



The Office of the Victorian Government Architect provides strategic advice to government about architecture, landscape architecture and urban design.

About this Publication

Victoria is committed to creating a high quality, sustainable built environment and reducing carbon emissions in alignment with science-based targets.

These outcomes can only be achieved however if government is a smart client, has good procurement processes and employs well qualified consultants and contractors.

Good Design and Sustainability is aimed at helping decision makers, project managers and designers deliver government projects in line with Government's aspirations and best practice. It provides guidance on how to set objectives, principles and targets, and lead a constructive process that achieves cost-effective and high performing buildings, infrastructure and public spaces.

Good Design and Sustainability is based on evidence and best used alongside our related publications:

- *The Case for Good Design (evidence base)*
- *Government as Smart Client (procurement)*
- *Good Design Issue 01 (design principles and process)*
- *Other Good Design publications (specific typologies)*

Acknowledgement

The OVGA acknowledges the traditional Aboriginal custodians of Country throughout Victoria. We respect their deep knowledge of Country and practices that support living in balance with the natural world. Project teams are encouraged to work closely with traditional owners on understanding and designing with Country and enrich the design and technical approach to sustainability.

(COVER) MONASH UNIVERSITY GILLIES HALL, 2019

ARCHITECTURE: Jackson Clements Burrows
 CLIENT: Monash University
 INNOVATION: Cross-laminated timber (CLT) structure
 halving of GHG from structure
 RATING: Passive House Certified

Gillies Hall student accommodation is one of Australia's largest cross laminated timber (CLT) buildings that also achieves Passive House Certification (PHC). The CLT panels halved the amount of embodied carbon compared with typical concrete construction.



BENDIGO LAW COURTS, 2023

ARCHITECTURE: Wardle
 CLIENT: Court Services Victoria
 INNOVATION: 90% local materials
 Net Zero Carbon Ready
 150-160kWh/day generated by rooftop PV
 RATING: 6 Star Greenstar (Design + AsBuilt 1.2)

Shaped through strong partnerships with Dja Dja Wurrung Clans Aboriginal Corporation and Court Services Victoria, the building contributes to the civic revitalisation of Bendigo's city precinct.

Leadership

Governments set policies and regulations but can also set standards and drive innovation through their role as the largest procurers of design services and construction. By doing so, the public benefits from both, better buildings and places but also from more sustainable and economical assets.

Exceeding the Federal Government's promise to cut carbon emissions 62 to 70% by 2035, Victoria is committed to reducing carbon emissions by 70-80% by 2035 and down to zero by 2045 ⁰¹. At the same time, significantly more homes need to be built, leading the construction industry's shift to greater productivity as well as sustainable production becomes crucial. Federally, this transition is supported by the Commonwealth Government's *Trajectory for Low Energy Buildings* ⁰², the Climate Change Authority's *Net-Zero Built Environment Sector Pathway* ⁰³.

Industry associations such as the Property Council ⁰⁴ and the Australian Institute of Architects ⁰⁵ call for action and recognise that innovation in sustainability is critical to the future of our built environment. By working together on key issues both industry and government can drive more effective change and deliver greater benefits to the community.

"If done well, sustainable design enhances people's lives and generates greater value, while addressing the critical issues of carbon, resilience and biodiversity."

Jill Garner, Victorian Government Architect

Policy

Victoria

[Climate Change Act 2017 and Strategy](#)
[Sustainable Investment Guidelines](#)
[Department of Energy, Environment and Climate Action \(DEECA\)](#)
[Recycled First Policy](#)

Australia

[Net Zero Built Environment Sector Pathway + Trajectory for Low Energy Buildings \(Department of Climate Change, Energy, the Environment and Water\)](#)
[National Australian Built Environment Rating System](#)
[Australian Sustainable Built Environment Council](#)
[Green Building Council of Australia](#)
[Infrastructure Sustainability Council of Australia](#)

International

[International Panel on Climate Change](#)
[International Energy Agency](#)
[UN Sustainable Development Goals](#)
[World Green Building Council](#)

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TARAKAN STREET HOUSING, 2024

ARCHITECTURE: NH with Bird de la Coeur
 LANDSCAPE: Openwork, Tract
 CLIENT: Homes Victoria
 OPERATOR: Uniting
 INNOVATION: Enhanced landscape
 RATING: 5 Star Greenstar
 min. 7 Star NatHERS ave.

The Tarakan Street social and affordable housing project was redeveloped on government-owned land, and comprises of 130 tenure-blind homes arranged around existing native trees. Five per cent of the development's social housing will be fully Disability Discrimination Act (DDA) compliant.

Responding to the Climate Crisis

Net Zero Emission Buildings

Buildings are both, the world's largest cause of carbon emissions yet provide the greatest and most cost-effective opportunity to reduce them. Of the 39% of global emissions associated with buildings, 28% occur from operations and 11% from construction.⁰⁶

The International Energy Agency warns that *"The buildings sector is not on track for net zero by mid-century, with emissions growing at an average of 1% per year since 2015. (...) To achieve net zero by 2050, all new buildings need to be net zero from 2030. A significant leap from less than 5% of new buildings today."*⁰⁷

The good news is, that the required strategies are readily available and improve the long-term viability of projects today. Net zero emission buildings are simply highly efficient, all electric and powered by renewables. Increasingly, buildings also need to be grid responsive through on-site storage and smart controls that can alleviate electricity demand and supply peaks while saving the operators high peak charges.

Low Embodied Carbon Buildings

As our electricity grid decarbonises over time, embodied carbon emissions - generated from product manufacturing, transport and construction of buildings - play an increasingly significant role.

Infrastructure Australia estimates that an industry-wide *"23% reduction in upfront carbon emissions is possible by 2026-27 by applying like-for-like decarbonisation strategies that that can be achieved by industry and government actively working together."*⁰⁸

It is therefore critical that government projects set benchmarks using the nationally agreed *NABERS Embodied Carbon*⁰⁹ methodology.

Climate Resilient Buildings

Australia is already experiencing the effects of climate change. Since records began in 1910, our mean temperature has increased by 1.5 degrees Celsius.¹⁰

The National Climate Risk Assessment ¹¹ warns that *"If populations remained as they are today, this would equate to >1.5 million people living areas that will experience sea level rise and coastal flooding risks by 2050."*

The increased risk of heat waves, droughts, bushfires, storms and floods means that we need to strengthen the resilience of our buildings and cities.

The starting point for projects should be a comprehensive screening of climate related risks by a suitably qualified professional, which will identify potential impacts to the health and wellbeing of occupants as well as the infrastructure.

For example, if designed well, a home can provide safe conditions for residents during black outs in heat waves, a new public building can become a safer place for the community in bushfires, and landscapes can help absorb flood waters in storm events.

FOOTSCRAY HOSPITAL, 2025

ARCHITECTURE:	Cox + Billard Leece
CLIENT:	VHBA
INNOVATION:	Future Electrification
RATINGS:	5 Star Green Star, (target) Well Gold

The Victorian Health Building Authority and the Department of Health have consistently improved the energy efficiency of their hospital portfolio with an average 4.1 Star NABERS Energy rating across projects. New hospitals aim for high performance, healthy environments and future proofing.



Benefits for the Community

Health and Wellbeing

Buildings and Infrastructure are ultimately for people and communities. We require comfortable conditions to thrive, whether we are dwelling at home, working in an office or learning at school.

These places should all have good access to daylight and outlook, thermal and acoustic comfort and clean air. Respective objectives and targets need to be embedded into project briefs.

Our publication *The Case for Good Design*¹² provides an overview of the benefits of sustainable design that are backed by research and evidence.

A Better Investment

Sustainable buildings and places are more adaptable to changes of use over time and minimise the risk of obsolescence and costly retrofitting. Not only do they reduce waste and depletion of resources, they also perform better as assets, both in terms of value and life cycle costs.¹³

Nature

Regeneration

There is increasing evidence that reinstating natural landscapes in our cities has positive effects on people's health and wellbeing¹⁴. As traditional owners have always known, we are not separate from, but deeply connected to the natural world around us.

Many projects have the opportunity to not only reduce negative impacts on their immediate environments, but to actively enhance nature in our cities. This requires prioritising landscape and reinstating and linking fragmented ecosystems where possible.

"To achieve net zero by 2050, all new buildings need to be net zero from 2030. A significant leap from less than 5% of new buildings today."

International Energy Agency, Breakthrough Report 2023

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REIMAGINING YOUR CREEK, 2021

LANDSCAPE: REALM Studios
 CLIENT: Melbourne Water
 INNOVATION: 5km of creek naturalised

The naturalisation of urban waterway corridors provides critical opportunities for high quality, accessible public open space, improved visual amenity and greater ecology outcomes. This project offers improved biodiversity, habitat and localised cooling benefits at a range of scales.

Aspects to Address

Design for People

Humans are generally adaptable and resilient. But continued exposure to pollutants, sensory deprivation or overstimulation and limited social interaction can impact health, well-being and productivity.

Buildings and our urban environment must therefore be designed with human well-being in mind, including for people of all abilities. Daylight, fresh air, acoustic calm, outlook and connection to nature remain as fundamental as opportunities to socialise and retreat.

Environmental Design

The starting point of good design is a thorough understanding of the site and its broader environment. Project requirements should be interrogated with this in mind.

Thorough analysis of climate and weather, wind, solar, noise, natural features and other environmental factors is crucial, yet it is only meaningful if considered and analysed in design options early on.

Buildings should modify environmental impacts through their facades before relying on mechanical services. This increases comfort and resilience while decreasing operating costs and risk of failure in extreme weather events.

Place

'Place' is more than location. It includes regard for the natural setting and its history, but also the cultural context, its urban structure and history. Designs that enhance existing qualities and create a positive place are the ones that the community will embrace and sustain over time.

Connecting with Country

As understood by traditional owners, the notion of 'Country' goes far beyond the natural environment, context and place.

*'From green building practices and energy efficient technologies to regenerative landscapes, Aboriginal communities can lead the way in transforming the built environment to promote sustainability, resilience and community health. Their cultural practices reflect a deep understanding of the interconnectedness of all living things, and a commitment to building a more equitable world for generations to come.'*¹⁵

Adaptability and Resilience

A successful building or precinct is adaptable to changing use patterns and conditions over time. While it can be hard to predict future needs, design strategies and elements like structural grids and layout flexibility should support easy transformation when required.

For climate resilience, buildings must be robust and optimised for passive design performance. This includes ensuring they can maintain safe and comfortable conditions even during power outages in extreme weather events.

In all cases, it is crucial to design buildings with excellent 'passive' climatic performance. This includes basic strategies such as facades that enable a building to 'buffer' external weather extremes.

Active systems such as on-site renewables with battery back-up may complement passive strategies to ensure basic and safe operations.

Flood risk may be addressed by directing and storing water through sensitive landscape architectural intervention and civil infrastructure, to create positive design outcomes.

MELBOURNE UNIVERSITY CAMPUS,

STUDENT PAVILION, 2023

ARCHITECTURE:	NMBW
CLIENT:	Melbourne University
INNOVATION:	Campus sustainability Adaptive Reuse of existing building
RATING, Campus	6 Star Green Star Communities

Governed by Melbourne University's Sustainability Plan 2030 and carbon neutrality by 2030, the Student Pavilion is part of the broader student precinct renewal and exemplifies sensitive adaptive reuse.



Circularity and Productivity

About a third of the world's waste is generated by the construction sector.

Procurement, design and engineering are critical in eliminating waste and fostering smart manufacturing and construction. When considered from the earliest design stages this can also reduce construction costs.

The Victorian 'Recycling First Policy' requires demonstrating how recycled content and reused materials are optimised in projects.

Climate Positive

At their core, climate positive buildings are highly energy efficient, all-electric and optimised for use of on-site renewables with the make-up electricity needs met by renewable power to ensure they are operationally at net zero carbon.

Increasingly, buildings will also need to help stabilise and optimise the electricity grid by reducing peak demand and oversupply, saving electricity costs in the process. This will include the ability to store and release thermal and electric energy through pre-cooling, pre-heating, batteries and smart systems.

Adopting the cross-Government endorsed Nabers Embodied Carbon methodology, where possible is critical. This tool supports a level playing field and builds shared knowledge of how to achieve real reductions. Aiming for 4 Star NABERS embodied carbon is a good starting point for most projects. This requires particular attention to building structure, facades and services.

Credible offsets should then be purchased to compensate for the whole project impact.

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MONASH UNIVERSITY WOODSIDE BUILDING, 2020

ARCHITECTURE:	Grimshaw
CLIENT:	Monash University
INNOVATION:	High Performance Facade Carbon offsets of construction
RATING:	Passive House Certified

As a transdisciplinary facility for the Faculties of Engineering and Information Technology, the Woodside Building establishes new education standards and world leading environmental innovation as one of the most energy efficient and innovative teaching buildings of its type. It has been designed with PassivHaus metrics to create an ultra-low energy building with all-electric services, integrating purpose built immersive and interactive learning and laboratory spaces.

"The Victorian Government will build all new government buildings as all-electric, including new schools and hospitals."

What to Do - by Project Phase

The following steps outline the integration of sustainability across key project phases and are aligned with the OVGA's guidance on procurement, 'Government as Smart Client'¹⁶.

1. Vision Statement + Objectives

The Vision Statement guides expectations and decision making throughout an entire project.

- Develop clear aspirations for sustainability, human comfort, operational net zero carbon readiness, up-front (embodied) carbon reduction and resilience.
- Include aspects that are important to the vision such as the prioritisation of landscape and designing with Country.
- Set expectations of a true integrated design outcome rather than a project with a disjointed Sustainable Management Plan and sustainability features prioritised by cost to achieve a rating.
- Consider whether the project can set an example and serve as education opportunity for the industry and community.

2. Business Case + Feasibility

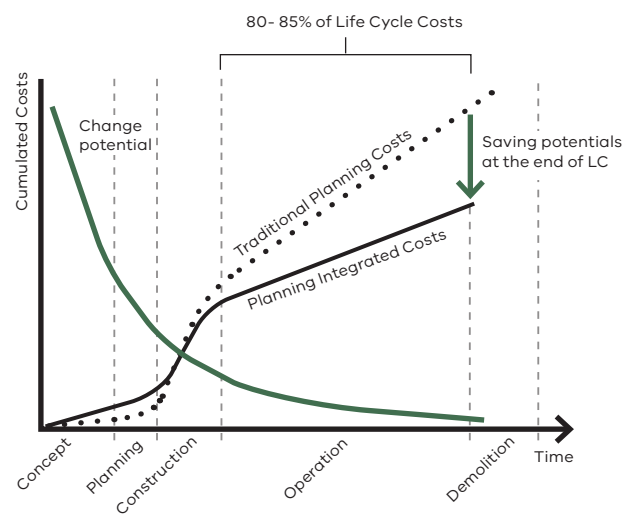
As the critical step in ensuring support and funding, the business case should interrogate the underlying project needs.

- Explore alternatives to building a new asset and comprehensively assess the potential for adapting and integrating existing facilities.
- Include whole of life carbon and costs in feasibility studies, including operations, maintenance, renewal, expansion, future adaptation and longevity of the asset.
- Reference designs need to reflect the project's aspirations, including net zero carbon readiness. A business-as-usual approach risks resulting in insufficient budget and scope.

3. Client and Design Teams

The cost of design services is very small compared to those of construction and life cycle, yet the quality of design significantly impacts these. It is therefore critical to engage highly qualified and experienced consultants that understand and can lead integrated sustainable design.

- In assessing submissions for design services consider separating the value-for-money assessment from the primary evaluation process or setting a budget for design services and evaluating submissions on quality.
- Identify a sustainability champion on both, the consultant and on the client sides who lead the project's sustainability focus throughout the project.



Costs in Integrated vs Traditional Planning

Kovacic, Zoller - Building Life Cycle Optimization tools for early design phases, Energy 2015 (ref. Jones Lang LaSalle, 2008)

T3 COLLINGWOOD, 2023

ARCHITECTURE: Jackson Clements Burrows

LANDSCAPE: Openwork

CLIENT: Hines

INNOVATION: CLT structure

structure -34% embodied GHG

RATING: 6 star Green Star (AsBuilt)

5.5 star NABERS Energy

T3 was designed with thermal efficiency, low carbon and low operational costs in mind. Its mass-timber construction, sourced ethically from local renewable forests, contains 34% less embodied carbon than an equivalent concrete structure.



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BELL TO MORELAND LEVEL CROSSING REMOVAL PROJECT, COBURG STATION, 2023

ARCHITECTURE:	Wood Marsh
LANDSCAPE:	Tract
CLIENT:	Level Crossing Removal Authority
INNOVATION:	103% enhancement of ecology 53% GHG emission reduction in construction 40% emission reduction (Stations) 90% water use reduction (Stations) Recycled fibres replacing steel reinforcements on foot/shared paths Remote concrete maturing monitoring Remote Isolation Switch replacing sub/tie station
RATINGS:	98% IS rating, Bell to Moreland 6 Star Green Star - As Built, Coburg Station

The Bell to Moreland section of the Level Crossings Removal Project maximised spatial opportunities to provide parks, play spaces, pedestrian connections and cycle paths by incorporating elevated rail. Acknowledging that concrete constituted the bulk of carbon emissions, the project identified and trialled innovations such as curing times and tensile strength materials.

Working with the Infrastructure Sustainability Council of Australia (ISCA) and the Green Building Council of Australia (GBCA), the line upgrade achieved the highest to-date scores for both the line upgrade and Coburg Station.

4. Brief, Targets + Requirements

The brief is the key document in setting aspirations, measurable targets and specific requirements.

- Optimise spatial and functional requirements
- Explore the use and adaptation of existing assets
- Consider the potential for spaces to fulfil multiple functions
- Clearly articulate specific sustainability requirements and benchmarks
- Include clear objectives and focus areas such as health and well-being of occupants or biodiversity
- Exclude fossil fuel use on site
- Specify performance levels, whole-of-life optimisation and requirements for independent certification
- Include post-occupancy evaluation in the scope to ensure learning and efficiencies feed into future projects

5. Independent Certification and Benchmarking

Many government agencies have great internal capabilities in sustainability. Even so, independent verification through recognised rating systems is critical. This ensures that project objectives are budgeted for, committed to by all parties and delivered throughout the entire design, value management, construction and commissioning process into the final operational asset.

- Choose the most suitable rating systems for the type and scale of project. These should include design, as-built and operational phases of the life cycle.
- Include overall sustainability in the certification as well as specific targets for key project aspects such as energy, water, waste, embodied carbon and indoor environment quality.
- Key recognised rating systems in Australia include NATHERS (design, residential energy efficiency), NABERS (design and as-built for embodied carbon, operational for energy, water, waste and indoor environment), Green Star (design and as-built across sustainability) and ISCA (Infrastructure Sustainability). International rating systems with particular focus areas that are recognised in Australia include WELL (design, operational, human well-being focussed), Living Building Challenge (design, operational, broad sustainability focussed) and Passivhaus (design, as-built, building fabric and air quality focussed).
- Avoid 'internal' or 'equivalent' verification where possible, as this risks insufficient rigour and assurance and is easily compromised through value management .
- Very small projects where certification costs outweigh benefits, need to be very specific about particular performance requirements so they can be easily verified. Rating systems can still be used as guidelines and structure.

6. Design and Documentation

Integrated design through early collaboration of consultants is fundamental to a good outcome. Hence, key sustainability strategies need to be developed from early schematic design and critical elements protected throughout documentation.

- Ensure all consultants share the project ambition.
- Develop sustainability strategies, building on high performing 'passive design' moves and mechanical services as complementary.
- Use environmental design modelling tools iteratively to inform the design.
- Explore and analyse the performance of options
- Minimise up-front carbon emissions as per the NABERS Embodied Carbon methodology where possible. Aim for at least 4 Stars.
- Design out unnecessary elements.
- Choose sustainable, enduring and healthy materials and finishes.
- Optimise life cycle performance and costs.
- Specify services and appliances to be highly efficient, all electric, grid-responsive and the use of electricity from 100% renewable sources.
- Documentation needs to coordinate and detail all sustainability strategies to ensure their delivery and the achievement of certification.
- Include design review at key stages to ensure strategies are reviewed, optimised and protected. The Office of the Victorian Government Architect can help by drawing on internal and external expertise .

7. Managing Value + Cost

Value management is often misunderstood as construction cost savings. While that is important, it is really meant to maximise value over time. Early integration of sustainability is key to optimising value and reducing costs.

- Ensure that project aspirations and specific requirements are upheld while alternative ways of achieving the brief requirements are explored.
- Consider life cycle costs, including operational and maintenance.
- **Consider an internal price on carbon, as outlined by the Climate Leaders Coalition.**

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NORTHCOTE AQUATIC CENTRE, VIC, 2023

ARCHITECTURE:	Warren and Mahoney
CLIENT:	Darebin City Council
INNOVATION:	All electric aquatic centre Carbon neutral CLT and GLT (timber)
RATING:	6-Star Green Star

The central challenge was to create a design which is sympathetic to the local, largely residential context, while also framing a new 50m pool and external space. The client required the project to meet a 6-Star Green Star sustainability rating – a demanding target for aquatic facilities. This was achieved using a wide range of techniques including large scale photovoltaic arrays on roof surfaces supporting the all-electric facility. 300cubic meters of mass timber and carefully designed daylight ensure a significant reduction of embodied carbon while providing a warm, human-centred environment.

8. Procurement and Construction

The procurement method has a strong influence on the quality of delivery and assurance of outcomes. For information on how to choose the most appropriate contracting type and get the best value out of it refer to our publication 'Government as Smart Client' ¹⁵.

- The builder needs to have the capability and processes in place to deliver the project's aspirations.
- In tender evaluation, include quality and environmental management practices and a demonstrated capability to deliver certified sustainable buildings.
- Ensure that design and sustainability consultants have line of sight to the construction process, potential material substitutions and built outcomes and are empowered to communicate with the client.
- Include performance testing such as for facade air tightness in the requirements.
- Ensure that sub-contractors are briefed on all sustainability requirements and respective quality assurance processes are in place.

9. Commissioning, Operations

Many buildings do not reach their performance potential as commissioning is neglected, knowledge of design intent is lost and buildings are not monitored and managed properly.

- Specify a rigorous commissioning regime and involve operators and facility managers.
- Ensure that building operational performance against objectives and targets are reported, including to consultants.

10. Post Occupancy Evaluation

Often omitted, post occupancy provides the opportunity to optimise building performance and integrate learnings into future projects. It is a key part of continuous organisational improvement.

- Closely monitor the facility for at least 4 full seasons, preferably 2 years.
- Ensure continuous monitoring and improvement thereafter.
- Make learnings available within but ideally beyond your organisation to ensure industry learning.
- Include independent post-occupancy evaluation in the project scope and ensure that the design team is involved, so that the design intent and performance can be compared and discrepancies identified and rectified.

10



Good Design

We need to remember that only a well-designed building, piece of infrastructure, landscape or public realm can be truly sustainable. Places that are not only fit for purpose but also loved will be cared for, retained and used well into the future.

1. Inspiring

Good design embeds the very essence of a project into an inspiring narrative and vision.

2. Contextual

Good design is informed by its location and responds to its environmental, social and cultural contexts.

3. Functional

Good design develops synergies between a project's functional requirements and its vision.

4. Valuable

Good design enhances our experience of a place, improves connections and supports a vibrant public realm which are all key to realising the full potential for value creation and capture.

5. Sustainable

Good design respects our environment and resources by promoting environmental repair and efficiency creating a sustainable long-term legacy.

6. Enjoyable

Good design delivers inclusive and enjoyable environments which contribute to broader positive social and economic outcomes.

7. Enduring

Through the synthesis of vision and function, good design embeds lasting value into our built environment. Good design is essential in place-making, which promotes community pride.

"The spaces we design can either exacerbate global challenges or become powerful solutions."

Architecture Industry Decarbonisation Plan 2025-50

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Further Information

The [OVGA website](#) provides resources including this publication.

In-text references

- 01 [Victoria's 2035 Emissions Reduction Target](#)
- 02 [2024 Trajectory for Low Energy Buildings](#)
- 03 [2024 Sector Pathways Review, Built Environment](#)
- 04 [Every Building Counts 2023](#)
- 05 [Architecture Industry Decarbonisation Plan 2025-50](#)
- 06 [Bringing Embodied Carbon Upfront, World GBC, 2019](#)
- 07 [IEA Breakthrough Agenda Report 2023](#)
- 08 [Embodied Carbon Projections for Australian Infrastructure and Buildings](#)
- 09 [NABERS Embodied Carbon](#)
- 10 [Australian Climate Change Observations](#)
- 11 [National Climate Risk Assessment](#)
- 12 [The Case for Good Design](#)
- 13 [The Business Case for Green Building](#)
- 14 [Nature Cities](#)
- 15 [Connecting with Country](#)
- 16 [Government as Smart Client](#)

Accessibility

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