

Building a VPP

Strategies for success

An industry knowledge building article
by New Energy Ventures

hello@newenergy.ventures
newenergy.ventures



Virtual power plants have been a hot topic in the Australian energy industry for a number of years now. But, like any nascent market, we've seen mixed results with some vendors doing well, others less so. In this article, we explore the factors employed by leading VPP proponents to achieve customer uptake and delivery success.

It's clear that VPPs are here to stay, and as the market for storage and demand response grows, so too will the demand VPPs. According to the **Australian Energy Market Operators Integrated System Plan**, up to 180 Hornsdale Power Reserves worth of batteries are to be deployed into the National Electricity Market alone over the next two decades (and this is using **conservative modelling**).

The Australian VPP market is still relatively immature with trial learnings still being disseminated, teething technology issues being overcome, and vendors still experimenting with how to best structure customer offers. But it's not too late for new market entrants to succeed in grabbing a share of the growing market. To do so, they'll need to crack the model first, especially in terms of market entry, delivery and scalability.

In this article we reveal some of the secrets employed by leading VPP proponents to deploy and scale VPPs effectively, including:

- Unpacking the fundamental elements of VPP success
- Case studying 4 x leading VPP proponents on their strategies to success
- Considering how to apply these learnings when developing a VPP

We hope you enjoy and can apply these lessons to your business.

1 The fundamental elements for VPP success

We see two fundamental elements necessary for successful VPP deployment and delivery:

1. **Skills:** the proponent must have the capability required to setup, build, and manage the VPP.
2. **Packaging:** The proponent must structure their offer appropriately to the customer.

These two elements can be seen as non-exclusive prerequisites in today's immature market. Ultimately, however, success will depend on more factors; including, how much value (money) does the VPP actually make? We introduce each of these elements in detail before going over case studies to back up our hypothesis.

Important note: we make no judgements in this article about the viability, risks, benefits or costs of each VPP offering. For such insights, talk to us about our consulting and VPP revenue modelling services.

1.1 What are the skillsets required and how to get them?

Deploying a virtual power plant requires the following core capabilities from the 'energy value chain':

- supply side skills: related to energy retail and wholesale markets understanding (plus any network-value component)



- demand-side skills: related to technology sale, install, maintenance and fleet orchestration.

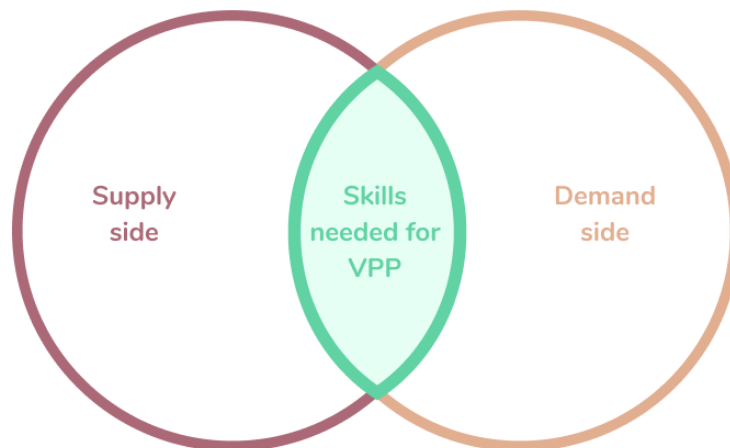


Figure 1: Energy value chain skills needed for VPP deployment

It comes then, as no surprise, that we see two predominant types of businesses seeking to capitalise upon VPP opportunities – the traditional supply-side businesses, such as energy retailers; and demand-side technology vendors like solar installers, battery companies and aggregators.

To be successful in this market you need an understanding of and access to energy markets AND to be good at selling and managing technology. Supply side businesses have historically struggled to sell technology. Conversely, technology businesses have struggled to overcome the knowledge and compliance barriers for market participation.

The question then becomes, how does a given company acquire the skills they need to succeed? We have identified three skillset pathways which businesses can employ:

- Partnerships between demand-side and supply-side businesses (*fast, but requires value share*)
- Incremental investments in capability and skills to accumulate the required capability (*requires time & internal investment*)
- Acquisitions for fast market entry and/or to fill skills gaps (*requires large amounts of capital*).

We explain more about these pathways in the Case Studies below.

1.2 How to package VPP offers for success?

The best VPPs to date have been able to package and present the offer to the customer in a way which respects the following principles:

- a) shields the customer from operational complexity and downside risk
- b) offers value to the customer in a tangible, understandable and accessible format

The behind-the-scenes nuts and bolts of a virtual power plant can be complex. We have multiple stakeholders, complex technology, complex optimisation requirements and complex regulations to



comply to. Somehow, either customers need to educate themselves on all this or vendors need to absorb the complexity and risk into their business model. The diagram below is a good illustration of this complexity. It shows what's required to integrate a battery into the following value streams:

- Frequency Markets
- The Wholesale Market
- Grid support
- Behind the meter value streams

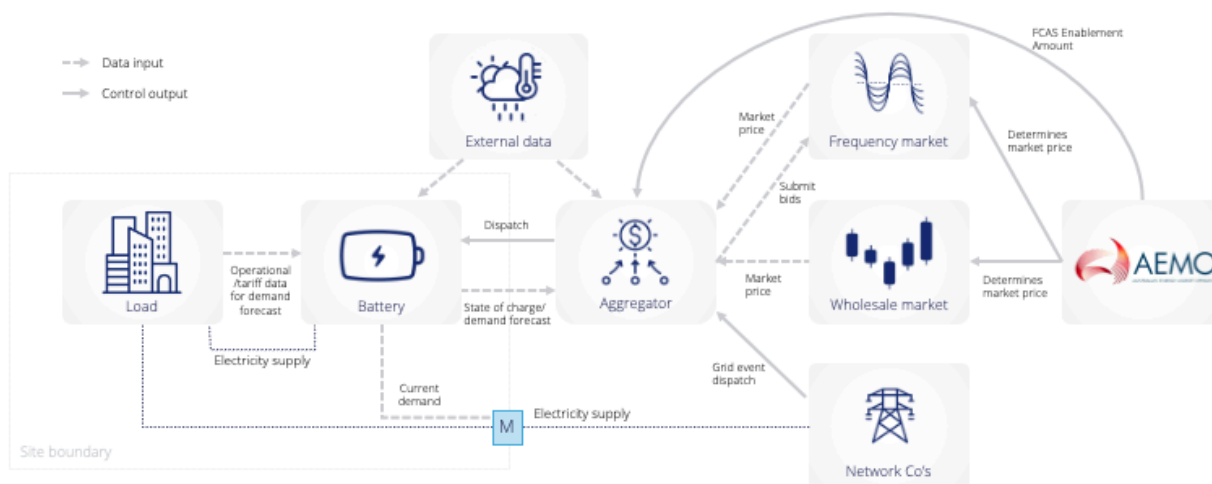


Figure 2- Advanced battery value stack configuration and control

Needless to say, this complexity makes developing a scalable and viable business model a material challenge, which includes the task of translating this into offerings that customers can (A) get heads around and (B) want to buy.

The best vendors to date have been able to follow the principles we've outlined by presenting offers with a clear and compelling value upside, absorbing or reducing the downside risks, and simplifying and streamlining the market integration. How these principles best translate into real world offers is limited only by your imagination, as there are a myriad of options depending on the customer segment and type of VPP. We review a number of diverse real-world customer offers in the Case Studies below. But it's clear that vendors who follow these principals - even if it initially means giving away more value than preferred - will be able to reap the longer-term rewards that come with scale.

2 Case studies showcasing VPP deployment success

We've selected a number of case studies to look deeper into the strategies leading companies are using to successfully deploy VPPs:

- Tesla/Energy Locals VPP
- Shine Hub's VPP
- Flow Power's 'VPP-like' solution
- Shell's & Hanwha's VPP solutions



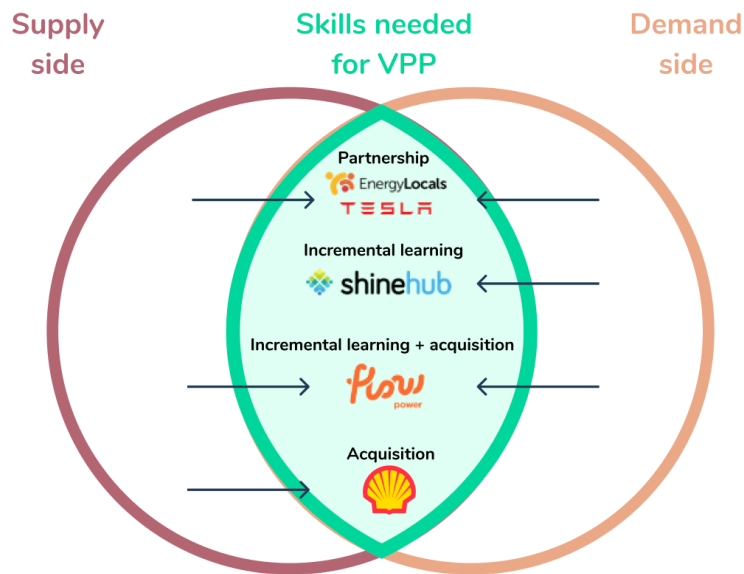


Figure 3 – Companies reviewed in case studies, how they acquired their skills (labels) and from where in the energy value chain they originated (arrows)

2.1 Tesla / Energy Locals Case Study

Tesla and Energy Locals launched their residential VPP in 2018/19, which initially targeted residents in Housing SA’s social housing program. In September 2019, the VPP was expanded to private households who own a Tesla PowerWall 2. Ultimately, the VPP is planned to control 250MW and include 50,000 customers.

How they achieved the required VPP skills sets

Tesla and Energy Locals developed a **partnership** to gain the respective skill sets and market access required to succeed. While the leg up from government certainly helped (with SA Government, Arena and CEFC supporting in some way), Tesla was able to quickly gain access to the wholesale market and FCAS markets via its partner Energy Locals. Vice versa through Tesla, Energy Locals gained exclusive access to a large number of customers for its retail offer and access to the necessary demand-side technology capability, which included Tesla’s hardware, fleet orchestration software and field maintenance network.

What can we take away from this? Partnership is a good means of gaining access to the ‘middle ground’ skill sets which blend supply and demand side. The challenge, as with any partnership, is effective integration of the businesses allowing them to work together. Our general view is this requires the supply side partner (typically a retailer) to be nimble enough to adapt its systems and processes to the needs of the demand side partner. Contrary to popular belief, retailers are very low margin. They can achieve this low margin by automating nearly every aspect of their business. The flipside of all the automation is rigidity and inflexibility. For a partnership to work, the ambition and prize has to be large, especially for the retailer. In the case of the SA VPP, Energy Locals – a relatively



small and nimble business – **will gain access to 50,000 customers (once fully rolled out)**. No doubt a large prize indeed.

How they packaged the VPP offer

For their initial VPP rollout to low-income housing customers, the deal was elegantly packaged as a low-cost energy retail contract, priced up to 32% lower than the then default offer, and the lowest in the market.

Customers would simply sign up to the retail offer with no ongoing contract and a solar PV and Tesla Powerwall would be installed; fully financed, owned and operated by the VPP technology consortium (likely comprising of Clean Energy Financing Corporation and/or the SA government, with contribution from ARENA).

Behind the scenes, Energy Locals earns a fixed fee for service, collecting revenue for the technology owners from the sale of electricity to customers, and the VPP fleet's market earnings in FCAS and wholesale arbitrage. Should the customer happen to churn away from the deal to another energy retailer, the solar and battery system is turned 'on-market' via the embedded network framework, enabling the VPP technology consortium to still earn revenues from the market, with no broken customer contract or buy out fees incurred by the customer.

Not only does this structure shield the customer from VPP complexity and market risk, but it also embeds product financing into the retail offer. Put together, this made selling and scaling the VPP very straightforward, and in line with Power of Choice retail competition obligations.

2.2 ShineHub Case Study

ShineHub's VPP success is very instructive. Today, they are one of Australia's top battery sellers and have a number of VPP offers in the market. However, back in 2016, ShineHub started their business by just selling solar and battery systems to residential customers. In the first three years of their business, **they generated \$15 million revenue from a seed of just \$1000**.

How they achieved the required VPP skills sets

ShineHub's journey from small solar business to serious VPP player has been achieved by skillset strategy of **Incremental learning and skills development**.

1. First, ShineHub learnt how to sell solar and batteries, especially overcoming the sales barriers to batteries. **70% of ShineHub's solar systems are sold with a battery as opposed to the market average of around 13%.**
2. Then, ShineHub learnt how to operate and maintain a fleet of batteries. There were many teething issues for first generation batteries, including the Tesla Powerwall that was launched at about the same time ShineHub entered the market.
3. After ShineHub had a base of revenue and customers, they developed their own hardware-free virtual power plant software, with API integration to the battery inverters themselves to control them from the cloud.
4. Finally, they developed relationships with networks and retailers to unlock the value of VPP market integration.





Figure 4 – ShineHub case study – overcoming barriers to a virtual power plant

What's important is ShineHub started with simple behind-the-meter solutions and learnt how to sell and maintain them before moving on to market integration. They also created a fleet of batteries that they could bolt their virtual power plant on top of. Simply put, the Minimum Viable Product (MVP) for a virtual power plant does not involve the market integration, it is simply selling a battery. They started with a simple self-sufficient battery value stack, and then added advanced value stacks onto it as they become available (recently registering to provide limited FCAS service provision in South Australia).

How they packaged the VPP offer

Shinehub sell VPPs as a value-add feature to a battery, whereby customers can opt-in at the point of sale or once operational. Importantly, joining a ShineHub VPP is free for the customer, both upfront and ongoing. This is helped by the fact that ShineHub have assembled a hardware-free VPP solution made possible by direct inverter integration via API. The predominant value to ShineHub is differentiation from their competitors. From the customers perspective joining one of their VPPs is a 'no-brainer' - an 'upside only' deal with all investment and market risk removed.

Another attribute worth mentioning is that ShineHub offer a 'retailer agnostic' VPP. In doing so, a major barrier to VPP entry is removed – customers no longer to need to weigh up the cost of leaving their retailer of choice to join a VPP. To deliver this service, Shinehub partner with network companies such as AusGrid and SAPN to provide congestion alleviation services. Customers get paid 45c/kWh for battery discharge events. Whilst this ultimately does not drive the same value potential as a retailer-linked VPP, ShineHub have presented a neat, accessible and scalable alternative which has potential to access more revenues in the future.

To round out customer choice, Shinehub have partnered with Powershop to offer a second VPP offer, linked to a retailer – which enables the additional value stream of wholesale energy arbitrage to be captured. Customers receive the same 45c/kWh for battery discharge but get a bonus \$2,000 off their total costs of a leased battery from ShineHub. The \$2000 in discounts might be spread over 10+ years of leasing savings, but the headline figure creates a solid marketing hook plus funnels customers towards Shinehub's long-term leasing arrangements - which are likely more profitable than cash sales.

Combined, this is excellent product packaging from ShineHub. Their customers get a choice of two VPPs, both of which are very easy to understand, have no downside risk and no lock in. From



ShineHub's perspective, it's a product feature other solar companies can't offer, plus they receive happy long-term customers who are more committed to ShineHub than their energy retailer.

2.3 Flow Power Case Study

Flow Power has been included as a case study because, like the other companies discussed, they truly are an energy company of the future – holistically blending supply and demand side solutions to maximise value for their customers. Flow Power feels like a recent market entrant, but it's actually been around since 2009, starting initially as PG Energy then rebranding to Flow Power in 2016. Little public information exists about the nature or scale of their VPP portfolio – but from what we can piece together - its participants are large commercial & industrial customers whose demand-side loads, embedded generators and storage are controlled for value capture via energy arbitrage and peak demand management.

How they achieved the required VPP skills sets

In many ways, Flow Power has (like ShineHub) utilised **incremental investment in skills and experience** to develop its market integrated DER solutions. According to their website, Flow Power founder Matthew van der Linden first developed the demand-side solution 'kWatch' to undertake energy monitoring and demand response (DR) using generators and loads in commercial and industrial facilities. In 2009, van der Linden launched an energy retailer PG Energy, which gave the kWatch and its customers access to the wholesale market, thereby unlocking the full potential of the kWatch technology. It took a number of years to slowly gather the necessary skills and customer learnings before PG Energy rebranded to Flow Power, eventually receiving serious venture backing from a Canadian pension fund to unlock a new growth trajectory.

It's worth noting that Flow Power has also recently used **acquisition** to round out the capabilities of the business. Acquiring Beast Solutions rounded out Flow's engineering capabilities on both the supply (generation and grid integration) and demand side (demand management and storage).

How they packaged the VPP offer

Flow Power's model lends itself well to easily deploying VPP offers to customers. By offering C&I **customers wholesale market exposure** they allow value pass-through to occur which fully incentivizes the customer to respond to market signals. This alone, would ordinarily create market risks beyond the comfort zone of most customers, but with Flow Power, the kWatch product reduces downside exposure and captures upside benefits. Supporting this, additional hedges are offered in the form of power purchase agreements and firming agreements.

Whilst these solutions can capture value for each participant independently of fleet orchestration (and therefore could be classed as market-integrated DER as opposed to a VPP) their structure should allow them to easily add additional revenues streams from VPP fleet orchestration, from FCAS, or the demand response mechanism for example.

Whilst the potential benefits of Flow Power's offer structure are easy for customers to understand, the risks are less so. To counter this, Flow Power has focused on customers large enough to have internal capacity to understand such risks, plus invested heavily in customer education at the point of sale.



Comparing the Flow Power example to Australian new energy technology company Greensync is telling. Greensync was at the same time developing a similar demand response control product to the kWatch, but unlike Flow Power, did not seek to package it with a complementary energy retail solution. This could go some way to explain why Greensync did not gain the same customer traction with their demand-side product as Flow Power.

2.4 Acquisition Case Studies

A fast way to achieve the required VPP skills sets

Acquisition is definitely a good way to gain quick access to required VPP skills and capabilities. The challenge in this nascent market, however, is the limited number of available acquisition options, and of course, having the cash lying around to do it! But for bigger supply side incumbents seeking to broaden their demand side capability to enable VPP deployment, acquisition is perhaps the most obvious strategy.

Shell provides an excellent example of an **acquisition strategy**. Shell has been busily hoovering up businesses around the globe on both the supply and demand sides of the electricity sector. Obviously, this strategy is about building more than simply VPP's – they're building a versatile energy business for the future of which VPPs are a part. Notable Shell purchases include battery & VPP provider Sonnen (DE), demand-side service provider GI Energy (US), VPP and market integration technology company Lime Jump (UK), plus energy retailers for customer access via ERM Power (AU) and First Utility (UK).

Shell is not alone in using acquisition to gain capability. Leading PV technology company Hanwha-QCells is on a similar trajectory, making investments in DER-integration specialists SwitchDin (AU), acquiring battery controls provider Geli (US) and setting up shop in Australia as a next-gen energy retailer (Nectr).

3 Applying the learnings and next steps

In summary, we've presented what we believe to be two of the key elements needed for deploying and scaling a VPP:

1. Getting the right mix of skills and capability (supply and demand side) via either:
 - a. Partnerships
 - b. Incremental investment
 - c. Acquisition
2. Packaging customer offers in a way which:
 - a. shields the customer from operational complexity and downside risk
 - b. offers value to the customer in a tangible, understandable and accessible format

Prospective vendors need to find a way to get these two elements right. And whilst we've presented just some of the strategies used effectively, this review is not exhaustive, and other elements we haven't assessed in this document are equally important. Along these lines, it's critically important



that vendors get a myriad of other things right behind the scenes in order to create offers and go to market, including:

- Understanding the technology and compliance requirements for different revenue streams.
- Maximising earnings potential of a VPP by selecting the right mix of revenue streams.
- Ensuring you're setting up delivery partnerships which align incentives as well as maximise your slice of the pie.
- Ensuring you and your investors understand market risk and future earnings scenarios (assuming you are shielding customers from risk).
- Knowing where to find customers who are likely to benefit from battery and VPP opportunities (particularly important in C&I sector where value is more sensitive to tariffs and loads).

It's a complex new energy world indeed, and VPPs are one of the models at the centre of this world - but those who can navigate the complexity will thrive.

How we can help you with your VPP

New Energy Ventures are a management consultancy offering a raft of support for new energy businesses, particularly battery and VPP market entrants. With our **strategic advisory services**, we can help fill your knowledge gaps so you can build VPP solutions that work in the real world.

In addition to our strategic consulting services, clients have exclusive access to **vippy**, our in-house modelling software specifically developed with batteries and VPPs in mind. **vippy** models potential revenues from a hypothetical VPP helping you refine your go-to-market strategy and customer offer. In addition, **vippy** can help you find & rank opportunities *en masse*. It can also conduct detailed feasibility studies for batteries, VPPs, other DER, and supply-side energy contracts, including PPAs and tariff optimisation.

Get in touch with us today to learn more about our services.

Email: Hello@newenergy.ventures

Web: www.newenergy.ventures

Authors: James Allston, Chris Cooper - New Energy Ventures
Published: December 2020
© 2020 New Energy Ventures Holdings Pty Ltd T/A New Energy Ventures

