Circular Australia

Activating place-based circular economy in Australia

# Circular Precincts

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aurecon

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This research draws upon interviews with professionals involved in precinct design, development and activation across Australia (listed in the Acknowledgements) and workshops with Circular Australia's Precinct & Infrastructure Taskforce. The findings and recommendations provided in this report are not representative of any single participant or their organisation.

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## Acknowledgement to Aboriginal people

We acknowledge the traditional custodians of Country and pay our respects to Elders past, present, and emerging. We recognise that our built environment and activities are on Aboriginal land and commit ourselves to thoughtful, inclusive, and respectful ongoing management of these places.

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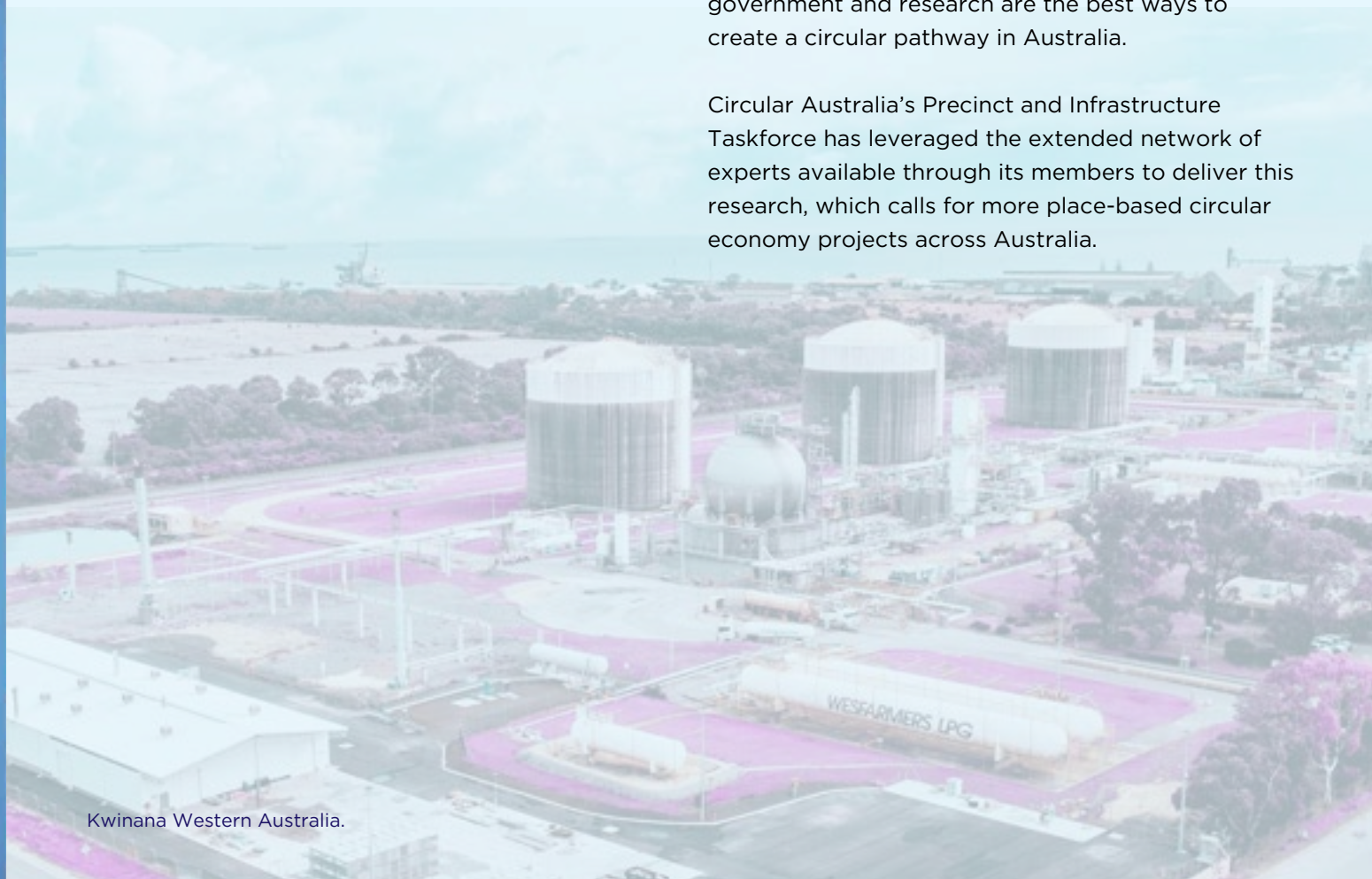
# Making circular economy actionable and scalable in precincts

Circular Australia has built a national network of committed experts and organisations working to transition Australia to a circular economy by 2030.

The circular economy is a systems transition - no one business or sector can make the transition on its own. Collaboration and co-design between industry, government and research are the best ways to create a circular pathway in Australia.

Circular Australia's Precinct and Infrastructure Taskforce has leveraged the extended network of experts available through its members to deliver this research, which calls for more place-based circular economy projects across Australia.




Kwinana Western Australia.

# Executive Summary

**Business and policy makers in Australia and globally are increasingly seeing circular precincts as effective ways to build local and regional circular economies. In precincts, it is possible to create new circular business models to share, repair, remanufacture and process secondary resources, while innovating and collaborating.**

This report ***Circular Precincts: Activating place-based circular economy in Australia*** brings together decades of expertise from Australian placemakers and Circular Australia Precincts and Infrastructure Taskforce Members, many of whom are leading the circular transition. Building on *Embedding Circular Economy Principles within Precincts and Infrastructure Business Case Processes in NSW* published in 2022, this report is a practical tool for business, industry and government in the conception, development and activation of circular precincts.

Circular precincts are essential to Australia's transition to a circular economy. They create physical spaces for businesses to integrate sustainable infrastructure, such as renewable energy systems, waste management facilities, recycling, repair, remanufacturing, reuse solutions, low-carbon transport and green spaces. They stimulate economic growth, creating jobs and new sustainable products and services, while supporting liveable and sustainable communities. Importantly, they provide opportunities to utilise First Nation's unparalleled knowledge and expertise, including how to Care for Country.

A circular precinct aims to keep assets and materials at their highest value, locally. Clusters of activity in precincts act as engines to close waste and material loops, at the same time as providing a fertile ground for implementing, demonstrating and replicating innovative circular solutions.

The need for a circular economy in Australia is clearly demonstrated by State and Territory Ministers' commitment to work with the private sector to achieve a circular economy by 2030. Considerable work is underway to understand what the circular economy means for different sectors, and at different stages of the life cycle.

This report reflects the strong demand from stakeholders for more circular precincts, funded by government and industry and coordinated by an independent governing body to progress Australia's circular economy transition. It emphasises the need for sandboxing where industry and researchers can safely work with Environmental Protection Agencies (EPAs) and other regulators on novel ways to reuse, remanufacture and recycle secondary resources. It recommends leveraging precincts to catalyse new circular markets to deliver on the 2030 circular economy targets, showing Government can make big inroads by supporting circular precinct to align with renewable energy agendas and major projects such as the Olympics.

Experience has shown there are a number of important steps to consider in creating successful and thriving circular economy precincts. A ***Circular Precincts Guide*** sits alongside this report outlining four key steps: *Engage & Explore, Design & Deliver, Attract & Activate and Manage & Monitor* - to help organisations achieve circular economy outcomes in both existing and future circular precincts.

The report and its findings were shared with the Circular Economy Ministerial Advisory Group (CEMAG), established by the Hon. Tanya Plibersek Minister for Environment and Water, to inform the development of the Circular Economy Roadmap 2030.

Circular Australia commends the federal government for its leadership and commitment to transition Australia to a circular economy future.

# Solving Complex Problems

Place-based circularity helps solve problems in a VUCA (Volatile, Uncertain, Complexity, Ambiguity) environment. Circularity can break down the complexities that businesses and governments regularly navigate. It presents an immense opportunity to guide the implementation of major programs such as Net Zero, ReMade Australia, Manufacturing Modernisation Fund, National Reconstruction Fund, Olympic Games, and Renewable Energy Zones (REZs), by effectively allocating funding and effort in line with what precincts have to offer at all levels and by providing a comprehensive framework to deliver in line with ever-increasing sustainability commitments and obligations. Circular precincts use systems thinking to solve the following complex problems:

### Embodied Carbon

Foster innovation in low-carbon technologies and enhance resilience against future climate challenges.

### Regenerating Natural Systems

Integrate nature into urban planning and business models to remain within our planetary boundaries.

### Infrastructure Development

Access, transform, transport and use materials to support a fast pace, resource intensive energy transition.

### Housing Crisis

Improve housing affordability, reduce waste in construction, and encourage sustainable housing practices.

## Systems Thinking for precincts

**Precincts function as local ecosystems of materials, structures, people, technologies, economic flows, natural assets, and information, generating synergies when approached holistically. They also exist within a broader system that must be understood to define their boundaries and purposes.**

**Taking a systems thinking approach shifts us from linear resource consumption to closed-loop systems, where every resource and product is viewed as part of an integrated ecosystem. This approach emphasises sustainable practices throughout the lifecycle of buildings, infrastructure, and community services, from initial design and construction to ongoing use and eventual repurposing or recycling.**

**By fostering collaboration among urban planners, architects, engineers, organisations and residents, systems thinking in circular precincts helps optimise resource efficiency, reduce environmental impact, and enhance the overall resilience and liveability of the place.**

SOLVING COMPLEX PROBLEMS

# Carbon & Nature

## Embodied Carbon

Sixty-five per cent of greenhouse gas emissions in Australia are linked to the management of materials, namely the production, transport and disposal of goods and food. *Circular precincts* play a crucial role in addressing embodied carbon by rethinking the entire lifecycle of construction materials and built environments. By promoting strategies such as using synergetic localised material flows, recycled materials, designing for disassembly and reuse, and implementing efficient energy systems, *circular precincts* reduce the initial carbon emissions linked to material extraction, manufacturing, and transportation.

This holistic approach not only decreases environmental impact but also fosters innovation in low-carbon technologies and enhances resilience against future climate challenges. It makes *circular precincts* integral to achieving net zero commitments and obligations under emerging reporting mechanisms such as the Taskforce on Nature-related Financial Disclosures (TNFD) and the Taskforce for Climate-related Financial Disclosures (TCFD).

**CASE STUDY: Blue Mountains Planetary Health Initiative**
Established by the Blue Mountains City Council, the Initiative supports local action to restore the health of natural systems in the Blue Mountains, while supporting community health, wellbeing, resilience and hope in the face of climate change and increasing natural disasters. Inspired by the wisdom and knowledge of First Nations people and working collaboratively in partnership with community, environment organisations, the business sector, tertiary institutions and other key stakeholders, the Initiative demonstrates innovative and creative ways to take local action to restore planetary health, and live in harmony with nature.

## Regenerating Natural Systems

Integrating nature into urban planning and business models is critical to remain within our planetary boundaries. *Circular precincts* by design can contribute to regenerating natural systems. For instance, through practices like integrated water systems and green infrastructure development, which includes green roofs, rain gardens, wetlands, and permeable surfaces, these circular precincts enhance biodiversity, improve air quality, and mitigate urban heat island effects.

By incorporating renewable energy sources and efficient water management systems, they reduce resource consumption and minimise pollution. Circular precincts also prioritise the use of recycled and locally sourced materials, reducing the demand for virgin resources that often put pressure on ecosystems elsewhere.

> **"It's much easier to create a precinct that enhances natural systems if you have a single entity that owns the entire precinct."**
> Dr Steven Liaros, Cevco

> **"We're using net zero as the vehicle to be more circular. We're pointing to the fact that we have lots of commitments in our precinct and if you're going to meet your net zero targets, one of the ways to do that is be more mindful of how you use products and resources."**
> Azaria Dobson, Department of Regional NSW

SOLVING COMPLEX PROBLEMS

# Housing & Infrastructure

## Housing Crisis

Australia is facing a significant housing crisis. By adopting circularity principles specific to each place, innovative solutions can be developed to improve housing affordability, reduce waste in construction, and encourage sustainable housing practices. Place-based circularity can foster collaboration between stakeholders to create a more inclusive and environmentally conscious housing sector.

New emerging housing models that include shared and decentralised utilities such as recycled water, solar energy, shared mobility are putting downward pressure on costs for construction as well as utility costs for consumers.

**"We have a huge demand for housing to deliver 1.2 million homes. The current approach to housing is not working, we have this target and the industry just can't deliver at that scale in that time frame, so we need new models of developing housing, such as circular eco-villages."**

Dr Steven Liaros, Cevco

## Infrastructure Development

In the race to decarbonise our economy, immense efforts are required to transform our infrastructure to generate, transmit, distribute and use clean energy across all sectors.

Applying a circular lens to accessing, transforming, transporting and using materials will help solve some of the challenges faced in the fast pace, resource intensive energy transition, including:

- Increasing resilience and sovereign (re)manufacturing capability
- Enabling future sustainable sources of remanufactured and recycled materials
- Avoiding future waste challenges

Circular precincts could provide a decentralised yet interconnected network of innovation and manufacturing hubs, enabling Renewable Energy Zones as in Hunter, Illawarra and Gippsland.

**"Reflecting on the work we're doing with the renewable energy sector, there are key opportunities, imperatives, really, if we want to achieve a circular economy."**

Paul Murfitt, Sustainability Victoria

# Defining Circular Precincts

*Circular precincts* create physical spaces for businesses that repair, reuse and remanufacture goods; share resources and tools; and innovate collaboratively. They stimulate economic growth, creating jobs and enabling liveable and sustainable communities.

*Circular precincts* are supported by:

- **Sustainable infrastructure** such as renewable energy systems, advanced water treatment, low-carbon transport options and green spaces
- **Research and innovation** whether through universities, incubators, accelerators that support the development and commercialisation of new technologies
- **Facilitated collaboration** among participants in the precinct, and wider businesses, academia and government to develop and implement circularity

A place-based approach allows for problem-solving within a relatively controlled environment, where influence can be exerted, and behaviour change can be driven effectively. By focusing on specific places and engaging stakeholders, circular precincts can create meaningful, measurable change that benefits local communities, businesses, and the environment.

Integrating circular economy principles at scale has been achievable across many precincts and regions. This has been possible due to the strong overlap between traditional 'place-based approach' and 'circular approaches', both partnering, ensuring shared design, shared stewardship and shared accountability for outcomes and impact.

**Definition:**

**Circular precincts are geographically bound places, bringing people and organisations together to deliver more sustainable solutions including:**

- **Designing out waste and pollution from materials and products**
- **Retaining assets, products and materials at their highest value**
- **Conserving natural resources and regenerating nature**

**"A circular precinct is where resources are used efficiently, waste is minimised and we drive innovation for a sustainable campus. We very much want to be a place of innovation, a place of leading, demonstrating best practice and learning."**

Dr Kendra Wasiluk, Monash University

DEFINING CIRCULAR PRECINCTS

# Precinct Types

The following precinct types are leading the circular economy transition:

**Industrial ecology (or symbiosis) precincts** where intense collaboration between companies in resource supply or manufacturing (usually colocated in an industrial park) lead to exchanges of materials, energy and water between businesses. These precincts often feature shared infrastructure, such as centralised waste treatment facilities and energy generation plants, to facilitate resource sharing and collaboration among industries. Industrial ecology precincts need a minimum critical mass of industries and material flows to be effective.

- *Examples: Kalundborg in Denmark and Kwinana in Western Australia*

**Circular material hubs** where reuse and recycling businesses are colocated, often with a landfill or waste to energy facility. Circular material hubs provide an ecosystem that supports entrepreneurship, knowledge, technology and resource exchange, driving economic growth and competitiveness. By aggregating material flows, these hubs make more types of reuse and recycling economically viable. Close access to landfill or waste-to-energy facilities also helps the viability of many recycling activities, which still must manage with non-recyclable process waste.

- *Examples: Alelyckan Recycling Park in Gothenburg and Eastern Creek Recycling Ecology Park in Sydney*

**Circular communities** typically involve a mix of residential, commercial and public spaces, along with green infrastructure like parks, gardens and streets that enable low-carbon transport such as walking and cycling. These precincts can exist at the scale of a neighbourhood or suburb and incorporate circularity approaches through adaptive reuse of built form, regeneration of natural ecosystems, together with platforms and business models that enable repairing, sharing and reuse of goods.

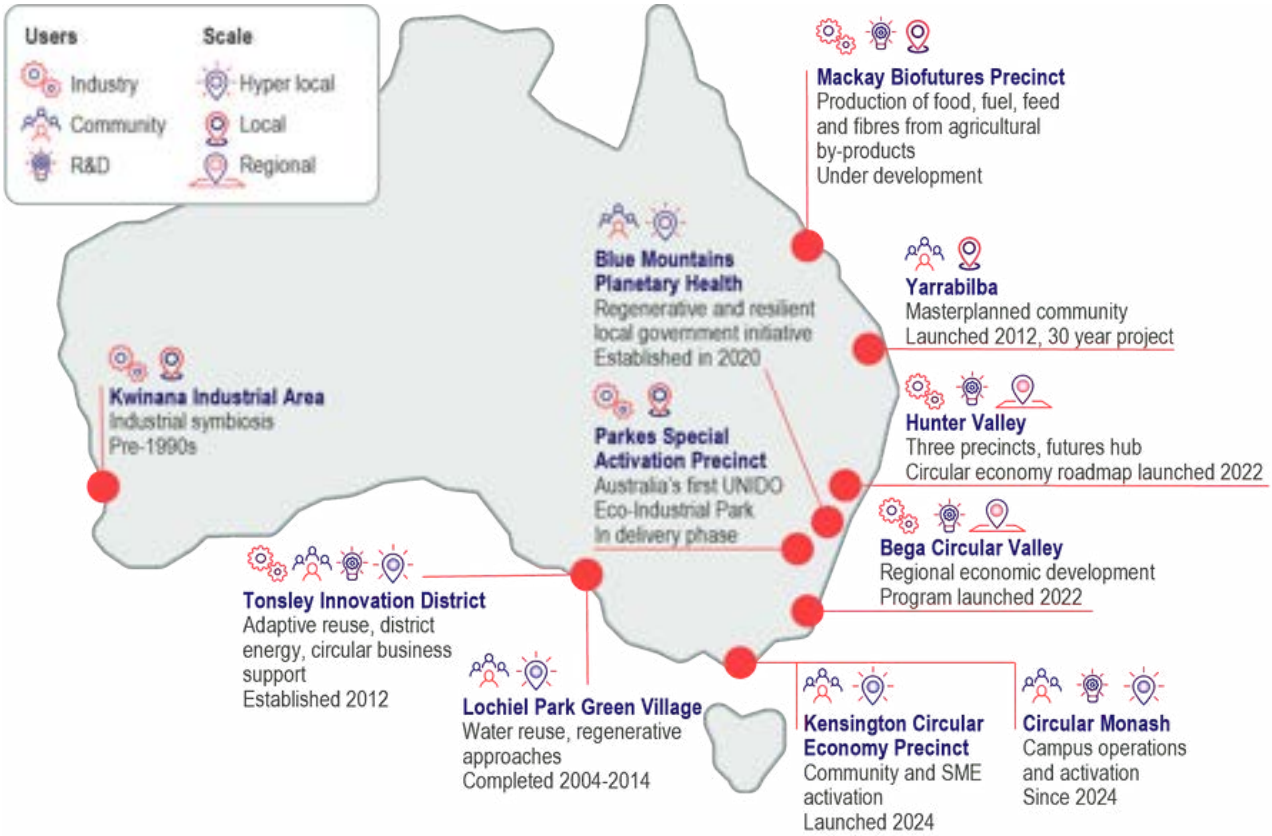
- *Examples: Carlsberg Byen in Copenhagen and Yarrabilba in Queensland*

These types of circular precincts can overlap. For example, at Tonsley Innovation Precinct a circular community is developing alongside a leading business precinct featuring shared infrastructure and cutting edge research. Circular precincts can also be hubs of resource consumption and waste generation, such as hospitals or schools, where there is high potential for the adoption of circular principles.

DEFINING CIRCULAR PRECINCTS

# Australian Circular Precincts

The scale of these precincts can vary, and they can be found in cities, suburbs or regions. Here are a number of exciting circular precincts in place and underway in Australia. The small number presented below shows the diversity of scale and user types involved.




Further information available:

Bega Circular Valley
Blue Mountains Planetary Health
Hunter Valley Circular Hub
Kensington Circular Economy Precinct
Kwinana Industrial Area
Lochiel Park Green Village
Mackay Future Foods Bio Hub
Circular Monash
Parkes Special Activation Precinct
Tonsley Innovation District
Yarrabilba

# Circular Precinct Principles

Precincts and regions have an important role to play in making the circular transition happen. They are at the centre of key decisions determining economic growth, social well-being and environmental benefits. These regions are home to a staggering amount and variety of assets and resources that can not only be produced, but used much more efficiently and sustainably. The efficiency of each item can be improved by applying circular design, bringing positive social, economic and environmental impacts on a much larger scale.

In promoting the take-up of circular precincts, this report proposes **Six Circular Precinct Principles** that can be applied to future-proof communities, industrial and business centres, residential and mixed use developments and other precincts. These principles help to reap greater productivity and efficiency, stimulate more resilient supply chains, reduce carbon and waste, while achieving strong Environmental Social Governance (ESG) outcomes.

## Economic Drivers

Leveraging place-based circularity to enable economic outcomes

## First Nations

Combining Caring for Country with place-based circularity

## Collaboration

Understanding the context of the place and its people and coordinating value chains

## Governance & Network Brokers

Clear governance and strong coordination is required for successful circular precincts

## Shared Resources & Infrastructure

Businesses leveraging each other's resources and processes for mutual benefit.

## Finance & Investment

Educating the finance sector will be important to secure funding for the circular transition

CIRCULAR PRECINCTS PRINCIPLES

# Economic Drivers

**Every year Australian firms spend $1.4 billion sending $26.5 billion worth of material to landfill. Australia has a low material productivity rate of US$1.20 of economic output for every kg of materials consumed - under half the OECD benchmark of US$2.50. This highlights the need for better resource use, with circular economy strategies potentially adding $210 billion to the GDP by 2048.**

The circular economy offers significant benefits across economic and industrial dimensions by boosting Gross Domestic Product (GDP), employment, investment, and labour productivity, while reducing resource dependency. It fosters resource-efficient, cleaner production systems that help companies save water, energy, and raw materials, reduce production costs, and minimise waste.

**Considerations from experts interviewed:**

- **Think about economic opportunity beyond the boundaries of the place, looking more widely at how the precinct can create jobs and stimulate the wider local economy**
- **Circularity is a facilitator of various outcomes, including economic ones**
- **There are multiple layers to place-based circularity looking at supply chains into the city, and what's happening at a regional level and beyond**

**CASE STUDIES**

In the Hunter region, generating $64b Gross Regional Product, circular precincts have the potential to unlock $600 million of investment to create new jobs contributing to the industrial transition underway.

Wagga Wagga Special Activation Precinct is estimating the generation of 2077 total FTEs at full operations (2063), $309m Present Value (PV) of producer surplus to NSW net of tax, and $99m PV of labour surplus.

**Job creation** Circular economy fosters new jobs and sophisticated, resilient local economies, transitioning from extractive practices to value-adding processes. Ben Fee, RDA Murraylands & Riverland says: "We leak economic value in the extractive economy, but a circular economy ensures value retention and creates technologically advanced job opportunities."

**Sectorial transition** "Most circularity projects support regions or sectors in transition, embedding circularity to foster economic development" says Gwyneth Elsum, Sustainability Victoria. By adopting circular principles, regions such as Geelong and Hunter can mitigate the impacts of industry decline and grow sustainable sectors, promoting economic resilience and environmental sustainability.

**Regional Development** Geographical constraints or industrial know-how shape the size and scale of circular precincts. Regions like Bega, Townsville, and the Northern Territory can achieve cost efficiencies and reduce supply chain dependency by leveraging local resources. "The precinct idea works well with one local government area, simplifying logistics and governance" says Jake Anson, Brisbane Lions. This approach enhances resource management and resilience in the face of logistical challenges.

**Local Manufacturing** Natasha Alford, NT Government says: "In the Northern Territory, remanufacturing and the right to repair are crucial for circular economy success." By embracing circularity and closed-loop systems, remote areas can stimulate innovation and overcome infrastructure challenges.

CIRCULAR PRECINCTS PRINCIPLES

# First Nations

**"Country-focused design is an attempt to reinvigorate ancient conversations about the human connection to nature and how the built environment can play a vital part in this dialogue. It is as much a process as it is a product. From the first marks on the page to the decisions by governments, to the materials used in the fabric of the building and the public domain, every step has respect for Country at its core."**

Alison Page, Design: Building on Country

Aboriginal and Torres Strait Islander peoples have been Caring for Country for millenia, practicing circularity by design. They extract value from countries under laws and customs that deeply respect the interconnectedness and dependence between people and nature, place and community. Combining Caring for Country with place-based circularity can create a pathway for First Nation's regenerative practices to be valued and integrated in Australia's new circular economy.

Working together to understand local context, take accountability for material consumption, and respect and regenerate natural systems can provide a pathway to collectively care for our natural and built environments: caring for ourselves, and for the generations that come after us.

Each place is unique in terms of social context, connection to country, natural systems and economic drivers. Circular thinking addresses these specific needs all at once, allowing for a more holistic, culturally sensitive and customised development/adaptation of initiatives to best suit local requirements.

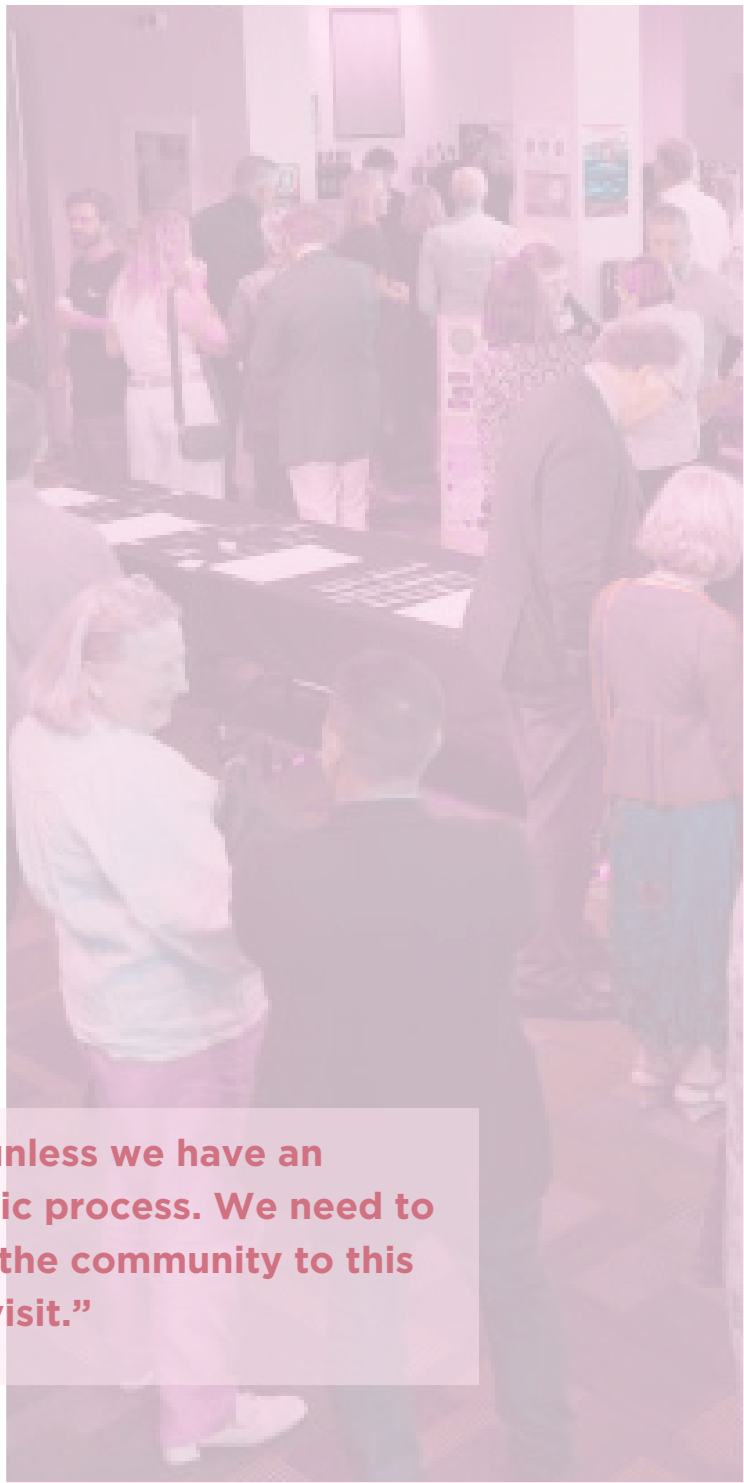
CIRCULAR PRECINCTS PRINCIPLES

# Collaborate

Successfully developing a circular precinct relies on understanding the context of the place and its people, and involves building a connection to people and the land, mapping current needs and conditions and responsively co-design precinct scale, vision and objectives with stakeholders. By sharing a common vision and working together, government, industry and the community can collaboratively drive the transition towards circularity. This ensures policy coherence, regulatory support, and effective resource allocation, leading to greater circularity adoption within a place.

By embracing circularity, places can foster creativity and entrepreneurship, nurturing a culture of sustainable innovation based on resource efficiency, collaboration, and circular business models. Mobilising the right stakeholders at an early stage of the circular journey will ensure that diverse ideas, options, and views are considered, and can increase acceptance and buy-in for proposed changes.

Circular precincts require a different mindset and way of designing, delivering and managing the place. They rely on coordination across value chains, to circulate and share resources and assets. It is crucial that organisations operating in circular precincts trust their other partners, and are willing to share knowledge and resources.



**"The systems are not going to work unless we have an engaged community. This is an organic process. We need to support social cohesion and connect the community to this place where they will work, live and visit."**

Lucy Sharman, Bradfield Delivery Authority

CIRCULAR PRECINCTS PRINCIPLES

# Governance & Network Brokers

## Clear governance and strong coordination across stakeholders has enabled many successful circular precincts.

A clear governance framework and dedicated governing body will guide strategic decision-making and establish oversight, to set and deliver on a precinct's circularity goals by:

- Garnering political support
- Setting objectives, scope and level of ambition
- Coordinating action, including through the development of policies and procedures that manage risk, establish circular procurement practices, ensure ethical conduct, comply with legal and regulatory requirements
- Challenging the linear status quo and advocating for change - where necessary - to planning regulations, standards and specifications and laws in order to enable circular activities
- Facilitating or conducting monitoring and evaluation processes

Precincts such as Parkes Special Activation Precinct, Bega Valley, Kwinana and Tonsley have one thing in common. From the beginning, they've been governed by a dedicated governing body, either setting a different planning and approval approach, shaping the vision, educating, attracting, activating all relevant stakeholders and/or ensuring the precinct operates efficiently and effectively.

These bodies are focused on delivering a good outcome for the precinct and surrounding communities, often supporting the transition from one land use or industry specialisation to another. They play an essential role in setting up the frameworks required for long-term success, attracting the right developers, and articulating the benefits of operating in a circular precinct to the right businesses.

**CASE STUDY:**
Clear governance and strong coordination across stakeholders has enabled many successful circular precincts. Such as the UNIDO Eco-Industrial Parks. The Ulsan Mipo and Onsan industrial park registered by UNIDO spans 6,540 hectares and housing 1,000 firms, encompasses a wide range of industries, including vehicle manufacturing, shipbuilding, oil refineries, and chemical industries, employing over 100,000 people. The governance of this Eco-Industrial Park (EIP) is managed by the Korea Industrial Complex Corporation (KICOX), which oversees planning, budgeting, and project approvals. The Ulsan regional EIP centre, guided by an advisory board from local government, academia, and industry, focuses on local industrial symbiosis projects, assisting in project development, proposal writing, and coordination with local authorities.

**"At the start, for Tonsley, it was about political buy-in. There were a few times when the project could have just been turned into a distribution centre for a supermarket chain, or something similar. So we had to go back to Cabinet to get a bit more cash to inject into it to double down on the vision for the project. There needs to be political will to make this stuff happen."**

Heath Edwards, Tract. Former Design & Planning Manager for Renewal SA

CIRCULAR PRECINCTS PRINCIPLES

# Shared Resources & Infrastructure

## Sharing infrastructure and resources - by design and by activation

All precincts are based on sharing infrastructure such as space, roads and basic utilities. Circular precincts build in more shared infrastructure by design, such as:

- Renewable energy generation, battery storage and electric vehicle charging
- Constructed wetlands, advanced water treatment, water recycling systems (including PRW), bioswales and rain gardens
- Materials-exchange hub to coordinate the procurement, redistribution, and reuse of construction materials
- On-site centres for salvage and reuse, recycling, crushing and screening of aggregates, soil banks

For communities, sharing infrastructure includes shared mobility (car, bikes, scooters...), repair and upcycling community spaces or social enterprises, and reusable packaging systems.

Beyond core infrastructure, circular precincts encourage businesses to co-locate to leverage each other's resources and processes for mutual benefit: that is, one company's waste becomes its neighbour's resource. This works best when businesses collaborate from the outset, and precincts integrate circular principles into master planning and investment attraction.

For existing precincts, tools such as ASPIRE and material flow studies can be used to identify synergies among existing businesses. For these potential synergies to become reality - saving materials and carbon - the other circular precincts principles come into play. Economic drivers of the project need to be clearly demonstrated, partners flex their ability to collaborate and network brokers provide a foundation of trust and logistical resources to make change happen.

**Considerations from experts interviewed:**

- **The precinct is based on all sectors working together, where one person's waste is another person's treasure, and that's already happening**
- **There's some obvious precincts, where there are like-minded businesses which are not necessarily seen to be competing and have by-products**
- **In our master plan, we're getting businesses to think about the materials that they (re)use, the data that they're capturing to eventually develop material stewardship. For instance, organisations are required to put solar panels on, with the goal for a business to set up solar panel recycling in the precinct**

CIRCULAR PRECINCTS PRINCIPLES

# Finance & Investment

## Finance and Investment

With the increase of ESG requirements and the growing importance of sustainable finance, investors are supporting the decarbonisation transition, taking a broader range of environmental and social factors to review and approve projects. Circular economy is still an emerging topic with no clear targets or requirements and is underpinned by the need for systemwide change of our economy, where balancing risks and returns is challenging. Educating the finance sector will therefore be important to secure funding.

A place-based approach allows for this systemic change to happen in a controlled environment, providing clearer and less risky conditions for investors to get involved. Project owners should be clearly articulating the vision and value proposition of the circular precinct, as well as the innovative economic models that underpins it.

The value creation of a circular precinct can be quite different to conventional projects. Therefore, it will be important to justify how the overall precinct and individual components working together deliver financial returns.

> **"One of our innovation district's goals is to promote further investment into the district and State through strategic partnerships, infrastructure delivery, business expansion, research funding and venture capital."**
>
> Diane Dixon, State Project Lead, Lot Fourteen

Taking investors on the journey from the beginning of the project is essential, so that they understand the circular economy principles, business models, where and how they are being captured and reused. In addition, government play a critical role in by supporting the earliest stages of the transition as a de-risking exercise to kickstart collaborations and partnerships through:

- **Grants, incentives or direct funding** enabling partnerships across organisations or the community to conduct investigations, start the transition, enable shared infrastructure, assets and equipment
- **Funding for public space/land to provide the enabling conditions** required by the stakeholders using and/or operating in the precinct

### Considerations from experts interviewed:

- **Big loans are sometimes as useful as grants. Running a structured triage feasibility to commercialisation with financing from low-interest loans, if not no-interest loans, for enterprises below a certain level will drive impact**
- **Risk Capital and Start Up Finance is a key challenge – we need to encourage people to take risks and learn from failures and then try again, rather than walk away**

# Barriers

Place-based circular approaches are constrained by a system that prioritises short-term outcomes and is naturally risk-adverse. Additionally, governments are not activating the considerable economic opportunities circular economy precincts provide. While some governments are beginning to include embodied carbon reduction measurement and benefits in business cases for precincts, the broader benefits of circularity such as improved resource productivity, additional residual value of assets, reduced capital investment, job creation, innovation and, benefits to nature are currently not being enabled. The following barriers are highlighted by our interviewees and research to scale circular precincts in Australia:

## Engage & Explore

Successfully developing a circular precinct relies on understanding the context of the place and its people, exploring how it will fit into the broader system, considering existing policy, industry and environmental opportunities and constraints. It starts with building a connection to people and the land, mapping current needs and conditions and responsively co-design precinct scale, vision and objectives with stakeholders.

Barriers at the Engage & Explore stage include:

- **Limited awareness and understanding of circular economy among stakeholders**
- **Silos across governments and industries**
- **Challenges in building relationships and collaboration between stakeholders**
- **Lack of engagement, awareness, and participation from stakeholders due to cultural barriers and dominant narratives**
- **Challenges in overcoming vested interests, political hurdles, and traditional ways of operating in sectors and industries**
- **Lack of consideration for all inputs and outputs of a process in the design processes, leading to unintended consequences later on**
- **Challenges in navigating regulatory frameworks and obtaining approvals for circular initiatives**
- **Overemphasis on growth models and a lack of recognition for the importance of circularity in achieving sustainable outcomes**
- **Need for clearer economic cases and incentives to drive circularity at various scales, from local to regional and national levels**

## Design & Deliver

Circular design strategies, procurement processes, innovative construction methods, integrated utilities, and digitally enabled infrastructure are crucial elements in achieving sustainable and future-proof precincts.

Barriers at the Design & Deliver stage include:

- **Insufficient flexibility within environmental approval codes to manage waste differently**
- **Limited education on circular economy concepts for stakeholders, particularly in the procurement space**
- **Challenges in transitioning established urban and infrastructure frameworks to support circularity**
- **Lack of specific clauses and regulations around circularity in procurement and waste management processes**
- **Challenges in demonstrating the commercial reality and market viability of sustainable and circular practices**
- **Difficulty in changing established urban spaces and infrastructure to support circularity**
- **Lack of set standards for circular economy practices in certain environments, such as hospitals**
- **Need for guidelines and benchmarks that promote circularity in design and construction processes**
- **Technical challenges and opportunities in adopting new technologies for sustainable construction**

# Barriers continued

## Attract & Activate

Attracting, activating stakeholders and securing finance are crucial to establishing successful circular precincts, as they bring together diverse expertise, resources, and collaborative efforts to drive innovation, ensure financial viability, and foster a synergetic approach towards achieving circular economy goals.

Barriers at the Attract & Activate stage include:

- **Lack of awareness, education, and incentives for businesses to adopt circular practices**
- **Limited resources and funding to support circular initiatives and overcome resource constraints**
- **Difficulty in attracting investment and financing for circular initiatives, particularly in regional areas**
- **Lack of structured plans and guidelines for transitioning to circularity in various sectors and industries, leading to uncertainty and reluctance to invest**
- **Limited coordination, collaboration, and innovation within the building industry, hindering the adoption of circular practices**
- **Limited leadership and framing of circular economy at the national, state, and local levels**
- **Challenges in balancing commercial interests, regulations, and policies in achieving circularity**
- **Overemphasis on growth models and lack of recognition for the importance of circularity in achieving sustainable outcomes**
- **Cultural barriers and resistance to change in existing governance systems and decision-making processes**
- **Complexity and interdependencies in driving circularity in place-based approaches, requiring innovative strategies and coordination among stakeholders**
- **Lack of awareness and understanding of the business case and opportunities for circularity in regional economies**
- **Limited remanufacturing capabilities within Australia, leading to the export of recycled materials**
- **Accounting rules that do not enable a circular economy, as they fail to account for the value of maintenance, continuation, and revaluation**
- **Challenges in balancing product availability and market development**

## Measure & Manage

A common thought is that industries and organisations can only manage what can be measured, so translating the vision into clear metrics across the lifecycle of the precinct is important to track performance and adjust the course where necessary. Successful precincts have set up a robust, evidence-based, flexible measurement framework.

Barriers at the Measure & Manage stage include:

- **Difficulty in obtaining data and information on the recycling and reuse of materials, hindering decision-making and transparency**
- **Limited visibility and knowledge about the recycling and transformation of recycled materials**
- **Challenges in measuring and benchmarking the amount of waste generated and its destination**
- **Need for improved data collection and measurement systems to support decision-making and transparency**
- **Technological barriers and opportunities in harnessing digital technologies for a circular economy**

# Recommendations

Federal, state and local governments at every level are responsible for creating enabling environments to drive social, economic and environmental outcomes across all stages of the precinct life cycle, using circularity as a lever. The success of circular precincts relies on strong government commitment and leadership.

## Federal Government

### 1 Invest in new circular precincts across Australia and the transition of existing precincts to deliver circular economy markets, social and environmental outcomes. Ensure:

- A mix of different precinct types and locations (rural, remote, urban, industrial) leveraging local economic characteristics and opportunities
- First Nation's expertise is enabled and included in precinct approaches and outcomes
- Funding and incentives for renewable energy circular precincts to repair, reuse, remanufacture and recycle assets, including solar panels, wind farms batteries

### 2 Establish and empower a national independent body with clear remit, resources and funding to support the 2030 national target and framework, to drive outcomes on the ground, as well as drive place-based circularity by:

- Developing a Governance model to activate, deliver, manage and monitor and replicate circular precincts.
- Coordinating circular transition brokers to work within precincts to train local experts and build local capacity, drive job creation and increase local value in construction, manufacturing and retail
- Monitoring outcomes, establishing open data sharing, supporting collaboration with diverse stakeholders
- Funding to re-skill sectoral and local workforce and evolve education programs to integrate circular practices
- Developing guidelines on materials, industrial symbiosis, repair/reuse, whole of life approaches to close knowledge gaps and enable more place-based action

### 3 Embed circular economy targets and approaches in key infrastructure and precinct projects, including the Olympic and Paralympic Games:

- Ensure the measurement of economic, social and environmental benefits of integrating circular economy strategies in these projects

### 4 Enable sandboxing opportunities in selected circular precincts, where industry, research can safely work with EPAs and other regulators on novel ways to reuse, remanufacture and recycle valuable secondary resources. Leverage circular precincts to:

- Safely introduce circular practices such as design for disassembly, adaptive reuse, dematerialising, 'as a service' business models, shared and digital infrastructure, along with circular utility solutions including Purified Recycled Water (PRW), and regenerative practices
- Evolve EPA licensing to enable the cleaning of secondary resources, remanufacturing, composting, use of secondary resources in facilities and precincts
- Inform the modernisation of regulations, standards and licensing when projects are successful

### 5 Expand the scope of the Environmentally Sustainable Procurement Policy and Reporting Framework to:

- Specify performance based circular targets and outcomes beyond recycled content, including circular design, durability, repairability, product as a service, design for disassembly, dematerialising, regenerative practices such as recycled water and nature based solutions

### 6 Mandate measurement of embodied carbon in the National Construction Code. The Code does not currently reference circular economy. Ensure:

- Embodied carbon is clearly defined in the Code as a requirement for carbon abatement
- The new ISO 59000s (4,10,20) Circular Economy Standards are adopted in the Code

RECOMMENDATIONS

# State and Local Government

## State

### 7 Embed circular economy targets and approaches in key infrastructure and precinct projects:

- Scale existing State and Territory circular precinct frameworks

### 8 Ensure State/Territory planning regulations and design codes enable circular outcomes including adaptive reuse:

- Embed circular economy principles in mixed-use zoning, resource-sharing infrastructure, and design for disassembly
- Ensure Environmental Protection Regulation activates existing powers to recycle and recover safe waste streams, particularly during demolition, by requiring a robust evaluation process to demonstrate why adaptive reuse is not feasible. If deconstruction is to proceed, it should require a clear plan for reuse and recycling

For example, the City of London's Circular Economy Statement requires a show cause notice for demolition.

### 9 Ensure place-based circularity approaches are at the centre of relevant major policies and programs including Renewable Energy Zones (REZ) and major public works to maximise synergies and outcomes:

- Review key infrastructure and precinct programs to integrate circular economy strategies to deliver economic, social and environmental outcomes

## Local

### 10 Commit to the establishment of circular precincts in Local Government Areas (LGAs) leveraging industrial and commercial zones and government-owned sites

### 11 Embed circular economy targets in local government strategic, economic, skills and planning strategies:

- Ensure circular economy is part of local government Integrated Planning & Reporting (IP&R) activities
- Identify suitable sites for circular precinct development

### 12 Facilitate circular communities of practice through networks, events, knowledge sharing, and supportive council policies

RECOMMENDATIONS

# Finance and Investment

## Finance and Investment

13 Investors, banks and insurers need to evolve their approach to financing circular precincts in order to ensure they are supporting circular outcomes. This could include financing individual organisations or a precinct entity.

14 Identify linear and circular risks and opportunities by embedding circular economy in risk policies, product development, and client engagement:

- Leverage circular economy to satisfy climate change and carbon reporting requirements
- Monitor emerging technologies and innovation and job creation along with negative externalities and shifts from the circular transition, across client sectors
- Assess the impact of circularity on employment and include this in client onboarding and review processes

15 Circular economy to be included in the Sustainable Finance Taxonomy to lock in circular outcomes as part of institutions Environmental, Social, and Governance (ESG) commitments. Institutions can contribute to financing the circular transition under key financial industry frameworks and integrate ESG issues into decision-making processes:

- Utilise industry knowledge, insights and emerging circular metrics to activate circular finance opportunities

16 Contribute to the standardisation of circular economy metrics and financial instruments for optimal mainstreaming of circularity. This includes utilising sector-agnostic instruments like green bonds or sustainability-linked loans

17 Evaluate institutional contributions to financing the circular transition under key financial industry frameworks

18 Measure and disclose the level of financing for circularity on your balance sheet, highlighting best practices and examples of circular activities to encourage behaviour change among clients and investors

RECOMMENDATIONS

# Industry

## Industry

**19 Investigate opportunities to locate business operations in circular precincts to share infrastructure and reduce resource consumption, including energy and water:**

- Pilot or set up new circular supply chains that will reduce consumption of virgin resources to keep materials in the economy longer and regenerate natural systems
- Develop new partnership models that will enable circular economy outcomes by committing to pilots, co-investment and research that catalyse new circular business opportunities while reducing risk to one single organisation
- Embrace an open data approach for continuous improvement and resource synergies, together with enhanced productivity and developing an ecosystem of circular data and knowledge

**20 Update corporate procurement policies to source innovative materials and drive circular solutions:**

- Establish targets and identify project opportunities to apply circular practices such as design for disassembly, adaptive reuse, dematerialising, 'as a service' business models, shared and digital infrastructure, along with circular utility solutions including Purified Recycled Water (PRW), and regenerative practices

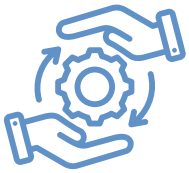
**21 Facilitate circular community of practice through business collaborators including supply chain partners, industry memberships networks, events and ESG policies and targets**

# Four Steps to Activate Your Precinct

To activate and scale place-based circularity, Circular Australia and Aurecon have produced a four-step guide to apply to both existing and future precincts. The **Circular Precincts Guide: Four Steps to place-based circular economy in Australia** goes hand in hand with this research report. It assists organisations, governments, research partners and collaborators to catalyse new precincts or transition existing ones and, in doing so, enable circular outcomes, jobs and industries. We encourage you to follow the four-steps and accelerate the transition to a circular economy.

### STEP 1
### Engage & Explore

Bring stakeholders onboard early to understand the system, shape the vision and build long lasting capability and trust.



### STEP 2
### Design & Deliver

Establish hard infrastructure that allows for sharing of resources and regeneration of natural ecosystems.

### STEP 3
### Attract & Activate

Create an environment that attracts investments, enables synergies across the community, businesses and nature.

### STEP 4
### Monitor & Manage

Collect data and insights to measure progress, performance, outcomes, share successes and learnings, effectively manage and adapt operations.

# Acknowledgements


## Circular Australia Precinct and Infrastructure Taskforce Members

Circular Australia has built a national network of committed experts and organisations working to transition Australia to a circular economy by 2030. Circular Australia's Precinct & Infrastructure Taskforce committed to deliver this research, leveraging the extended network of experts available through its members to build more place-based circular economy projects across Australia. Collaboration and co-design between industry, government and research is the way to create a circular pathway for Australia. The circular economy is a systems transition - not one business or sector can make the transition on its own.

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