



Redflow Energy Storage

“We do what we can to reduce our environmental impact. This solution is testament to that and is part of our wider journey towards the efficient rollout of broadband connectivity throughout New Zealand.”

Vodafone NZ Technology Director Tony Baird



Redflow benefits for Vodafone New Zealand

Vodafone New Zealand has met the challenge of bringing broadband connectivity to the North Island’s remote Kauaeranga Valley, where no grid power is available, by deploying a best-in-class green energy cell site, powered by Vertiv’s Hybrid Energy Storage System (HESS) with energy stored by Redflow batteries. Located east of Thames, on the edge of the Coromandel Forest Park, the Vodafone tower site, which includes five Redflow ZBM2 zinc-bromine flow batteries, has improved mobile phone coverage and high-speed wireless broadband for thousands of locals and visitors in the region.

PROJECT OVERVIEW

- Location: Kauaeranga Valley, Coromandel Peninsula, New Zealand
- Redflow installation partner: Vertiv <https://www.vertivco.com/en-asia/>
- Storage: Five ZBM2 zinc-bromine flow batteries (50 kilowatt-hours total storage capacity)
- Renewable energy sources: 12 kWp installed solar capacity and 2kW installed wind capacity
- Redflow batteries have stored and delivered more than 50 MWh (megawatt-hours) of energy
- Redflow batteries leverage wind and solar power sources to reduce fossil fuel consumption
- Redflow batteries are 48-volt DC, which easily fits with most telco sites globally
- Redflow batteries help to lower maintenance costs and ensure enhanced reliability
- Redflow batteries contribute to providing the site with continuous off-grid power.



TELECOMMUNICATIONS
CASE STUDY

COROMANDEL
PENINSULA

Vodafone NZ uses Redflow for remote energy storage

Vodafone New Zealand has used Redflow's ZBM2 zinc-bromine flow batteries as part of a best-in-class green energy cell site that brings broadband connectivity to a remote part of the country.

Working with Redflow partner Vertiv, Vodafone NZ has improved mobile coverage and high-speed wireless broadband for thousands of locals and visitors in the southern Coromandel region in the North Island. As part of the New Zealand Government-led Rural Broadband Initiative (RBI), Vodafone has delivered 541 new and upgraded mobile towers on time and within budget. The RBI program now makes high speed wireless broadband accessible for hundreds of thousands of rural homes and businesses.

However, some sites, such as the Kauaeranga Valley, nestled on the edge of the Coromandel Forest Park east of Thames, are so remote that it is unfeasible to lay or connect power cables. Alternative power sources, such as diesel generators, come with their own set of challenges including a second generator for redundancy, high maintenance costs and expensive and difficult diesel deliveries.

To deliver its RBI commitments in the Kauaeranga Valley, Vodafone deployed a best-in-class, green energy cell site using an off-grid solution based on Vertiv's Hybrid Energy Storage System (HESS). The system, which contains five Redflow ZBM2 zinc-bromine flow batteries, provides continuous off-grid power, reduces fossil fuel consumption, lowers maintenance costs and enhances reliability.



Installed in 2016, the system uses wind, solar and batteries as primary energy sources for the tower, with a diesel generator only for minimal backup power during low radiation days. Capable of withstanding the harsh NZ climate, Vertiv's HESS solution comes in a rugged IP55 outdoor enclosure that contains Vertiv's newest generation of rectifiers, solar and wind converters and associated electrical protection devices. It also contains five Redflow ZBM2 zinc-bromine flow batteries, capable of storing a total of 50 kilowatt-hours of energy.

Vertiv chose the innovative Redflow batteries for their intelligent management, remote monitoring and recharging capabilities. High temperature ratings and low environmental emissions also make this an attractive alternative to its valve-regulated lead-acid (VRLA) counterparts.

Redflow batteries can also tolerate temperatures as hot as 50 degrees Celsius without any active cooling. Their ability to provide 100 per cent depth-of-discharge daily makes

this technology ideal for unstable grids and renewable energy sources. Unlike traditional battery technologies, the ZBM2's inherent depth-of-discharge characteristics prevent battery damage from prolonged outages. Redflow batteries are made from easily reused or recycled components and contain a fluid electrolyte that is inherently non-flammable.

"We take great responsibility in our role to deliver broadband to the entire country," said Tony Baird, Technology Director at Vodafone NZ. "Using a hybrid model means a mix of natural energy sources that gives us the ability to provide our customers with an always-on broadband network."

"Designing and deploying this solution was surprisingly simple due to the knowledge of our people and the significant advances in renewable energy sources and battery technology," added Cal Lahteenmaa, Technical Director at Vertiv. "Our engineers leveraged global resources to develop best-in-breed technologies that could integrate seamlessly with our equipment and monitoring design and provide an optimum experience for Vodafone."

Vertiv's HESS solution has been both lab-tested and field-tested for other industry applications to deliver these connectivity results elsewhere in New Zealand, the Asia Pacific and around the world.

To learn more about Redflow ZBM2 zinc-bromine flow batteries, visit www.redflow.com.



About Redflow

Redflow Limited, a publicly-listed Australian company (ASX: RFX), produces small 10kWh zinc-bromine flow batteries that tolerate daily hard work in harsh conditions. Marketed as **ZCell** and **ZBM2**, Redflow batteries are designed for high cycle-rate, long time-base stationary energy storage applications in the residential, commercial & industrial and telecommunications sectors, and are scalable from a single battery installation through to grid-scale deployments. Redflow batteries are sold, installed and maintained by an international network of energy system integrators. Redflow's smart, self-protecting batteries offer unique advantages including secure remote management, 100 per cent daily depth of discharge, tolerance of high ambient temperatures, a simple recycling path, no propensity for thermal runaway and sustained energy delivery throughout their operating life.

www.redflow.com **sustainable energy storage**



ZBM2