



Australian Government



Landmark buildings and greener industrial precincts

As Australia targets a net zero future by 2050 how can the building and construction sector push emissions reduction further than before? The CEFC has worked with Western Australian developer Hesperia to tackle hard-to-abate emissions through the use of low emissions construction materials including low carbon concrete.

ROE ROE HIGHWAY
LOGISTICS PARK



“

We're very proud to have established Hesperia as the first B-Corp in the property industry. We see our business as a vehicle for improving the places where we live and work in terms of environmental, social and economic outcomes. We feel it is important to take action now rather than some point in the future.”

Ben Lisle
Managing Director, Hesperia

Roe Highway Logistics Park

\$95m
CEFC commitment

70-hectare
industrial estate

92,000t
CO₂-e estimated
upfront abatement

Decarbonising construction in the race to net zero

As a thriving industry that employs many Australians and adds significantly to the economy, it is critical that the building and construction sector makes the transition to lower emissions as smoothly as possible.

The building and construction sector accounts for 39 per cent of global emissions and represents a great opportunity to help Australia transition to a low emissions economy. Significant progress has already been made to reduce the sector's operational emissions. That makes embodied carbon – responsible for 28 per cent of emissions from the building and construction sector globally – the next frontier in the task to decarbonise the sector.

The investors

Hesperia: ROE developer and manager Hesperia has extensive experience across commercial, industrial, residential, retail and hospitality projects. The Hesperia name, meaning 'western land', reflects the company's WA heritage and commitment to the state, drawing on best practice in urban design and sustainability. ROE is WA's first 6 Star Green Star facility.

CEFC: The CEFC committed up to \$95 million in senior project finance to the ROE development, its first direct investment in the property sector focused solely on Scope 3 emissions outcomes, using low carbon concrete as a key factor in the carbon neutral construction. The CEFC finance was repaid in December 2022.

Making carbon neutrality a reality

The Roe Highway Logistics Park (ROE) – a rail-side industrial development located nine kilometres from Perth Airport – is the largest premium industrial estate to be established in Perth in more than a decade.

ROE features the first 6 Star Green Star accredited industrial warehouse facility in Western Australia and is seeking to become Western Australia's first carbon neutral industrial estate.

The Hesperia strategy for ROE was to achieve lifetime carbon neutrality for the development.

Hesperia minimised the carbon footprint of ROE by maximising the use of recycled and sustainable materials, maximising energy efficiency and maximising the use of renewable energy. This included using ENVISIA concrete in the foundations of three warehouses.

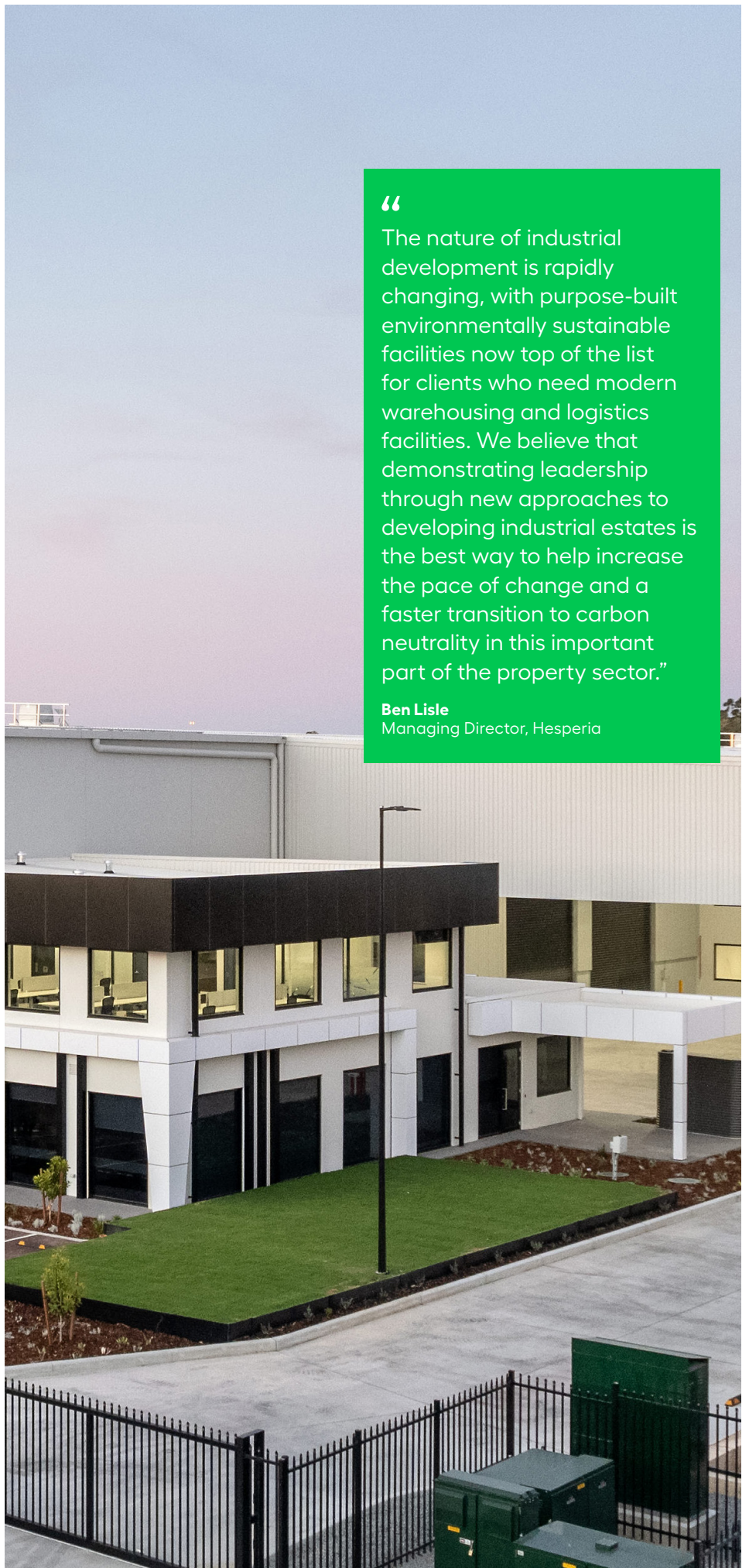
Data analysis of the solar and energy use of each of ROE's tenanted warehouses is also helping determine peak periods of power draw, to inform decisions on solar and battery sizing for each tenant.

The approach taps into growing demand from tenants, owners, investors and communities for developments that cut lifetime emissions and lift sustainability outcomes.

“

The nature of industrial development is rapidly changing, with purpose-built environmentally sustainable facilities now top of the list for clients who need modern warehousing and logistics facilities. We believe that demonstrating leadership through new approaches to developing industrial estates is the best way to help increase the pace of change and a faster transition to carbon neutrality in this important part of the property sector.”

Ben Lisle
Managing Director, Hesperia



Success embodied in concrete approach

Hesperia estimated 21,000 cubic metres of low carbon concrete was poured across the ROE estate, representing, on average, a 41 per cent reduction of the upfront embodied carbon compared to traditional concrete. Combined with better design standards and the use of accredited offsets, the project's overall reduction in upfront embodied carbon emissions was estimated at 92,000 tCO₂-e.

Early engagement between Hesperia and cement supplier Boral ensured that the demanding performance specifications required for industrial properties were met or exceeded, while being delivered on budget.

Over 18 months, Hesperia and Boral tested three low carbon cement products to determine the most appropriate product to use at ROE. Three test slabs were poured and monitored for pourability, setting qualities, strength, and shrinkage.

The chosen Boral ENVISIA product replaced about 50 per cent of the Portland Cement component with blast furnace slag, to achieve an estimated 41 per cent reduction in embodied carbon across the various strengths of concrete mixes used onsite.



ENVISIA features

Early age strength equivalent to conventional concrete, producing similar build times

30 per cent greater flexural strength compared with conventional concrete, to help extend the life of a slab

Up to 50 per cent lower shrinkage than conventional concrete, extending the life of a slab as well as providing enhanced engineering options

Greater protection for reinforcing against steel chloride-induced corrosion

Improved sulphate and acid resistance

Ability to be placed, pumped and finished equivalent to conventional concrete.



Low carbon concrete delivers

21,000m³

low carbon concrete

41%

reduction on embodied carbon

“

Materials and design expertise are improving at a rapid rate, which means low carbon building is a reality now. Understanding and implementing embodied carbon empowers designers, engineers and builders to better manage embodied carbon, delivering a more sustainable approach to these critical assets.”

Michael Di Russo
Director and Joint Head of Property, CEFC

Innovative approach provides template for other buildings

Key sustainability innovations at ROE include new low carbon building materials, large-scale solar PV, and strategic initiatives associated with storm and wastewater management.

Hesperia now plans to use these innovations across its projects, which span the medical, commercial and residential sectors in addition to industrial projects.



Key features

Up to 2 MW solar PV to generate onsite renewable energy for tenant use

Solar consumption metering to help owners and tenants maximise solar benefits and use data to help achieve operational efficiencies

Smart inverters and smart metering, power factor correction and voltage control to enable ROE to work with WA's main electricity network, the South West Interconnected System

Onsite water recycling, storm water management systems, low energy lighting, double glazing, and insulation

More than 4,000 trees planted

Green power purchased to cover any shortfall of energy not generated onsite

Australian Carbon Credit Units purchased and retired to offset remaining emissions.



“Our property-related investment commitments have included demonstration projects with the ability to deliver best-in-class performance around energy efficiency, along with the effective integration of renewable energy into new and existing buildings. Cutting emissions from embodied carbon is the next frontier for the construction sector, with enormous potential from development through to occupation.”

Ryan Rathborne
Director and Joint Head of Property, CEFC

Going above and beyond

As part of its carbon neutrality strategy, Hesperia elected to adopt internationally recognised sustainability initiatives, raising the bar on its ambitions. This included joining some 100 other companies globally in signing onto the World Green Building Council **Net Zero Carbon Buildings Commitment**.

The Commitment challenges companies, cities, states and regions to reach net zero operating emissions in their portfolios by 2030, and to advocate for all buildings to be net zero in operation by 2050. By setting ambitious 'absolute' targets, the Commitment aims to maximise the chances of limiting global warming to below 2 degrees, and ideally below 1.5 degrees, by drastically reducing operating emissions from buildings.

The Commitment provides a framework for organisations to develop globally ambitious yet locally relevant, flexible and universally viable solutions for their portfolio to both reduce energy demand and achieve net zero carbon emissions.

Closer to home, ROE has reaped considerable recognition for its sustainability initiatives:

1

Environmental Excellence:
2022 Urban Development Institute of Australia National Awards

2

Environmental Excellence: 2021 Urban Development Institute of Australia WA Awards

3

Best Industrial Development:
2021 WA Property Awards

4

Best Sustainable Development:
2021 WA Property Awards



Optimising Sandvik energy use

Hesperia received WA's first 6 Star Green Star – Design and As Built industrial facility at ROE for international mining tenant Sandvik Mining and Rock Solutions.

The Green Star sustainability rating system is recognised on an international scale, with 6 Star reserved for highly efficient buildings, meeting strict environmental and social issues while contributing to the community.

The facility, built by Q Design and Construct, includes a 10,500sqm warehouse, 500sqm double storey office, and 220sqm dock office with a 3,615sqm super awning for outdoor storage. It features 100 kW solar and 67 Kwh battery storage, a dual electric vehicle charging station, low carbon concrete, energy-efficient lighting, and a rainwater harvesting system.

Protecting endangered cockatoos

The ROE sustainability commitment extends to bird life. Hesperia has developed the ROE Conservation Strategy to help protect the endangered Forest Red-tailed Black Cockatoo, which seasonally inhabits a specific and wooded area of the ROE estate. The birds live in small flocks in eucalypt forests. Working with BirdLife Australia, Hesperia is conserving and enhancing this cockatoo roost.

Property and the emissions challenge

Scope 1 and 2 operational emissions of commercial properties are expected to reduce over time as the energy sector continues to decarbonise.

The CEFC recognises that focusing on reducing Scope 3 emissions such as embodied carbon will further accelerate the property sector's overall transition to net zero emissions.

Embodied carbon emissions are expected to account for almost half of total emissions from new constructions between now and 2050, with concrete, steel and aluminium considered some of the more challenging materials to decarbonise.



A better built environment with net zero

The CEFC is working with industry leaders and technical experts to build awareness about the potential to deliver a better built environment with net zero emissions. Here are some of our reports:



Low carbon materials

CEFC analysis shows it is possible to achieve a 5-18 per cent reduction in embodied carbon – alongside a 0.4-3 per cent reduction in material costs – in typical building and infrastructure projects.

Embodied carbon emissions occur during the resource extraction, manufacturing and transportation to construction site of materials used in a building or an infrastructure asset. These emissions are expected to account for almost half of total emissions from new constructions between 2019 and 2050.

Read more in this detailed analysis from the CEFC, the Green Building Council of Australia and the Infrastructure Sustainability Council: *Australian buildings and infrastructure: Opportunities for cutting embodied carbon*.



How to electrify everything

Most buildings standing today will still be operational in 2050 – which means electrifying existing and new buildings will ensure they are future-proofed for a decarbonised world.

Electrification can be achieved through the use of new and existing technologies, as well as sustainable design thinking.

Proven low emissions technology and building solutions include high thermal insulation, passive ventilation, solar shading and hydronic heating.

Embedded power networks incorporated at the development stage improve access to renewable energy, reducing building emissions and energy costs.

Read more in these two reports we co-developed with the Green Building Council of Australia: *A Practical Guide to Electrification for new buildings* and *A Practical Guide to Electrification for existing buildings*.



Back to the future with timber

Timber-framed medium and high-rise buildings are growing in popularity across the world, offering a lower carbon footprint, fast build time and physiological benefits for the end user. Innovations in engineered wood products have created new opportunities for mass timber construction in larger projects, with immediate and long-term environmental benefits.

Mass engineered timber is manufactured using adhesives, dowels or nails to laminate small timber pieces to form engineered products that can be stronger than solid wood products of the same dimensions.

CEFC analysis suggests the use of mass timber construction methods cut as much as 75 per cent in embodied carbon emissions compared with conventional steel and concrete designs.

Read more about the CEFC *Timber Building Program*



In summary, the analysis identified that the transition to a lower embodied carbon market is financially accessible and, in many cases, already underway. While barriers still exist, there is significant opportunity to reduce embodied carbon through innovation and a renewal in the way we manufacture, design, build, specify, and procure infrastructure and building projects. Research report: *Australian buildings and infrastructure: Opportunities for cutting embodied carbon.*

Investing for greener outcomes

Through property-related investment commitments the CEFC finances projects that extend the benefits of clean energy across the commercial, industrial and residential property sectors.

Each of these properties has its own energy demands requiring an approach that identifies and harnesses available opportunities. Our investments are demonstrating best-in-class performance around energy efficiency and the integration of renewable energy technologies into new and existing buildings.



Transforming the industrial property sector

\$50m

CEFC investment

The Charter Hall Prime Industrial Fund has 75 assets across Australia including warehouses, industrial estates and distribution centres. The Fund is working with the CEFC to identify demonstration projects to showcase exemplar energy efficiency solutions, clean energy enabling activities and carbon neutral developments.



Providing green power for industrial tenants

\$75m

CEFC investment

Fraser's Property is offering clean, green power for no additional cost at two industrial estates. Innovative distributed energy generation models will be installed at Rubix Connect in Victoria and The Horsley Park Estate in NSW to deliver carbon neutral electricity through onsite solar, battery storage and a biodiesel generator.

About the CEFC

The CEFC is a specialist investor at the centre of efforts to help deliver on Australia's ambitions for a thriving, low emissions future. With a strong investment track record, we are committed to accelerating our transition to net zero emissions by 2050. In addressing some of our toughest emissions challenges, we are filling market gaps and collaborating with investors, innovators and industry leaders to spur substantial new investment where it will have the greatest impact. The CEFC invests on behalf of the Australian Government, with a strong commitment to deliver a positive return for taxpayers across our portfolio.



Setting a new property sector benchmark

\$100m

CEFC investment

The Mirvac Wholesale Office Fund (formerly the AMP Capital Wholesale Fund) has committed to ambitious emissions reductions and efficiency targets across its property portfolio to reach net zero emissions and a portfolio-wide average NABERS Base Building Energy Rating of 5.5 stars by 2030.



Developing environmentally conscious housing

\$54m

CEFC investment

Property developer Metro is incorporating high sustainability standards, low embodied carbon concrete, and green design into its Northcote Place project in Melbourne. The homes have an average NatHERS rating of 8 stars.