Green Building Council Australia

NZGBC
TE KAUNIHERA HANGANGA TAUTAIAO

Green Star in focus

The case for sustainable social infrastructure

greenstar

◆ The Northern Beaches Hospital, NSW. Healthscope.
4 Star Green Star – Healthcare Design, 4 Star Green Star – Healthcare As Built

MAY
2021

Green Building Council Australia

About the Green Building Council of Australia

Established in 2002, the Green Building Council of Australia (GBCA) is the nation's authority on sustainable buildings, communities and cities. Our vision is for healthy, resilient and positive places for people. Our purpose is to lead the sustainable transformation of the built environment.

GBCA's membership reflects the diversity of Australian business with more than 500 small-to-medium enterprises, 83 companies with annual turnover of more than $100 million and 30 companies listed on the SP/ASX200 with a combined market capitalisation of more than $608 billion. Members include major developers, professional services firms, banks, superannuation funds, product manufacturers, retailers and suppliers. We also work with 32 local government members, 24 state government departments and land organisations, and 21 universities.

Company members alone employ more than 50,000 staff across Australia. Our professional development program boasts over 1,400 people advancing their careers and building their skills through their membership with us.

NZGBC
TE KAUNIHERA HANGANGA TAUTAIAO

About the New Zealand Green Building Council

Established in 2006, the New Zealand Green Building Council (NZGBC) believes all New Zealanders deserve to be safe, healthy and happy – at home, at school, at work. Everywhere.

NZGBC represents more than 520 companies and organisations, including government departments, banks, energy companies, insurers, property and construction companies, architects, developers, designers and tertiary education institutions. This includes many of the NZX50. These members have a combined market turnover of NZ$40 billion. We also work with local government members, representing over 60% of New Zealand's population,

NZGBC are passionate advocates for better buildings, because we know that better buildings mean healthier, happier Kiwis. We run trusted, robust authentication schemes, such as Green Star and Homestar, that highlight the many buildings that have proven their healthy, safe credentials. And we provide education for hundreds of New Zealanders every year keen to learn about the technical aspects behind better buildings.

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◆ Tūranga, NZ. Christchurch City Council
5 Star Green Star – Design

Executive summary

As Australia and New Zealand increase their efforts to tackle climate change, our governments must find ways to reduce carbon emissions, energy and water use and waste, while still providing high quality, cost-effective social infrastructure – the buildings and spaces that facilitate the delivery of social services by governments and other service providers.

Buildings account for over 20% of greenhouse gas (GHG) emissions in Australia and New Zealand.[1][2] This includes the embodied carbon from the creation of materials such as steel and concrete used in their construction, the energy used and waste generated during construction, and operational energy use.

Reducing buildings' emissions is one of the most cost-effective ways Australia and New Zealand can meet climate goals.[3] Governments must lead by example to achieve their own emissions reduction targets, but also to unlock many other significant benefits such as such as the effective and efficient use of resources, the protection of our natural environment, the ability to 'future-proof' for shocks and stresses, opportunities to reduce emissions and deliver value for money. As the biggest players in property, construction and procurement, governments have a critical role to play in making more sustainable procurement decisions that catalyse positive changes in the supply chain, drive innovation and build industry capacity.

Over 3000 Green Star projects have been certified in Australia and New Zealand from fitouts, to individual buildings of all types, to whole communities. Almost 200 social infrastructure projects on both sides of the Tasman, including hospitals, schools and universities, libraries, bus and train stations, sporting facilities, community centres and social housing,[4] have achieved Green Star certification and are delivering sustainable outcomes for their government owners and the communities they serve. Green Star is a certified trade mark with a rigorous, independent verification process that assesses projects against industry-agreed best practice benchmarks. Green Star can help guide governments in setting sustainability requirements and allow procuring agencies and project teams to set ambitious sustainability targets and certify that they have been delivered.

While there are costs related to achieving Green Star certification, analysis of Green Star projects shows that the average cost of Green Star is 2.5% of a project's budget.[5] For Best Practice projects (4 Star Green Star), the average cost is 1.1% and many have achieved Green Star for under 1% of total project costs.

4 The New Zealand Government uses the Homestar rating system to verify the sustainability of its social housing projects in New Zealand. Green Star is used to certify multi-unit residential projects in Australia, and the GBCA is developing a Green Star Homes Standard that will deliver sustainable housing at volume.

▲ McAuley Community School, SA. Catholic Education South Australia. 6 Star Green Star – Design & As Built

Green Star helps to future-proof buildings against the impacts of a changing climate and the rising financial and environmental costs of energy, water, waste and emissions.

Analysis of Green Star certified projects has shown average electricity savings of 66%, a 55% reduction in GHG emissions, and a 51% saving in potable water use.[6] Specific analysis of Green Star community centres, libraries and civic buildings undertaken for this report shows average savings of $100,000 per year in energy bills, while Green Star certified schools are generating, on average, 67% fewer GHG emissions. Train stations and bus depots rated with Green Star show average energy savings of 49% and 50% fewer emissions compared to facilities built to minimum standards.

If greater sustainability, reducing operating costs and reducing the total cost of ownership is important for a project, then certification provides the third-party validation that is priceless.

Green Star is a trusted rating system to help governments build, occupy and operate healthier, more productive, efficient, liveable and resilient social infrastructure assets.

The case for sustainable social infrastructure

Social infrastructure commonly refers to foundational services and structures that support the quality of life of a nation, region, city or community. This includes the buildings and spaces that facilitate the delivery of social services by governments and other service providers[7], which are essential to maintaining and improving our standard of living. Examples include facilities for education, health and aged care, arts and culture, social housing, justice and emergency services.[8]

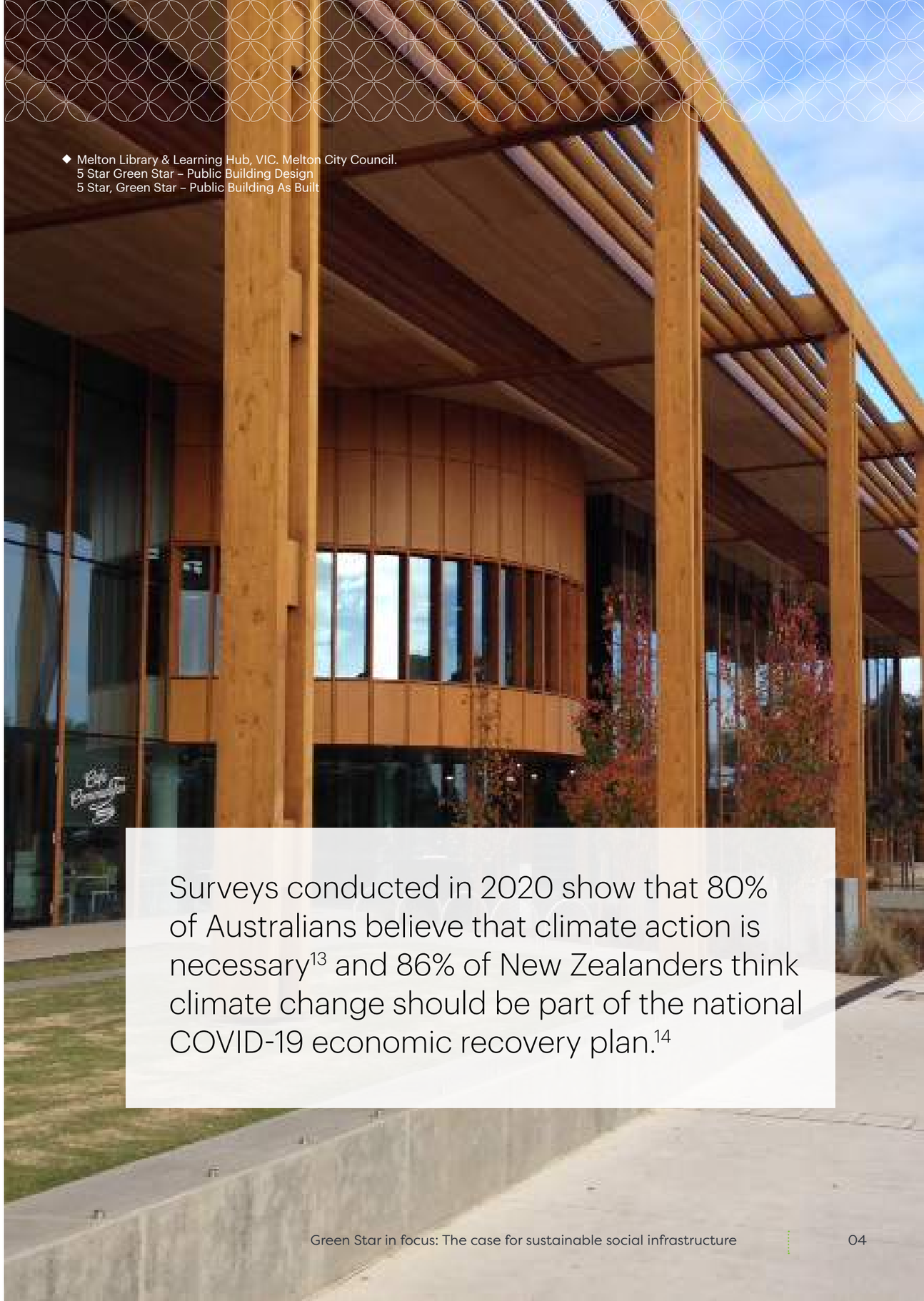
The Australian and New Zealand Governments, to accommodate for growing populations and various social and service delivery needs, are investing in one of the biggest infrastructure development pipelines ever seen. This investment has important implications across a number of priority areas, such as the effective and efficient use of resources, the protection of our natural environment, the ability to 'future-proof' for shocks and stresses, opportunities to reduce emissions and deliver value for money.

Social infrastructure that is developed to serve our present needs as well as future generations leads to communities that are more likely to be 'hired, housed, healthy and happy'.[9] Infrastructure Australia considers sustainable infrastructure to be that which is designed to meet the population's essential service needs, while following sustainability principles. This results in "infrastructure that is planned, designed, procured, constructed and operated to optimise social, economic, environmental and governance outcomes over an asset's life."[10]

Buildings, which amount to 21%[11] and 20%[12] of Australia and New Zealand's total carbon emissions respectively (when emissions resulting from building materials are included as well as operational emissions), can provide some of the fastest and most affordable solutions to our energy and emissions challenges. Social infrastructure projects delivered today should support the transition to net zero emissions, not only as a response to broader policy and economic trends but also to avoid becoming stranded assets in a net zero future.

Governments taking action on climate change can lead by example and put policy into practice by committing to ensuring that all government-owned, operated and occupied facilities are constructed and operated as healthy, efficient and low/zero carbon assets. This includes our schools and hospitals, museums and libraries, stadiums and train stations and government office accommodation.

Government commitment to a rating system such as Green Star on new construction projects – as well as buildings owned, occupied and operated by government – is a way to deliver on the expectations set by government emissions targets and policies, as well as expectations of the community and private investors.



◆ Melton Library & Learning Hub, VIC. Melton City Council.
5 Star Green Star – Public Building Design
5 Star, Green Star – Public Building As Built

Surveys conducted in 2020 show that 80% of Australians believe that climate action is necessary[13] and 86% of New Zealanders think climate change should be part of the national COVID-19 economic recovery plan.[14]

Challenges and opportunities

Governments are always under pressure to deliver and demonstrate value for money. The community expects governments to optimise the utility of assets throughout their lifecycle. We also expect assets to provide a safe, healthy environment for users, that minimise resource use, carbon emissions and other impacts on the environment.

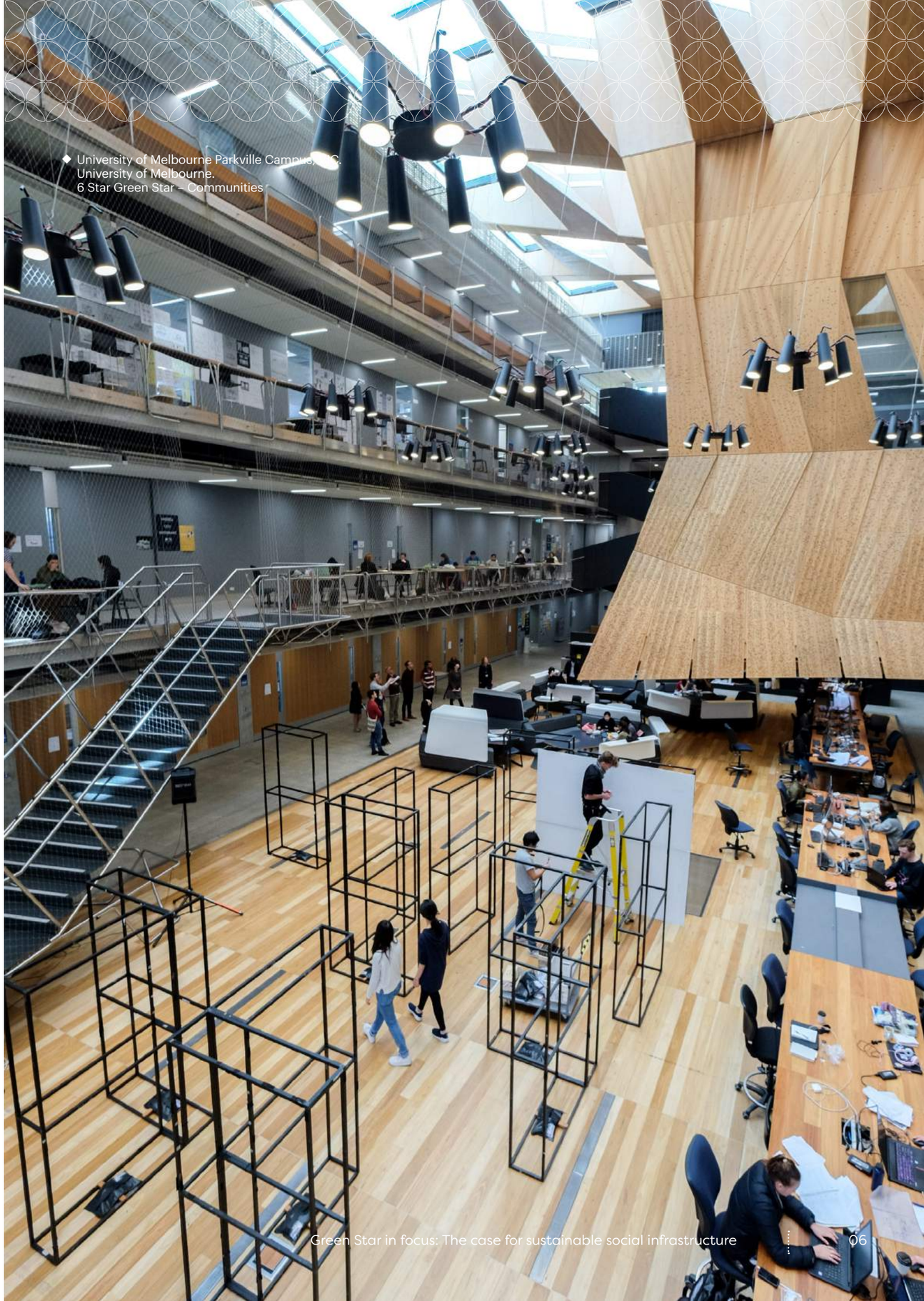
As well as community expectations, governments must also align spending, project delivery and asset operation with policy priorities and shifting economic climates. Governments must balance growth and urbanisation with liveability and meeting environmental challenges.

Natural disasters and global shocks such as the COVID-19 pandemic add complexity to government decision making and alter priorities. The unprecedented ferocity of Australia's 2019-2020 bushfire season, for example, is already prompting change in the way that the insurance and investment sectors approach risk and resilience.[15] [16] Governments must be more responsive and decisive in their approach to climate change mitigation and adaptation than ever before.

With significant investment in COVID-19 economic recovery underway, Australia and New Zealand have a once-in-a-generation opportunity to transform and grow our economy towards a net zero carbon future. Investing in social infrastructure gives governments the opportunity to focus spending on much-needed assets. It creates jobs and can deliver enhanced value through consideration of the environmental, social and economic benefits for the community.

This report shows how committing to sustainability benchmarks for government projects, social infrastructure investment can lead to better health, wellbeing, productivity, liveability and resilience outcomes as well as reducing emissions and ongoing operating costs for governments.

Now is the time to scale up what works and build a pipeline of projects that are more able to meet future challenges and deliver for our communities as well as for our environmental commitments. There are already many examples of projects in New Zealand and Australia doing just this and using Green Star to ensure excellent outcomes.



◆ University of Melbourne Parkville Campus, [illegible]C.
University of Melbourne.
6 Star Green Star – Communities

Understanding Green Star

Green Star is a holistic rating system for providing independent assurance for sustainable buildings, infrastructure and master-planned communities. Launched by GBCA in 2003 in Australia, and in 2007 in New Zealand, Green Star is an internationally recognised rating system that provides a common language for benchmarks of sustainability in the built environment.

The Green Star rating system has been developed collaboratively with stakeholders from industry, government and academia, and locally adapted to suit the Australian and New Zealand markets. It can be applied to every building type, fitouts and master planned communities.[17]

The Green Star rating tools can be applied to single projects, achieve economies of scale using a volume-based approach, or applied across a portfolio of assets. Green Star is compatible with other built environment rating tools including NABERS, NABERSNZ, and Climate Active carbon neutral certification. They have been used together on many projects across Australia and New Zealand.

Green Star and the Infrastructure Sustainability (IS) rating tool have also been used together on several major projects, including the Sydney Metro and Melbourne Metro Tunnel.

Green Star is a registered certification trade mark approved by the Australian Competition and Consumer Commission. A certification trade mark indicates to consumers that a product or service meets a particular standard. The use of a certification trade mark is governed by the Trade Marks Act 1995 which establishes clear requirements and processes to help ensure the integrity and independence of certification trade marks. In addition, the GBCA operates a quality management system which complies with the requirements of the international standard ISO 9001 for the development, upkeep, and delivery of Green Star certification. The NZGBC operates Green Star in New Zealand under licence and in accordance with the relevant trade mark requirements.

17 In October 2020, after extensive consultation, GBCA released the first new rating tool in a staged program of updates, Green Star Buildings. Green Star Buildings is now available in Australia (and will be released in New Zealand in 2022) alongside four existing Green Star rating tools (available in Australia and New Zealand).

- Green Star Design & As Built
- Green Star Interiors
- Green Star Performance
- Green Star Communities

▲ Tonsley, SA. Renewal SA. 6 Star Green Star – Communities

The benefits of Green Star certification

Government commitment to sustainable social infrastructure and achieving Green Star certification can deliver cost savings, support strategic procurement and deliver greater wellbeing, resilience and environmental outcomes among a range of other significant opportunities and benefits.

Green Star provides independent verification that industry-agreed best practice benchmarks have been met and encourages and rewards good design and operation. The rating system's flexibility enables projects of all types to be able to achieve certification.

Green Star is designed to future-proof assets. The requirements in Green Star Buildings, for example, require the building to be ready for future impacts of a changing climate and the rising financial and environmental costs of energy, water and carbon emissions

Certify for certainty

Green Star certification delivers transparent assurance and provides independent verification that the sustainability outcomes the project is seeking have been met.

Projects that want to achieve a Green Star certification must first register with GBCA or NZGBC, and then assemble the documentation needed to demonstrate that the building, fitout or community meets Green Star's sustainability benchmarks within the submission guidelines for the relevant Green Star rating tool.

When all documentation is submitted, it is reviewed by an independent panel of sustainable development experts and an overall score and star rating is assigned.

Whilst Green Star rating tool guidelines are currently available to download and use, no claim of compliance with the Green Star standard can be made without certification.

Only Green Star certification delivers transparent assurance and provides independent verification that the Green Star benchmarks have been met. So called 'equivalency' claims – that a project is 'Green Star equivalent' or 'designed/built to a Green Star standard' are misleading and in breach of trade mark rules.

▼ Patrick Campbell, ESD Engineer, Hutchinson Builders

> Green Star's final stamp of approval is unarguable – you have either built it right or you haven't. The only way to get true confirmation that you've met Green Star benchmarks is to get a rating.

Achieving Green Star certification delivers certainty and assurance in several ways:

- **Green Star certification is rigorous** – Unlike buildings which claim to be green, or claim to be 'designed to' rating system standards without engaging in the certification process, Green Star ensures success and demonstrates that projects achieve a high standard of design, construction and/or operation. Projects claiming 'equivalency', have not been subjected to the independent Green Star verification process used by GBCA and NZGBC.
- **The Green Star rating system has been refined and adopted by industry and government** – The Green Star rating system and certification process is developed and regularly updated in consultation with industry and government stakeholders. Achieving certification guarantees that projects are compared against the most appropriate and up-to-date benchmarks and standards available.
- **Green Star is a trusted trade mark** – claims of 'equivalency' misuse the trade mark, breaching the trust that all stakeholders place in it.
- **Green Star certification is built on a quality process accredited to ISO9001** – 'Equivalency' claims are not subject to any quality assurance processes.

▼ Alec Couchman, Director, Brewer Davidson Architects

> We design and document numerous building types that achieve Green Star certification as well as projects that try to achieve an equivalent standard. Green Star provides certainty that the sustainability initiatives in a building are of a verified minimum standard. Buildings that have not gone through the certification process are unlikely to achieve the same outcomes. This means that an unverified building may not be as energy efficient or provide the same benefits in occupant health.

Cost savings through reduced resource use

World Green Building Council (WorldGBC) research has shown that 20% of total construction costs is saved over a green building's lifetime from energy efficiency alone.[18]

Analysis in Australia shows that Green Star-certified buildings:[19]

- use **66%** less electricity than average Australian buildings.
- produce **55%** fewer greenhouse gas emissions than average Australian buildings.
- use **51%** less potable water than if they had been built to meet minimum industry requirements.

Analysis of Green Star certified social infrastructure projects in Australia undertaken for this report by GBCA shows:

ON AVERAGE, GREEN STAR COMMUNITY CENTRES, LIBRARIES AND CIVIC BUILDINGS:

- use **50%** less energy than buildings built to minimum standards
- generate **54%** fewer GHG emissions than buildings built to minimum standards
- have an average energy intensity **86 kWh** per metre squared per annum, compared to **189 kWh** per square metre per annum if they had been built to standard practice
- will save around **$100,000** per year in energy bills[20]

20 Based on an average floor area of 5521m² and an electricity price of 17.5cents/kWh.

GREEN STAR SCHOOLS:

- Produce, on average, **67%** fewer GHG emissions than schools built to minimum standards
- **73%** of the schools analysed have onsite solar generation, with a combined capacity of **603,237 kWh**. That's enough to power around 50 homes for a year.
- demonstrate GHG emissions reductions with or without solar power.

TRAIN STATIONS AND BUS DEPOTS

- Use **49%** less energy, on average, compared to facilities built to minimum standards and generate **50%** fewer GHG emissions.
- Across the 26 bus stations and bus depots certified, there is a saving of **4,283,377 kWh** per year. Enough energy to power around 390 homes for a year.
- 16 of the facilities have onsite solar energy generation. Together they create **437,627 kWh** of electricity each year. Enough to power around 40 homes for a year.

GBCA analysis of Australian hospitals and healthcare facilities that achieved Green Star certification in 2017 and 2018 shows that they produce 57% fewer GHG emissions than average healthcare buildings. Overall, Green Star rated healthcare facilities in Australia are saving over 35,000 tonnes of GHG emissions every year.[21]

In Australia and New Zealand, Green Star rated social infrastructure projects consistently deliver significant reductions in energy use

Energy modelling for Tūranga, a central library in Christchurch, NZ, with a 5 Star Green Star rating showed the building would use 72% less energy and emit 72% fewer GHG emissions than a comparable building.

► Tūranga, NZ. Christchurch City Council. 5 Star Green Star – Design

Pegasus Bay School in Canterbury, NZ, achieved a 5 Star Green Star certification. Modelling showed it would use 74% less energy and produce 78% fewer GHG emissions than a comparable facility. The school generates enough renewable energy onsite to offset any remaining GHG emissions.

► Pegasus Bay School, NZ. Ministry of Education. 5 Star Green Star – Education Built

South Australia's Attorney General's Department office fitout achieved a 5 Star Green Star and 5 star NABERS rating. The cost of energy is estimated to be half that of an equivalent, non-Green Star rated building.

► Attorney-General's Department Fitout, SA. SA Government. 5 Star Green Star – Interiors

Energy modelling for the Powerhouse Parramatta museum in Western Sydney, Australia predicts a 30% reduction in operational energy compared with an average building, and the goal is for the building to be carbon neutral.

► Powerhouse Parramatta, NSW. NSW Government. Registered for Green Star – Design & As Built

▼ Dr Carl Hopley, Buildings and Facilities Sustainability Planner, Wollongong City Council

> Before Wollongong City Council embraced Green Star, it was benchmarking assets against themselves to achieve continued improvement. But the question was always the same: how do our buildings perform against others? Green Star has helped us answer this. We are now able to validate the success of the implemented efficiency measures and also gauge the benefits from the management procedures and practices followed in the building. The result? The building is running 64% more efficiently than it was when compared to the building's baseline. If we were still consuming at our 2007/08 baseline levels, we'd be spending $250,000 a year more on electricity. Instead, we can reinvest that money back into our community."

Leadership and accountability

Both governments and private sector organisations are becoming increasingly accountable to stakeholders and investors regarding climate action, assessment of climate related risks and commitment to ethical and sustainable development principles.

The use of Green Star can enhance governments' ability to assess climate related risks and identify appropriate adaptation and mitigation strategies for social infrastructure projects. It can support streamlined reporting to organisations such as GRESB (Global ESG Benchmark for Real Assets) and the Taskforce on Climate-related Financial Disclosures (TCFD), and meets the needs of investors looking for trusted and proven measures to back claims of sustainable investment-ready assets. Additionally, it provides an opportunity to share achievements and lessons learnt with industry and the wider community.

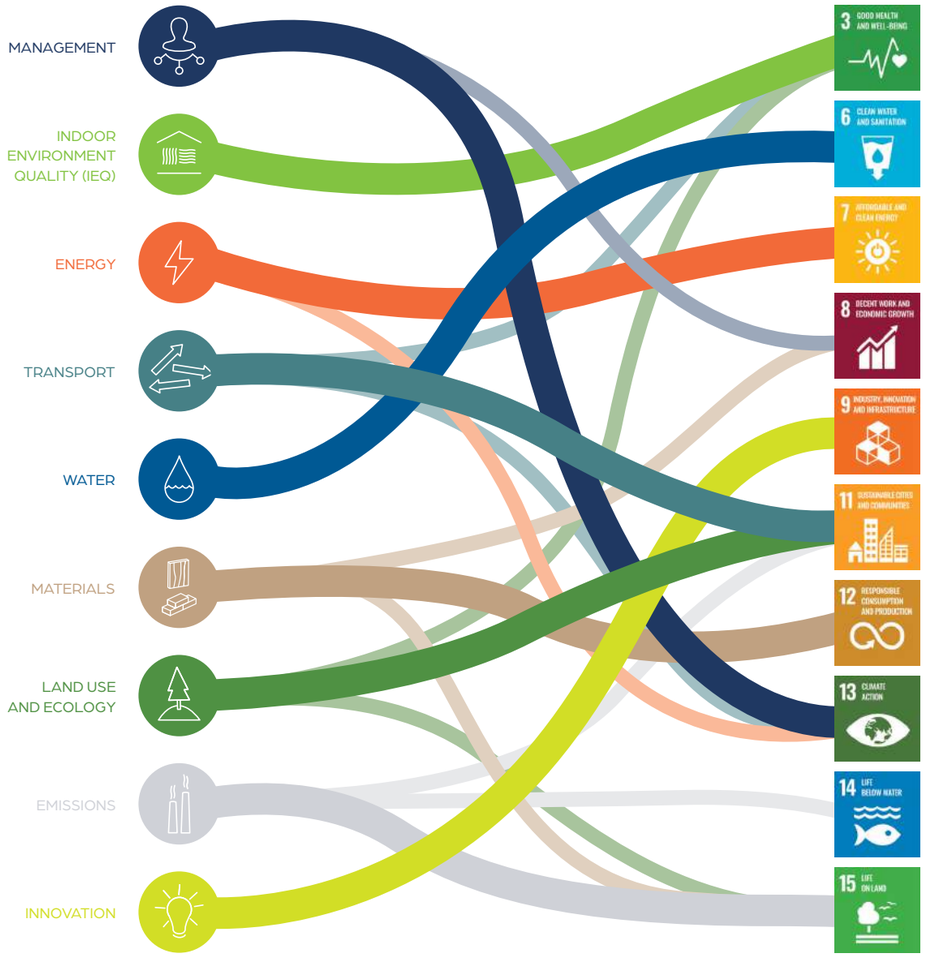
As part of the United Nations (UN), Australia and New Zealand are committed to the 17 UN Sustainable Development Goals (SDGs) and the universal agenda to achieve sustainable development globally, known as Agenda 2030. Governments are increasingly using the SDGs to understand and prioritise sustainable development options, help decision making and align investment outcomes with our regional and global interests. Green Star has strong alignment with the SDGs and can be leveraged by governments to achieve their sustainability objectives

◆ Te Manawa (Westgate), NZ. Auckland City Council.
5 Star Green Star – Custom Design

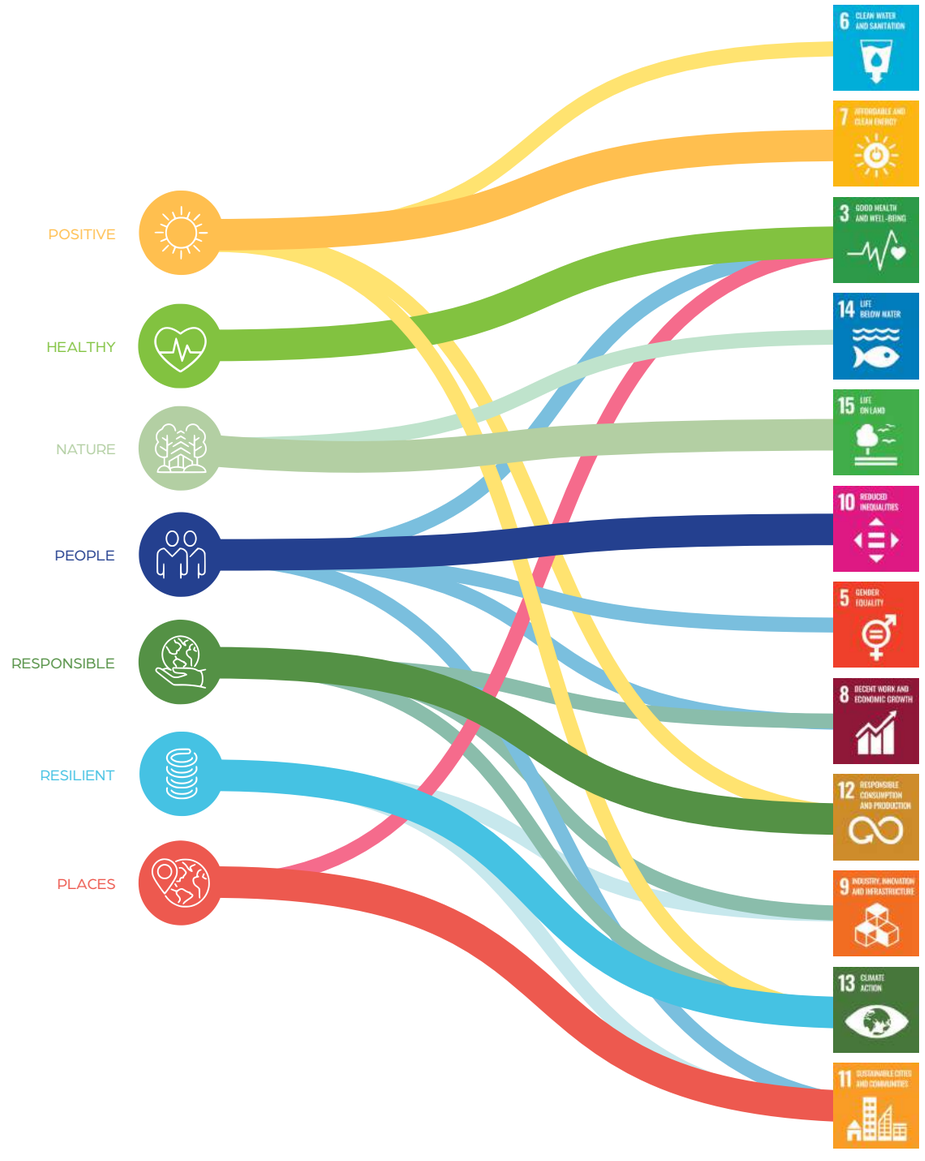
Sustainable Development Goals (SDGs)

Green Star and the United Nations Sustainable Development Goals (SDGs)

This diagram shows Green Star's original nine impact categories (applies to Green Star – Design & As Built, Green Star – Interiors and Green Star – Performance).



This diagram shows the evolution of Green Star with a new set of impact categories that reflect the issues that will define the next decade of the built environment. These categories form the Green Star Buildings rating tool (launched in Australia in October 2020 and to be launched in New Zealand in 2022) and will be introduced across the whole Green Star rating system over the next several years.



Green Star and climate action

Bringing the built environment to net zero emissions is fundamental to ensure we are on track to meet a 1.5°C trajectory. To achieve this, we need new buildings to be net zero in operations by 2030 and all buildings (including their materials or upfront carbon emissions) to be net zero by 2050.

GBCA's Carbon Positive Roadmap and NZGBC's A Zero Carbon Roadmap for Aotearoa's Buildings articulate how we aim to drive the built environment to be net zero through a combination of rating tool targets, advocacy, and education efforts.

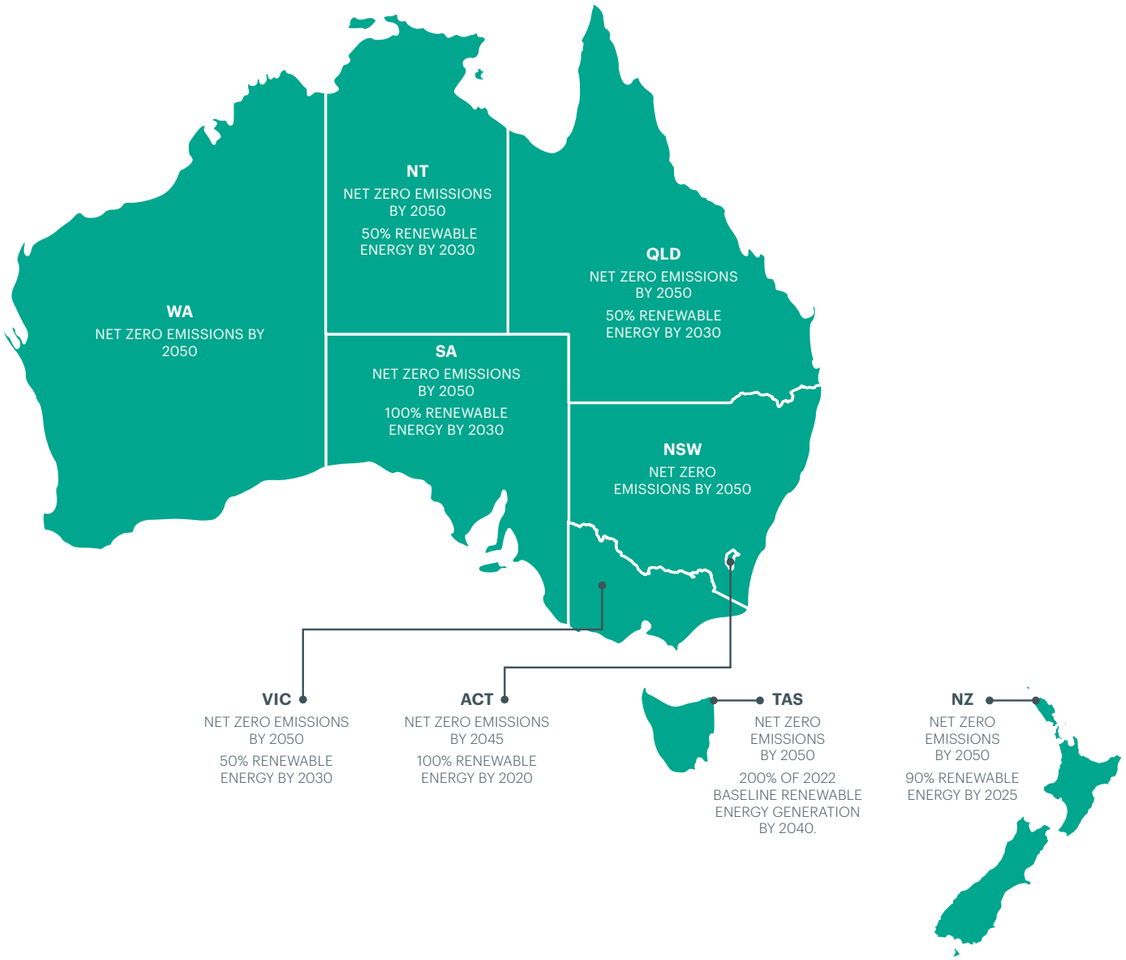
For Green Star, the roadmaps provide a comprehensive trajectory to deliver net zero carbon buildings through a series of updates to the rating system. For example, the launch of the Green Star Buildings tool in Australia in 2020 saw the introduction of new requirements for highest rated buildings (6 Star) to be net zero in operations - defined as being fossil fuel free, highly efficient, powered by renewables, built with lower upfront emissions, and offsetting residual emissions with nature.

In Australia, GBCA plans to cascade this requirement over time to all rated buildings by 2026. NZGBC aims to consult on Green Star Buildings and adapt this rating tool for the New Zealand market. Green Star Buildings will be available in New Zealand in 2022.

Subsequent updates to Green Star rating tools for operational performance (Green Star Performance), fitouts (Green Star – Interiors) and precincts (Green Star – Communities) will include similar requirements in both countries.

Emissions reduction targets

The transition to a low emissions economy is already underway and gathering pace across Australia and New Zealand.



▼ Gordon Bradbery AM, Lord Mayor, Wollongong City Council

> It's important we're not just encouraging our community to consider what they can do to help the environment but also taking on a leadership role and actually doing it ourselves. The Green Star rating is evidence we're following our own advice.

▼ Kevin Devlin, CEO, Level Crossing Removal Project

> By setting high benchmarks in sustainability through the use of Green Star, we are encouraging contractors to think outside the box and ensuring that our works are delivered with environmental and social impacts in mind. Lessons learned are shared for the benefit of the wider construction industry, helping each of our projects to continually improve upon what others have done, which is in turn driving new discussion among interstate transport agencies.

▲ Bayswater Level Crossings Removal Project, VIC. Government of Victoria. 4 Star Green Star - Custom

Innovative finance opportunities

Using trusted independent certification opens access to a growing pool of finance options for governments. As well as increasing options for partnering with and/or attracting investment from private investors and accessing sustainability-linked loans, several governments in Australia and New Zealand have issued their own green bonds. Green bonds can provide finance for new projects, sustainable upgrades to facilities and refinancing existing sustainable assets.

In Australia and New Zealand, the data required for green bond reporting, including Certified Climate Bonds and bonds seeking to be Green Bond Principle compliant, is already collected when certifying a project with Green Star, NABERS or NABERSNZ.[22]

The International Finance Corporation, part of the World Bank Group, notes that investors need to have faith in the reliability of 'greenness' of assets and that buildings must have "clear and reliable labels on them that convey how well a building performs once completed."[23]

Treasury Corporation Victoria raised AU$300 million in 2016 to finance a range of sustainable investments, including low carbon upgrades for buildings.[24]

Auckland City Council (ACC) has issued several green bonds, raising NZ$350 million to date[25] for projects such as cycleways and refinancing the region's electric train fleet. Assets such as the Auckland City Council Head Office is also part of the ACC's growing eligible asset pool for green bonds due to its Green Star and NABERSNZ ratings.

Kāinga Ora, the agency with primary responsibility for delivering public housing in New Zealand, has developed a Sustainability Financing Framework. Under the Framework, Kāinga Ora may issue green bonds, social bonds, green loans, sustainability bonds and wellbeing bonds and the proceeds of these can be used for new social housing, or retrofits of existing social housing, that meet Kāinga Ora's sustainability requirements.[26] This includes projects achieving a minimum 6 Star Homestar[27] rating.

Improving health, wellbeing and productivity

While reducing energy use and carbon emissions is critically important, this should never be achieved at the expense of occupant wellbeing and comfort. The Green Star rating system sets best practice benchmarks for indoor environment quality and encourages efforts to reduce or eliminate pollutants in buildings and increase access to nature.

Even though the value of positive benefits to health and wellbeing from green buildings can be hard to quantify, the WorldGBC has published pre- and post- occupancy studies on a range of green-rated offices, that illustrate:

- A **27%** reduction in staff turnover, as well as high levels (**over 90%**) of employee satisfaction in their workplace
- A **64%** reduction in reported allergy problems and a **68%** reduction in reported respiratory problems
- A reduction of **four sick days** per employee per year
- A **19%** reduction in absenteeism and a **16%** reduction in presenteeism.[28]

WorldGBC's Health and Wellbeing Framework[29] comprehensively details the links between health, wellbeing and productivity and a sustainable built environment. Extensive research is referenced in this framework including findings such as:

- Studies of the benefits of access to nature demonstrate an **8%** increase in office worker productivity, higher rates of learning and improved test results in education spaces, and less crime attributed to areas with access to nature.[30]
- Studies have shown that exposure to natural light during the working day leads to **46 minutes** more of sleep each night.[31]
- Wider comfort indicators which can lead to greater productivity include interior design and aesthetics, colour, character, layout, functionality, space, access to views, nature and greenery.[32]

▲ North Fitzroy Library, VIC. Yarra City Council. 6 Star Green Star – Public Building Design

In New Zealand, a post-occupancy survey[33] was completed to measure and compare occupant satisfaction at four CBD offices in Auckland (non-Green Star). A fifth, Green Star rated office was then surveyed. Tenants within the (6 Star Green Star, 5.5 Star NABERSNZ) Mason Bros. building reported:

- Higher rates of satisfaction with almost every metric reported by occupants of the Green Star office compared with the non-Green Star offices.
- **25%** reduction of absenteeism
- A (self-reported) rise in personal productivity of **8.5%**
- That temperatures were more stable, air was fresher and less smelly, and closer to an ideal humidity
- Feeling more comfortable and perceived that they were healthier overall.

▲ Mason Bros. Building, NZ. Precinct Properties. 6 Star Green Star – Custom Built

Supporting robust procurement

Infrastructure projects are gradually changing in their size and complexity, and new approaches to planning and procurement will be needed for effective delivery. How governments make decisions and assess risk can have lasting impacts on the quality and functionality of the project as well as on value for money outcomes.

In Australia and New Zealand, governments spend billions of dollars each year procuring, developing and maintaining assets. Governments are placing greater importance on reducing operating and whole-of-life costs and on optimising economic, social and environmentally sustainable outcomes throughout an asset's lifecycle. For new projects this also means planning and future-proofing assets to avoid costly retrofits for the purpose of mitigating or avoiding known risks. Taking this approach can lead to better decisions that benefit the community today as well as future generations.

Common considerations related to sustainable investment include outcomes related to:

- Climate resilience
- Energy productivity and carbon emissions
- Water management
- Material use and circular economy
- Liveability
- Cultural heritage
- Environmental protection and enhancement
- Transport access and connectivity

Through Green Star, project teams have access to an internationally recognised rating system that provides a common language for benchmarks of sustainability in the built environment. Clear and tangible benchmarks can be linked directly with government policies and procurement guidelines and can also be used to complement assessment mechanisms within government departments.

Green Star can assist governments to focus on their priorities. For example, if a government wants action on reduced GHG emissions, or wants to promote the use of sustainable materials, it could require government-funded projects to achieve certain benchmarks within the relevant credits as part of their Green Star certification. Achieving certification would ensure these objectives are met as well as assisting with reporting.

▲ Kimi Ora School, NZ. Ministry of Education. 5 Star Green Star – Education Built Photography: Kevin Hawkins

How Green Star supports reporting on, and achieving, New Zealand Government procurement guidelines:

NEW ZEALAND GOVERNMENT PROCUREMENT GUIDELINES	PROCUREMENT CONSIDERATIONS	GREEN STAR
Whole-of-Life: Construction procurement guidelines 2019[34]	Through-life-cost	Green Star has credits focused on Energy, Water, Materials and Maintainability that help a project to consider, plan and maximise efficiency and value throughout the life of a building.
	Environment	Green Star requires projects to provide evidence of how they will deliver energy, water and emissions performance that is demonstrably better than minimum standards required by the building code.
Sustainable Construction: Construction procurement guidelines 2019[35]	Utilising low-impact, sustainable construction materials	Green Star Materials credits encourage and reward materials that are re-used/ recycled/ sourced locally/sourced sustainably/have low emissions/do not include harmful chemicals. Environmental Product Declaration (EPD) requirements can improve transparency and assist life cycle analyses.
	Minimising construction waste and re-using existing built assets	There is a Green Star Materials credit that rewards retaining or reusing existing structures and materials. There is also a credit that rewards minimising and recycling construction and demolition waste.
	Minimising energy and water consumption	The Green Star Energy category is focused on reducing energy consumption and carbon emissions. The Water category encourages reduced consumption of potable water.
Strengthened procurement rules, September 2020[36]	Assess the GHG emissions resulting from the materials and construction processes used.	Green Star encourages projects to consider the lifecycle impacts of materials such as concrete and steel. These materials have high embodied energy and Green Star encourages projects to consider how to reduce volumes, substitute for lower-carbon alternatives such as timber, or consider reusing rather than demolishing existing structures.

How Green Star supports the NSW Government's Gateway Policy for reviewing major capital projects:[37 38]

Gateway 1 Needs analysis	Evaluate strategic options across government priorities using Green Star as a framework to consider broader benefits across portfolios.
Gateway 2 Funding approval	Build, evidence and evaluate the business case using industry agreed standards to evidence and inform value.
Gateway 3 Project procurement and delivery plan	Support value for money through efficient procurement using a tool and standards that are understood by industry and reflect best practice.
Gateway 4 Service provider selection	Provide a leading framework to support tender evaluation against prioritised benefits using a common language.
Gateway 5 Contract management	Deliver a mechanism to communicate how benefits have been achieved using tools that are recognised by industry and the community.
Gateway 6 Procurement and evaluation	Provide evidence and communicate broad benefits realisation and value-add through quantifiable co-benefits delivered through independent, third party assessment against industry agreed, and internationally recognised best-practice standards.

Supporting robust procurement (Cont.)

Using Green Star – with its holistic suite of sustainability benchmarks – for social infrastructure projects can assist governments looking beyond the traditional cost benefit analysis in a number of ways, including:

- Embedding project evaluation and benefits realisation frameworks within decision making processes as a condition of funding and as a component of project scoping.
- Ensuring that business cases and project decisions are held to account through regular reporting and assessment against clear statements of vision, objectives and policies.
- Ensuring that business case development and project selection maximises productivity, liveability and sustainability outcomes.
- Identifying whole-of-life benefits upfront and prioritising projects that deliver significant liveability and sustainability dividends.
- Collecting and analysing data to demonstrate progress against project objectives and communicate outcomes to provide accountability.
- Ensuring that investment into social infrastructure maximises the social and environmental benefits, in addition to economic and productivity gains.
- Collaborating with industry and industry bodies such as the GBCA and NZGBC to refine and implement key policies relating to emissions reduction and sustainable outcomes for the built environment, as well as to ensure transparency, industry coordination and greater business confidence.

Green Star encourages and supports early engagement with all project stakeholders and provides a common language, consistent understanding and shared goals for everyone on the project team. This promotes an integrated team approach to design that can lead to early adoption of sustainability features, early identification of project interdependencies, greater efficiencies, and fewer design conflicts and subsequent change orders. The best outcomes are likely to be achieved when a commitment to Green Star is made at project inception and is embedded throughout the entire investment process, from planning and procurement to delivery and operation.

▼ Tony Moore, Principal Advisor Urban Design, Urban Regeneration and Heritage, Christchurch City Council

> “Green Star has a clear criteria to follow with reporting requirements so everyone had a real understanding of the Tūranga vision and what was to be achieved. Green Star fosters smarter building, more resource efficiency, energy and water savings, lower running costs and a healthy work environment for everyone.

◆ Geelong Library & Heritage Centre, VIC. City of Greater Geelong.
5 Star Green Star – Public Building Design

Procuring more sustainable projects

In New Zealand, the Government's Construction Procurement Guidelines[39] include sustainable construction guidelines[40] that require project teams to incorporate sustainable building practices such as using sustainable construction materials, minimising construction waste and minimising energy and water consumption. In 2020, the procurement rules were further strengthened and now also include the requirement to consider embodied carbon in government building projects.[41]

In Australia, the Queensland Government's independent infrastructure advisory body, Building Queensland, requires a sustainability assessment in business cases for proposals with a capital value of more than AU$100 million. This assessment is part of a set of extensive guidelines for how to incorporate social, environmental, financial and economic considerations into a business case to inform investment.[42] Building Queensland collaborated with GBCA and the Infrastructure Sustainability Council of Australia (ISCA) in 2019-20 to develop an approach for internal project teams to consider sustainability for both linear infrastructure and buildings as part of the business case process.

◆ SA Water Regional Office, SA. SA Water.
5 Star Green Star – Office Design,
5 Star Green Star – Office As Built

The Australian Government's Sustainable Procurement Guide provides step-by-step guidance on how government officials should consider sustainability at different stages when procuring goods and services and are designed to support the implementation of the Commonwealth Procurement Rules. The Guide notes with respect to certifications for building and construction, that projects claiming to meet the requirements of Green Star but are not certified are potentially in breach of trademark rules and may be accused of 'greenwash'.[43]

Governments in Australia and New Zealand are increasingly seeing the benefits of committing to Green Star to deliver a range of benefits and ensure sustainability objectives are met.

In Australia, the governments of Western Australia, South Australia, the Australian Capital Territory, New South Wales and Victoria include Green Star requirements in their procurement standards for office accommodation.[44] For example, the NSW Government Resource Efficiency Policy (GREP) aims to reduce the NSW Government's operating costs and lead by example in increasing the efficiency of its resource use. The policy focuses on energy, water, waste and clean air and agencies are required to report annually on their resource use and their performance against the policy's targets and minimum requirements. GREP requires Green Star for new buildings and fitouts with project costs over AU$10 million.

In New Zealand, the Ministry of Health requires that all new builds, fit outs and renovations should use a certified sustainability rating system such as Green Star.[45] Several other Ministries and departments are also using Green Star for capital projects and office accommodation.

The Building for Climate Change programme[46] proposes a stepped approach for increasing operational energy efficiency requirements and reducing emissions in New Zealand buildings. The programme proposes that government buildings must achieve requirements a step ahead of what is required by industry.

In December 2020, the Prime Minister of New Zealand committed the public sector to become carbon neutral by 2025. The Carbon Neutral Government Programme will require public sector agencies to measure and publicly report on their emissions and to offset any they can't cut by 2025. From January 2021, where government departments take up new leases or renew leases of over 2,000m^2, a NABERSNZ rating of 4 star or above is required.[47]

Giving reinforced credibility to environmental claims

A key benefit of Green Star is in the credible, third-party assurance of outcomes provided through certification. Certification ensures that all parties involved in the project, from project managers, to consultants, to contractors are held accountable and work collaboratively to achieve the project's sustainability goals. The additional scrutiny of an independent process ensures that sustainability features committed to at the outset of a project are less likely to be 'managed out' as the project progresses, and cost-cutting exercises and substitutions do not erode the quality of the final outcome. Not only does this ensure that the project can stay on track, the added credibility to environmental claims means that governments can report on project delivery outcomes with confidence.

▼ Ken Long, Sustainability Consultant, dsquared

> Green Star brings a high level of accountability through the construction process to ensure all sustainability features are truly integrated into the finished building. This process gives the client a clear understanding of the standards they can expect and a specific benchmark for the project team to strive for.

▼ Anita Milne, Technical Director, Built Environment, Aurecon

> Over the 10+ years since Green Star was launched in New Zealand, I have worked on both Green Star certified projects and those that claim equivalence. While as an industry we would like to claim that environmentally sustainable design is now business as usual, the reality is that without following through with certification the robustness is not there.
>
> What were aspirations at the beginning are forgotten, value engineered out during the design & construction process or simply missed during delivery. Certification provides that additional layer of scrutiny, holding the project team to account; and the outcome delivers certainty of the results and buildings that are healthier and more energy efficient than an 'equivalent' building. Certification is the only independent means of verification.

Driving innovation and building industry capacity

The WorldGBC notes that public sector action can help to create a level playing field for low and zero carbon materials and technologies, whilst providing the long-term confidence needed for business investment into these sectors.[48]

Governments have an opportunity to set procurement targets and policies to incentivise market maturity and drive capacity[49] relating to emissions reduction and the use of sustainable materials, such as recycled content in procured goods and services,[50] or low carbon building materials.[51] Significantly, governments can lead the way immediately with their own projects and assets, with no need to wait for policies and targets to be legislated or plans to be ratified. Indeed, governments should strive to remain ahead of minimum standards and a commitment to using Green Star would ensure this leadership.

The Australian and New Zealand markets have already proved to be excellent testbeds for some of the world's most innovative sustainable building solutions, as evidenced through the 3,000+ Green Star ratings across thousands of buildings, fitouts, and communities.[52] Expertise in areas such as carbon mitigation and adaptation, energy modelling, sustainable building design and engineering, building management systems and recycled, low-toxicity and modular building products has grown with the adoption of Green Star, mainly by the private sector. Greater government commitment to sustainability, and independent verification of sustainable outcomes, may enable some of these approaches to be adopted at scale, and will certainly accelerate expertise and industry capacity.

▲ MSS Ohakea, NZ. New Zealand Defence Force. 5 Star Green Star – Industrial Design

Green Star and responsible products

Green Star has sought to be a major driver in the Australian and New Zealand property construction sector for the use of sustainable products and materials. Responsible products are rewarded through a number of credits in the Design & As Built rating tool, such as the Responsible Building Materials credit that offers points for the use of responsibly sourced steel, certified and or re-used timber, and PVC free or best practice PVC based plastic products. The Sustainable Products credit rewards projects for the produces that are re-used, contain recycled content, have an EPD, are covered by an eligible eco-label, or are part of a suitable stewardship programme.

Green Star rating tools released from 2020 onwards include credits that reward the use of products which meet a set of criteria set out in the GBCA's Responsible Products Framework. The Framework scores initiatives that a product or manufacture can comply with, against four key principles:

- Responsible: the product's impacts and content are transparent and meet high standards.
- Healthy: The product is low toxic, respects human rights, and drives valuable social outcomes.
- Positive: The manufacturing process avoids significant environmental impact and delivers net zero carbon products.
- Circular: The product is helping deliver a future low-carbon production and the circular economy.

Improving resilience

The need to improve the resilience of social infrastructure has never been more urgent, as Australia and New Zealand face greater uncertainty from the effects of global trends and a growing list of shocks and stressors. Events such as the 2011 Christchurch and Canterbury earthquakes, Australia's disastrous 2019-20 bushfire season, and the global shock of the COVID-19 pandemic have highlighted just how rapidly conditions can change, and the impacts this has across our interconnected communities.

The extent to which our assets can adapt and how we embed resilience to future shocks will determine their effectiveness and productivity under future scenarios. Our communities deserve to be confident that social infrastructure and other government-funded projects have been thoroughly risk-assessed and that appropriate mitigation and adaptation measures applied.

Since social infrastructure built today will exist long into the future, accounting for risks now will help reduce the risk of stranded assets, or avoidable future refurbishment and retrofit.

While publicly available guidance on how to manage, build and plan for greater resilience can be difficult to find,[51] resilience credits have been a part of the Green Star rating tools for many years. More recently, the focus on encouraging greater resilience in our buildings and communities has increased.

In 2018, GBCA brought together Australia's leading resilience thinkers and practitioners as well as drawing from global leaders and resources to create a set of community resilience principles. A set of new resilience credits has also been developed for Green Star and the principles will guide the future evolution and application of the credits in years to come.

▼ Quin Henderson, CEO, Southbase (Lead Contractor on Tūranga)

> "[Green Star] provided us with a platform to educate our supply chain about sustainable construction and material selection. In some cases, we influenced suppliers to seek out sustainable solutions including material sourcing. Having the project awarded with a Green Star rating validates these efforts.

Green Star and resilience

A climate change resilience credit was introduced in 2012 in Green Star – Communities and in 2014 in Green Star – Design & As Built. Since then, 194 buildings in Australia have been awarded points against these credits, and 30 more in Green Star – Communities.

To encourage and support the benefits that resilience thinking brings to projects, the GBCA developed an Asset Resilience Innovation Challenge for Green Star – Performance. Launched in 2018, the credit seeks to encourage and recognise projects that address the short- and long-term shocks and stresses associated with environmental, climate, societal, economic, technological and geopolitical changes through asset resilience. The success of these credits and the Asset Resilience Innovation Challenge prompted the GBCA to begin working on a more comprehensive definition of resilience for the rating system in 2018. The outcome of this process culminated in credits that can be found in the Resilient, Positive, Places and Nature categories of the Green Star Buildings rating tool (released in Australia in 2020).

CREDIT		CREDIT OUTCOME & REQUIREMENTS
Resilient	Climate change resilience	The asset can respond to the direct and indirect impacts of climate change.
	Operations resilience	The asset can respond to acute shocks and chronic stresses that can affect its operations over time.
	Community resilience	The asset contributes to improving the resilience of the community.
	Heat resilience	The asset reduces its impact on heat island effect.
	Grid resilience	The asset contributes to the functioning of the grid as it transitions to a higher level of renewable energy capacity.

CREDIT		CREDIT OUTCOME & REQUIREMENTS
Positive	Energy use	The asset has low energy use.
	Energy source	The asset's energy sources are decarbonised.
	Water use	The asset has low water use.

CREDIT		CREDIT OUTCOME & REQUIREMENTS
Places	Contribution to place	The asset has been designed to encourage safe and socially inclusive places.

CREDIT		CREDIT OUTCOME & REQUIREMENTS
Nature	Biodiversity enhancement	The asset includes rich and biodiverse natural spaces.
	Waterway protection	The asset protects waterways from pollution and runoff.
	Integrated water cycle	The asset manages the water cycle in an integrated fashion, reducing demand and protecting the natural cycle.

In Australia, the total economic cost of natural disasters in the 10 years to 2016 has averaged AU$18.2 billion per year, equivalent to 1.2% of average gross domestic product (GDP) over the same period. This is expected to reach AU$39 billion per year on average by 2050 (in present value terms), without even considering the impacts of climate change.[54]

New Zealand is ranked by Lloyd's of London as the second riskiest country in the world when it comes to natural disasters. Lloyd's calculates the annual average cost of natural disasters to New Zealand as 0.66% of its GDP, while noting that the Christchurch and Canterbury earthquakes of 2011 resulted in damage equivalent to 14% of NZ's GDP.[55]

▲ Hobsonville Point Secondary School, NZ. Ministry of Education. 5 Star Green Star – Education Built Photography: Kate Whitley

Costs

While there is a cost to achieving Green Star certification, requirements and certification processes are continuously improved and streamlined to keep the cost of certification as low as possible. Analysis of Green Star projects in Australia by the GBCA in 2019 found that the average cost of Green Star was 2.5% of a project's budget, down from 2.9% in 2016.[56]

In some cases, projects are achieving Green Star for under 1% of total project costs.[57]

The cost of Green Star varies by sector and the number of stars achieved. The table[58] below shows the average cost of achieving Green Star Design and As Built certification as a percentage of the total project budget for different sectors.

Design and As Built

The average percentage of a project budget being spent to achieve a Green Star rating is outlined in the table below.

Office 1.7%
- 4 Star Green Star 0.5%
- 5 Star Green Star 1.7%
- 6 Star Green Star 1.9%

Education 0.8%
- 4 Star Green Star 0.8%
- 5 Star Green Star 0.6%
- 6 Star Green Star 1.3%

Industrial 2.3%
- 4 Star Green Star 0.7%
- 5 Star Green Star 2.5%
- 6 Star Green Star 1.9%

Residential 5.2%
- 4 Star Green Star 0.3%
- 5 Star Green Star 6.0%
- 6 Star Green Star 5.9%

Retail 1.7%
- 5 Star Green Star 1.7%
- 6 Star Green Star 1.6%

Public building 4.3%
- 5 Star Green Star 2.9%
- 6 Star Green Star 6.1%

The cost to achieve a Green Star rating comprises three streams:

- Green Star certification fees (which varies by project value)
- the cost of documenting the credits and compiling the submission, which is often undertaken by consultants or the project applicant
- additional capital costs to the project, which includes the cost of materials and installation.

Costs (Cont.)

While the costs of adding features such as solar photovoltaics, rainwater harvesting and end-of-trip facilities form the largest component of the cost, GBCA members report that more and more developers and tenants are choosing to include such features even if they are not targeting a Green Star rating. If these capital investments are considered separately, the cost of Green Star certification becomes very low indeed.

A 2013 University of Auckland study[59] examined cost plan data for 17 buildings in New Zealand which had all achieved Green Star ratings ranging from 4 to 6 Stars and found there was no statistically significant cost difference between these and their unrated counterparts. In fact, seven of the Green Star buildings cost less than an equivalent conventional build would have, according to modelled cost data. Two of the buildings studied were more than 20% less expensive to construct. This study aligned with international research that found the industry's perception of cost is often higher than reality.

▲ Wunggurrwil Dhurrung Centre, VIC. Wyndham City. 5 Star, Green Star – Design & As Built

▲ Sunshine Coast University Hospital, QLD. Lendlease, Queensland Health. 6 Star Green Star - Healthcare Design

▲ Papamoa College – Stage 2, NZ. Ministry of Education. 5 Star Green Star – Education Built Photography: Bruce Clarke

What can governments do to accelerate sustainable building?

Governments in Australia and New Zealand have already implemented a range of important initiatives and have made significant commitments to accelerate decarbonisation and improve our built environment. We call on governments to strengthen commitments, increase their efforts and act now to ensure we can meet critical emissions targets. There are many actions that governments can take, including:

- Lead by example and commit to net zero carbon government owned and leased buildings with a trajectory of performance requirements (for both embodied carbon and operational emissions) that keeps government ahead of minimum standards required by building codes.
- Commit to Green Star certification for all new government projects, fitouts and major refurbishments, and Green Star Performance and NABERSNZ and NABERS for existing government owned and leased buildings.
- Promoting achievements in sustainable procurement with departments and agencies, industry and the wider community. Anecdotal evidence suggests that when procurement targets and rating tool commitments are regularly discussed by senior officials and public servants, this drives a whole-of-government approach to ensuring that sustainability is a priority and keeps project teams on track.
- Make sustainability outcomes a key performance indicator for senior departmental executives. When performance is linked to government policy and legislation, for example, the Zero Carbon Act in New Zealand, or the Commonwealth Procurement Guidelines in Australia, then sustainability will remain a priority for projects.
- Set up dedicated upgrade programs to fund energy efficiency initiatives in public buildings to lower energy costs, create jobs and reduce emissions.
- Develop programs to improve internal capacity to grow compliance and implementation.
- Review procurement policies and guidelines and address gaps in procurement methodology with the aim of strengthening sustainability and whole-of-life outcomes and embedding best practice objectives.
- Ensure transparency by requiring project/procurement teams to evaluate and report progress, as well as final outcomes, against procurement guidelines/requirements and best practice objectives.
- Ensure that lessons learned from project evaluation processes are embedded into considerations for future projects and share these across departments and governments.
- Bring forward the best lessons learnt from existing projects and scale up best practice approaches to asset design, construction and operation.
- Use procurement to build competitive advantage in the supply chain, encourage skills, innovation and business investment, and drive demand for more sustainable, low or no carbon products and technologies.
- Maximise the resilience potential of government investment by identifying and prioritising resilience outcomes and requiring best practice design supported by third-party certification of outcomes through Green Star.

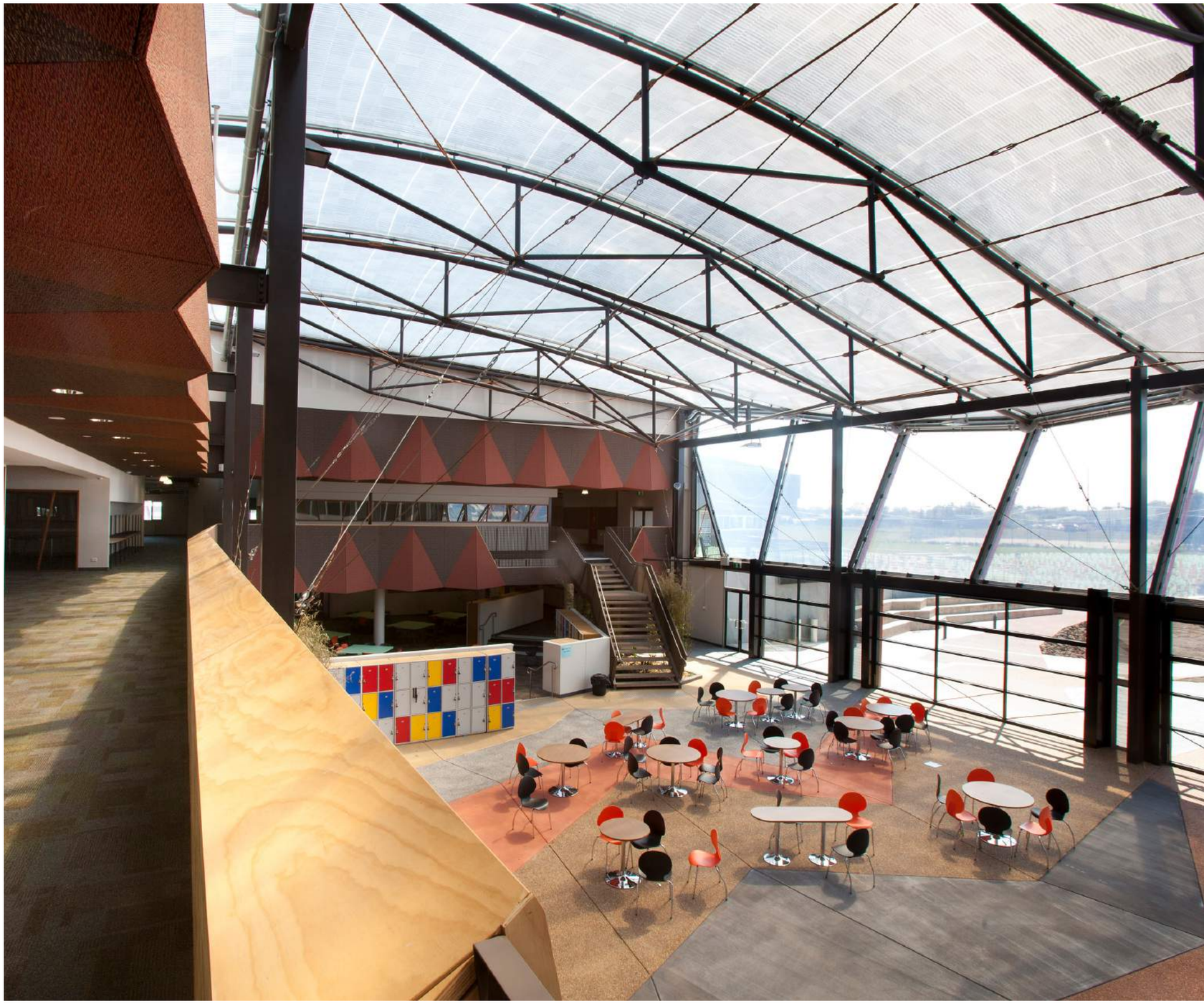
◆ Library-At-The-Dock, VIC. City of Melbourne, 6 Star Green Star – Public Building Design PILOT

What can the GBCA and NZGBC do to support governments and industry?

The GBCA and NZGBC welcome the opportunity to work with and support governments to progress policies and initiatives that will deliver healthier, more efficient, more sustainable buildings. We can do this in a range of ways, including:

- Providing information about how Green Star aligns with government policies, programs and guidelines. We can help support government reporting and accountability by sharing how government projects using these rating systems are meeting government sustainability guidelines and requirements.
- Helping to showcase project achievements and supporting project data collection. Government projects that achieve certification are future-proofed, saving money, saving the environment and providing healthy, safe places for people to live, work, play, learn and heal. We can help to celebrate those achievements and share lessons learnt with industry.
- Continue to work with our partners to streamline and simplify the certification process for Green Star.
- Continue to work with our partners to deliver rating tools that are more accessible, relevant and ready to meet the challenges of today and the future.
- Deliver events and professional development opportunities to upskill people in government as well as the property and construction sector.
- Continue to engage with both industry and government to facilitate the exchange of information and ideas and to share best practice examples and lessons learnt.

For more information, please visit gbca.org.au and nzgbc.org.nz



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