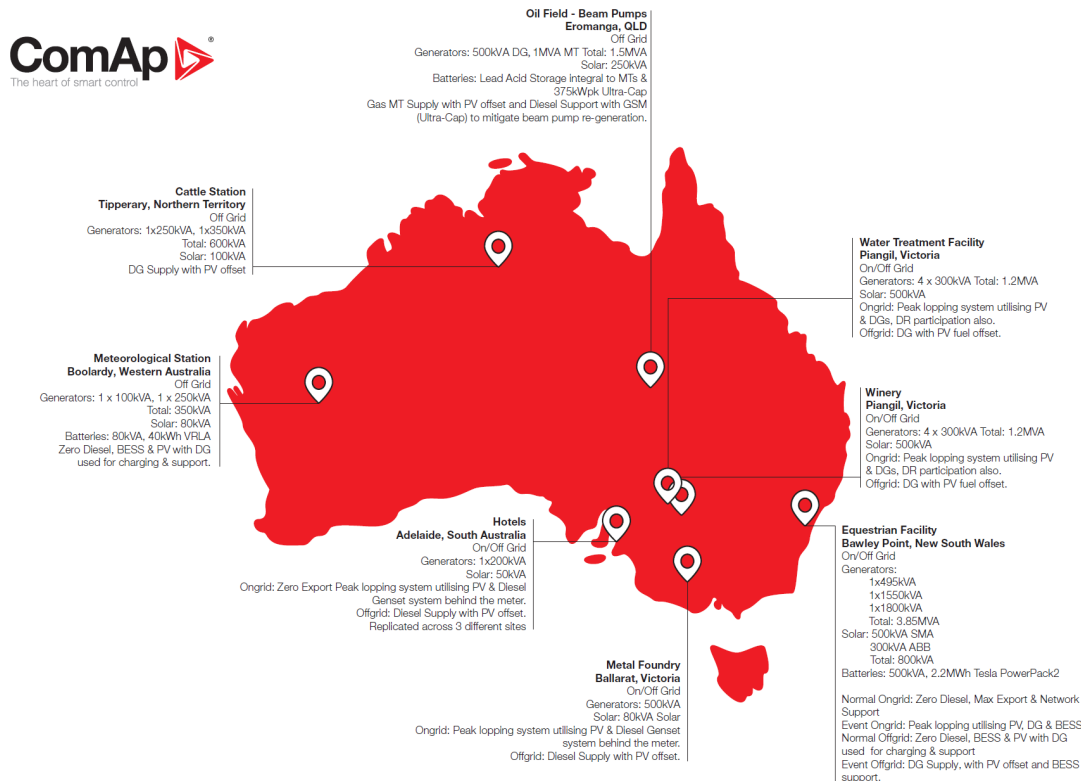


PPA Virtual Conference

Hybrid microgrids
for agriculture,
rural & remote
power consumers

ComAp Hybrid Microgrid Sites in Australia



› Industries we see adopting this technology

- › Agriculture
- › Government Entities and Power Utilities
- › Manufacturing
- › Retail/Hospitality
- › Misc. C&I scale energy consumers

› General Observations

- › Integration of renewable energy sources is becoming common practice.
- › De-centralised microgrid power systems are actually more cost effective than maintaining “poles & wires” and eliminate significant bushfire risk from poor maintenance of these assets.
- › Energy security is essential for business continuity

Hybrid Microgrids - Features

› Definitions:

- › Hybrid – typically depicts two or more energy sources.
 - Solar Industry = Solar + BESS
 - Power Industry = Diesel/Gas generators, Solar, Wind, Hydro, BESS, Hydrogen Fuel Cells etc.
- › Microgrids are power systems that can be:
 - On Grid and are installed “behind the meter” OR
 - Off Grid and completely stand-alone

Note: On Grid systems can typically operate off-grid also.

› General Benefits

- › Cleaner energy profile (\propto REC%)
- › Lower cost to operate
- › Improved energy security

› General Challenges

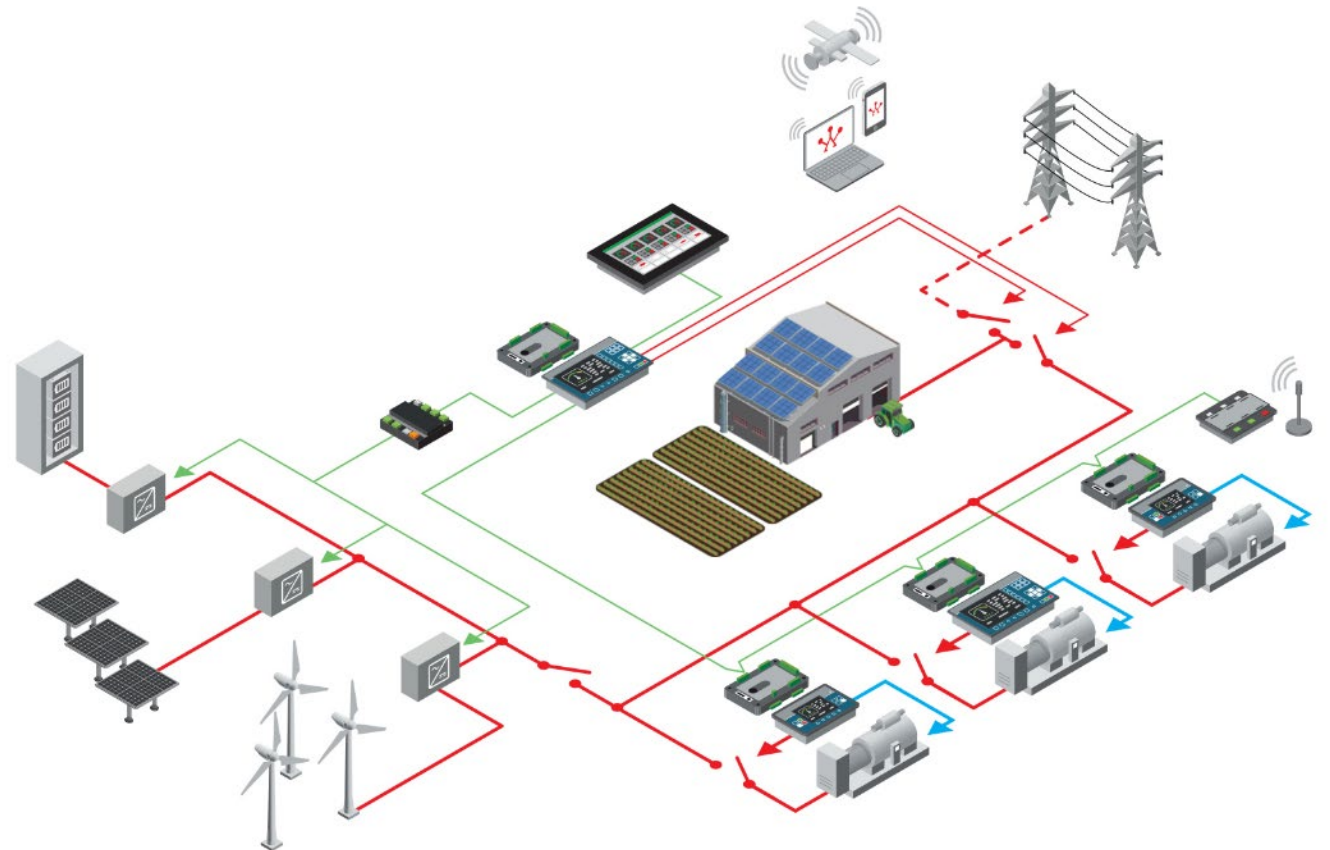
- › High upfront capital expenditure
- › Technical complexity of higher REC systems
- › Inconsistency wrt. Compliance requirements from Utilities for grid connected systems.



Source: Willinga Park Hybrid System

Value Drivers for Agriculture, Rural and Remote Power Consumers

- › Typically - short term ROI on stable/consistent off grid systems
- › Viable alternative to Utility upgrades (\$\$\$)
- › Scalable solution – system can grow with the business' power demands
- › Potential additional revenue stream for grid connected systems with:
 - › Feed In Tariffs (Hopefully AEMC comes to its senses here...);
 - › FCAS market participation options available;
 - › Demand response market participation options available; OR simply
 - › Peak shaving for commercial power consumers (exposed to wholesale rates)
- › Improved quality of supply
 - › Stable V/Hz @ point of consumption
- › Lower operational risk
 - › Fewer outages
 - › Diversity of energy sources
- › Social license to operate
 - › Demonstrating the industry can operate reduce its carbon emissions whilst also potentially improving its MCO.



Project Example: Andrew Peace Wines

› General Details

- › Type of site - Winery
- › Located – Piangil Victoria
- › Solution Partners – AEES Group, Power Logistics Company & Staunch Machinery

› Microgrid Details

- › Grid Connected, can operate off-grid
- › Solar Diesel Hybrid System
- › 1MW (predominately GM) Solar
- › 3 x 500kVA Bio Diesel Generators + Existing 1600kVA Diesel Generator

› Key Project Drivers

- › Mitigation of operational risk (loss of supply)
- › Reduction in operational costs
- › Avoidance of network upgrade charges



Site Photos – Installation



Key Outcomes

- › Energy Security
 - ›› More stable supply
 - ›› Guaranteed power during vintage season
- › Additional revenue from demand response market participation
- › Lower operational costs
- › Greener footprint
- › Future proof energy plan
 - ›› System can scale up if/when the business grows.
 - ›› Site is BESS ready (potential future option)

Key considerations for those think about Hybrid Microgrids

- › Each site is different. Basic financial feasibility modelling (Homer or equivalent) is a great starting point.
- › From an investment perspective cost is a function of:
 - › Renewable Energy Contribution/Target; and
 - › Reliability
- › Sites that operate continuously typically have a better ROI than those that have significant seasonal load demand changes.
- › Selection of key equipment is a critical factor to reliability of the microgrid
- › Control systems become a critical element for larger more complex microgrid solutions
- › Off grid systems with battery storage will support applications where continuous supply or zero diesel operation is required
- › Grid connected systems may be suitable for energy arbitrage or other commercial revenue drivers i.e. Spot price dispatch, demand response, FCAS support etc.



Thank you for your time

