

AUSTRALIAN GREEN BUILDING

Developing a smart, sustainable ASEAN



Australian Government

Australian Trade and Investment Commission



green
building
council
australia

At Library at the Dock in Melbourne, lightweight cross-laminated timber allowed construction at the water's edge, delivering a building that is both spectacular and sustainable.



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**Royal Adelaide Hospital
features more than
70 courtyards, terraces
and skygardens.**



INTRODUCTION

Australia's reputation as one of the leaders of the global green building movement reflects a long-term commitment to sustainability and a widespread spirit of collaboration. Today, Australia's property industry regards superior sustainability as a symbol of quality.

The global real estate sustainability benchmark ranks the Australian real estate market as the world's greenest.¹ Meanwhile, Australian companies Mirvac Group, Stockland and The GPT Group have led the Dow Jones Sustainability Index for the last decade.²

Australia's highly skilled workforce, visionary companies and forward-thinking policymakers are committed to collaboration, transparency and knowledge sharing along the length of the construction supply chain.

“Australian companies, through the Green Building Council of Australia (GBCA), have forged strong partnerships with many counterparts in ASEAN, as we work together to accelerate the uptake of sustainable building practices in the world's economic powerhouse.”

Romilly Madew, Chief Executive Officer, GBCA

Already equivalent to the fifth largest economy in the world, the ASEAN region is expected to grow by at least 5.4 per cent each year for the next decade and beyond – well above the global average.³ In this context, opportunities for Australian and ASEAN companies to work together are endless.

The ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA) and bilateral FTAs with Malaysia, Singapore and Thailand deliver Australian urban service firms a competitive edge. What's more, the Regional Comprehensive Economic Partnership and a future bilateral trade agreement with Indonesia will present new opportunities for Australian and ASEAN businesses to connect and collaborate.

Together with its proximity to ASEAN nations, Australia is an ideal partner to develop green building projects that support growth, invest in communities and prepare the region for a low-carbon future.

Talk to your local Austrade representative for tailored advice and to partner with Australia's green builders.

GLOBAL CONTEXT

The United Nations estimates that cities generate 70 per cent of the world's carbon emissions,⁴ and buildings produce around 40 per cent of emissions.⁵

Nations are also rapidly urbanising, and more than one in three of us will live in cities by 2030.

At the intersection of urbanisation and climate change sits a solution that can cut carbon emissions, boost productivity and enhance the health and wellbeing of people. That solution is green building.

Australia can help ASEAN nations manage growth in innovative, economic and environmentally sustainable ways. By 2030, it is anticipated that 40 cities across ASEAN will have populations of one million or more.⁶ According to the Green Building Council of Australia (GBCA), Australia will construct more than 40 million square metres, or 215 million square feet, of certified green building space by 2020.

The maturity of the Australian green building market is underscored by the strength of the GBCA, and the widespread adoption of the internationally recognised Green Star rating system.

As a foundation member of the World Green Building Council's Asia Pacific Network, the GBCA collaborates on cross-regional projects and research, and has strong relationships with green building councils in China, India, Singapore, Malaysia and Indonesia.

Green Star has transformed Australia's approach to the design and delivery of buildings, communities and cities, and this scalable system has been widely adopted in other markets.

Australia has proved the perfect testbed for some of the world's most innovative sustainable building solutions. Early adoption of technologies, such as chilled-beam cooling and cross-laminated timber, have led to widespread efficiencies and emissions reductions.

Famed international projects – from Beijing's Watercube, designed by PTW Architects, to London's International Quarter, developed by Lendlease – are influenced by Australian talent.

COLLABORATING TO CUT CARBON EMISSIONS

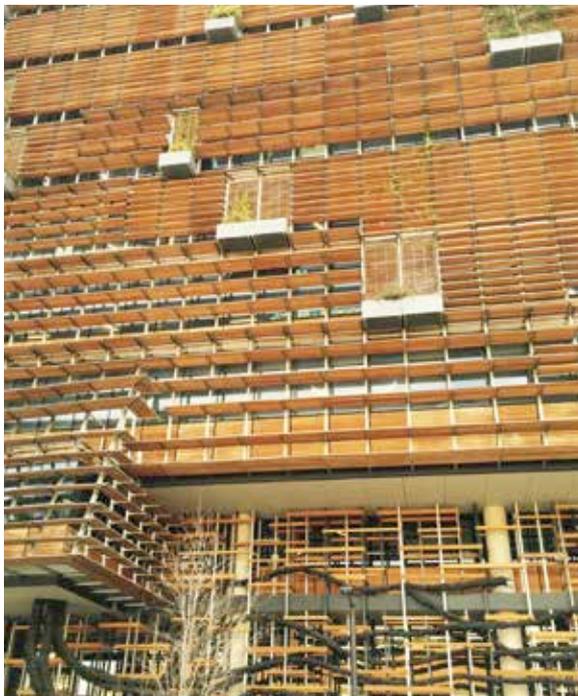
In 2017, the Australian Government launched the National Carbon Offset Standard for Buildings and the National Carbon Offset Standard for Precincts. These standards, developed through close collaboration between the Australian Government, the National Australian Built Environment Rating System (NABERS) and the Green Building Council of Australia (GBCA), provide clear definitions of carbon-neutral buildings and precincts in operation. Building owners can use the robust Green Star or NABERS process to demonstrate compliance.

INDUSTRY STRENGTHS

Australia's harsh climate and scarce water resources mean sustainable building is an economic and environmental necessity. Australians are accustomed to working with weather extremes and diverse geographies, in remote locations and in challenging city environments.

Green building gained momentum in Australia after the Sydney Olympics in 2000. Australia's venues and facilities established new best practice benchmarks and showcased sustainability at scale. Since then, its expertise has evolved and Australia now boasts arguably the world's most mature green building market.

The benefits of Australia's sustainable approach stretch far beyond the environment. Australian green building expertise presents governments and corporations around the world with practical solutions to lower operating costs, increase building values and improve the health and productivity of citizens.



The internationally acclaimed Nishi building in Canberra, designed by Fender Katsalidis, boasts a 6 Star Green Star rating, representing world leadership in sustainable design and construction.

Australia's experience in large-scale sustainable projects is world-renowned – from hospitals to hotels, shopping centres to schools, and from masterplanned communities to city infrastructure.

Among Australia's sustainability stars are Westfield Sydney, one of the most visited shopping malls in the world; One Central Park, a globally admired tall building adorned with living green walls; and Barangaroo South in Sydney, on track to be the first carbon-neutral precinct globally.

Australian firms behind these green icons now penetrate export markets and provide green building expertise to urban projects throughout the world. At the heart of this revolution are clear sustainable building guidelines, consistent regulation and stable policy settings.

WORLD-LEADING AUSTRALIAN EXPERTISE

Australian industry strengths and export-ready firms are world leaders in:

- › Carbon adaptation
- › Lifecycle analysis and energy modelling
- › Sustainable building design
- › Environmentally Sustainable Design (ESD) engineering
- › Energy-efficient lighting, heating, ventilation and air-conditioning (HVAC)
- › Environmentally and economically efficient water systems
- › Building management systems
- › Recycled, low-toxicity and modular building products.

WHY ASEAN

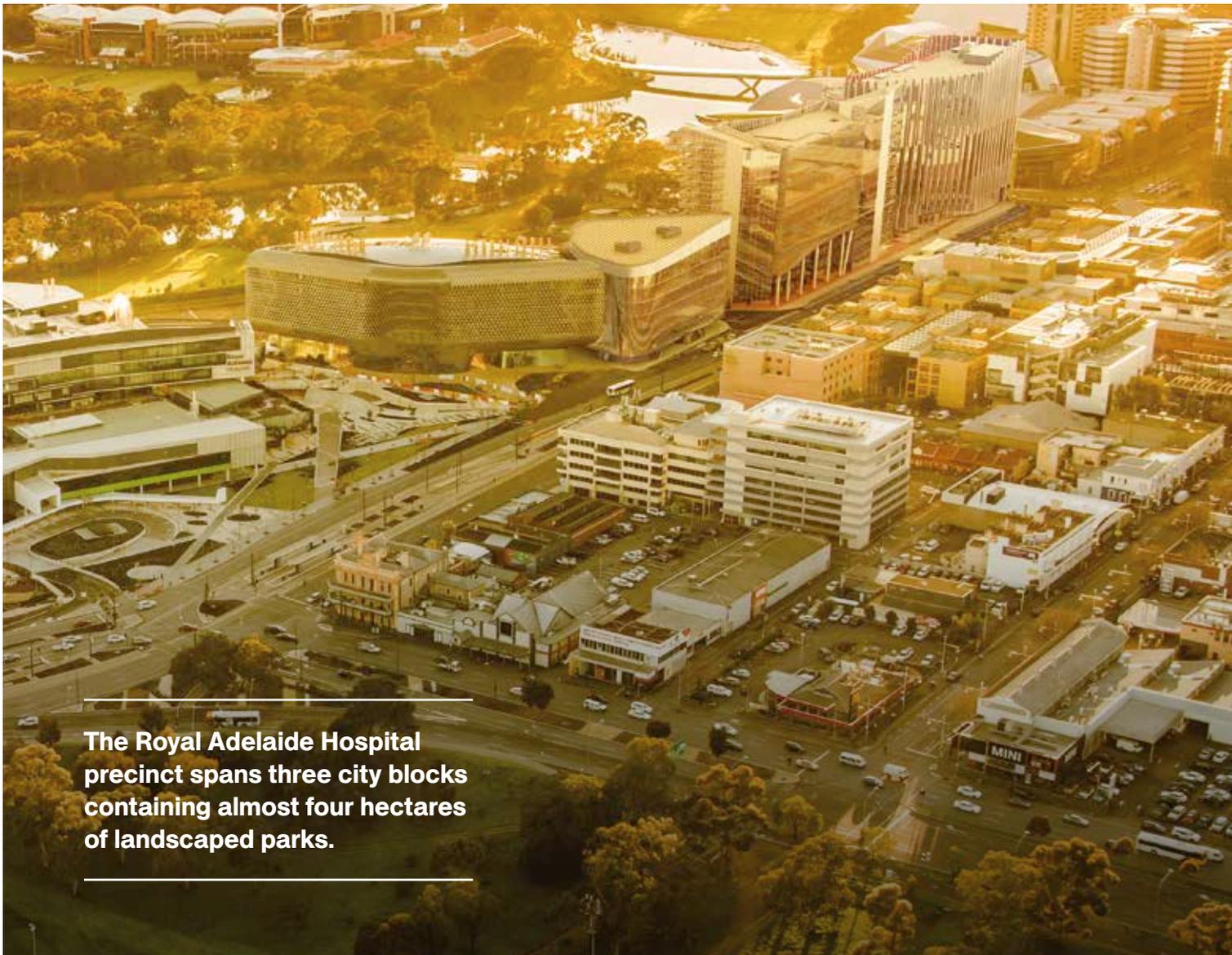
ASEAN leaders are increasingly concerned about environmental sustainability, ethical investment and meeting the challenges of a low-carbon future.

In a region expected to grow by an additional 108 million people by 2035, the task ahead is enormous.

The opportunities, too, are enormous as the ASEAN region's growth is expected to drive green investment of more than US\$3 trillion by 2030.⁸

Recognising the huge potential for a new asset class, the ASEAN Capital Markets Forum has standardised the rules for green bonds across the region.

The ASEAN Green Bond Standards will help investors to make informed decisions about sustainable infrastructure and drive demand for low-emissions, efficient buildings.



The Royal Adelaide Hospital precinct spans three city blocks containing almost four hectares of landscaped parks.

SUSTAINABLE MATERIALS

The global green building materials market is expected to accelerate rapidly over the next few years, reaching \$377 billion by 2022.⁷ Much of this growth will be in the Asia Pacific as cities expand. ASEAN countries are also increasingly concerned about national energy security and the need to do more with less, which is why they are turning to low-carbon, high-performance and healthy materials.

Australia's mature green building market has driven large-scale innovation across the supply chain. The property and construction industry works closely with manufacturers and researchers to develop products and materials that comply with benchmarks for emissions, recycled content and product stewardship. Four outstanding examples are included here.

Sustainable steel

The Centre for Sustainable Materials

Research and Technology (SMaRT) is leading scientific and engineering research into the sustainability of materials and manufacturing processes. Researchers have discovered a process to turn waste into high-quality steel. This new approach has not only improved steelmaking in Australia but led to valuable exports, with 'green steel' now commercialised in Asia, Europe and Britain.

Cross-laminated timber champions

Australia boasts the world's tallest timber high-rise towers, including Forté and Library at the Dock in Melbourne, International House in Sydney and the King Street office tower in Brisbane. Each building is made from prefabricated wooden panels of cross-laminated timber, which reduces the energy-intensity of the construction process, while providing long-term carbon capture. The ability to prefabricate elements of buildings – or the whole development – means less waste, less transport and faster construction times.

Prefabrication pioneers

Hickory Building Systems has pioneered a patented building technology that accelerates construction programs by up to 50 per cent, minimises material and energy waste, and maximises quality and safety. Australia's tallest prefabricated building, the 133-metre-high, 44-storey La Trobe Tower in Melbourne, is a celebrated example of Hickory's success. The Council on Tall Buildings and Urban Habitat named Hickory Building Systems a finalist in the prestigious 2018 Best Tall Building Awards in the Innovation category.

Cool roof revolutionaries

Developer **Stockland** has been working with Australia's **Cooperative Research Centre for Low Carbon Living** to test cool roof strategies on shopping centres and large-scale communities. A range of cool roof materials and colours have been put through their paces to determine which reflects the most sunlight and absorbs the least heat. Stockland is now using the lessons learnt to ensure its new communities combat the heat island effect.

AUSTRALIAN INGENUITY

Established leaders and emerging entrepreneurs across the breadth of Australia's property and construction industry are carving out their niche in one of the world's strongest sustainable building markets. Here are three examples of Australian ingenuity and innovation at work.



Katitjin Centre, Floreat, Western Australia

COX ARCHITECTURE

With offices in Australia, Malaysia and the Middle East, COX integrates architecture, planning, urban design and interior design.

COX designs find balance between the built and natural environments. Sometimes, this means rehabilitating natural landscapes, in other cases nature may provide an alternative solution. In other instances, COX responds to natural forces like floods, winds and other climate concerns.

Perth's Katitjin Centre is just one COX legacy. Smart site orientation ensures this emissions-neutral building benefits from high levels of daylight penetration while reducing thermal loads.

Air-conditioning and ventilation systems don't need to work as hard, and the lighting is only used sparingly, reducing demand in two areas of high energy use.

The orientation, coupled with highly efficient systems, allows the Centre's remaining energy requirements to be met by the installed solar array.

A 42,000-litre rainwater tank and a 'xeriscape' garden at the Katitjin Centre also make it a water-wise wonder.



69 Robertson Street, Brisbane

FLOTH

Working on major projects in Australia and Asia, most notably Indonesia and East Timor, Floth has earned a reputation for technically excellent, commercially viable and sustainable designs.

Floth pioneered now established building services solutions in Australia, and deploys a range of technologies, from building information modelling to computational fluid dynamics.

Floth's 69 Robertson Street building in Brisbane won the World Green Building Council 2016 Asia Pacific Leadership in Green Building Awards for its sustainable design and performance.

This net zero building has halved operational carbon emissions through a smart façade design and leading-edge building services. A roof-mounted solar photovoltaic system offsets another 28 per cent of the building's final operational energy.

But Floth hasn't stopped at energy efficiency. Water-saving measures – from a roof collection system to efficient fixtures and fittings – deliver a 76 per cent water saving on business as usual activities.



Legion House, Sydney

GROCON

From the sparkling office towers to sustainable social housing developments around Australia, Grocon is one of the country's most experienced diversified property and construction groups.

Take the company's work on Australia's first zero net emissions office building, Pixel in Melbourne. Grocon's team tested a range of technologies, from an industry-leading vacuum toilet system to the most efficient solar panels on the market at the time.

Legion House in Sydney demonstrates a carbon-neutral future is possible with the help of existing buildings.

Legion House is disconnected from the grid and all power is produced onsite. Energy is generated through a gasification system which uses recycled woodchips, timber offcuts and even paper from adjacent office towers.

Working with governments on Common Ground projects around Australia, Grocon demonstrates that sustainable design can be a smart, affordable housing solution for people on low incomes and experiencing homelessness.

With offices in Sydney, Melbourne, Brisbane and New York, Grocon has built a reputation for solving complicated sustainability problems in an evolving market.

SUSTAINABILITY SHOWCASE



ONE CENTRAL PARK, SYDNEY

Australia's sustainability specialists were a natural fit for Singaporean developer Frasers Property and its Japanese partner Sekisui House Australia, as they shaped the multi-stage Central Park precinct.

At its heart sits One Central Park. From the stunning vertical gardens and heliostat to on-site water recycling and thermal tri-generation plants, One Central Park packs a punch.

The most eye-catching sustainable innovation is the 120-metre vertical garden enveloped by 35,000 plants. The 1,120-square metre green wall improves the building's efficiency and reduces the urban heat island effect, while also enhancing air quality, biodiversity and human health.

One Central Park's heliostat is made up of more than 40 mirrors which track the sun's path and reflect light up to an area that would otherwise be in shade.

The precinct's 'membrane bioreactor', developed by Flow Systems, is a recycled water facility that treats effluent to such a high quality that it can be reclaimed for urban irrigation – halving potable water consumption and setting new Australian benchmarks for water-sensitive design.

Meanwhile, a tri-generation plant simultaneously produces electricity, heating and cooling and can

provide power, hot water, space heating and air-conditioning. This system supports 3,000 residences and 65,000 square metres of retail and commercial space. It will reduce greenhouse gas emissions by 190,000-plus tonnes over the 25-year life of the plant – equivalent to removing 2,500 cars from the roads every year.

Project team

- › **Acoustic consultants:** Acoustic Logic
- › **Architects:** Atelier Jean Nouvel and PTW Architects
- › **Building services engineer:** Arup Australasia
- › **Landscaping consultants:** Jeppe Aagaard Andersen, Turf Design Studio and Oculus
- › **Main contractor:** Watpac Construction
- › **Quantity surveyor:** Davis Langdon Australia
- › **Structural and civil engineer:** Robert Bird Group
- › **Sustainability consultant:** Savills Australia
- › **Precinct water:** Flow Systems
- › **Foliage:** Junglefy





480 QUEEN STREET, BRISBANE

Featuring the first in-building public park within an office development in the Southern Hemisphere, 480 Queen Street is a 32-storey vertical village with sustainability at its heart.

The building boasts a rooftop grove that offers some of the best views of Brisbane, while the 1,400-square metre public park on level four features a 100-seat amphitheatre for events, bars, restaurants and a boutique gym.

The building's high-performance glazing manages solar heat gains while maximising daylight, which reduces the need for air-conditioning and improves thermal comfort. All timbers were sourced from sustainable plantations or were recycled. More than 80 per cent of construction and demolition waste was diverted from landfill and recycling.

480 Queen Street is the first property in Queensland to register for WELL certification, the world's first building standard focused exclusively on human health.

Project team

- › **Acoustic consultants:** Acoustic Logic and Marshall Day Acoustics
- › **Architect:** BVN (Bligh Voller Nield)
- › **Building services engineers:** NDY and H Design in conjunction with D&C contractors
- › **Developer and D&C contractor:** Grocon
- › **Development Manager:** Dexus
- › **Landscaping consultant:** Lat27
- › **Owners:** Dexus and Dexus Wholesale Property Fund
- › **Structural and civil engineer:** Aurecon Australasia
- › **Sustainability consultant:** Cundall and Lat27





171 COLLINS STREET, MELBOURNE

Fusing a heritage façade with modern design, 171 Collins Street features myriad best practice sustainability features.

Among its clever technologies, 171 Collins Street includes an Australian-first ceiling tile system that absorbs office pollutants and creates a healthier office environment for workers.

Meanwhile, its innovative grey water treatment program collects used water from the cyclist shower facilities and recycles it through the building's cooling towers and toilets, offsetting more than 90 per cent of the cooling towers' water consumption.

The outside of the building is similarly impressive, with 171 Collins Street's façade a big driver of cost efficiency. This high-performance façade folds light from the sky into the base of the building, helping achieve energy efficiency targets.

Project team

- › **Acoustic consultant:** Acoustic Logic
- › **Architect:** Bates Smart Architects
- › **Building services engineers:** Umow Lai
- › **Building surveyor:** PLP Building Surveyors & Consultants
- › **Main contractor:** Multiplex Australasia
- › **Owners:** Cbus Property and Charter Hall
- › **Project Manager:** APP Corporation
- › **Quantity surveyor:** Rider Levett Bucknall
- › **Structural and civil engineer:** Winward Structures
- › **Sustainability consultant:** Umow Lai





ROYAL ADELAIDE HOSPITAL

According to the World Health Organization, climate change poses significant problems to human health, amplifying current health challenges and presenting new risks. This places our health systems at the frontline of climate change.

At the same time, a growing population and rising middle class across the ASEAN region is fuelling regional demand for healthcare services.

One of the largest and most technically complex Green Star buildings in Australia, the 800-bed Royal Adelaide Hospital provides care to 85,000 inpatients and 400,000 outpatients each year.

Spanning three city blocks on a pristine site containing almost four hectares of landscaped parks and internal green space, the hospital features more than 70 courtyards, terraces and sky gardens.

Optimised for daylight, the hospital offers the best possible healing environment with greater levels of privacy, comfort and infection control.

The complexity of this project demanded a deep commitment to collaboration from the multi-disciplinary team.

Project team

- › **Acoustic consultant:** Norman Disney & Young
- › **Architects:** Silver Thomas Hanley and DesignInc
- › **Building services engineers:** Bestec and Lehr Consultants International (Australia)
- › **Building and quantity surveyors:** Hansen Yuncken and CPB Contractors-Cimic Group
- › **ESD consultant:** Cundall
- › **Landscaping consultant:** Tract Consultants
- › **Main contractors and project managers:** Hansen Yuncken and CPB Contractors-Cimic Group
- › **Structural and civil engineers:** Wallbridge and Gilbert



SUPPORTIVE REGULATION

Australia is well known for its robust regulatory environment, which has made it one of the world's most desirable destinations for property investors.

The country's commitment to collaboration is just as robust. Government and industry – led by the GBCA and others – work together to shape regulation that supports more sustainable outcomes. By working together, Green Star and NABERS have become nationally adopted.

For example:

- › The **Building Code of Australia** has strict energy efficiency provisions for both residential and commercial buildings, and minimum energy performance standards are mandatory in all states and territories. Industry and government work together to make sure the Code continues to address climate change.
- › The **Commercial Building Disclosure** scheme requires the NABERS energy efficiency rating of any commercial building larger than 1,000 square metres to be disclosed at the time of sale or lease. This has driven higher levels of transparency, with more than 2,000 buildings in the NABERS directory.
- › The **Nationwide House Energy Rating Scheme** (NatHERS) is a mandatory star rating system that assesses the energy efficiency of a home, based on its design. This measure, introduced in 2017, is expected to deliver \$50 million in new energy savings and around 3.5 megatonnes of carbon in just five years.

MAXIMISING ENVIRONMENTAL PERFORMANCE

NABERS, the National Australian Built Environment Rating System, measures the environmental performance of buildings, tenancies and homes. Buildings are assessed and awarded an individual rating, whether for energy, water, waste or indoor environment quality.

In comparison, Green Star assesses buildings against nine environmental impact categories and awards a holistic rating. The rating systems work in harmony, and many building owners achieve both NABERS and Green Star ratings.

nabers.gov.au

gbca.org.au/green-star

FURTHER RESOURCES

This document is part of a suite of publications on ASEAN, Australian green building capability and the Green Building Council of Australia. For more information go to:

ASEAN Now: Insights for Australian business

<http://dfat.gov.au/about-us/publications/Documents/asean-now-insights-for-australian-business.pdf>

Austrade's Australian Green Building Showcase

<https://www.austrade.gov.au/MultiMediaFiles/Australian-Green-Building-Industry-Showcase/>

Green and Sustainable Building Report 2013

<https://www.austrade.gov.au/greenbuildings/>

ABOUT AUSTRADE

The Australian Trade and Investment Commission – Austrade – contributes to Australia's economic prosperity by helping Australian businesses, education institutions, tourism operators, governments and citizens as they:

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- › win productive foreign direct investment
- › promote international education
- › strengthen Australia's tourism industry
- › seek consular and passport services.

Austrade helps companies around the world to identify and take up investment opportunities in Australia as well as to source Australian goods and services.

Our assistance includes:

- › providing insight on Australian capabilities
- › identifying potential investment projects and strategic alliance partners
- › helping you identify and contact Australian suppliers.

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The project team behind the University of Tasmania's Institute for Marine and Antarctic Studies, including John Wardle, Terroir, Umow Lai and Marshall Day, have delivered a building that is both efficient and inspiring. Image courtesy of Leigh Woolley.



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