

INNOVATION, SUSTAINABILITY + DIGITAL IN PRACTICE

ISDIP

ISDIP104	Solar Powered Offices at Kaiwera Windfarm
Date	24/09/2025
Business Unit	Higgins
Project & Region	Kaiwera Downs Windfarm
ISC Themes	• Using Resources • Emissions, Pollution and Waste • Innovation

1 What Happened?

Our Kaiwera Downs Wind Farm Stage 2 project team is driving sustainability by implementing hybrid power solutions across the site. By integrating solar panels with battery management systems and diesel generators, they're dramatically reducing the carbon footprint and diesel dependency.

2 What Are We Doing Differently?

To reduce carbon emissions and diesel dependency in remote locations, the team implemented hybrid power solutions at the Main Compound, Security Hut, and prime Laydown in conjunction with solar lighting on this project.

At the **Main Compound**, three 8Kva standalone off-grid solar units work in parallel for 3-phase supply, linked to a 110Kva diesel genset. This setup, controlled by a battery management system, has cut daily CO₂ emissions from 818kg to 345kg – a reduction of 473kg per day. **Laydown C** features a 5Kva solar system paired with a 22Kva genset, on track to meet 75% of power needs, with the goal of reaching 100% solar over summer. The **Security Hub** uses a modular solar system to power a container office, minimising generator run time and maximising clean energy use. Diesel usage has dropped from 344L/day to 130L/day, and the modular solar systems will be relocated and reused for future projects, amplifying our sustainability efforts.



The Hybrid power system of solar, battery and genset at Kiwera Downs providing lower carbon site power.

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Main Compound

The setup incorporates 3 x 8Kva standalone off grid connected in parallel for 3 phase supply, 50amps max per phase. The supply is linked to a 110Kva diesel Genset, both being controlled by the battery management system. This configuration results in a daily CO₂ emissions reduction of 473kg, as shown in the emissions data table below. Emission calculations are based on a 110kVa genset running at varied loads.

24-hour Energy Consumption							
110kVa Genset							
2.68 kg/L CO ₂ emissions							
DIESEL USAGE & EMISSIONS					EXPECTED SOLAR EFFICIENCY		
Genset Load	L/Hr	Hrs per Day	Total Emissions per Day (Kg)	CO ₂ per Day	Percentage Taken up by Solar	Revised Emissions per Day (Kg)	CO ₂ Reduction per Day
1/4 Load (Night)	7	9	169		100%	0	169
1/2 Load (Early morning and late evening)	12.8	6	206		100%	0	206
3/4 Load (Day)	18.4	9	444		22%	345	99
Total CO ₂ Emissions			818			345	473

The highest demand for power where the generator will typically be running at ¾ capacity, is between the hours of 7am to 7pm, peaking from 8.30am to 5pm. On a typical day at this location, we can expect that the stored energy (battery bank) and solar-generated power, will be sufficient to power the main compound from 6PM to 9am where usage is low to minimal as well as 2 hours of peak operating times. Not only are the potential savings in CO₂ emissions significant, but our diesel usage also decreases from a maximum 344L/day to 130L/day.

Laydown C

The setup incorporates 1 x 5Kva standalone off grid connected to a 22Kva diesel Genset with both being controlled by the battery management system. This location is on target for completion in September, with the solar install scheduled for completion mid-October. It is hoped that the solar option will cover 75% of all power requirements for Laydown C, and possibly 100% over the summer months.



The team are also using solar lights around the compound that do not need to be connected to power supply.

FLETCHER CONSTRUCTION | BRIAN PERRY CIVIL | HIGGINS

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Security Hub

This setup is supplied by Royal Wolf in a 40' Container office with kitchenette and in-built toilet facilities, with 3kW of solar panels. This is paired with a 3.75kVa petrol generator, connected to the Battery Energy Storage System (BESS). The solar panels charge the batteries during daylight hours, with the generator activating when solar energy is insufficient to meet demand—greatly minimising generator run time.



The Solar systems are modular and will be packed and relocated for use at the next project site.

The site team are expecting the performance of the system to improve as we move into the summer months. By the end of the year, they will have enough data to validate the system performance and get a true understanding of the technical capabilities of the system.

3 More Information

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