Regional and Remote Communities Reliability Fund Microgrid

MyTown Microgrid

Business Model Scan & Market and Regulatory Review Report

Report - June 2021

wattwatchers DIGITAL ENERGY

LATROBE VALLEY AUTHORITY

HEYFIELD COMMUNITY RESOURCE CENTRE

Federation University

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About the Project

MyTown Microgrid is an innovative, multi-year, multi-stakeholder project that aims to undertake a detailed data-led microgrid feasibility for the town of Heyfield (Victoria), built on a platform of deep community engagement and capacity building.

The project received funding under the Australian Government's Regional and Remote Communities Reliability Fund Microgrids stage 1 funding round and the.

Contents

Abbreviations

Abbreviation	Definition	Abbreviation	Definition
BM	Business Model	**NFP**	Not-for-Profit
DBOOM	Design, Build, Own, Operate, Maintain	**O&M**	Operation and Maintenance
DER	Decentralised Energy Resources	**PAYG**	Pay As You Go
DNSP	Distribution Network Service Provider	**P2P**	Peer-to-peer (energy trading)
EAAS	Energy as a Service	**PPA**	Purchase Power Agreement
EPC	Energy Performance Contract	**VPP**	Virtual Power Plant

1 Background

1.1 Project objective

The Heyfield MyTown Microgrid project aims to undertake a detailed data-led microgrid and energy solutions feasibility for the town of Heyfield (Victoria), built on a platform of deep community engagement and capacity building. Over the three-year duration, the project will also develop the knowledge and tools to make it faster, easier, and cheaper for other regional communities to understand microgrid and other energy solution propositions for their community. This project takes a novel approach to a community-based microgrid feasibility process by:

- Using multi-data source platforms to calculate demand, flexibility and supply.
- Undertaking deep community and stakeholder engagement.
- Co-designing community-centric business models with enshrined benefits and consumer protections.
- Wrapping technical, market, economic and regulatory analysis into fit-for-purpose decision support tools.

From the community's perspective, the deployment of microgrid and energy solutions seeks to improve community agency over:

- Energy supply and usage, including maximising the utilisation of local renewable energy
- Energy bills
- Local quality and reliability of supply

In developing the local opportunities, the community is also seeking to maximise complementary social and economic development outcomes to improve the resilience of Heyfield and the Latrobe Valley region in a low carbon, climate resilient future.

1.2 Work package & report objective

The report forms part of Work Package 4: Business Models and Regulatory Review.

The objective of the **Business Models component** is to develop a co-design process and supporting resources to allow community, network and industry partners to understand and prioritise the pros and cons of different business model (BM) options, and how they can be progressed to meet the community goals above.

The complementary **Regulatory and Market Review component** (starting Feb 2021) will support the co-design process by helping to understand and avoid or work around the regulatory and market impediments associated with partner or business model choices.

Version note: This v2.0 report is the first iteration of a living document designed to provide 'building blocks' reference material on business model design choices that can be drawn on by the project team in developing business model co-design sessions. The content will be tailored as input from the other work streams comes in, specifically: Community Engagement; the Technical and Economic Options Assessment; and the Regulatory and Market Review.

The content and language of the later public version of this report will be tailored towards informed community members, after the Heyfield co-design process has taken place.

V2.0 adds content on regulatory and market barriers (s.3 & 4) and updates case study content (s.5)

1.3 What is a Business Model?

A business model describes how an organisation creates value, and how it gets paid – or rewarded through other means – for doing so.[1] Most commonly the term is applied narrowly to mean the way an organisation makes money. However, business models are increasingly understood in the context of sustainable and responsible business to describe the logic of how not only economic, but also social and environmental value is created, and how that value flows to customers, owners, the supply chain and society more broadly. This means the term can include many elements but it is perhaps most useful to return to three:

- Value *creation*: who obtains what benefit from the product/service?
- Value *delivery*: how does that value or product/service reach the beneficiaries?
- Value *capture*: how is it monetized? What other forms of value are accrued?

Example: Rooftop Solar
There are numerous business models through which rooftop solar can reach the customer.

The most common is direct solar sales and installation:

1. *Value creation*: Reduces customer reliance on energy companies to give greater control over energy sourcing and spending; Reduces greenhouse gas emissions from electricity generation; Locating energy supply and consumption potentially reduces the need for upstream transmission and distribution infrastructure.
2. *Value delivery*: professionally designed and installed hardware is sold to customers (that have access to capital), which reduces retail electricity spending. Customer takes ongoing operational performance risk (supported by warranties).
3. *Value capture*: owners–hardware is sold at a margin; customers–reduced bills and exposure to price increases, export sales, climate action, renewable energy certificate credits; society–reduced emissions.

A second example is delivery of solar through an energy performance contract, which has similar value *creation* but the value *delivery* and *capture* mechanisms differ. Ownership, financing and performance management of the asset rests with the organisation. This improves equity by opening up the types of customers that can access the product (beyond those with access to capital), and guarantees ongoing performance but increases overall customer costs.

If the ownership model of either the above was through a mission-driven not-for-profit vehicle, dividends from the operation may be reinvested in improving the local labour force or invested in the creation of other social value. As such ownership and governance also have a strong bearing on the business model and the resulting value and incentives.

For more a more nuanced exploration, business models are commonly unpacked into at least nine components in a one page ‘Business Model Canvas’, shown in Appendix A.

1.4 Roles & functions in a local energy system

A business model can be relatively straight forward in the above example of a single solar sales and installation company. However, in a local energy system with many decentralised energy resources

[1] In academic terms a business model describes the “rationale of how an organisation creates, delivers and captures value” (Osterwalder & Pigneur 2010, p.14)

(DER) being managed as a microgrid, the business model involves the intersection of a coordinated portfolio of different functions which might be delivered by a range of parties.

Table 1 below shows the range of functions or components to be delivered in a local energy system that need to be considered in the business model design. If ultimately the technical solution looked like a microgrid that could be islanded from the grid, this could in theory involve a single company providing all technical components and services.[2] However, perhaps more likely for Heyfield, this will be managed by a collection of existing or new entities, progressively developed over time.

Table 1: Typical functions (or components) to be delivered in a local energy system

Component	Energy efficiency	Metering & data	Generation & storage	Control & Orchestration	Dist'n Network	Retail	
						Energy Market Services	Billing
Party 1	✓		PV/Battery				
Party 2			Biomass				
Party 3				✓	✓		
Party 4		✓				✓	✓
etc…							

1.5 Business Model Success Criteria

An initial set of successful criteria for the selected portfolio of business model choices across the above functions are:

1. Unlock all sources of value for customers and community
2. Reduce energy costs over both i) short-term and ii) long-term
3. Community control over governance/decision-making
4. Breadth of access across community (to benefits of new energy opportunities)
5. Flexibility to integrate new tech/services providers
6. Unlock new local social, economic & environmental opportunities (enterprise/employment /skills, bushfire safety, community infrastructure)
7. Carbon emissions reduction
8. Create social/community connection
9. Suitable risk profile (commercial, bushfire, COVID-19)

And while of less direct concern to Heyfield, an additional project criterion is:

10. Good replication potential in other communities

The final outcome must be attractive not only to residential and business customers participating in local energy initiatives, but also non-participating customers and the broader community (such as through local services, skills and industries).

[2] This describes a 'turnkey' microgrid solution provider, elaborated in Section 3.4.1.

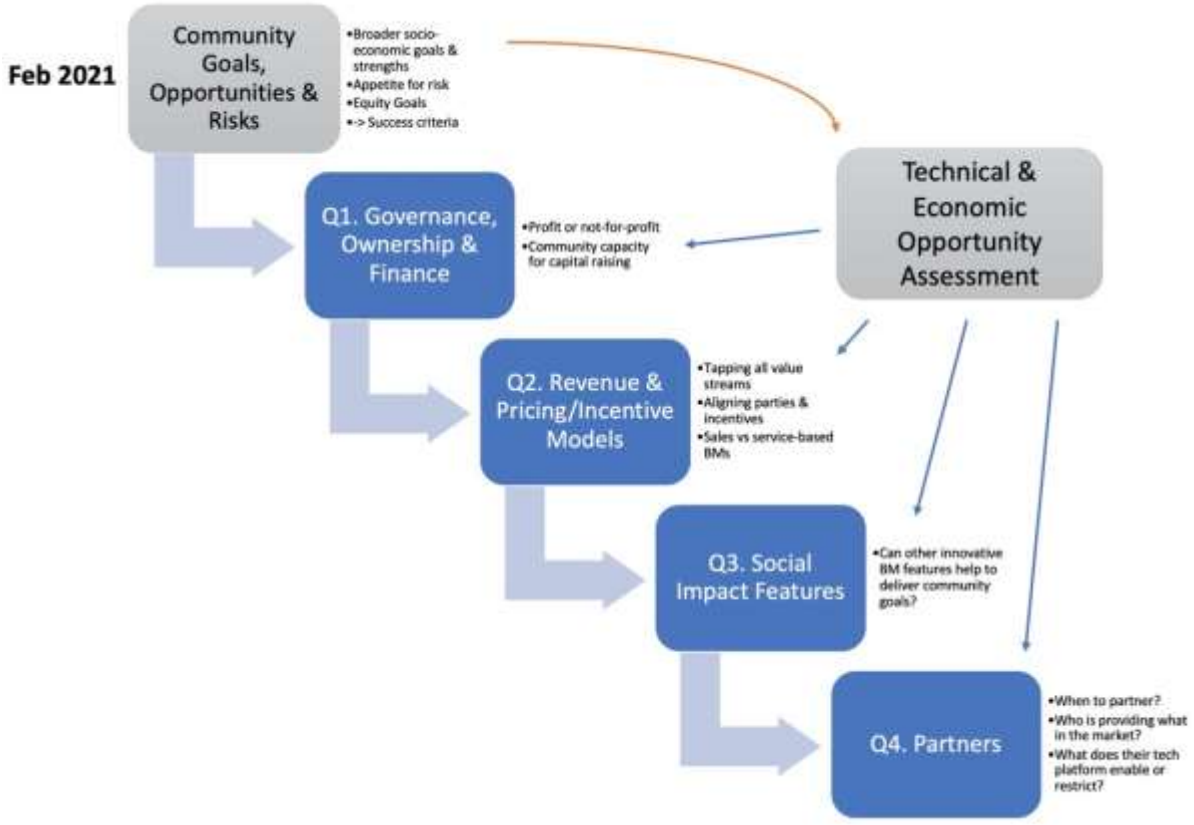
1.6 Structure and use of this report

Section 2's Market Scan Summary provides a comparative overview of how different types of microgrid and local energy solutions are commonly delivered through business model types that communities might be familiar with. These are compared in terms of common ownership, finance and revenue models that shape the outcomes.

To uncover community preferences that will inform their business model choices, **Section 3** presents four building block questions that communities work through in the co-design process to understand the range of **Business Model Design Possibilities**. These questions are intended to apply both to communities starting their own community enterprise or governance organisation, or to partnering or contracting with experienced parties in the market.

Figure 1 below illustrates how the four business model design questions explored in the co-design process (blue boxes) relate to other workstreams of the project (grey boxes). The initial community engagement in February 2021 is critical to defining the community goals, appetite for risks and the principles defining what a "successful" business model will deliver. The technical and economic opportunity assessment will inform the technology options for which a suitable business model for deployment needs to be found.

Figure 1: Stakeholder engagement and co-design process steps, including four Key Business Model Design Questions



Section 4 will integrate the initial work of the Regulatory and Market Review will be integrated into this report in the Feb 2021, as barriers, risks and mitigation options surrounding each of the design possibilities.

Section 5 presents a series of **case studies** referenced throughout the earlier sections.

Sections 6 and 7 are Appendices with supplementary detail.

2 Business Model Market Scan Overview

This section presents a high-level overview of the types of community-based local energy solutions currently being undertaken in Australia and overseas, and the 'business model' characteristics through which each opportunity is commonly realised. As shown in Figure 2, these opportunities range from one-off or coordinated "on-site" customer investments, to larger "community scale" energy projects, aggregation and trading of energy from these assets via "virtual power plants" or "peer-to-peer trading", to collections of activities coordinated as islandable or stand alone "microgrids". As will be more fully explored in Section 3, whether designing your own, or understanding a partners', a 'business model' is largely defined by the following three questions:

1. Who **owns and governs** the organisation and its activities?
2. Where does the **finance** come from?
3. How is its **revenue model** structured? (i.e. how does it make money)

Other related features, like the **underlying technology platform choices** (section 3.4.2), also have a strong bearing on the degree of current or future flexibility the community might have in realising their goals, or the kinds of further partnerships they can make.

Figure 2: Types of community energy solutions and associated business model characteristics

Given the wide variety of microgrid components, it is reasonable to expect that the industry will never converge on one business model,[3] and the 'right choice' will need to consider community goals, renewable resources, geography, regulations and who is doing what in the market at the time. Table 1 below compares the community energy solution types above according to common business model characteristics, and when each choice might be appropriate. Note that the options shown are at times overlapping and not mutually exclusive.

[3] Asmus & Lawrence, 2016.
http://www.g20ys.org/upload/auto/abf2f0a71ea657d34c551214a4ff7045515582eb.pdf

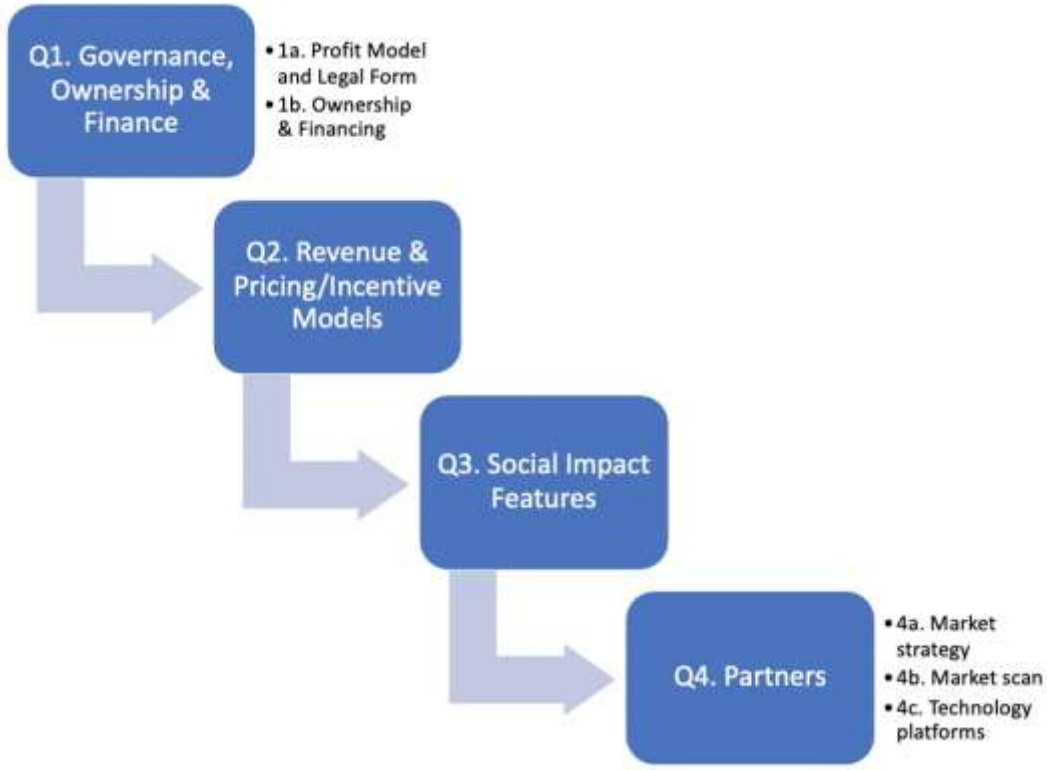
Table 2: Comparison of business model characteristics of community energy solutions

Solution Type	Common technologies	Ownership options	Revenue models	Benefits/Risks	Case examples [Ref #]
Microgrids	• Mix of on-site and community-scale generation, with local orchestration. • Can be powered by solar, wind but requires some dispatchable generation (bioenergy, battery, hydro, etc)	• Network business • Third-party • Customer or community • Combined	• Owner finance & maintenance • Power Purchase Agreements (PPAs) • Energy as a Service (EAAS) • Turnkey (Design, Build, Own, Operate & Maintain)	• Can unlock greater local benefit from supply reliability or self-sufficiency. • Higher level of technical complexity; Full benefit not accessible to whole community; Risk of vendor lock in / limited community control needs careful planning.	• Mooroolbark [#1], Vic (Network led) • Yackandandah [#5], Vic (community owned, third party managed) • Kalbarri [#15], WA (Network owned, third party managed) • Huntlee [#7] grid connected microgrid (third party owned & operated)
On-site options	• Energy efficiency • Load management/ control • Solar PV – residential, commercial • Battery systems	• Owned and financed by household/ business • As above but debt financed • Owned & leased by third party • community crowd-funded (e.g. business solar or community facility)	• Direct product sales • Community bulk buys • Feed-in-Tariffs • Lease or PPAs • Pay As You Go • Differential pricing • Energy Performance Contracts (EPCs) or Energy as a Service (EAAS)	• Yields greater value as operating behind-the-meter; May be part of microgrid or VPP later; Easy to deliver with standard market service providers • Requires revenue model or finance to enhance access for whole community; needs consideration of microgrid/VPP compatibility.	• Yackandandah [#5] community wide bulk buys (individual owned & financed) • Pingala solar (community owned, equity crowdfunding) • Simpa progressive purchase model
Virtual Power Plant (VPP)	• Rooftop PV + battery storage • Demand response • Community battery	• Third Party / Retailer • Network Business • Combined	• Subscription • Direct product sales • Aggregated market participation (spot market, FCAS, network constraints) • Software as a Service (SaaS)	• Enables multiple benefits to be realised by fleet of assets to network of distributed energy resources; Do not have to be locally located so can get scale beyond the town. • Risk of vendor lock-in or compatibility issues with different types of hardware; may be harder to respond to local network needs.	• AGL VPP [#11], SA (Retailer owned & managed, direct sale) • Tesla / Energy Locals VPP [#13], SA (third party owned and retailer managed, subscription) • Sonnen Flat tariff [#14] (fixed price subscription)
Community Scale Infrastructure	• Solar/wind farms • Community Battery • EV charging management	• Community • Third party • Network business (community battery)	• PPAs • Solar Gardens	• Community owned assets focussed on community benefits as profit or not for profit legal forms; can be donation funded or investment based	• Hepburn Wind [#9] (community; PPA) • Newstead community solar [#6] • Pingala Haystacks (solar garden coop)
Community retailer	• Energy efficiency • Solar/batteries • Community-scale generation • Microgrids (experimental)	• Community • May be supported by some larger investors	• Feed-in-tariffs (FiTs) • PPAs • Differential pricing	• Greater flexibility to support community goals via product offerings. • High complexity and effort to launch retailer, which now may be more easily achievable with partnership model.	• Enova • Indigo/Energy Locals [#5] • DC Power Co

3 Business Model Design Questions

This section provides a high-level outline and comparison of business model design possibilities, grouped around the four key questions shown earlier, extracted in Figure 3 below for clarity. The aim if this section is to provide material to support the business model co-design process to help a community decide what business model will suit their goals, whether the right partner is out there to work with, or if they should innovate themselves.

Figure 3: Structure of four key business model design questions



Note, however, that the regulatory and market environment places some restrictions on the types of business model choices that are possible or available. These are briefly discussed separately under each design possibility and are summarised in a separate section on Regulatory and Market Risks in Section 4.2.

3.1 Q1 – Who will own and control the project? (Governance, ownership & finance)

The legal and institutional structures that define ownership and governance have a dominant bearing on the outcomes that will be achieved. This is most commonly – although not necessarily – linked to the source of finance, and as such these design possibilities are covered together.

3.1.1 Q1a – What structure does the organisation/s use? (Profit Model and Legal Form)

Whatever the technology or option under consideration they will be delivered via some kind of legally defined organisation/s. The community may choose whether to create an organisation through which to deliver those function/s, or have them delivered by existing organisation/s. There are three broad types of organisational profit models: for-profit, not-for-profit / community benefit, and hybrids of these forms. For-profits include strictly commercial operators, as well as for-profits with bounded communities that the organisation seeks to serve, such as for-profit cooperatives.

Table 3 makes a high-level comparison of the benefits and disadvantages associated with each broad type of profit model, supported by some example organisations.

Table 3: Comparison of benefits and disadvantages associated with different profit models

Type	Benefits	Disadvantages	Organisational Examples [#]
For-profit	Relative familiarity in Australian energy landscape; readily available legal & financial support; access to private equity funding	Difficult to balance community benefit with financial motivations as organisation grows; Vulnerable to takeover	Most commercial players in the Australian marketplace, including following case studies: • AGL VPP [#11] • Huntlee grid-connected microgrid [#7]
For-profit (bounded, e.g. coop)	Allows benefits to be distributed to specific group in support of local outcomes	Scale of finance requirement large for small community so requires extension of membership boundary	Hepburn Wind [#9] Pingala Brewery Solar Projects
Not-for-Profit / Community benefit	100% of surplus is in service of community or social goals; Impervious to takeover	Few existing potential NFP partners; Relative unfamiliarity in Australian energy landscape; external capital raising	Australian Energy Foundation (AEF)
Hybrid	Mix benefits of different models	Higher level of innovation required (inherent barriers)	Enova Energy Community retailer Indigo in Yackandandah, Victoria [#5]

Some of for-profit disadvantages noted in Table 3 are seeking to be addressed by certification schemes such as B-Corp, described in **Breakout 1** below.

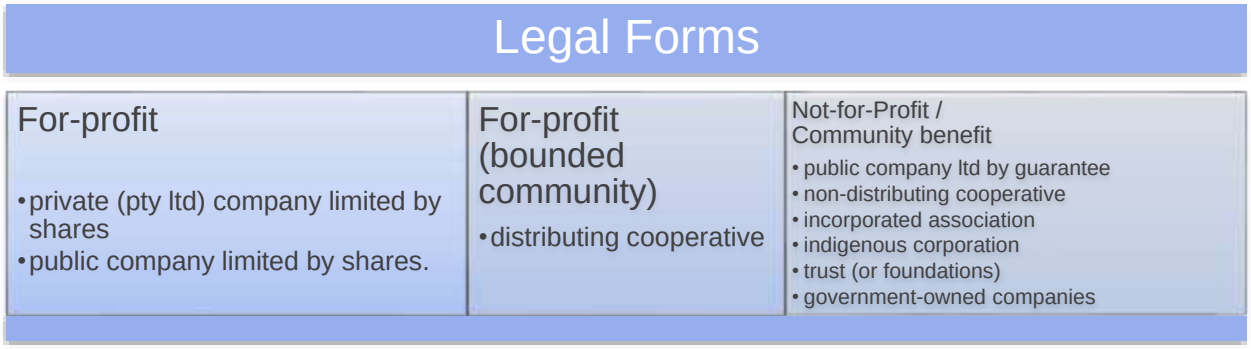
Breakout 1: B-Corp Certification

B-Corp is one certification scheme commonly applied in for-profit business types to aid organisations to better balance social and environmental goals alongside financial goals. It includes a robust assessment and scoring system to benchmark social and environmental performance and practices. As of September 2020, B-Corps are also required to amend their company constitution to share a dual commitment to pursue profit and purpose, and hold themselves to a higher standard of accountability for their decisions. The legal requirement also seeks to help companies protect their (newly articulated) mission through capital raises and leadership changes.

Examples of B-Corps in the Australian energy sector include Solar Analytics and Clean Technology Partners.

Figure 4 below lists the specific legal forms according to their profit model, while a more detailed comparison matrix of legal models can be found here.

Figure 4: Legal forms by profit model



Each profit model type is explained in more detail in Appendix B, section 7.1.

Regulatory and market risks: Energy regulations and policies are generally agnostic to the profit model or legal form of the party. Depending on the choice of revenue or pricing model, the MyTown microgrid project may need to gain retail authorisation where there is the sale of electricity reflected in a separate, discrete charge. This energy sale does not necessarily have to be for-profit: passing through the amount at-cost is still considered to be the sale of electricity. However, the AER has noted it will consider whether the party is for-profit or not-for-profit (such as for community benefit) in deciding whether to grant a retail exemption and in determining the conditions it may place as part of the exemption.[4] Receiving a retail exemption may reduce a number of regulatory obligations otherwise required of retailers. These risks are elaborated in Section 4.2.

3.1.2 Q1b – Who's owns it and where does the money come from? (Ownership & Financing)

Pursuing high penetration local energy efficiency and renewables, potentially on a path towards local microgrid operation, may lower average energy costs over the lifetime of the microgrid, and/or deliver greater local value in the process, but will involve substantial financial investment in new energy technology and services. It is useful to understand the potential implementation costs across different stages of the value chain to give a sense of the relative scale of capital likely to be required for different levels of project ambition and coverage. This is illustrated in Figure 5 below, showing the bulk of costs are in distributed energy infrastructure investment. A similar image will be produced be updated with locally relevant costs and options as the Heyfield project evolves.

Figure 5: Breakdown of investment costs along an example microgrid 'value chain'[5]

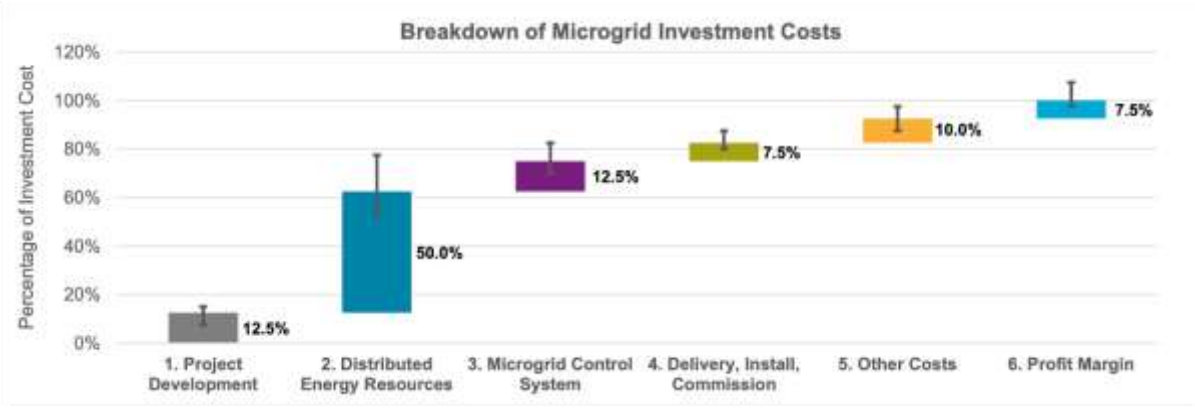


Table 4 below makes a high-level comparison of the benefits and disadvantages associated with each broad type of ownership & financing model, supported by some examples. Note that ownership and financing can be separated – for example, when customers or community use loans/debt – but this complexity is not addressed at this stage.

[4] AER, *Retail Exempt Selling Guideline v5*, March 2018.
[5] Delta EE, 2017. Microgrids: A rapidly growing global market – where are the opportunities? May 2017

Table 4: Comparison of benefits and disadvantages associated with different ownership & financing models

Type	Benefits	Disadvantages	Examples [#]
Customer owned and financed	Customers understand purchasing products they own to deliver personal benefit.	Limited to products on customer premises, and restricts access to those with capital; generally leaves risk of performance with the customer.	Integrated solar & storage smart energy products in Yackandandah [#5].
Community owned and financed	Create opportunity to build social capital through co-owned assets on community or business sites.	Capital raising takes time; Harder to make generation projects stack up financially as projects may only get 5-10c/kWh for exports instead of offsetting 20-30c/kWh retail power costs; Capital raising takes time.	Indigo Power [see Yackandandah #5], Planned Newstead community solar farm [#6], Pingala crowd-funded solar on Sydney breweries, Enova Energy, Hepburn Wind [#9], Solar Share. Sapphire Wind Farm community co-investment campaign [#10]
Network business (with government or private debt finance)	High-level of technical knowledge and expertise already exists within utility; Potentially easier to protect against risks of bushfire infrastructure loss, etc; Most suitable for local distribution elements of the microgrid.	Limited likelihood outside of remote locations; Limited flexibility to develop community interests not expressly focussed on grid benefits; May not represent best value to community (hard to invoke competition benefits).	Western Power's microgrid projects: Kalbarri [#15], Perenjori, Bremer Bay and Ravensthorpe projects. AusNet Services' Mooroolbark Mini Grid [#1]
Government (ownership not likely; only financed)	Only likely in Heyfield case as source of grant funding or low interest debt finance (i.e. low cost of capital) or in a partnership model with a community energy group to lease land and purchase electricity	Long funding cycles and reporting guidelines may detract from purpose. See also comments above under 'network business' regarding limited flexibility.	Primarily rural electrification in developing markets for actual development funding. Innovation grants/ investment examples include Huntlee [#7], partnership examples include Lismore Community Solar, Clean Cowra and the Bendigo Sustainability Group
Third Party owned or financed	High level of innovation with new financing structures emerging; Potentially responsive to emerging new opportunities.	Higher cost of capital. May be difficult to balance investor expectations with social purpose.	Simply Energy VPP [#12] Thrive Renewables Community Bridge (finance only; see App. B, s7.2) Huntlee housing development [#7]
Governance without ownership	Retain benefits of more mainstream legal and capital raising structures.	Few global precedents at this time.	Riversimple Six Custodians Model (see App. B, s7.2)

Each ownership and financing model is explained in more detail in Appendix B, section 7.2.

Regulatory and market risks: A number of key regulatory obligations relate to who will be responsible for meeting obligations for generating, delivering, billing and providing necessary retail supports.

Generation of a certain scale (either as a single unit or as an aggregation) will have obligations to register with AEMO and participate in their dispatch and control processes. This can include obligations to respond to

central dispatch control (including for system security or emergency conditions) and exposure to causer-pays fees for deviations from these directions/control.

Providing energy retail services requires licensing and authorisation. This will require meeting a range of prudential and technical requirements set out by AEMO and the AER which may be a steep bar for smaller organisations and not-for-profits. However, the AER does provide retail exemptions from certain obligations where the standard regulations are excessive to the potential for consumer harm.

The AER's ring-fencing obligations limit regulated networks from owning or operating energy generation, metering and retail services. The AER may provide a waiver where an appropriate case has been made that doing so would be in the long-term interests of consumers and the risk of consumer harms are appropriately managed.

These risks are elaborated in Section 4.2.

3.2 Q2 – How will it make money? (Revenue & pricing/incentive models)

A key function of a business model is to enable those creating value and/or investing capital, to monetise this value to enable a viable business case. A common barrier to microgrid deployment is the misalignment of benefits and costs, where benefits accrue to different parties than those that bear the costs. An example of this is a cost-benefit analysis of avoiding replacement of the electricity cable from Kangaroo Island, South Australia to the main south Australian grid. This option enabled a move to 90%+ local renewable energy at the same or lower cost. However, under standard market arrangements a viable business case did not exist as many of the benefits accrued to the network business or other market parties, and regulatory arrangements for moving to islanded microgrids were uncertain.

Table 5 makes a high-level comparison of the applications, benefits and disadvantages associated with each broad type of revenue & pricing/incentive model applying to whole microgrid projects or DER projects more generally, supported by some case study examples.

Table 5 offers an initial grounding in some basic revenue model types. However, there is substantial nuance in each organisation's offering in the marketplace in terms of who gets paid for what, and thus what incentives are created for different parties.

When assessing the revenue model of potential partners or product/service providers in the co-design process, the community will be taken through the following questions to compare and contrast options for delivering each specific technical component (e.g. solar/storage, efficiency products, load control aggregation, etc):

– What costs does each party bear?

– What risks does each party bear?

– How attractive is the current offering in meeting community goals?

– Are the incentives in the revenue model compatible with meeting future community goals?

– Does sufficient rationale exist for forming a new organisation?

This process will be informed by finalisation of the Australian Market Scan (Section 3.4.2) which will occur as the technical and economic options are confirmed throughout 2021.

Table 5: Comparison of benefits and disadvantages associated with different revenue & pricing/incentive models[6]

Type & Application	Benefits	Disadvantages	Examples [#]
Direct hardware sales	**Applications: On-site options; some metering & feedback hardware.** Simple, well understood concept by customers. Can have very low risk of vendor 'lock-in'.	No professional control or responsibility over product performance or end-of-life reuse/repurposing. As smart energy technology requires professional management of services maximise value, direct sales may become limited to non-digital products.	Solar & storage products in Yackandandah [#5] Energy efficiency retrofit products where integrated into building. Electric vehicle sales (in 2020 – will change over time)
Power Purchase Agreements (PPAs)	**Applications: Large & community scale generation; Microgrids; Some on-site generation options.** Huge diversity of contractual structures to deliver market access and investment certainty for a range of energy assets. Protect against the risk of fluctuating energy prices via long term contracts. Can form the basis of new partnerships (e.g. corporates)	Market uncertainty has historically inhibited PPAs with retailer as buyer. Requires relatively sophisticated expertise to navigate PPA negotiation.	Sapphire Wind PPA with ACT Govt & Opera House via Flow Power [#10] Hepburn Wind solar farm [#9] Other Corporate PPAs such as UTS, Telstra, Mars (see BRC-A deal tracker) Some rooftop solar providers internationally (see s.**0**)
Service-based or outcome-based contracts	**Applications: On-site options (e.g. business energy efficiency, or rooftop solar in more rudimentary leasing forms); Limited retailers** Shifts focus from inputs (e.g. kWh sold) to outcomes that matter (electrical services or thermal comfort) – opens up and Allows end-of-life reuse	Can involve relatively high cost of capital. May require customer to value improved service levels or having risks assumed by service provider.	Sonnenflat [#14] Energy Locals membership-based pricing (service-based) removes disincentive for retailers to reduce customer consumption [part of #13, #14] AGL Electric Vehicle Subscription At microgrid scale service contracts are increasingly popular in US military applications.
Platforms & Software as a Service (SaaS)	**Applications: Microgrid control; VPPs & trading; Metering & feedback.**	Can be vulnerable to vendor lock-in depending on technology platform if not using open-ecosystem approach (see s**1.1.1**).	Incudes peer-to peer or VPP operators LO3 (Latrobe Valley Microgrid [#2]), Power Ledger

[6]Sources include Asmus & Lawrence, 2016. Emerging Microgrid Business Models. Navigant Research Brief, 1Q 2016.

Type & Application	Benefits	Disadvantages	Examples [#]
	Plays vital connector role that is increasingly important to access range of markets necessary for microgrid realisation.		
Solar Garden	**Applications: Community scale generation.** Allows crowd-sourced investment for community scale generation with bill credit for customer Improves equity of access to renewables.	First Australian project still in development (not yet proven). Initial project involves lock-in to retail partner.	Haystacks Solar Garden Coop (Pingala, Enova Energy, etc)
Facility owner finance & maintenance	**Applications: On site; (certain) microgrids** Simplest option for whole of microgrid delivery where site and assets are centrally owned and controlled.	Mostly applicable to commercial sites but not to town scale site like Heyfield.	Commercial grid-connected microgrids.
Turnkey (DBOOM– Design Build Own Operate Maintain)	**Application: On site; community scale** Simplicity for customer in dealing with a single party in-house expertise. Easier to align costs and benefits.	Most commonly applied in military or commercial applications, or greenfield developments. Restricts innovations to those licensed by turnkey company.	Community example: Siemens' turnkey battery storage and microgrid testing in Wildpoldsried, Germany [#19]
Community retailer[%]	Allows higher levels of flexibility in products to support	High complexity and effort to launch retailer, which now may be more easily achievable with partnership model.	Enova, Indigo/Energy Locals [#5], DC Power Co (solar-specific rather than geographic community)

% While not strictly a revenue model as such, a community retailer is likely to a visible strategy of community seeking to better facilitate local energy goals.

Regulatory and market risks: In Victoria, the Energy Retail Code (and the National Energy Consumer Framework (NECF) in the rest of the NEM) provides energy-specific consumer protections and is intended to work in conjunction with Australian Consumer Law (ACL). However, the Energy Retail Code and NECF only provide for cases where there is a financial transaction in relation to a volume of energy. This means there will be inconsistent minimum requirements for consumer protections depending on the revenue and pricing model chosen.

For example, direct leasing of hardware or service-based contracts with households may not need to comply with the Energy Retail Code or NECF as the financial transaction is often not directly linked to a metered electricity volume. This means energy-specific protections would not apply such as those relating to energy retail marketing, gaining the explicit informed consent of consumers, limitations on disconnecting supply as well as requirements to provide payment support and hardship plans. This may decrease the burden on the project but may also offer lower protections to consumers.

Another aspect to consider is the ability for consumers to opt-in or opt-out of the project's chosen delivery model and/or their energy retailer. Restricting consumers' ability to change their energy retail offer or preclude the ability to make later decisions (such as investing in their own solar systems) may be seen as reducing their consumer protections and make those models less attractive.

There are some voluntary codes of conduct, such as the New Energy Technology Consumer Code,[7] that seek to provide guidance on the appropriate consumer protections necessary for energy services such as DER or microgrids that are not fully considered in the current energy-specific protections framework.

Forming a community retailer will require meeting a range of prudential and technical requirements set out by AEMO and the AER. However, the AER does provide retail exemptions from certain obligations where the standard regulations are excessive to the potential for consumer harm.

These risks are elaborated in Section 4.2.

3.3 Q3 – How do we maximise community benefit? (Selected social impact business model features)

This section covers some more nuanced business model features not necessarily covered in the major design questions above, or features that relate to the content of the local opportunities pursued. As they are not alternatives to each other *per se*, these features are not compared in a table like as per the previous design questions but are discussed in turn below.

Localising or specifying supply chains

There is increasing pressure on companies / entities to be more transparent in their supply chains and consider the impact on local communities. Including local businesses and skills in supply chains can boost company reputation, while benefitting local livelihoods. These inclusive supply chains, also serve to shorten the supply chain and potentially reduce disruptions. Integrating local, often low-income or less skilled suppliers into the supply chains of (existing for-profit) companies will require providing financial support and training opportunities to develop local suppliers' capabilities. This is not unheard of in the energy space with many large businesses already including this in their procurement policies. Pacific Hydro's commitment to use local contractors has built capacities of a very small electrical company to a leading industrial electrical company specialising in wind farms.

Hepburn Wind prioritises local purchasing, with more than half of its Australian budget spent in regional Victoria. The original wind project strived to use local service providers not just for construction and operations, but for catering, graphic design, internet service, accountancy and other consulting services. They also created new employment and skill development opportunities for local staff and more than a dozen local service providers, in areas as diverse as community engagement, project management, finance, communications and contract negotiation. This ethos is also embedded in all Hepburn's new partnerships

[7] https://www.cleanenergycouncil.org.au/advocacy-initiatives/behind-the-meter-code; https://www.accc.gov.au/public-registers/authorisations-and-notifications-registers/authorisations-register/new-energy-tech-consumer-code

with commercial entities to develop local capability relating to energy efficiency and electric vehicles. Karadoc Solar Farm, Victoria also set up a program that focussed on local employment and training and apprenticeships, however this was not supported by contractual obligations.

The disadvantage with this approach is that building local supply chains can be more expensive than going to the open market and as such a pragmatic blend of market competition and local collaboration is required, particularly where higher costs might constrain uptake.

Equity-based features

Energy inequity is inherent in most societies, including Australia. Some community energy approaches like Australian Energy Foundation's Moreland project seek to redress energy inequity by including renters and homeowners who otherwise could not participate in renewable energy. They worked with three properties to install solar, allowing tenants to have access to cheaper electricity and landlords to have an improved investment property and a more attractive dwelling for future tenants. The Tesla Virtual Power Plant in South Australia will install rooftop solar and battery on 3,000 Adelaide social housing properties, at no upfront cost to the tenant. Tenants will pay for the electricity they use, but at rates 22 per cent lower than the default market offer through community-based retailer Energy Locals. [8]

Another approach is offering pricing benefits to the broader community outside of the microgrid area. Yackandandah, Victoria, has three microgrids, to trial ways to create a more secure energy resource. However, the solar PV and solar hot water bulk buy options have been available to and availed by the larger community to get them ready for the 100% renewable transition.[9]

Some approaches aim to deliver energy affordability through innovative financing options like product leasing or renting for a certain period of time instead of selling it outright, with an option, that can lead to ownership. Simpa Networks provides distributed energy solutions to underserved consumers in emerging markets on this "progressive purchase" basis. Customers first make a small down payment for a solar system and then pre-pay for the energy service they need. Pay as you go models using mobile technology have been widely successful in enabling access to renewable energy especially solar in low-income communities.

Another aspect is that of community benefit sharing, to ensure the rewards of renewable energy development (often large scale) reach local communities to compensate for the change in the local landscape and economy. Benefit sharing might include providing funding (e.g. grants, sponsorships or scholarships), establishing partnerships with important local groups or projects, providing in-kind support or developing education and tourism initiatives. It might also include innovative options for financing (e.g. community co-investment) or innovative products (e.g. energy retailing options)[10].

Future proofing for a circular economy

Business models have an opportunity to integrate the idea of circular material and energy flows into their processes and service delivery. This can be achieved by employing a shared or cascaded use of resources, by-products, and waste materials among different actors on a commercial basis. This allows reducing waste and optimizing material flows among multiple organizations. For example, to further circularity in Australian businesses, CSIRO developed ASPIRE – an online marketplace which intelligently matches businesses with potential remanufacturer, purchasers or recyclers of waste resources. The surge in adoption of solar photovoltaic panels and electric vehicles creates an opening for companies to extract value through extending the useful lifecycle of parts and batteries. London-based Powervault breaks down Renault Zoe batteries for use as solar PV storage in homes and schools, cutting household energy bills by up to one-third.

Energy from waste is a classic example of this industrial symbiosis. CLEAN Cowra Ltd, a regional community organisation is developing a unique model to empower communities to generate their own energy by

[8] https://arena.gov.au/blog/social-housing-added-to-teslas-virtual-power-plant/
[9] https://solarintegrityaw.com.au/projects/
[10] https://assets.cleanenergycouncil.org.au/documents/advocacy-initiatives/community-engagement/guide-to-benefit-sharing-options-for-renewable-energy-projects.pdf

converting their biomass waste resources into high valued commodities, gas, fertilisers and fuels. At full capacity, the Cowra biomass project seeks to produce 60% of the town's energy needs.

The energy as a service approach is another interesting way of manifesting circularity (and also equity) in business models. Customers pay for a service without any upfront cost, in the form a subscription for devices that are owned by a management company. In this approach, there is an incentive for the company to invest in products with a longer life as well as the full lifecycle responsibility. Philips sells lighting as a service for business customers, by retaining ownership of the lights and equipment so customers do not have to pay the upfront costs of installation. Philips also ensures the sound environmental management of its products by taking them back at the appropriate time for recycling or upgrading.[11] More popular with energy efficiency products, similar approaches are now available with some solar retailers. SolarCity (now a Tesla subsidiary), SunRun, and Vivint Solar are prominent examples of companies that offer residential customers solar lease or PPA options.[12]

3.4 Q4 – Who should we partner or contract with to deliver it? (Partners)

3.4.1 Q4a – When do we make partnerships? (Market strategy)

The stage at which the community makes partnerships with commercial or other players, and the stage at which external participation is taken to market competitively will strongly shape the outcome. Broadly speaking, there are three strategies that would change the shape of how the project is developed, as shown in Table 6 below. Whilst the question of market strategy is not a "business model design option" as such, it has a large bearing on the staging and process through which business model design choices are made.

Table 6: Benefits and disadvantages of different market strategies

Market Strategy	Benefits	Disadvantages	Examples [#]
A. Exploratory partnership	Early support to define technical opportunities and approach	Early commitment to partner before options & outcomes are clear	Yakandandah, Vic (Mondo Power) [#5]
B. Turnkey contract	Lower input requirement from community and one party to deal with	Monopolistic supplier risks; vendor lock-in over long time frames	Siemens DBOOM Model[13]
C. Staged contracts & partnerships	Flexibility to choose diverse partners & level of competitiveness based on maturity level	Higher resource input from community; Lack of coordination	Wildpoldsried (Germany) [#19]

Through the Heyfield project, strong technical support is provided through the project team, which opens up Option C. Materials produced through the project then seek to give communities the tools and confidence to chart a pathway of higher levels of control aligned with Option C.

3.4.2 Q4b – Who might we partner or contract with? (Australian Market Scan)

This section reviews and summarises the different market players active in microgrid and energy solutions area, and the role/s they occupy or could play in a Heyfield project (Table 7).

[11] https://www.greenbiz.com/article/how-philips-became-pioneer-circularity-service
[12] Cleary, K & Palmer,K, 2019Energy-as-a-Service: A Business Model for Expanding Deployment of Low-Carbon Technologies (https://www.rff.org/publications/issue-briefs/energy-service-business-model-expanding-deployment-low-carbon-technologies/#:~:text=Energy%2Das%2Da%2Dservice%20(EaaS)%20is%20a,deliver%20the%20desired%20energy%20service.)
[13] Most recently described here: rmeb.org/Meetings/2020/RMEB%20Presetnation%20Public%20Private%20Energy%20Investments%20v09282020%20v2.pdf

Table 8 then characterises key business model features such as profit-model/legal structure, ownership, and key revenue & pricing/incentive model/s that shape how they approach market deployment.

Version note: Table 7 and Table 8 are sample snapshots of a filterable spreadsheet database that is progressively being developed and will be finalised as the options emerge from the Technical and Economic Options assessment. During the co-design process the community will need to evaluate potential partners for solar and storage delivery, for example. This database will be used to filter and compare the benefits, risks, business model and technology platform characteristics to determine suitability of existing market parties

Table 7: Summary of roles currently provided to Australian microgrid/energy market (examples only)

Component	Energy efficiency	Metering & data	Generation & storage	Control & Orchestration	Dist'n Network	Retail	
						Energy Market Services	Billing
CAT systems	✓	✓	✓	✓			
Australian Energy Foundation	Business, residential		Solar PV, battery				
Greensync		✓		✓			
Energy Locals			PV/Battery	✓(VPP)		✓	✓

Table 8: Summary of key business model features of organisations covered in Australian Market Scan (examples only)

Organisation	Description	Profit Model	Ownership / Financing	Revenue & pricing/ incentive models	Potential Role/s for Heyfield MG
Energy Locals	Energy retailer that uses community & commercial partnership model to deliver new products, often 'white labelled'. Transparent subscription-based fixed monthly fee so no incentive to sell customer more kWh.	For-profit (but shares revenue with community partners)	Third party (private)	Subscription fee Platform (VPP) PPAs Free solar on new builds	Retail partner, VPP provider, PPA off-taker
Simply Energy	Energy retailer running VPP with financed solar/battery package (free solar system, low cost battery (small/large))	For-profit	Third party (private)	Offer pay-as-you-go 6/12 months plan (finance included)	VPP provider, PPA off-taker
Australian Energy Foundation	Supplier of decentralised energy products, services and advice running several advisory contracts for local governments	Not-for-profit	Foundation	Energy advice as a service; Direct hardware sales (commissions)	Delivery agent for solar & storage
Sonnen	Battery manufacturer that provides solar and storage under flat tariff with no kWh costs unlimited usage per	For-profit	Third party (private)	Service/outcome based plan	Operates VPP but walled garden approach may be problematic for staged approach to microgrid
GreenSync	Provision of platform to allow networks to gain DER visibility and customers to access value for avoiding network constraints	For-profit	Third party (private)	Platform; Software as a Service; Subscription	Integration partner to access network value related to AusNet services constraints
Etc…					

3.4.3 Q4c – What does a partner's technology platform enable or restrict?

Every organisation that deals in energy technology makes decisions about what technology they use, what other technology it is compatible with, and how this attracts or retains customers and revenues over time. This can have important implications for empowering or restricting community choices, particularly if the goal is to work towards a coordinated microgrid in a staged fashion. While the specifics differ by technology, a spectrum of openness three broad categories apply, as shown in Table 9.

Table 9: Technology platform risks and enablers

Tech Platform	Risks and enablers	Common examples
Walled Garden	Restricts customers to offering from the vendor only and interoperability would require new technology purchase. May yield better short-term benefit but restrict flexibility.	Brand-specific solar and battery storage VPPs (e.g. Sonnen, Reposit)
Partially open ecosystem	Technology offer designed to retain customers, but interoperability possible or lock-in may apply to only part of services.	Some retailer-led VPPs (e.g. Simply Energy, Tesla/Energy Locals)
Open Ecosystem	Technology and contracts designed for open compatibility, according to standard data protocols. Maximises customer flexibility.	'Connector' device companies (e.g. WattWatchers, SwitchDin); Market access platforms (e.g deX); ShineHub Battery/VPP Combo.

Regulatory and market risks: The ability for consumers to opt-in or opt-out of the project's chosen delivery model and/or their energy retailer may be an important consideration. Restricting consumers' ability to change their energy retail offer or preclude the ability to make later decisions (such as investing in their own solar systems) may be seen as reducing their consumer protections. This may make Walled Garden options less attractive.

These risks are elaborated in Section 4.2.

4 Regulatory Developments and Risks

The regulatory landscape for grid-connected microgrids is in a constant state of evolution, as unresolved regulatory barriers currently present impediments to many of the potential business models. There are also substantial differences between regulations in Victoria and other Australian jurisdictions, and increasing likelihood of continued divergence in other NEM states as different jurisdictions grapple with overcoming regulatory and market hurdles.

This section gives an overview of the major reform processes that will influence the project, and how the following Business Model Design Possibilities (s**3**) are affected by regulatory or market challenges.

4.1 Current reform processes and implications

4.1.1 National framework for Stand-Alone Power Systems and microgrids

The Australian Energy Market Commission (AEMC) has developed a framework for incorporating Stand-Alone Power Systems (SAPS) and microgrids into the regulations and operations of the National Electricity Market. The framework sets out a three-tiered approach to the necessary regulations and protections intended to be proportionate to the size of the microgrid.[14] The framework is designed to be opt-in for each jurisdiction with several key aspects (such as the exact thresholds between different tiers for regulatory obligations) open to determination by participating jurisdictions.

The framework will define and clarify how national regulations will apply to the MyTown microgrid project, such as those governing energy-specific consumer protections, retail offers and how the microgrid interacts with the rest of the NEM. Three microgrid categories are established based on scale:

- Category 1 would comprise very large microgrids with a sufficiently large customer-base to support competition in retail and generation. These would be regulated under the national framework in an equivalent method to standard supply.

- Category 2 would range from those connecting more than a handful of customers to those supplying smaller towns. These microgrids would be expected to be vertically integrated and unlikely to be able to support meaningful competition in generation or retail. Consumer protections, safety standards and operational obligations would be imposed on the operators of these systems through jurisdictional regulations.

- Category 3 would encompass very small microgrids with a handful of customers, only supplying large customers and individual power systems where there is a sale of energy. These would have much lighter-touch regulations. With jurisdictional obligations expected to provide minimum consumer protections, such as billing, as well as energy-specific safety requirements, basic metering requirements and some technical standards.

The MyTown microgrid project is likely to fall within Category 2.

The package of Rules and Law changes have been consulted on but are yet to be enacted by the COAG Energy Council, and the jurisdictions are also yet to decide whether and how to opt-in. There have been significant concerns raised by various stakeholders regarding the workability of particular aspects of the AEMC's proposed model – such as the reliance on retailers to provide competitive offers for a relatively small cohort of SAPS-supplied customers and the lack of well-defined provisions for a party to act as a provider of

[14] This approach is for microgrids provided by a "third-party" other than the local DNSP – for instance by communities, local councils or developers. The AEMC also developed a framework for DNSP-led SAPS where it is found that transitioning some of their existing customers to a SAPS or microgrid is a more efficient way to continue to deliver their monopoly regulated network services. The MyTown microgrid project is being driven by the local community and hence is unlikely to be a DNSP-led SAPS.

last resort to protect consumers. This may lead to derogations or other deviations from the AEMC's model to apply to each state.

Once the National Energy Rules and Law changes are enacted, the AER will have to consult on and develop or amend the necessary guidelines. Work on some of these guidelines have already commenced such as the DNSP ring-fencing guideline. Some jurisdiction-specific work may also be required to integrate the national framework into state-based licensing and regulations.

4.1.2 Victorian review of embedded networks

The Victorian Government is currently undertaking an Embedded Network Review. An issues paper is available for public submission.[15]

This reform expressly includes reference to the 'need to amend legislative and regulatory instruments in the context of providing an exemptions pathway for microgrids that deliver low-cost renewable energy benefits to consumers.' Depending on the definition for microgrids this reform process adopts, and whether and how licence exemptions for microgrids will be introduced, this reform process can have far reaching impacts for the viability of this project. Generally, though, the review aims to support microgrid developments that deliver low-cost renewable energy benefits to consumers, stating that:

> It is important that the Review and its recommendations on any subsequent regulatory changes do not disproportionally impact microgrids and stifle this industry that can provide financial and environmental benefits to Victorian consumers.

These reforms are therefore more likely *aid* innovative business models, rather than complicate them. The MyTown microgrid project should keep track of the review and submit comments should future opportunities arise. A draft report is scheduled for June 2021.

4.1.3 New revenue streams in the NEM

The Energy Security Board (ESB) is developing a suite of substantial, long-lasting changes to the NEM that could be applied from the mid-2020s called the Post-2025 market design process.[16] Amongst a number of priority areas, the Demand Side Participation workstream may have the most impact on the MyTown microgrid project by affecting the regulations and opportunities for DER, demand response, aggregation and electric vehicles (EVs). Other workstreams are also examining what system security and ancillary services are needed.

These reforms may introduce new services and refine the conditions or obligations around existing ones that can provide important revenue streams for storage and VPPs. They may also introduce new obligations, such as on DER technical performance, or on how the microgrid interacts with the rest of the NEM.

4.1.4 DER access and pricing

The AEMC is consulting on a number of rule changes related to access and pricing for Distributed Energy Resources (DER) such as for rooftop PV and batteries. They build on ongoing work to make distribution network tariffs more cost reflective. The reforms being considered seek to change the way networks can reflect the costs and benefits created by DER both injecting into the grid as well as consuming from the grid at various times. It may also include some level of guaranteed or conditional access for DER to be able to inject power into the grid.

Once any rule changes are made, the AER may need to develop or amend their guidelines and DNSPs will need to implement new network tariffs – most likely as part of the periodic determinations for their revenue and Tariff Structure Statement. The reforms may also have implications on network reliability standards which are set and monitored by each jurisdiction.

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15 https://engage.vic.gov.au/embedded-networks-review

16 http://www.coagenergycouncil.gov.au/energy-security-board/post-2025

The outcome of these reforms may impact the planning for the necessary network capacity and coordination as well as the business case for the MyTown microgrid project. The new tariff structures may also help enable more innovative uses of DER including local trading or community batteries.

4.1.5 Victorian Neighbourhood Battery Initiative

In early 2021 Victorian Government consulted on its Neighbourhood Battery Initiative.[17] The Initiative will support trials of a range of neighbourhood battery models in Victoria, from feasibility through to implementation. It is intended to develop the understanding of the role neighbourhood-scale batteries (also called community batteries) can play in Victoria's transitioning electricity system, and demonstrate a range of benefits for communities, energy users and electricity networks.

The consultation process will inform the Victorian Government's long-term strategy and future funding decisions to support neighbourhood-scale batteries and is intended to complement the initial application for funding for trials.

The outcomes of this consultation can shape and clarify the jurisdictional obligations any storage devices within the MyTown microgrid project must meet. This can help make it easier to unlock the potential benefit streams from storage devices within the microgrid and to the system as a whole.

4.1.6 Metering

Electricity metering in Victoria currently follows its own regulatory regime where smart meters are owned by DNSPs. Victoria has not implemented the NEM competition in metering rules reforms. A 2019 KPMG review confirmed that 'introducing contestability at this time is unlikely to unlock benefits to consumers and may diminish some benefits that have been realised'.[18] The Victorian government has made no firm commitment yet to adopt the NEM metering framework.

In late 2020, the AEMC commenced a review examining the current national framework for contestable metering.[19] In addition to addressing a number of identified issues with the provision and minimum technical capabilities of smart meters, this process could affect the current regulations on who can and cannot provide metering infrastructure and services. It may also influence whether the Victorian government makes similar changes to its metering framework or chooses to adopt the national framework.

4.1.7 Consumer Data Right

The Consumer Data Right (CDR) is a whole-of-economy initiative lead by the Federal Treasury to improve customers' access to their data.[20] Electricity has been identified as a priority sector for CDR. The ACCC and AEMO, along with numerous stakeholders and related bodies, have been developing the necessary systems and policies to implement it. Once implemented, it is intended that consumers should be able to more readily authorise their energy data (such as metering data but also including some billing and financial data) to be shared with an accredited third-party (such as a retail price comparator service or to allow more accurate sizing of DER systems).

The CDR will affect the necessary systems and obligations relating to metering data for the parties that hold retail and metering responsibilities for the MyTown microgrid project, or the ability for future community replicants to access customer load data.

4.1.8 Regulatory Sandbox trials

The AEMC, AER and AEMO in collaboration developed a framework for regulatory sandbox trials to allow innovative projects or approaches that do not fit within current regulatory frameworks to be tested in a controlled environment. This includes a quick, non-binding information service to understand how a proposal

17 https://engage.vic.gov.au/victorian-neighbourhood-battery-initiative-consultation
18 https://www.energy.vic.gov.au/electricity/smart-meters
19 https://www.aemc.gov.au/market-reviews-advice/review-regulatory-framework-metering-services
20 https://treasury.gov.au/consumer-data-right

may interact with the current regulations, a trial waiver process to receive limited exemptions from specific regulations and a trial rule change process for proof-of-concept trials.

The COAG Energy Council has consulted on the necessary legislative changes for this framework but has yet to implement them. Once made, the market institutions will likely develop guidelines for how they may assess sandbox trial applications and any requirements ongoing monitoring.

The regulatory sandbox framework may offer a useful mechanism for clarifying regulatory implications and using more innovative models or approaches in the MyTown microgrid project that do not fit within the current regulatory framework.

4.1.9 Obligations for large storage in the NEM

A rule change is in progress to Integrate Storage into the NEM focussing on creating new, more clearly defined obligations around large storage devices for registering with AEMO and their operating requirements. This will include both large, central storage devices and aggregations of multiple, smaller storage devices acting in concert. After any necessary rule changes are made, AEMO will need to develop or amend its guidelines and procedures that provide more specific detail on such obligations.

The outcome of this may affect the initial connection process for any large, central or aggregated storage devices that form part of the MyTown microgrid project (subject to size threshold). It may also clarify obligations for such storage devices to respond to or interact with AEMO's central dispatch processes. Both these may influence the technical considerations and business case for the project.

The timing of each of these reform processes is shown in below.

Table 10: Timeline of Regulatory Reforms relevant to community microgrids in Victoria

Process	H1 2021	H2 2021	H1 2022	H2 2022	H1 2023	H2 2023
National Stand Alone Power Systems (SAPS) framework**	Policy and legislative development					
Victorian review of embedded networks	Draft determination	# Final determination	Anticipated implementation*			
Victorian Neighbourhood Battery Initiative	Consultation	Engagement summary and findings report				
ESB Post-2025 Market Design	Policy development				Potentially begin staggered implementation of suite of reforms*	
DER Access and Pricing	Policy development			Staggered implementation*		
Obligations for large storage	Draft determination	Final determination	Implementation*			
Metering**	Draft determination	Final determination	Implementation*			
Consumer Data Right (for energy)	Policy and systems development			Implementation*		
Regulatory Sandbox Trials	Enact legislation in NEL		Possible implementation*			

* Best estimates of when implementation will occur.

** Implementation of these reforms rely on jurisdictional decisions to opt-into the framework which is not guaranteed to occur.

Key regulatory engagement opportunity

4.2 Risk assessment by business model choice

The following tables seek to show a high-level "Traffic light" summary of regulatory and market risks, as they relate to the following key questions outlined in Business Model Design Questions in Section **3**:

- Q1a: Profit model & legal form (Table 11)
- Q1b: Ownership & financing (Table 12)
- Q2: Revenue & pricing/incentive models (Table 13)
- Q4c: Technology platform models (Table 14)

Red represents a 'showstopper' risk or barrier making that choice very challenging to implement. **Orange** represents a substantial risk or barrier that may be overcome with the plausible change or market development. **Yellow** represents some difficulty or impediment but no regulatory or market change required. **Green** represents no impediment. Uncoloured items are Not Applicable (N/A).

4.2.1 Licencing requirements

Depending on the technical model chosen for the Heyfield microgrid, a range of licencing options need to be considered. The scale of the project, the location and connection between assets and the trading arrangements (such as exporting to NEM, trading between participants, and who will operate the system) will all impact on what licences are required or whether exemptions will apply.

Generally speaking, no electricity industry activity can be undertaken without a licence. Licences in Victoria are granted by the Essential Services Commission (ESC). Depending on the activity undertaken and the licence conditions applied by ESC, the project may require a retail, generation and/or a distribution licence. In particular, this requires compliance with the energy retail and distribution codes, which include a range of consumer protection requirements.

Licences are granted based on financial viability, technical expertise and licensees showing that they are a 'fit and proper person.'

The General Exemption Order may apply and exempt the planned project from licence requirements. Exemptions can be deemed or registerable. Even with an exemption, parts of the retail and the distribution codes will still apply. For many microgrid project the multi-activity exemption may be an option – but this is not a deemed exemption, and the project will need to apply to be included in the register of exempt persons.

4.2.2 Q1a. Profit model and legal form

No major regulatory or policy risks. Not-for-profit status may improve the case for exemptions from certain licensing or authorisation obligations, reducing the regulatory burden on the project.

Table 11: Regulatory/ market risk level for Victorian microgrid profit model & legal form by microgrid component/function (Q1a)

For profit	May be better equipped to handle licencing requirements than smaller community organisations
For profit (bounded)	Depends on size and experience
Not-for-profit	May be easier to get exemption, but steep regulatory requirements
Hybrid	Depends on size and experience

4.2.3 Q1b. Ownership and financing models

Ring-fencing requirements may prevent or complicate network businesses providing any services other than those directly classified as distribution network services – in particular generation and retail services.[21]

Licensing requirements may prevent or complicate any party other than the local DNSP providing distribution network services.

Depending on the specific third-party proposed, current licensing and registration requirements may complicate third-party provision of services. For instance, this may include demonstrating sufficient organisational maturity to meet the legal, technical or financial obligations necessary to provide retail services.

Without clear definition of ownership and financial responsibility, as could occur with the 'Governance without ownership' model, obtaining licensing and authorisation for generation, distribution network and retail services may be complicated or prevented.

Table 12: Regulatory/ market risk level for Victorian microgrid ownership & financing models by microgrid component/function (Q1b)

Customer	No barriers but only applies to on-site options. Some new DER access regulations may apply.
Community	Steep regulatory requirements
Network	Will need exemption from ring-fencing rules
Government	Unclear how this could be government owned- if gov financed – who will own
Third-Party	Depends on the third party: large energy retail businesses may be better placed to handle risk
Governance without ownership	May need very careful design to ensure clear definition of legal and financial responsibility

4.2.4 Q2. Revenue and pricing/incentive models

Models that do not directly involve a financial transaction in relation to a volume of energy (such as direct hardware sales or service-based contracts) may not have to apply with the energy-specific consumer protections under the Victorian Energy Retail Code or NECF. This may lower the burden on the provider but provides lower protections to consumers.

Models that lock customers into a particular revenue or pricing model, restrict their ability to change energy retail offer or preclude their ability to make their own energy investments (such as installing their own solar systems) may be seen as reducing consumer protections. This may apply to models such as direct hardware sales or turnkey.

Table 13: Regulatory/ market risk level for Victorian microgrid revenue & pricing/incentive models (Q2)

Direct hardware sales	Less stringent on consumer protection so may simplify obligations but may provide weaker protections or support to consumers.
Power Purchase Agreements (PPAs)	
Service-based or outcome-based contracts	
Platforms & Software as a Service (SaaS) incl. VPPs	Potential consumer lock in

[21] Even where the DNSP is providing a stand-alone power system as a regulated service as the most efficient option to continue supplying an existing customer (i.e.: DNSP-led SAPS), there are material ring-fencing and other barriers that complicate the DNSP providing generation or retail services.

Solar Garden	Potential consumer lock in
Facility owner finance & maintenance	
Turnkey (DBOOM–Design Build Own Operate Maintain)	Likely consumer lock in
Community retailer	Steep regulatory requirements, but some exemptions available

4.2.5 Q4c. Technology platform models

Models that lock customers into a particular revenue or pricing model, restrict their ability to change energy retail offer or preclude their ability to make their own energy investments (such as installing their own solar systems) may be seen as reducing consumer protections. This may apply to models such as the walled garden.

Table 14: Regulatory/ market risk level for Victorian microgrid technology platform models (Q4c)

Walled garden	Increases risk of consumer protection issues, esp. for retail products or customer DER investments
Partially open ecosystem	Lower risk as per above
Open ecosystem	

Each of the risks flagged above is briefly elaborated in the relevant section of Business Model Design Questions (s**3**).

5 Case Study Examples

This section goes into more detail on specific microgrid or local energy business model case examples with local relevance, unusual or innovative features.

5.1 Local/Regional

#1. Mooroolbark Mini Grid Project, East Melbourne, Victoria

- **Project Partners & Roles:** AusNet Services (Network & DER asset owner and operator); GreenSync, PowerTec Engineered Solutions (tech suppliers). Ausnet supplied solar and battery system; GreenSync provided cloud based MicroEM™ platform to monitor/share electricity. PowerTec Engineered Solutions provided mini grid 'stabiliser' (allows islanding); AER funding under the Demand Management Incentive Scheme (DMIS): $365,126.[22]
- **Description:** Microgrid in established community of 14 nearby homes – each equipped with solar panels and 10 kWh storage batteries, and advanced energy management, communications, monitoring and safety systems. Total solar between 3kW and 4.5kW per household; battery storage system with a 5kW battery inverter and 10kWh of energy storage.[23] Focussed on testing three scenarios of grid operation/connectedness:
  - grid connected mode using solar, batteries & grid.
  - off-grid household mode/island home: using solar batteries and demand/consumption management.
  - Community Island: mini grid community operates independently of main grid.
- **Business model:** DNSP-owned and operated microgrid, with all functions including procurement, recruitment; DER control and orchestration performed by tech partners, also the tech partners developed control platforms. Project paid for equipment; Customer benefit was in energy bill savings; installed rooftop solar & battery systems remain in community ownership after project; simulation of peer-to-peer trading.
- **Outcomes:** Demonstrated increased customer reliability (through batteries), bill impact: 60% or more (savings: 80% resulted from the solar system and 20% from the battery storage system).[23] Main cost savings during peak times as energy is provided through the battery; islanding determined by temperature effect on household battery cabinets. [23] Unclear if any increased community control or cohesion has resulted from relatively passive community role. Community feedback: support for distributed energy increased from 19% prior to the trial to 88% (small sample), this was largely due to excellent battery performance during outage.[23]
- **Heyfield Lessons:** Determine AusNet Services' (and tech partners') current perspective on active role in microgrid ownership, control & orchestration based on Mooroolbark experience.
- **References**
  - https://www.aer.gov.au/system/files/AusNet%20Services%20%20Demand%20Management%20Innovation%20Allowance%20Report%202018.pdf
  - https://greensync.com/news/mooroolbark-community-mini-grid/
  - rmeb.org/Meetings/2020/RMEB%20Presetnation%20Public%20Private%20Energy%20Investments%20v09282020%20v2.pdf

#2. LO3 Latrobe Valley Microgrid, Victoria (Feasibility study)

- **Project partners and roles:** LO3 (Lead); AusNet (DNSP, funding); King and Wood Mallesons (legal and regulatory support); ARENA (Grant funding)

[22] *https://www.aer.gov.au/system/files/AusNet%20Services%20-%20Demand%20Management%20Innovation%20Allowance%20Report%202018.pdf; https://greensync.com/news/mooroolbark-community-mini-grid/*

[23] *https://www.ausnetservices.com.au/-/media/Files/AusNet/Innovation/Mooroolbark-Community-Mini-Grid.ashx?la=en*

- **Description:** Development of VPP, peer-to-peer trade through a virtual platform/IoT (called TransActiveGrid), price creation based on eBay style auction mechanism (highest bidder wins) using blockchain; electricity availability based on local electricity market (LEM) and smart meter devices; aggregation of local energy market participants on platform incl. retailers, AEMO, distribution services (platform can be used to advertise contracts); participants include 200 dairy farms, 100+ household consumers, ~20 other commercial and industrial customers.[24] LO3 organised community engagement workshops on VPP concept – local businesses/ dairy farmers voiced particular interest due to high energy use.[25] Based on lessons from almost 10 projects running around the world, from the USA to Australia, the UK to Japan, LO3 plans to launch the platform commercially soon.[26]
- **Business model:** Software as a Service – VPP with commercial industry partnerships (LO3 does not plan to run the platform), residential, business and agricultural customers (local energy market participants) will have to pay small fee, VPP will create greater economic benefits for prosumers than consumers. Three scenarios were modelled to compared the economic gains made by buying or selling on the LEM against a counterfactual: 1) where buyers and sellers did not pay network charges (retailers bore this cost); 2) costs split between buyers and sellers, and; 3) charged all costs to the consumers, which is most consistent with existing markets and regulation and could immediately be implemented.
- **Outcomes & issues:** Based on modelling outcomes, in scenario 3, customer can potentially save 6-12% on electricity costs if purchased through LEM platform (ranges according to strategic bidding), prosumer's potential saving are higher: around 18-37%.[25] LO3 reported issues around data access such as a cumbersome process to request and verify access to smart meter data; understanding separation of network/retail charges on electricity bill; farmers with multiple meter ID's (NMI) and different retail plans with different levels of information on bills. Even though there was a lot of in-person enthusiasm, due to these issues, only a trickle of formal interest was received. Providing meaningful information on bills, and simplifying complex retailers' plans and offerings, along with a local community advocate to help with recruitment were the key lessons from this and other LO3 pilot projects.
- **Heyfield Lessons:** Geographically dispersed VPPs are increasingly prevalent, and if Heyfield was to primarily operate in grid-connected mode, VPP operators could be considered as part of operation and control mix. Challenges to local energy trading platforms remain but may need to be in mix for islandable scenarios.
- **References**
  - Energy Magazine https://www.energymagazine.com.au/latrobe-valley-farmers-to-benefit-from-blockchain-technology/
  - ARENA report https://arena.gov.au/assets/2018/05/latrobe-valley-microgrid-feasibility-assessment.pdf
  - https://lo3energy.com/report-reveals-major-benefits-and-opportunities-in-local-energy-marketplaces/
  - https://engage.vic.gov.au/embedded-networks-review

#3. Solar Partnering Around Regional Communities (SPARC) Project, Latrobe Valley, Victoria

- **Project partners and roles:** SGSP Assets (Jemena) subsidiary Ovida Pty Ltd (lead, solar company), Australian Energy Foundation (Solar Partnering Around Regional Communities project), Allume Technologies, RMIT University (partners), DELWP (funding)
- **Description:** aims to install up to 75 microgrid clusters in commercial centres of the Latrobe Valley (i.e. 10 small to medium-size businesses per single microgrid), focus on commercial customers/ businesses with large properties with partners. Aim is to cut participating businesses energy bill by 25%.[27]
- **Business model:** overall 7.5MW solar and 1.5MW battery storage is installed across the 75 systems. The installation of rooftop solar was aimed at businesses who couldn't afford the upfront costs;[27] Ovida will install, own and operate roof top solar panels, battery storage systems and smart interconnected technology, while participants only pay for the energy they consume and can continue to choose their

[24] Energy Magazine https://www.energymagazine.com.au/latrobe-valley-farmers-to-benefit-from-blockchain-technology/
[25] ARENA report https://arena.gov.au/assets/2018/05/latrobe-valley-microgrid-feasibility-assessment.pdf
[26] https://lo3energy.com/report-reveals-major-benefits-and-opportunities-in-local-energy-marketplaces/
[27] AEF 2019. Latrobe Valley Microgrid. https://www.aef.com.au/projects/latrobe-valley-microgrid

own grid energy retailer.[28], community co-investment/part-ownership; aim to keep profits in local economy; community consultation/ engagement/ guidance.[29]

- **Heyfield Lessons:** continue knowledge sharing on evolving outcomes.
- **References**
  - AEF 2019. Latrobe Valley Microgrid. https://www.aef.com.au/projects/latrobe-valley-microgrid
  - Ovida, 2020. Solar Partnering Around Regional Communities (SPARC Project). url: https://solar.ovida.com.au/sparc/
  - RenewEconomy, 2019. Huge wind farm planned for Victoria's coal centre, overlooking closed Hazelwood plant. 28 Mar 2019. https://reneweconomy.com.au/huge-wind-farm-planned-for-victorias-coal-centre-overlooking-closed-hazelwood-plant-46221/
  - http://www.coagenergycouncil.gov.au/energy-security-board/post-2025

#4. Community Energy Hubs project, Victoria

- **Project partners and roles:** SGSP Assets (Jemena) subsidiary Ovida Pty Ltd (lead, solar company), Australian Energy Foundation, Allume Technologies, RMIT University, Housing Choices Australia (partners), Gippsland Solar (installation), DELWP (funding; 980,000 grant from the Victorian Government's Microgrid Demonstration Initiative)
- **Description:** 52-resident apartment building in Preston/Melbourne, 70kW solar panels, 54kWh battery storage, and distribution software (installed, operated and maintained by Ovida), Allume provided SolShare technology (one solar system is shared among all residents).
- **Business model:** Ovida pays for the solar energy and storage system, residents can opt in and continue to choose their retailer and only pay for the energy they consume. Aims to reduce bills in community housing as solar-generated electricity is cheaper than from the grid, addressing energy poverty/social inequality, more sites expected to be installed across Melbourne in 2020.
- **Outcomes & Issues:** Project's challenges included technical and equipment challenges for relatively untested enabling technologies, design challenges with the limited space available for the microgrid equipment, a legal and regulatory landscape that had not anticipated such a solution, and the complexity of developing and testing a technical solution that satisfies the interests of multiple parties. To get more residents to participate, Ovida explained the new technology in five different languages, including Auslan, and communicated creatively with BBQ group information events, one-on-one meetings, video, posters and letters.[30]
- **Heyfield lessons:** knowledge sharing on overcoming new technology design, and installation challenges.
- **References:**
  - https://www.pv-magazine-australia.com/2019/12/19/shared-solar-switched-on-at-melbourne-apartment-block/
  - https://gippslandsolar.com.au/australian-first-microgrid/
  - https://utilitymagazine.com.au/renewables-for-renters/

#5. Yackandandah Community Mini Grid, Victoria

- **Project partners and roles:** Established in 2014 by volunteer group Totally Renewable Yackandandah, Indigo Shire Council (New Energy Jobs Fund grant). Mondo (tech partner) including provision of Ubi smart controller.
- **Description**: To support goal of 100% renewable energy by 2022, energy sovereignty, community size: 2000 ppl -> requires 3MW to 4MW to meet energy needs. Includes 70kW solar garden and 130kWh

[28] Ovida, 2020. Solar Partnering Around Regional Communities (SPARC Project). url: https://solar.ovida.com.au/sparc/
[29] RenewEconomy, 2019. Huge wind farm planned for Victoria's coal centre, overlooking closed Hazelwood plant. 28 Mar 2019. https://reneweconomy.com.au/huge-wind-farm-planned-for-victorias-coal-centre-overlooking-closed-hazelwood-plant-46221/
[30] https://utilitymagazine.com.au/renewables-for-renters/

battery; replace electric hot water with solar hot water (reduce electricity demand). Participants include 14 houses (solar & battery 2017; [Mondo website]), 10 public buildings (2019), and 550 kW of solar power covering 106 houses; 274 kWh behind-the-meter, retail-facing battery and 65 kW solar array at sawmill commissioned in July 2021.

- **Business model**: Example of early 'exploratory' commercial partnership with Mondo but retained community centric focus. Community/customer owned on-site options: involved each of the 14 households purchasing subsidised solar, battery and Ubi device for AUD 12,000 [McGowan, 2018]. Community retailer Indigo Power was formed (with retail backend support from Energy Locals) – buying & selling local RE through PPAs.
- **Outcomes**: In Feb. 2019, 1GWh was generated ¼ from solar, equivalent to more than $160,000 in local energy cost savings [Utility magazine 2019]. The Yackandandah CFA saved ~$3000 since their system was installed in 2019.
- **Heyfield Lessons:** strong community engagement through Totally Renewable Yakandandah. Useful contact for knowledge sharing on stepwise growth of RE uptake, and drivers for centralised community solar & battery storage; Household scale battery cost was prohibitive, leading to community scale implementation. Indigo Power, Mondo & Energy Locals both potential partners. Inclusion of entire community (e.g. 30% of Yackandandah residents had rooftop solar), including public buildings and bulk buys included whole community beyond smaller microgrid. recycling considered in replacement or end-of-life decisions.
- **References:**
  - Giles Parkinson, G., 2019. https://onestepoffthegrid.com.au/yackandandah-takes-one-step-closer-to-100-renewable-energy/
  - https://utilitymagazine.com.au/industry-and-community-collaborate-on-award-winning-mini-grid-project/
  - https://mondo.com.au/community/energy-hubs-and-projects/yackandandah
  - https://totallyrenewableyack.org.au/watts-happening/yack01-community-battery/

#6. Renewable Newstead, Victoria

- **Project partners and roles:** Renewable Newstead (community group, formed in 2008), Powercor (network provider), Energy for the People, The People's Solar (consultancy), Victorian Planning Ministry (grant application awaiting results).
- **Description:** Plan for single energy retailer to own and operate small scale 5MW solar farm close to town to increase a sense of local connection and ownership, motivating households to sign up. Overall the community has a history of local cooperation (drought), challenge status quo, climate mitigation targets and focuses on long-term planning: 100% RE (50 year vision).
- **Business model:** Construction and management of solar farm is planned to be outsourced to single commercial retailer/generator partner and based on special distribution tariff with Powercor planning fixed distribution charge (AUD1/day), no per kWh charge for participating households. System planned to include battery storage (owned and managed by retailer?); Newstead households sign long-term contract with solar farm/retailer to reduce energy costs over time.
- **Outcomes:** Not yet known, plans revised and solar farm size has been downscaled form initially 10MW to 5MW [Victorian Parliament 2019]; expected bill reduction for customers: expected to fall by 10-30%.
- **Heyfield Lessons:** Community chose to outsource investment construction and management as they did not see themselves as having the expertise to take these risks; Powercor was willing to consider tariff experimentation on this project which is a valuable precedent.
- **References**
  - Renewable Newstead, 2020. https://renewablenewstead.com.au/how-it-works/
  - Green, M., 2016. Community power. *Nat Energy* 1, 16014. doi.org/10.1038/nenergy.2016.14
  - Victorian Parliament, 2019. Project Proposal. https://www.parliament.vic.gov.au/images/stories/committees/epc-LA/Inquiry_into_Tackling_Climate_Change_in_Victorian_Communities/Submissions/S095_Renewable_Newstead.pdf

#7. Huntlee microgrid, Hunter Valley NSW (2015, discontinued)

- **Project partners and roles:** Brookfield Energy Australia Pty Limited/Flow Systems (lead), Siemens, Kinesis and CSIRO (partners)
- **Description:** Greenfield development in Hunter Valley targeted at testing viability of off-grid electricity supply, although ultimately grid-connected. Has 40MW rooftop PV (95% of 7,500 homes), 4MW Solar Farm, Smart Microgrid – Microgrid Management System' and smart controllers at each customer connection, Energy Centre (gas generators, large battery storage), energy efficient homes/home systems, community energy utility.
- **Business model:** Appears to be third party owned and financed, with capital financed by the developer on premise of lower overall cost than utility supply. Costs rolled into the development, so indirectly paid by buyers. Management of infrastructure was contracted out to Flow Systems.
- **Outcomes:** Offgrid Energy (2019) finds levelised cost of energy per lot are lower for the microgrid than if the development were to connect to the national grid but still decided against going off-grid[31] mainly due to regulatory barriers. AER knocked back the proposal as embedded networks have not been typical for master planned house and land developments, but has since then softened its stance.
- **Heyfield Lessons:** Microgrid economics are substantially strengthened when existing infrastructure is absent. Developer financed local energy systems or microgrids should be considered if new housing subdivisions are planned in the area, making property developers active players in potential projects. Regulatory positions need to be considered early in the process.
- **References:**
  - DER Customer Insights, 2020. ARENA https://arena.gov.au/assets/2020/08/der-customer-insights-the-customer-journey.pdf
  - Brookfield/Flow Systems, 2016. https://arena.gov.au/assets/2015/04/Delivering-higher-renewable-penetration-new-land-housing-developments-microgrids.pdf
  - https://www.offgridenergy.com.au/wp-content/uploads/2016/12/Case-Study-HUNTLEE.pdf
  - https://thefifthestate.com.au/innovation/building-construction/flow-systems-looks-to-demonstrate-the-future-of-communities/

#8. Euroa Microgrid demonstration project, Victoria

- **Project partners and roles:** Euroa Environment Group Mondo (tech supply, orchestration), 14 local Euroa businesses, Globird Energy (PV system design), DELWP (project funding, $680,000)
- **Description:** Project "aims to increase power reliability while creating savings for participants through a micro grid system comprising of rooftop solar PV, battery systems as well as smart metering and energy management technology". Expect to have all systems installed by March 2020. In parallel, Mondo are developing the Mondo Platform in order to perform tests to demonstrate the orchestration and capability of the micro grid. Project is expected to run until mid-2021.
- **Business model:** 14 businesses within Euroa which will install 589 kW of new solar PV and up to 400 kWh of new batteries. Mondo are offering businesses in Euroa special solar Power Purchase Agreements (PPA) as an affordable way for business to utilize energy from renewable sources.
- **Outcomes:** still unknown. Potential to extend to the residential community of Euroa and to other towns as it will demonstrate how a microgrid can operate, and provide economic benefits to the Euroa community.
- **Heyfield Lessons:** Similar approach to Heyfield in terms of data driven plan – ensure knowledge sharing and partnership options remain open.
- **References:**
  - https://mondo.com.au/news/euroa-micro-grid-kicks-off
  - http://www.jaclynsymes.com.au/media-releases/new-microgrid-funding-for-the-euroa-community/

[31] https://www.abc.net.au/radio/newcastle/programs/drive/microgrids/11762740

#9. Hepburn Wind – Community Wind and Renewable Energy Cooperative, Victoria

- **Project partners and roles:** Hepburn Wind Coop (project lead); Vic Govt (various grants) Hepburn Shire Council, ZNET Alliance (collaborative regional project development; Powershop (partner retailer with range of functions including turbine O&M, RE certificate sales)
- **Description:** Two turbine 4.1 MW community owned wind farm. Runs bulk buys for a range of energy products including most recently affordable electric vehicles. Recently submitted planning permit for a 7.44MW solar farm with the potential to add a 10MWh battery storage facility in the future.
- **Business model:** Owned/financed by 2000+ members using distributing cooperative structure. Survived without fixed PPA and just receiving spot market price for energy generated, but attractive PPA would have been preferred if available. Uses community benefit fund model and procurement policies to distribute community value locally and develop local partner institutions. Coop noted as a top performed in B-Corp rating and certification.
- **Outcomes:** First community wind farm in Australia, created 3 ongoing part time roles. Profits from the project remain in the community as dividends returned to investors and through the Community Fund. shown that the community is prepared to invest significant capital in local infrastructure, provided that local benefits are created.
- **Heyfield Lessons:** Good template is available if considering cooperative model, and local job/skills creation models are directly transferrable. Retailer partnership has been fruitful over time.
- **References:**
  - https://www.hepburnwind.com.au/
  - https://www.c4ce.org.au/knowledge_resources/case-studies/wind-farm-projects/hepburn-community-wind-park-co-operative-vic

5.2 National

#10. Sapphire Wind Farm

- **Project partners and roles:** CWP Renewables (RE developer, owner and asset manager); Vestas and Zenviron (construction); ACT Govt (Govt PPA buyer); Sydney Opera House (corporate PPA buyer)
- **Description:** NSW's largest windfarm of 270MW located in New England with interesting commercial/community partnership.
- **Business model:** Government and corporate PPAs secured the purchase of the energy to get project financed and built. Employs community benefit fund model to distribute value to local area, and uses a Community Consultative Committee as part of stakeholder management mechanisms.
- **Outcomes:** Helped the ACT Government meet its target of 100% renewables in 2020 by providing a long term PPA; 685,000 tonnes of emissions avoided, 259 jobs created, contributed $3.75M regional investment in the community.
- **Heyfield Lessons:** Community/commercial partnerships can create community investment streams, but where the community is shielded from the underlying complexity of establishing the arrangement as is delivered by the commercial project team.
- **References:**
  - https://www.sapphirewindfarm.com.au/
  - https://inverell.nsw.gov.au/building-and-development/wind-farms/sapphire-wind-farm/

#11. AGL Virtual Power Plant (VPP), Adelaide, South Australia

- **Project partners and roles:** AGL (Lead; Retailer); Tesla, LG Chem (batteries), Solar Edge (inverter) (tech suppliers), SA Power Networks (DNSP); ARENA (Grant funding)

- **Description:** Solar and battery based VPP that connects 1,000 residential and business premises in Adelaide via a cloud-based control system – batteries 'talk to each other' and form a 5MW virtual solar power plant.
- **Business model:** Retailer-owned and controlled VPP with commercial industry partnerships. Customer offers include "bring your own battery": $100 sign-up bonus & $45 quarterly bill credit over the first 12 months; AGL subsidised purchase of battery only (+AUD 1000) if joining for 5-year plan.
- **Outcomes & Issues:** $280 in bill credits over the first 12 months for battery owners, Expanded VVP to residential customers in Queensland, NSW & Victoria working towards target of having 350 MW of distributed and demand response assets under orchestration by FY24. Key challenges included finding customers who met the eligibility requirements, and managing customer churn and managing and monitoring installations. Good communication and marketing design helped overcome the customer challenges.
- **Heyfield Lessons:** Geographically dispersed VPPs are increasingly prevalent, and if Heyfield was to primarily operate in grid-connected mode, VPP operators could be considered as part of operation and control mix.
- **References:**
  - https://arena.gov.au/assets/2017/02/VPP-SA-Public-Milestone-1-Report-Final-for-issue.pdf
  - https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2020/september/agl-expands-virtual-power-plant-with-solar-battery-sales-across-eastern-states
  - https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2019/september/agl-completes-installation-of-1000th-battery-in-virtual-power-plant

#12. VPP / Home Battery Scheme (SA, 2018-2020)

- **Project partners & roles:** SA government (funding), Commercial parties (hardware and VPP providers), CEFC (loan), ARENA (grant for social housing).
- **Description**: The inclusion of home solar systems and home batteries is part of the SA government's clean energy transition: VPP and major roll-out of home batteries (in up to 50,000 homes, 20,000 installed as of Sept 2020) in addition to expansion of its grid-scale battery storage.
- **Business model:** State government subsidies and low-interest loans - provided by the Clean Energy Finance Corporation - to help pay for a home battery system and new solar. Customers can then join different VPPS active in the state and seek rewards for participation.
- **Outcomes**: SA's home battery scheme has opened up a competitive VPP market (Simply Energy (small/large battery offer pay-as-you-go 6/12 months plan), ShineHub (flexible FiT AUD 0.37-7.05/kWh, supports Alpha-ESS battery), Stoddart (new home, owner occupied – free solar system, discounted battery), Tesla Energy Plan (no daily charge, low price for 13kWh powerwall), Discover Energy Smart Saver (fixed FiT AUD 0.35, range of batteries compatible), Sonnenflat [SA Government 2020]). Port Lincoln had access to electricity during 2019 bushfire [SA Government, 2020].
- **Heyfield Lessons**: As per #11, plus SA Govt approach might inform advocacy with regional or state levels of government regarding how to stimulate market activity for Heyfield and beyond. Useful precedent for battery storage value in bushfire events.
- **References**:
  - SA Government 2020. https://homebatteryscheme.sa.gov.au/join-a-vpp

#13. Tesla / Energy Locals VPP

- **Project partners and roles:** Tesla (hardware supplier and app; VPP management), Energy Locals (facilitating retailer services include wholes and FCAS market access, billing, etc.)
- **Description:** Residential VPP launched in 2018/19, initially targeted at residents in Housing SA's social housing program but later expanded to private households owning a Tesla PowerWall 2. VPP is planned to control 250MW and include 50,000 customers.
- **Business model:** Mix of fully financed service-based product, and direct hardware sales model: Offered to social housing customers as low-cost energy retail contract, at up to a third lower than default offer.

who sign up to the retail offer with no ongoing contract, a solar PV and Tesla Powerwall would be installed, fully financed, owned and operated by the VPP technology consortium. Energy Locals obtains subscription based fixed fee for service. Elegant use of embedded network framework to avoid customer lock-in if circumstances change.

- **Outcomes:** First VPP to lift FCAS capacity to 10MW, facilitated by Energy Locals. $220 (incl GST) in grid support bill credits to customers. New time of use tariff introduced for the plan.
- **Heyfield Lessons:** As per #11. Energy Locals retailer backend services could be valuable facilitator for community activities, and has attractive approach to avoiding vendor lock-in.
- References:
  - New Energy Ventures 2020[1]
  - https://www.growthstate.sa.gov.au/news/south-australias-virtual-power-plant-to-boost-capacity
  - https://reneweconomy.com.au/tesla-virtual-power-plant-in-south-australia-first-to-lift-fcas-capacity-to-10mw-75743/

#14. SonnenFlat Energy Service Tariff

- **Project partners & roles:** Sonnen (hardware supplier, control, offer design), Energy Locals (retailer services)
- **Description:** energy retail offer designed for home battery owners. first hardware & software provider to move into the retail electricity space in Australia.
- **Business model:** Very close to Energy as a Service (EAAS) for residential customers: a fixed monthly energy charge is made, and all electricity customers consume is "'free' regardless of the source (solar, battery or grid), provided that they do not use more than a certain amount of electricity. On the starter package this is about 20kWh per day. Energy Locals obtains subscription based fixed fee for service and provides underpinning retail functions.
- **Outcomes:** as battery prices, and upfront costs fall, offer is expected to be very lucrative to customers faced with electricity price uncertainty.
- **References:**
  - https://sonnen.com.au/sonnenflat/
  - https://www.solarchoice.net.au/blog/sonnen-sonnenflat-is-it-worth-it

#15. Kalbarri Microgrid, Western Australia

- **Project partners and roles:** Western Power (project lead), Lendlease (project delivery contractor)
- **Description:** In order to reduce power outages Western Power is installing a microgrid to meet demand during peak times more efficiently than through traditional centralised generation and network supply, via locally generated renewable electricity. Town has fluctuating population (1,500 locals + 100,000 visitors/year), demand can hit peak of 3MW, single line exposed to high winds, falling vegetation, salt and dirt build-up. 1.6MW wind farm, rooftop solar 1MW, and 3.5MW battery storage.[32]
- **Business model:** Network owned and financed, with money recouped through utility rate base revenue model. State owned organisation so is technically not-for-profit.
- **Outcomes:** still unknown as project has been delayed. Testing is expected to happen in 2021.
- **Heyfield Lessons:** Australian precedents for network led and financed microgrids now exist on the basis of microgrid solutions being a more economically efficient means of service provision (but are in very remote areas with high cost of service and good renewable resources).
- **References:**
  - https://www.westernpower.com.au/our-energy-evolution/projects-and-trials/kalbarri-microgrid/

[32] https://www.westernpower.com.au/our-energy-evolution/projects-and-trials/kalbarri-microgrid/

- https://www.farmweekly.com.au/story/7085245/kalbarri-residents-are-to-get-repowered/

5.3 International

#16. Oncor Microgrid, Lancaster, Texas/USA

- **Project partners and roles:** operated by S&C Electric and Schneider Electric, 1.25MW
- **Description:** innovative problem solving and proof-of-concept project. Highly automated (4 individual MGs), automates dispatch/storage and economics/pricing (selling/buying → accounts for day-ahead weather forecasts; powered on different sources: 3 small diesel generators (560 kW), propane micro-turbine (65 kW), carport solar array (106 kW); a gas reciprocating generator (45 kW)→ the multi-source set-up can detect outage and switch to another resource ('self-healing system');
- **Context:** Trial – showcases the innovative potential of utilities (island mode vs micro grid connection); high costs of tesla battery ($350/kWh) are expected to decrease in the future
- **Outcomes:** showcase the latest advancements in energy storage and smart grid technology with the new Lancaster advanced microgrid, around an existing electrical infrastructure and 30-year-old generation equipment. project is a learning lab for the industry.
- **Key lessons:** regulatory barriers to battery storage owned by utility → currently not allowed in state
- **References:**
  - https://microgridknowledge.com/the-oncor-microgrid-what-makes-it-like-no-other/
  - https://www.utilitydive.com/news/oncor-microgrid-gives-a-peek-into-the-future-of-distributed-energy/386728/

#17. Algonquin College (2016) in Ontario, Canada

- **Project partners:** Siemens Canada
- **Description:** 54,000 students, system size: 500 kW solar PV, 1,500kWh battery storage. Education-focused (learning-lab) → system contains solar arrays, container-sized battery and a meteorological/weather station; systems tie into existing infrastructure: grid/diesel generator, also a 4 MW combined heat and power (CHP)
- **Context:** core element of carbon-neutral campus, international showcase on sustainability and generates/maximises a positive return on investment, campus runs New Energy Centre
- **Outcomes:** advanced controller reconfigures use of MG and outside grid and helps to run the MG at a high cost efficiency – one of the most difficult issues for MG operation.
- **Key lessons learnt:** The campus serves as a playground that facilitates the experimentation on the combined use of power and heat in real time and modelling, it also allows for the integration of technologies into existing infrastructure (campus buildings, local grid). The economic model behind the automation of selling/buying/storage and use of onsite/offsite electricity includes economic forecasting price signals and also takes into account weather forecasts. Overall, these inputs optimise the energy use and costs.
- **References:**
  - *https://microgridknowledge.com/optimized-microgrid-2/*
  - https://new.siemens.com/global/en/company/stories/infrastructure/2017/everything-s-connected-des-at-algonquin-college.html

#18. Samsø Island, Denmark

- **Project partners and roles:** Danish Ministry of Environment and Energy (won competition price).
- **Description:** In 1997, Samsø won a government run competition to become a model renewable energy community, which enabled it to shift from 100% dependence on oil and coal imported from the mainland, to self-sufficient energy supply based on renewable energy in a decade, reduction of the energy

demand, several grid-connected off-shore wind turbines 2.3-10MW. Island population is ~3,700. The competition paid for a person assigned to draft a 10-year master plan for the island.

- **Business model:** Mixed ownership of off-shore wind turbines (municipality-owned (5), external investors (3), and partly local cooperatives own the remaining wind turbines (2), and on shore wind turbines eleven 1MW turbines owned by farmers (9) and local cooperatives (2) which involves 490 local shareholders; Decarbonisation of heating: biomass-based and solar thermal-based district heating (heating plants owned by local customers and a local entrepreneur). Public grants and subsidies covered some costs. Samsø Renewable Energy-Island project staff were in charge of organising, planning, and communication. Energy organisations played an important role in getting citizens on board and recruiting them for different investment offerings.
- **Outcomes:** transformation to carbon neutral in less than a decade and is now working to phase out fossil fuels by 2030. Template for other communities to take action and drive their energy transition.
- **Key lessons learnt:** though initiated by the government, the transformation happened completely due to community efforts. Community buy-in was key and is manifested in the unique ownership options of the energy facilities on the island. Energy infrastructure projects led to local jobs and eco-tourism opportunities.
- **References:**
  - https://www.theguardian.com/sustainable-business/2017/feb/24/energy-positive-how-denmarks-sams-island-switched-to-zero-carbon
  - https://energiakademiet.dk/wp-content/uploads/2018/08/samso-renewable-energy-island.pdf
  - https://en.wikipedia.org/wiki/Sams%C3%B8

#19. Wildpoldsried, Bavaria, Germany

- **Project partners and roles:** Wildpoldsried Village; Others unknown; Siemens (turnkey battery storage system; microgrid control system testing)
- **Description:** Town of 2500 population in Bavaria that has successfully worked towards local energy independence since 2000. Technology includes 2x250kW CHP plants, 400kW biomass boiler and 4km biogas networks. District heating system services all public buildings, 120 private flats and 4 companies. 250 private owners of a total of 5MW solar PV and 150 solar hot water installations. Strong energy efficiency, and more recently inclusion of lithium-ion battery storage system, a diesel generator with vegetable oil operation, a backup diesel, a load bank, two controllable distribution transformers, a sophisticated measurement system, and has been experimenting with microgrid islanding.
- **Business model:** Strong community ownership of 12.1MW of wind turbines, 40% financed by equity and remainder by credit. Customer ownership of rooftop PV. Battery uses turnkey business model.
- **Outcomes:** In 2013 town generated 469% of its electricity consumption and 55% of heating energy locally from renewable sources and has received much international attention.
- **Key lessons learnt:** This has been a government and community driven process undertaken progressively over a long period through various partnerships.
- **References:**
  - https://c4cecongress14.files.wordpress.com/2014/06/160614_arnozengle_keynote1.pdf
  - https://new.siemens.com/global/en/company/stories/infrastructure/2016/energy-transition-wildpoldsried.html

#20. Chelsea Microgrid, USA

- **Project partners and roles:** GreenRoots (represents community, approves design / development decisions), Climable (technical team chair, stakeholder communication), City government (host, owner of microgrid), State Government (funding)
- **Description:** Microgrid links building virtually not geographically as a disaster repose post Hurricane Maria. buildings are connected contractually and through a cloud-based platform, which allows a central controller to aggregate their energy storage, solar power and load management into a virtual power plant. It includes battery banks for electric reliability and peak shaving; solar where possible on the

historic building (city hall), and biodiesel or bio-derived methane generators. the city can then decommission diesel backup generators it now uses. model ensures residents the ability to prosper in place during an emergency when evacuation is not an option.

- **Business model:** city to self-fund the project, through a bond or cash reserves to keep the microgrid as a public asset. Grassroots partners recruit customers (residential, municipal and commercial buildings plus critical facilities) as possible participants.
- **Outcomes**: model for neighbourhood led municipally sponsored/owned microgrid without borders. Outcomes unknown a project feasibility has been established, financing plan in underway.
- **Key lessons learnt:** Powerful city/community alliance. Community organisations base building and community organizing for a long time.
- **References:**
  - https://microgridknowledge.com/microgrid-without-borders-chelsea/
  - https://www.massclu.org/the-chelsea-project/
  - https://greenjusticecoalition.org/blog/community_microgrids-2/

6 Appendix A: Business Model Canvas

There are many business model canvases that seek to analyse or describe a business model on one page. The example shown below is the “Social Business Model Canvas” which adds elements of social value propositions and what an organisation does with its profit, to the very financially focussed original version.

7 Appendix B: Design Possibilities – Supporting Detail

This section provides additional supporting detail for the some of the design options in Section 3.

7.1 Legal form and profit model

For-profit

For-profit entities are far the dominant form of business active in the Australian energy marketplace, that has been applied to all roles, technologies or geographies. The key advantage of a for profit model is the easy access it provides to private capital, especially equity investors for expansion as well as innovation. It has the inherent advantage of business startup, legal and administrative support services and advice being readily available. Entities of a requisite size also have the bargaining capability / power to negotiate and trade within the NEM, an edge smaller/individual players may not have. This model allows founders and shareholders to obtain unlimited private financial benefit from company success. The key challenge is that, as for-profit entities grow, the influence of profit as a dominant force in decision-making tends to increase. For example, as new capital is sought for expansion, this opens the company governance to new investors with purely financial motivations, reducing the prominence of social purpose. For-profit businesses are also vulnerable to buyout or takeover by larger organisations that may not respect the founding intent of the company. Some of these challenges are seeking to be addressed by certification schemes such as B-Corp (see **Breakout 1** in main report).

The specific legal forms that are for-profit include:

- private (pty ltd) company limited by shares
- public company limited by shares.

For-profit (bounded community, e.g. coop)

For-profit models can be applied within a ‘bounded’ community, such as for-profit cooperatives. These are known as ‘distributing’ cooperatives as they can distribute profit to their members. This model offers an ongoing opportunity for unlimited members to join and thus invest for wider adoption. Equity crowdfunding to sell the co-operative shares is interesting mechanism that allows ordinary people / local communities to become involved in their (local / renewable) energy projects. Grant funds are often used to kickstart projects, cover project management costs or as gap funding. They are grounded in one-member one-vote governance, so that all members have an equal say in decision making (irrespective on their financial investment), and members are not liable for the cooperative’s debts, similar to other limited liability entities. Cooperatives follow seven internationally recognised co-operative principles: voluntary and open membership, democratic member control, member economic participation, autonomy and independence, education, training & information, co-operation among co-operatives and concern for the community (for a brief overview see here). They can include customer-owned, worker-owned, producer-owned, platform or multi-stakeholder coops.

In the energy sector cooperatives are relatively uncommon, with the most well-known example being the 2000+ member Hepburn Wind. Other smaller examples include other community energy organisations Pingala and CENREC, though these are not microgrid examples. In Australia distributing cooperatives are more familiar to other sectors such as wholesale, retail, farming or manufacturing, such as Norco and Dairy Farmers. Legal and administrative support for cooperatives draws from a much smaller pool than private companies, but is more readily accessible than in past. The member benefit and democratic governance structure tends to anchor for-profit cooperatives closer to social value delivery. However, cooperatives might face barriers in raising external capital. Co-operative Capital Units (CCUs) can be used to raise capital from non-members while retaining member control of the co-operative but are not allowed in all states (Victoria allows it). Further there are still some difficulties in attracting interstate investors.

Members can voluntarily wind up the co-operative for a share in assets, and surplus funds are distributed in proportion to share capital held[33]. In some places, it is considered standard practice for co-ops that are closing down to give all assets to other co-ops, in accordance with the cooperative spirit (often not for profit co-ops).[34] Italy has a special national cooperative development fund that promotes the creation of other cooperatives, and when a co-op is dissolved, all remaining assets are transferred to this fund.[35] BCorp certification (**Breakout 1** in main report) can be applied to coops, as in the case of Hepburn Wind. The specific legal forms that are for-profit within a bounded community include:

- distributing cooperative (NB: for non-distributing coops, see Not-for-Profit section 0 below)

Not-for-Profit / Community benefit

Not-for-profit models often conjure thoughts of charities based on donation or grant-funding, but here refers to forms of enterprise that can trade and make a profit, but cannot distribute these profits to its members/investors. They can only use the profits to expand or improve on their primary activities, which serve the social or environmental mission of the organisation. If the organisation is dissolved an "asset lock" applies such that any assets must be reallocated to another organisation in line with its social purpose. Such legal provisions also make NFP models immune to hostile takeover, and thus guarantee they remain aligned with their mission. However, most legal forms for NFP models are governed by state laws (co-operatives, incorporated associations) and thus make it difficult to have interstate operations or attract interstate investors[36], and as such commonly operate at relatively small scale and with relatively small assets. Such organisations are relatively uncommon in the Australian energy landscape, but include the Australian Energy Foundation (formerly the Moreland Energy Foundation), Blue Mountains Renewable Energy Co-op,[37] and some electricity network businesses outside of Victoria.[38] SolReflection, another non-distributing co-operative is developing a community owned concentrated solar thermal project in Queensland. Internationally, examples include the Energy Web Foundation blockchain initiative, local government-owned retailers such as Bristol Energy, and many social enterprises looking to increase electricity access in developing countries, such as the Pollinate Group.

Incorporated associations are commonly used for community energy groups when they start out, often utilising the Association to find host sites, attract grants, manage finances and run communications and promotions. An association is the easiest and cheapest legal structure to set up. They generally establish a separate entity (often a co-operative) to own one or more community energy assets, and to facilitate the distribution/reinvestment of profits.[39] This was the model followed by Pingala and Hepburn (distributing co-op) and Repower Shoalhaven (private limited).

Besides non-equity-based crowdfunding where people invest in a mission / social returns not shares, NFPs can also avail traditional forms of capital like loans. Loan repayments and interest are considered business expenses.[34] Social impact or green bonds are other capital raising avenues.

The specific legal forms that are not-for-profit include:

- public company ltd by guarantee

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[33] https://fed.coop/co-operatives-in-australia-a-manual/part-two-forming-a-co-operative/what-type-of-structure-do-you-need/

[34] Hinton, J., Maclurcan, D., 2016. How on Earth: Flourishing in a Not-for-Profit World by 2050. Working Draft.

[35] Thompson, D. (2005) 'Building the Future: Change, challenge, capital, and clusters in Italy's market leader', Cooperative Grocer Network Magazine, November – December. (https://www.grocer.coop/articles/building-future)

[36] Community Power Agency, Community owned renewable energy, a how to guide, 2014 (https://www.environment.nsw.gov.au/resources/communities/cpa-community-energy-how-to.pdf)

[37] This is a small scale non-distributing cooperative, that has had two successful crowd funding campaigns to install charitable solar systems at neighbourhood centres

[38] Technically, government-owned companies are NFP entities, as any surplus goes back into taxpayer funds, however they can be governed as revenue generators to cross-subsidise other parts of social service delivery and thus may not always result in the best energy outcomes as has been the case with state government owned networks at different points in the past.

[39] Community Power Agency, Community owned renewable energy, a how to guide, 2014 (https://www.environment.nsw.gov.au/resources/communities/cpa-community-energy-how-to.pdf)

- non-distributing cooperative
- incorporated association
- indigenous corporation
- trust (or foundations)
- government-owned companies

Hybrid

Hybrid profit-models are neither wholly for-profit nor wholly not-for-profit and may identify as “social enterprises”. For example, energy retailers Enova Energy (originally Northern Rivers Region, NSW) and Indigo Power (northeast Victoria) are both hybrid models that are community owned and invest 50% of their profits in community energy goals. To do so Enova Energy, as an example, combines a for-profit retail business that generates revenues, and a NFP organisation that manages investment of the profits into community energy projects focused on energy efficiency, education, community owned renewable energy.

7.2 Ownership & Financing

Customer owned and financed

Globally this is the most common financing model associated with products that are on customer premises (or ‘behind-the-meter’), such as solar, batteries, energy efficient appliances or smart home devices. A customer purchases a product from a supplier and generally assumes the risk/responsibility of ensuring the product is performing. Other products may be available to help customers to check product risk.

Community

Community investment in increasingly common in local community energy generation and retail sector projects in Australia, and are much more common in the UK and Europe for both generation and, increasingly in Germany, for network infrastructure. At the larger end are pioneer projects like the $9.8m raised by Hepburn Wind from almost 2,000 co-operative members. In recent years three community-funded energy retailers have launched (Enova, Indigo, DC Power), and community solar projects have crowd-funded equity such as Pingala and Clear Sky Solar Investments at the smaller end, and Solar Share at the larger 1MW end.

It is not uncommon that even where appetite for community equity investment exists, they may collectively have access to insufficient funds to meet the opportunity, at least in the timeframe required. Note, however, that debt-based (loans) rather than equity-based financing models enable ownership to be retained by the community, even when limited capital is initially available. A good example of a private provider offering a temporary debt-based product is the UK-based Thrive Renewables ‘Community Bridge’ product, which provides bridging finance to allows community to invest in energy assets, with money repaid over two to three years as local investment is sought and community takes full ownership. Hybrid models are also a recent innovation in large scale renewables such as in the 270MW Sapphire Wind Farm which combines a community investment stream alongside private finance [#10].

Or where clear social or environmental benefit exists, as may be the case in the renewable energy based microgrid projects, this may open up emerging forms of low interest debt such as green or social impact bonds. The Climate Bonds Initiative is an international, investor-focused not-for-profit organisation working to mobilise the $100 trillion bond market, for climate change solutions. The Lighthouse Community Energy Project is partnering with a local financial institution which issues Community Clean Energy Bonds (CCEB) with a fixed maturity date and earning a fixed rate of interest, certified under the global Climate Bond Standard. Money raised through the issue of CCEB’s can then be used by community not-for-profit organisations, to fund investment in clean energy.

Network business

Network business ownership is common for poles and wires when using pre-existing public infrastructure for transmitting locally generated energy. Network businesses and regulators are currently exploring whether/how networks can or should fund and own other local energy infrastructure like solar and batteries, such as by Western Power and AusNet Services (see examples #15, #1). In the absence of the network business owning and operating network infrastructure, an experienced third party is needed, which may be challenging to achieve cost-effectively outside of cities. The main reasons for privately owning and operating grid infrastructure are:

1. to operate as an "embedded network" connected to the main grid to obtain greater financial benefit for the community from locating generation locally, as current standard network pricing structures offer no reward for this; and
2. Investment in new grid infrastructure can't easily be rolled into costs of the network.

Options for network funded generation assets are currently being debated by the industry (see regulatory and market risks below).

Government

Government funding in the Australian context is only likely for grant funding to reduce innovation risk, or as innovation investment or low-interest finance such as via ARENA or the Clean Energy Finance Corporation (CEFC). Government capital funding of large infrastructure that is repaid by electricity users through tariffs is more common in countries without universal electricity connection, and thus no pre-existing infrastructure.

Third-Party

With microgrids and community energy developing viable business cases, there has been increasing interest from private third-party developers in owning and investing in these projects. These can include property developers who often factor embedded network

infrastructure administration and costs into their developments, and retailers or technology companies who are in a customer facing role. IKEA Adelaide is building the largest microgrid in Australia in partnership with Epic Energy, the owner and operator of the microgrid.

Third-party vendors tend to develop more innovative technology and new financial strategies, piggybacking on advances pioneered by the solar PV industry[40]. Financing through PPAs, Energy as a Service, lease models are well suited to third party microgrid ownership. Powerstar have partnered with Ultima Capital to offer voltage optimisation systems via a lease or rental agreement at no upfront costs, with a guarantee that power savings are greater than financing.[41]

Governance for local control without ownership

While organisational governance generally reflects the underlying ownership and financing structure, it is possible to integrate the voices of other stakeholders into more traditionally financed businesses. For example, Welsh electric mobility company Riversimple have adopted a "Six Custodians model" which involves an independent legislative body with appointed representatives of the following stakeholder groups: Environment, Customers (Users), the Community (Neighbours), the Staff, the Investors and the Commercial Partners. There are very few examples of such structures as yet, and opportunities for representative governance experimentation are likely limited to the formation of a new organisation, or the creation of a new joint venture with another organisational partner. If no new organisation or joint venture is created, then the governance and underpinning ownership and finance structures of the selected delivery partner will generally be inherited.

[40] Asmus, P., & Lawrence, M., 2016, Emerging Microgrid Business Models, Navigant Research Brief
[41] https://prwire.com.au/print/powerstar-finance-through-new-smart-power-alliance


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HEYFIELD
COMMUNITY
RESOURCE CENTRE
UTS