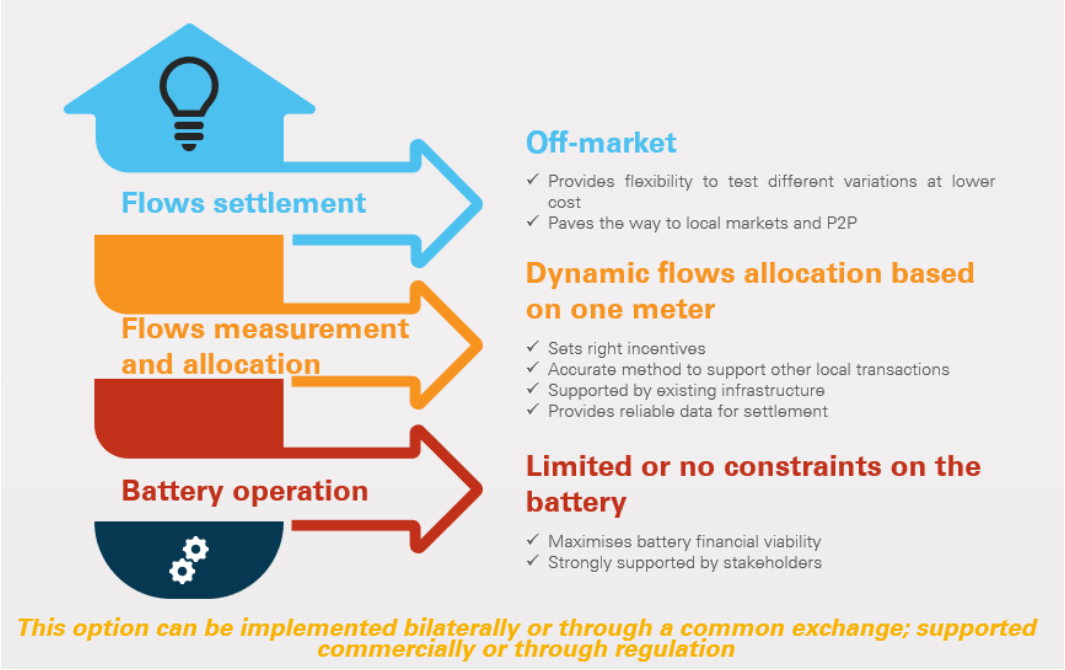
  As part of our assessment, we considered two options for segmenting out customer to battery flows for settlement purposes: deemed load profiles or dynamic flows allocation.

  The dynamic flows allocation is the recommended approach as it sets the right incentives and provides an accurate solution to support all local transactions. Under this approach a set of pre-defined rules are applied to determine how the customer uses the battery over the period. A deemed load profile is inherently an inaccurate substitute for measuring energy flows and it also fails to incentivise consumers to appropriately manage demand and respond to tariff price signals. In addition, it adds complexity as it requires a reconciliation process.

- **Limited constraints on the battery operation.** Close coupling of a battery's physical charging and discharging behaviour with customer behaviour would materially undermine the commercial viability of the community battery given current battery costs. This is because such coupling would constrain the battery's ability to participate in wholesale and ancillary services markets and would materially impede the battery from maximising its market and ancillary services revenues. Therefore, we recommend the model imposes limited or no constraints on the battery's physical operation. While some constraints may be needed for operational purpose, we consider that it is possible for these to be aligned with the commercial and conceptual role of the community battery.

The battery operator should have flexibility on how to best satisfy the imposed constraints.

Figure 2: Components to the prefered model



5. Variations on off-market option

An off-market approach requires that retailers are willing to agree to use the rule book approach for dynamic flow allocations. It is not essential for every retailer to voluntarily enter into such an agreement and there would still be retail choice for participating customers if a small number of retailers take part in the approach.

There are many ways to frame and implement such agreements. They differ by the degree of sophistication in the supporting systems and the approach to agreeing the distribution and sharing of benefits from the community battery. In our report, we put forward four off-market variations that could be tested as part of the trials (separately or in combination):

- **FiT holidays for retailers:** Participating retailers would get a benefit of not having to pay the FiT to participating customers for exports to the community battery; and in return, retailers would agree not to charge customers the retail tariff for the deemed allocation of flows from the battery back to customers.
- **Network tariff adjustment:** The network tariff adjustment (or subsidy) would be applied to the identified local flows. Retailers' exposure at the wholesale market would not change – they would continue to manage price risk and customers settlement, but they would have lower network tariffs. A proportion of the savings in network tariffs could be retained by the retailer to compensate any impacts under the concept.
- **Battery operator hedging product:** The battery operator would offer retailers a new product which neutralises any retailer settlement exposure for local flows under the existing AEMO settlement rules. Under this neutralising approach, the outcomes for participating retailers are the same as under the on-market solutions.
- **Commercial trading product:** A more sophisticated and less decentralised approach would be through establishing a local settlement system between participating parties. Under this variation, a set of tradable rights to the customer flows (and access to the battery) would be established and legally enforceable between participating retailers and the community battery operator.

These four options are not mutually exclusive and a combination of them could be deployed. At this stage of development of the concept, we don't consider the hedging product and trading product options to be viable given the limited scale of batteries plus the risk that these products could over-complicate the application of the dynamic flow allocation. Testing the FiT holiday and network tariff adjustment approaches would be more immediately practicable. However, any approach to fostering retailers' participation in the scheme needs to consider:

- how willing retailers are to participate in the scheme,
- how network tariff adjustment or FiT holidays approach would impact on value for customers and the level of participation in the scheme, and
- the regulatory framework for Local Use of System (**LUOS**) charges.

6. Elements to be tested in the trial

Table 2 below summarises:

- all options considered in the full KPMG report delivered to Ausgrid and the recommended options (as described in section 4 of this paper), and
- elements of the recommended options that could be tested as part of the Ausgrid's community battery trial.

While we recommend certain elements to be explored as part of the trial, we acknowledge that the optimal solution will change and evolve over time. The solution will also depend on commercial discussions with retailers and further discussions with a broad set of stakeholders to fully understand the consumer impacts, future markets design and regulatory landscape.

Table 2: Recommended elements to be tested as part of the trial

Component	Options considered and recommended	Elements to test in the trial
Component one: Flows measurement and allocation	**Options considered:** *Measurement:* - One-meter option - Two-meter option *Flows allocation:* - Deemed load profile - Dynamic rule book allocation **Recommendation:** Dynamic rule book allocation approach based on one meter at customer premises	1. Explore how to enable two settlement points for participating customers and whether two National Metering Identifiers (**NMIs**) would be required to achieve this. 2. Test different allocation rules and explore how they can minimise risks for participating parties and maximise benefits for customers and network operation. Specifically, test different: - time periods for service settlement (i.e., 24-hour) and increments (i.e., 5 minutes); - storage service caps; - time periods when customers would have access to the community battery and alignment with peak tariff periods; and - treatment of customer positive balance at the end of the day. 3. Explore whether costumer local flows identified through the application of the dynamic rule book allocation approach should be exempt from export charges introduced by the recent rule change or subject to the reduced charges.
Component two: How to settle flows to and from	**Options considered:** - Centralised market option	4. Test different variation of off-market option with the view to facilitate the development of

community battery	- Off-market option - Local market option **Recommendation:** Off-market approach for the trial which will inform the development of the local markets or on-market solution in the long-term	local markets or on-market option in the long-term. 5. Test off-market option operations in terms of how allocation is achieved with different retailers involved (i.e., responsibilities, verification processes, risk management). 6. Test different value propositions to retailers starting with minimal value transfer from customers to retailers, such as under FiT holiday for retailers' variation.
Component three: Community battery operation	**Options considered:** - No constraints - One-to-one mapping of battery operation - Limited constraints **Recommendation:** Limited constraints, if required	7. Identify whether operational constraints are needed on the battery operation to implement the rule book. If yes, test different variations to provide the battery operator with flexibility on how best to achieve those constraints. 8. Explore the ways to align constraints with commercial and conceptual role of the community battery. 9. Explore opportunities for the community battery to operate as a 'solar sponge' and consider how this impacts on design of the rule book for the dynamic flow allocation.

7. Long-term implementation issues

While we consider that the trial of storage service may be structured in a manner which ensures it can proceed without the need for regulatory change, the enduring solution is likely to require a degree of regulatory change to enable and facilitate the service.

Key implementation levers to consider include:

1) network regulation and charges;
2) data access regime; and
3) retail regulation.

Further, we note that many stakeholders we engaged with supported the development of local markets. Our stakeholder engagement has also demonstrated that there is no industry maturity in respect to the local market design. We consider that the off-market approach trialled by Ausgrid could become a steppingstone towards a transition to local markets and peer-to-peer trading. Different concepts and off-market variations should be trialled to inform the development of local markets. For example:

- if implemented in the Rules, the rule book concept for dynamic allocation could facilitate local flows and transactions;
- commercial trading product developed under the trial could inform the development of the software systems and smart architecture required to enable the local flows and their accounting; and
- network tariff adjustment and FiT holidays for retailers may become important characteristics of the future local markets.

We note that other community battery models are emerging around Australia. We therefore recommend sharing the findings across the trials underway and explore with different retailers the potential options for introducing a scalable retail product for the shared customer storage service.

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