

ENERGY TRADING

A PRACTICAL GUIDE

AT A GLANCE

Best suited to:

Businesses with existing solar and controllable loads

Main benefit:

Increased self-consumption with potential income generation

Main barriers:

Need to understand and respond to energy pricing in real time

Good first step:

Investigating existing Virtual Power Plant programs





OVERVIEW

As more businesses install solar, batteries, and smart electrical equipment, there is growing interest in how these systems can work together for shared benefit, rather than operating individually.

Virtual Power Plants (VPPs), Peer-to-Peer (P2P) energy trading, and local or Virtual Energy Networks (VEN) are all approaches that use software, communications systems, and smart meters (sometimes described as “soft infrastructure”) to better coordinate energy generation, storage, and consumption across multiple sites.

A VPP links together distributed energy resources from different properties such as solar, batteries (and their inverters), hot water systems, pumps, and electric vehicles to operate in a coordinated way. A VPP operator such as an electricity retailer may remotely charge or discharge batteries, shift loads, or export power to support the grid or respond to electricity prices. VPPs can engage with energy trading and support energy system services, such as to correct voltage imbalances.

Peer-to-Peer trading allows electricity users to buy and sell electricity directly between participants, usually through a digital platform. For example, a business with surplus solar generation may sell energy to a neighbouring business.

Local or VEN arrangements allow groups of connected sites to share or allocate energy across multiple meters or locations.

While these concepts are developing rapidly, the regulatory and technical arrangements are still evolving in Australia, particularly in regional and rural areas. Currently only a small number of retailers offer VEN or VPP participation.



SUITABLE BUSINESS TYPES

These models are most likely to suit businesses that already have:

- Solar generation with some battery storage.
- Controllable electrical loads (e.g. the ability to shift usage times to respond to lower demand or high solar generation).

- Interval or smart metering.
- Good communications systems.

Intensive agriculture, food processing, and packing sheds may also be suitable because they often have existing technology that can support participation, including refrigeration systems, hot water loads, batteries, backup generation, and controllable processes.

Energy trading may also provide value in remote network areas where reliability is a concern, local solar generation is increasing but export may be constrained, network augmentation is expensive, and communities are looking for alternatives to diesel generation.



BENEFITS

There are a number of potential benefits associated with energy trading. For example:

Energy trading through connected distributed energy resources can help support electrification by:

- Managing increased electricity demand.
- Coordinating charging and storage.
- Reducing peak loads.
- Integrating flexible loads.
- Assisting with energy services like voltage management and emergency mechanisms.

Energy trading can support better use of solar by helping match local generation and demand across a number of businesses, thereby:

- Reducing curtailment of solar exports.
- Absorbing excess solar locally.
- Increasing self-consumption.
- Reducing low-value exports to the grid.

While the size and consistency of revenue streams can vary significantly, some VPP arrangements allow participants to receive payments for:

- Exporting energy during peak demand.
- Providing grid support services.
- Allowing batteries or loads to be controlled.
- Participating in demand response programs.



CHALLENGES

Some of the challenges to consider include:

- Australia's electricity system was not originally designed for widespread distributed trading between small energy users. VPPs and VENs are not available everywhere and are still emerging in a number of locations. As a result, regulations are still evolving and market access can be complicated.
- Poor internet connectivity in regional areas can prevent these systems from working effectively. Satellite internet services may improve viability in some remote areas.
- Revenue streams can be difficult to predict because they depend on wholesale electricity prices, network tariffs, market rules, the cost of operating the system, and the rate that can be paid for exported power.
- Participants need to become familiar with energy trading models and platforms (or identify a third-party to do this work for them), automated battery control, and data sharing requirements. There can also be concerns around third-party control of batteries, cybersecurity, privacy, and complexity of contracts.



TECHNICAL CONSIDERATIONS

Smart metering and good communications

These systems usually utilise solar and batteries behind-the-meter, and rely heavily on communications, software, and metering infrastructure to monitor and conduct energy trading. Most VPP and energy sharing systems require:

- Smart meters to track energy generation, imports and exports, and the timing of energy flows among participants.
- Communications connectivity to allow remote control systems and connection to cloud-based software.
- Remote monitoring capability for live monitoring and automated optimisation.

Controllable equipment

The value of these systems increases where businesses have flexible or controllable loads that can be automatically controlled to absorb surplus solar, reduce peak demand, and respond to electricity pricing. Such equipment can include:

- Batteries, inverters, and electric vehicle chargers.
- Electric hot water systems.
- Refrigeration systems.
- Thermal storage.
- Irrigation pumps.

Software and energy management systems

- A key component is the software platform that coordinates energy flows between participants or devices. If a rural feeder has export constraints, voltage issues, or weak communications, the software may help use the available capacity more intelligently, but it still sits within the limits of the local network.



IMPLEMENTATION CONSIDERATIONS

System upgrades

Implementation may require:

- Upgrades to smart meters, software, and communications between sites, and ensuring the compatibility of existing batteries or inverters.
- The assessment of current electrical systems and upgrades to meters and electrical wiring.
- Upgrades to internet connections.

Specialist design

More complex arrangements such as local energy networks or embedded networks generally require:

- Specialist design.
- Clear legal arrangements between participants.
- Energy retailer coordination.
- Network approvals.



DECISION FACTORS

When this option may make sense

- Your business has significant solar generation and battery storage.
- There is flexible electrical demand within and between participants.
- Export and network infrastructure constraints or poor reliability mean local energy sharing would be more useful.
- High peak demand can be supported by multiple energy generating sites located close together.
- There is strong interest in energy coordination, and communities are looking for local resilience solutions.

When it may not be suitable

- When electricity demand is low and/or the network is relatively stable.
- If communications are unreliable.
- When there is limited smart metering.
- When potential participants are uncomfortable with automation or third-party control.

Key decision criteria

Some factors to consider when deciding whether energy trading is right for you:

If you are unsure about connecting to a VPP, a practical starting point is often to install solar and monitoring, understand your load profiles, add controls to loads or storage (such as pumps, hot water, and batteries) and then assess VPP or coordination opportunities.

The simplest opportunities are often:

- Joining an existing VPP program, where available.
- Participating through a compatible community battery system.

In areas without an existing system, strong community networks can help set the scene for communities to develop a shared energy trading platform.



SPOTLIGHT.

VIRTUAL POWER PLANTS

Virtual power plants (VPPs) can be operated by existing electricity retailers or by third-party providers. In both cases, customers allow the retailer to access their battery at certain times, with the customer retaining different levels of control over when this happens. This access allows the VPP service provider to respond to different energy prices in real time during the day, allowing excess battery energy to be sold during peak periods.

Electricity retailers that support current residential customers and small businesses to participate in a VPP include:

- **Diamond Energy Wattbank VPP.**
- **EnergyAustralia Battery Ease.**
- **AGL Virtual Power Plant.**
- **Nectr Virtual Power Plant.**
- **Synergy Virtual Power Plant.**

Third-party retailers (i.e. companies that don't run network systems but act as a broker for energy) include:

- **Amber Energy SmartShift.**
- **Flow Power.**



www.re-alliance.org.au/electrification