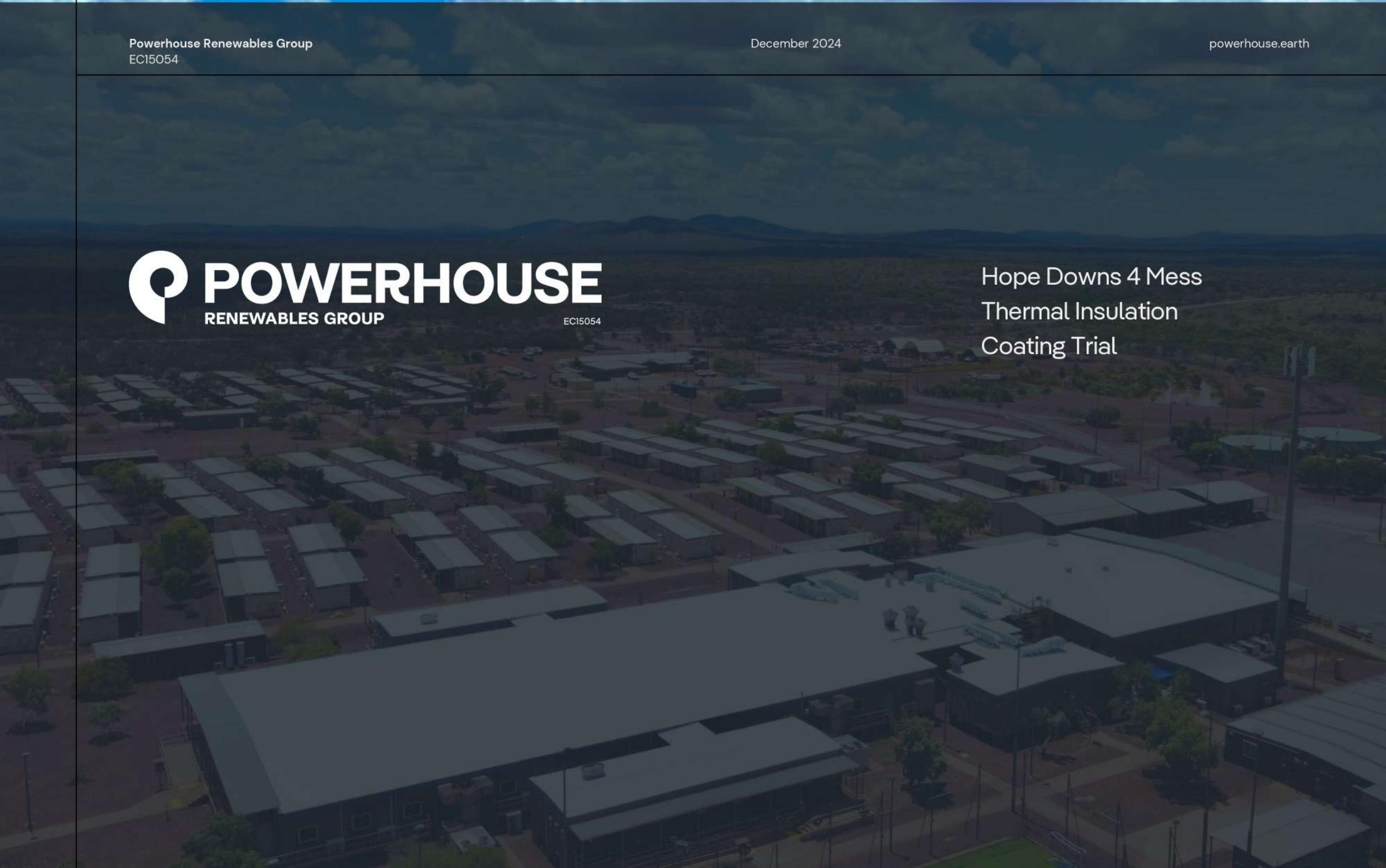




Hope Downs 4 Mess
Thermal Insulation
Coating Trial



Thermal Insulation Application



Roof Repair and Waterproofing

As part of the Thermoshield application project at Hope Downs 4 Mess Camp, comprehensive minor roof repairs and waterproofing were conducted to address damaged and vulnerable areas. These repairs were undertaken to ensure the roof was prepared for the application of Thermoshield and to provide long-lasting protection against environmental stressors.

The waterproofing process involved the application of a high-quality, weather-resistant sealant to identified areas of concern, with a 10-year warranty underscoring the reliability and durability of the solution.

Shortly after the waterproofing was completed, the site experienced significant storm activity. Initial feedback from the camp confirmed the success of the waterproofing, with no reported leaks or water ingress during or after the storms. This positive outcome highlights the effectiveness of the repairs and waterproofing measures.

By preventing water ingress and protecting the roof from rust, the waterproofing process extends the life of the roof, contributing to the overall sustainability of the building. This proactive maintenance approach reduces the need for frequent repairs or replacements, aligning with long-term sustainability goals and minimising the environmental footprint of the camp.

Thermal Insulation Benefits

The completion of the Thermoshield application has given the roof a facelift, delivering a wide range of significant benefits that enhance its efficiency, durability, and safety.

Heat Reduction and Condensation Control

One of the standout advantages of the Thermoshield application for this asset is the substantial reduction in surface heat. By lowering the temperature of the roof and the roof space, the system minimises condensation caused by the interaction between cold air conditioning units and warm surfaces. This reduction in condensation mitigates the risk of mold growth.

Structural Durability

The reduced surface heat on the Colorbond material decreases the expansion and contraction of the roof, a common cause of structural stress and damage over time. By stabilising the roof's thermal behavior, the Thermoshield application significantly extends its life, reducing the need for repairs or premature replacement.

Improved Safety for Workers

The dramatic drop in surface temperature also eliminates the risk of burns for individuals working on the roof. Prior to the application, surface temperatures regularly exceeded 60°C, creating hazardous conditions for maintenance personnel. The Thermoshield now ensures a much safer work environment, even during the hottest months.

- **Heat reduction**
- **Waterproofing**
- **Reduce roof expansion and contraction**
- **Mold prevention**
- **Rust conversion**
- **Health and safety improvement**



Max Surface Temperature Before Application

62.8°C

Max Surface Temperature After Application

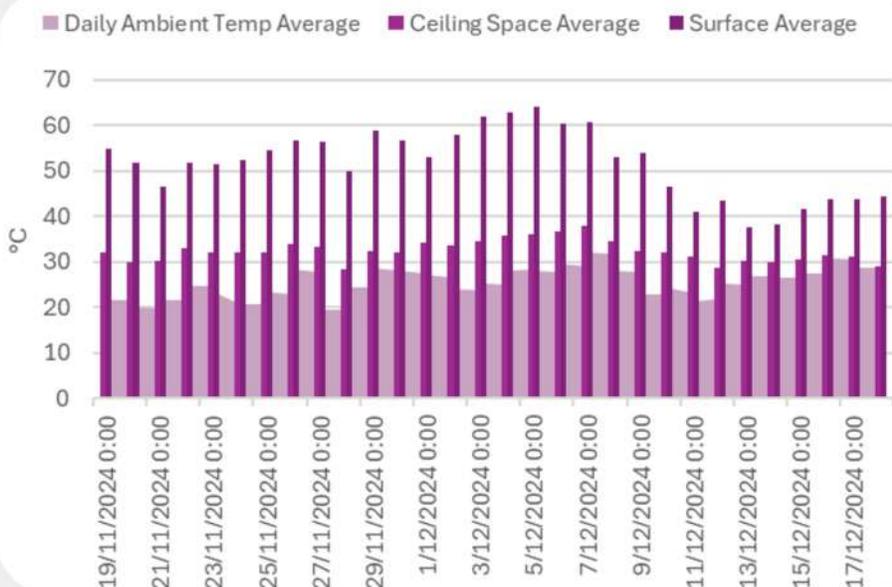
44.8°C

5th December 2024

37.6°C Average Ambient
43.9°C Average Surface

15th December 2024

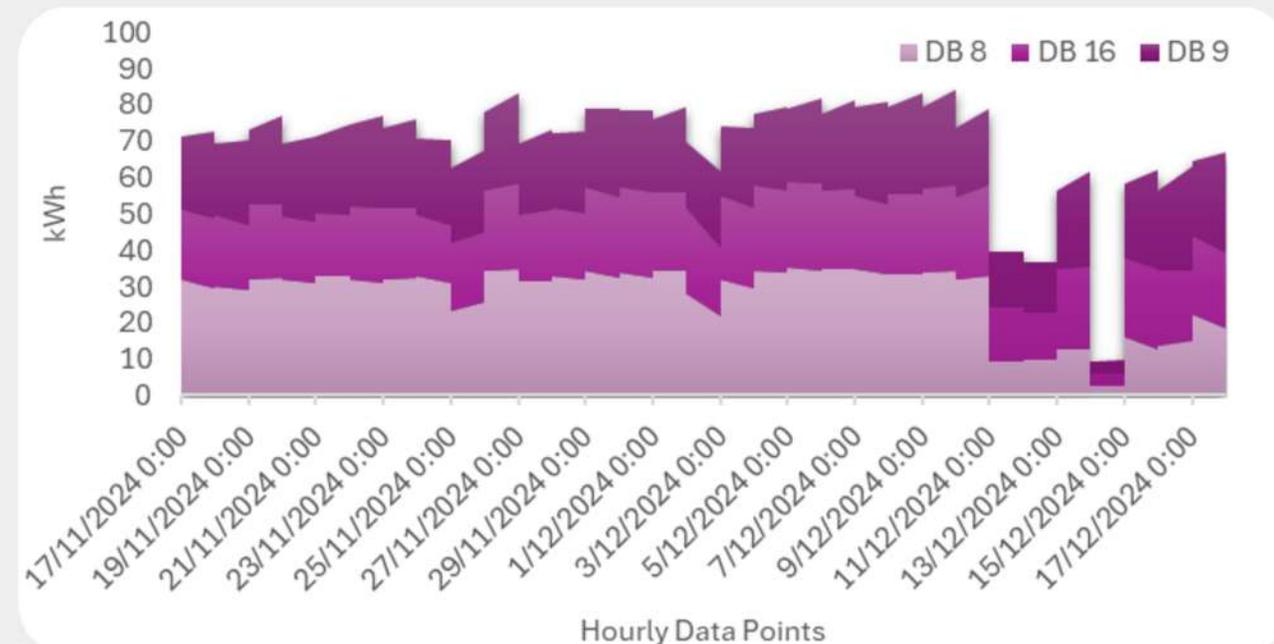
36.3°C Average Ambient
32.4°C Average Surface



Temperature Data

Energy Data

The following data is based on energy monitors on 3 distribution boards located in the Hope Downs 4 Mess. There are approx. 16 distribution boards in this facility.



Energy Consumption Decrease

30.8%

Daily Energy Decrease in kW

558kW

Annual Carbon Emissions Avoided

137t

Equivalent Trees Planted

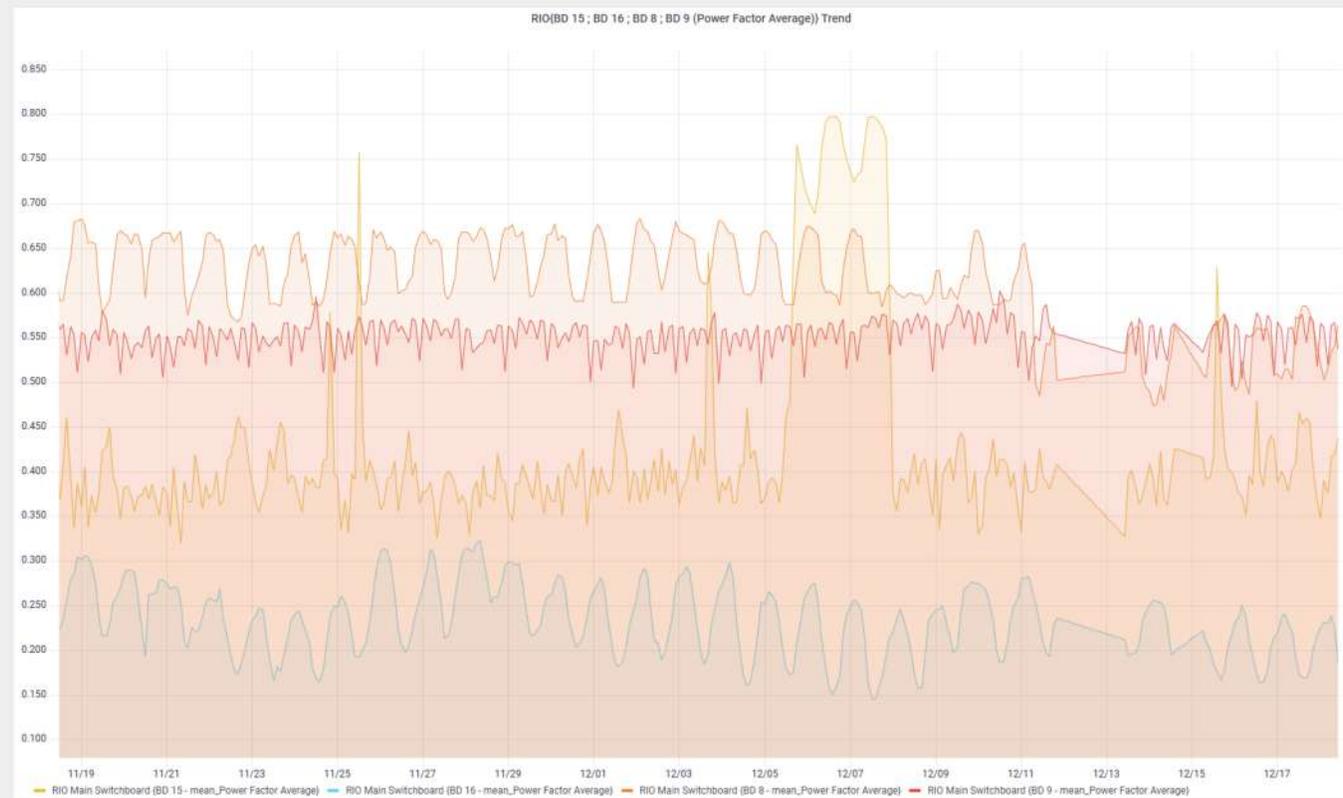
2,264

With the implementation of the thermal insulation coating and other energy efficiency technologies a 30% decrease in energy consumption in this asset would see over;

730 Tons

Annual Carbon Emissions Avoided

Opportunity for Improvement



Power Factor Correction Benefits

- Lower Energy Costs
- Reduced Energy Losses
- Improve Equipment Lifespan
- Increased Capacity

Power Factor Correction

Explaining Power Factor – the Australian way!

The Beer and Foam Analogy

- Imagine you're pouring a glass of beer.
- The beer itself represents the real power—this is what you actually want because it quenches your thirst and serves a purpose.
- The foam represents reactive power—it takes up space in the glass but doesn't contribute to quenching your thirst.
- The total volume of the glass is like the apparent power, which combines both the beer and the foam.

Good vs. Poor Power Factor

- If the glass is mostly beer and only a little foam, it's efficient—you're getting what you want. (This is a good power factor, close to 1.)
- If the glass is mostly foam and only a little beer, you're wasting space and not getting much value. (This is a poor power factor, less than 1.)

Power Factor Correction

- Power factor correction is like learning to pour the beer properly to minimise the foam.
- By reducing the foam (reactive power), you can fit more beer (real power) into the same glass (apparent power).
- This makes the process more efficient and satisfying—just like improving power factor reduces waste and maximises the usefulness of electricity in a system.

Average Power Factor 0.4

Data shows that Hope Downs 4 Mess has an average power factor of below 0.4. A power factor below 0.7 is considered inefficient and can lead to significant energy waste. Therefore, there is a clear opportunity for improvement, which could result in reduced energy costs and improved system efficiency.

Opportunity for Improvement

Natural Refrigerant Conversion

Energy Consumption Review of Distribution Board 15

Upon reviewing the energy data for Distribution Board 15, we've observed that the daily consumption is high, ranging between 5MW and 7MW. If we assume that the majority of this consumption is attributed to cooling systems, there is a significant opportunity for improvement. By converting most equipment to natural refrigerants, we anticipate an energy reduction of 30% to 40%.

Even with a more conservative estimate of a 25% reduction, this could lead to an annual cost saving of over \$140,000 and a reduction of approximately 490 tons of CO2 emissions per year.

Potential Cost Saving
Annually

\$140k

Potential CO2 Reduction
Annually

**490t
CO2**

Distribution Board 15 Load Profile





powerhouse.earth

future@powerhouse.earth

0417 057 651

1/994 Croydon Rd
Karratha LIA WA 6714

Powerhouse Renewables Group Pty Ltd
18 625 701 751
EC15054