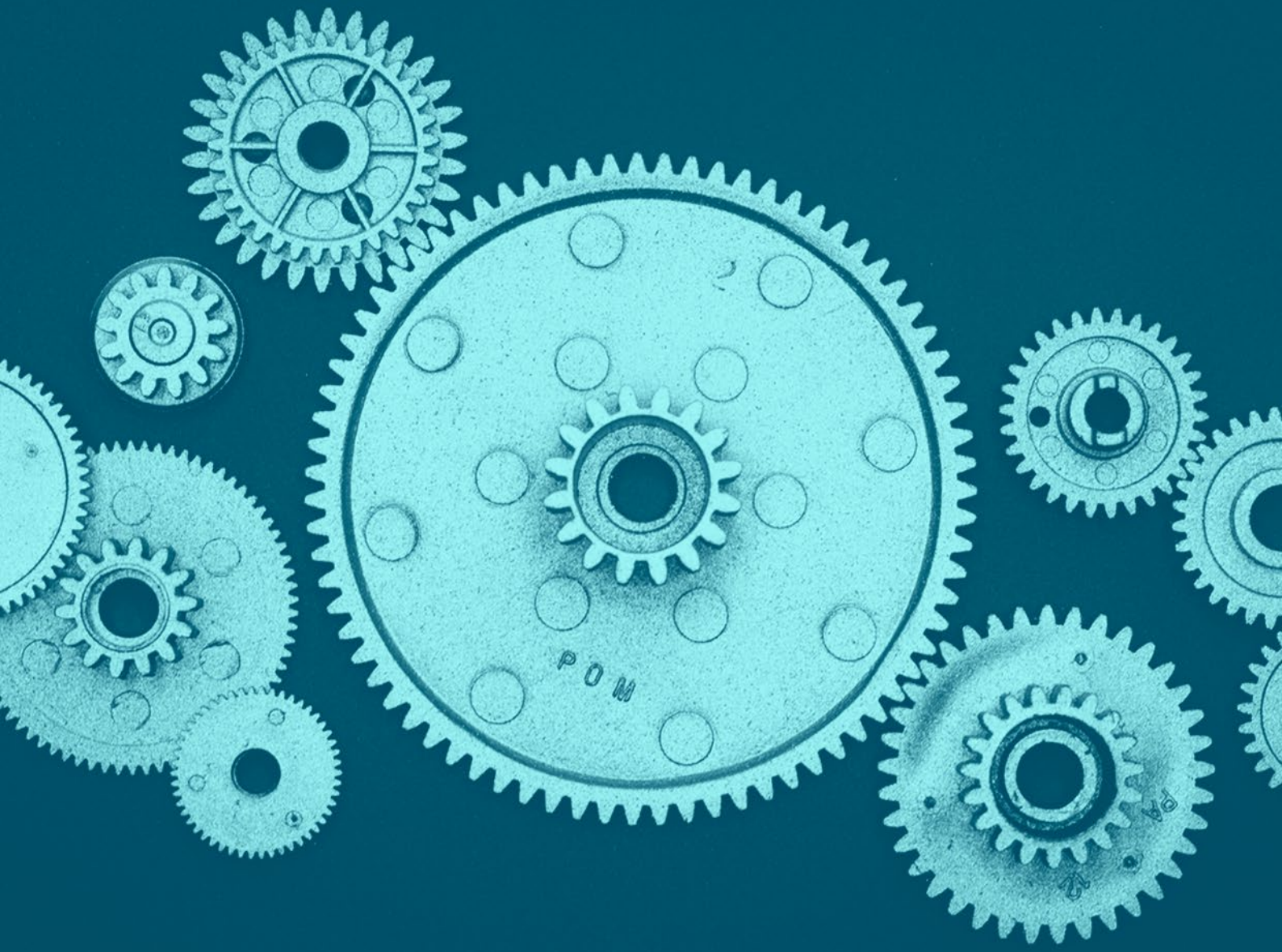
MEASURING THE CIRCULAR ECONOMY:

An Australian Perspective



AUSTRALIAN CIRCULAR ECONOMY HUB
PLANET ARK

A research report from the ACE Hub and Edge Environment

February 2022

EDGE

ACKNOWLEDGEMENTS

> ***The circular economy requires one of the most significant collaboration efforts ever undertaken.***
>
> *- Paul Klymenko, Planet Ark co-CEO*

This inaugural Technical Supporter research project from Planet Ark's Australian Circular Economy Hub (ACE Hub) and Edge Environment is an example of one such collaboration effort.

Thank you to the participants who kindly donated their expertise, insights and time to contribute to this research. We appreciate your support.

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Thank you to Jess Braun, Dana King and Jenni Philippe from Edge Environment for your research and authorship. Working with the Edge team has been collaboration in action.

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ABOUT

AUSTRALIAN CIRCULAR ECONOMY HUB
PLANET ARK

Planet Ark Environmental Foundation is an Australian not-for-profit organisation that helps individuals, communities, governments and businesses reduce their impact on the environment. Planet Ark established the Australian Circular Economy Hub (ACE Hub) to facilitate the transition away from the take-make-use-dispose linear economic model to a regenerative circular economy in Australia. The ACE Hub is a platform for all things circular in Australia and for celebrating the efforts of all those working towards this vital transition.

ABOUT

EDGE

Established in 2008, Edge is a full service sustainability consultancy focused on Asia-Pacific and the Americas. Our mission is to create a world where unsustainable is unthinkable.

We exist to help our clients create value from tackling one of the world's most fundamental challenges: creating truly sustainable economies and societies. We do this by combining science, strategy and storytelling in a way that gives our clients the confidence to take ambitious action, and do well by doing good.

FUNDING PARTNER

Australian Government

This project received $1.6 million grant funding under the Australian Government's Environment Restoration Fund program.

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FOREWORD

On behalf of Planet Ark's Australian Circular Economy Hub (ACE Hub), it is with great pleasure that we share our latest report, *Measuring the Circular Economy: An Australian Perspective.*

This inaugural Technical Supporter research project is a collaboration between the ACE Hub and Edge Environment. ACE Hub Technical Supporters play a vital role in our being able to examine important subjects that will lead to the transition to a circular economy in Australia. Edge saw our vision for the ACE Hub early on and were our first Technical Supporter, a group that has now grown to six.

While not all things can be measured, it is widely agreed that it is difficult to chart progress towards a goal without an appropriate measurement framework. The goal we believe Australia should seek is the transformation of our current take-make-dispose linear economy to one that is circular and regenerative by design. As well as determining where we currently stand, a measurement framework is vital to monitor progress.

Government plays a special role in our economy as the overall manager, as well being the 'keepers' of vital data through such instrumentalities as the Australian Bureau of Statistics. Data and metrics play an important role in providing valuable evidence in the development of government policies.

This report highlights the need for Australia to implement a circular economy framework that will guide measurement for government at all levels. It also provides a baseline understanding of the current state of circular economy measurement in Australia and guidance on what is required to enable progress towards more effective metrics.

Most importantly, this report highlights the need for dedicated resources and appropriate investment to drive the development of world leading circular economy measurement practices in the region. Through forming a Metrics Working Group, the ACE Hub has recruited and facilitated a group of experts with the skills, passion and networks to allow this to happen.

A tremendous amount of effort has gone into producing this report. We would like to express our gratitude to the team at Edge Environment for their sterling work and collaborative spirit. We would also like to thank the many contributors, reviewers as well as the 23 government interviewees for providing their valuable time and insights.

Finally, we want to acknowledge our dedicated ACE Hub team who have worked tirelessly to bring this report to life.

Regards,

Rebecca Gilling and Paul Klymenko
co-CEOs, Planet Ark and the ACE Hub

EXECUTIVE SUMMARY

The circular economy is an economic framework built on the principles of designing products to circulate at their highest value for longer, eliminating waste and pollution and regenerating nature.

Effective measurement of the circular economy in Australia could provide the impetus to drive a meaningful shift in actions and impacts across scales and sectors. For example, measurement data is the evidence-base needed to inform policy, attract and direct public and private investment and guide behaviour changes in consumption.

This research shows interest in circular economy measurement is gaining traction across governments in Australia. The report identifies activitiy from various governments that, if harnessed correctly, have the potential to accelerate national progress on measuring the circular economy, and set Australia to be leaders on circular economy measurement in the Asia-Pacific region.

The *Measuring the Circular Economy: An Australian Perspective* report generates a baseline understanding of the current state of circular economy measurement in Australia for all levels of government and provides guidance on what is required from these stakeholders to enable progress towards more effective metrics.

Insights were generated from interviews with international and Australian technical experts in the fields of measurement and circularity. Survey data was also collected from selected government stakeholders representing federal, state and local government perspectives.

The results are clear: there is a need for Australia to implement a circular economy measurement framework that will guide measurement for government at all levels.

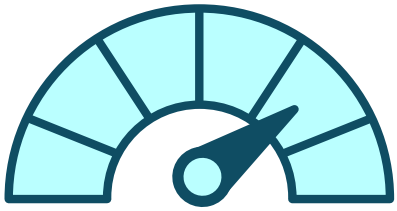
Measurement activities that exist currently are thought to be disconnected, piecemeal and heavily focused on waste data. Other available data sources, combined with local expertise, can design a systems-based approach that reflects a national circular economy.

Participants noted consistency in agreed measures across all states/territories is needed to build a harmonised national data set. One expert interviewee suggested there is also benefit in harmonising measures beyond Australia's jurisdiction with other countries/regions where possible. Strong governance and transparent reporting were also considered as important to maintain consistency.

Experts suggested an Australian circular economy measurement framework could include **headline, impact** and **transition** indicators that capture varying elements of the circular economy. The following objectives for a measurement framework were also identified: communication, prioritisation, monitoring and comparative performance measures across jurisdictions, along with the appropriate hierarchy of indicators and governance mechanisms.

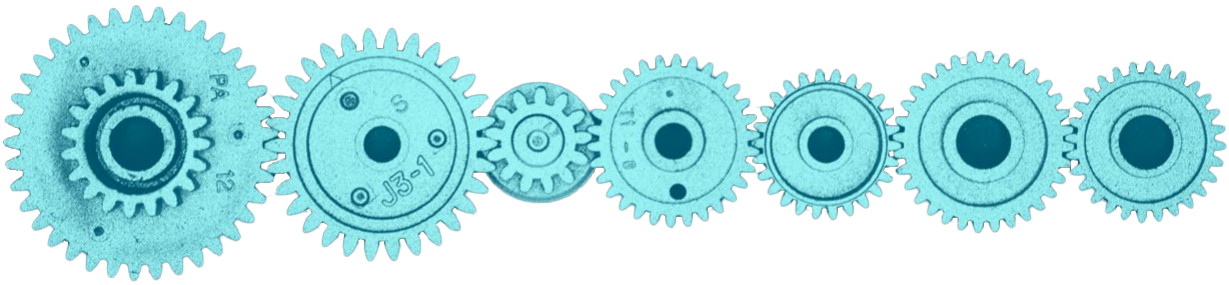
Continual evaluation and evolution of a circular economy measurement framework can support improvements in data collection, accessibility and maturity in the range of indicators over time.

International examples of circular economy measurement such as those set by Colombia, the Netherlands and the United Kingdom, reflect strong leadership by governments, but a comprehensive framework remains unavailable in Australia. This report highlights the need for dedicated resources and appropriate backing to drive the development of world leading circular economy measurement practices in the region.



Australia has the opportunity to capitalise on existing data and expertise to build a comprehensive circular economy measurement framework using a plan-do-evolve approach. This framework could support Australia's transition to a circular economy and help realise the projected social, economic and environmental benefits from the transition.

The results are clear: there is a need for Australia to implement a circular economy framework that will guide measurement for government at all levels.



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1. INTRODUCTION

The circular economy is an economic framework built on the principles of designing products to circulate at their highest value for longer, eliminating waste and pollution and regenerating nature.[1] It provides an approach to sustainable production and consumption that can address many critical environmental problems while meeting society's needs.[2] The transition to a circular economy will play a significant role in achieving Australia's and other nations' targets of net zero emissions. Research indicates transitioning to a circular economy can help to reduce 45% of emissions globally[3] and achieve multiple co-benefits across natural systems, society and the economy. In Australia's case, the economic opportunity in adopting circular economy initiatives across the built environment, mobility, community and industrial sectors is estimated at $1,860 billion over 20 years to 2040.[4]

Establishing a baseline through measurement is critical in identifying what needs to shift for the achievement of circular economy goals and targets. Measurement to track progress against the baseline and scaling the successful interventions over time can help to achieve widespread and system-level change.

> The transition to a circular economy will play a significant role in **achieving Australia's and other nations' targets of net zero emissions**.

1. EMF (2021), *What is a circular economy?*, Ellen MacArthur Foundation
2. EMF (2021), *A way to transform our system*, Ellen MacArthur Foundation
3. EMF (2019), *Completing the Picture: How the Circular Economy Tackles Climate Change*, Ellen MacArthur Foundation, p.13
4. Price Waterhouse Cooper (2021), Building a more circular Australia, p. 12

A circular economy measurement framework can include aggregated data sets across environmental, social, governance and economic aspects of a system. Data can be collected from a variety of stakeholders and analysed to observe results across a chosen set of indicators. Three groups of indicators have emerged in the circular economy measurement space as presented below:

HEADLINE INDICATORS

to provide a high-level indication of how circular an economy is, expressed by percentage or resources consumed per unit.[5]

IMPACT INDICATORS

to observe the effect of resource consumption and use on systems, including the economy e.g., Gross Domestic Product (GDP), the environment (e.g., greenhouse gas emissions, biodiversity), and society (e.g., jobs).

TRANSITION INDICATORS

to observe how the economy is tracking against markers of progress towards the desired future state, e.g., training programs to build skills needed for a circular economy or businesses providing products aligned with circular economy principles.

The strategic objectives for measuring the circular economy should guide which indicators are included in the measurement framework for a specific system. Internationally, governments with advanced circular economy measurement frameworks have indicators on waste, material flows, 'R-strategies' (e.g., reduce, reuse, repurpose, recycling), policy and process, and environmental and socio-economic impact.

This report focuses on generating a baseline understanding of the current state of measuring the circular economy by governments in Australia. The report explores at a high-level: current data coverage and gaps, current or planned circular economy indicators and what the future of circular economy measurement could include for all levels of government. It concludes with some recommended steps to move forward. An overview of the current landscape of circular economy measurement frameworks for governments around the world can be found in existing reports, for example, research from the Organisation for Economic Co-operation and Development (OECD) and the Platform for Accelerating Circular Economy (PACE). Readers can find links to these reports at the end of this section.

5. PACE (2021), *Circular Indicators for Governments*, PACE

The methods used to develop the report's findings included interviews with national and international experts in fields related to measurement of the circular economy and an online survey of Australian government representatives (federal, state and local). Desktop research was also conducted.

Four national and five international experts were interviewed to explore: the current state of circular economy measurement in Australia; global trends and measurement frameworks; what the future state of a circular economy measurement framework could look like for Australia; and how to get started towards the desired future state. Respondents to the government survey totalled 23 across the national (3), state/territory (11) and local (9) government levels in Australia, with all states/territories captured at either the state/territory and/or local level. Survey questions covered the current state of circular economy measurement, visions for the future and perceptions of enablers and barriers in achieving those visions. Government representatives from existing networks were invited to participate in the survey. While effort was made to capture a sample across government levels and jurisdictions, a wider sample is recommended for future works to evolve the knowledge in this area.

ADDITIONAL READING

- **The Ellen MacArthur Foundation** provides a comprehensive overview of circular economy as a central institution driving knowledge sharing of circular economy globally.
- **The OECD report, *The Circular Economy in Cities and Regions*** provides an overview of the circular economy in 51 cities and regions from OECD and non-OECD countries. It also develops a Checklist for Action and an Indicator Framework. The OECD also produced *The OECD Inventory of Circular Economy Indicators,* containing 450+ examples of input, output, outcome and impact indicators from existing circular economy strategies.
- **The global Platform for Accelerating Circular Economy (PACE)** community has recently released a report titled *Circular Indicators for Government*, which presents their recommendations for improving circular indicators and measurement.
- **The Australian Circular Economy Hub (ACE Hub)** is an avenue for public education on the circular economy in Australia, providing a multitude of resources and case studies on the circular economy.
- **The Bellagio Declaration** was published in March 2021, developed by the European Environmental Agency (EEA), the environmental agency of Italy (ISPRA) and an advisory group with representatives from several European nations. The Bellagio Declaration includes a set of seven principles, known as the Bellagio Principles, which describe the integral elements of a circular economy monitoring framework to ensure the relevant aspects are captured and the relevant parties are involved.

2. EMERGING MEASUREMENT

OF THE CIRCULAR ECONOMY IN AUSTRALIA

KEY FINDINGS

1. **Circular economy and its measurement are currently centred within the waste management narrative.**

2. **Australia has sufficient data to start measuring circularity more comprehensively.**

3. **Some stakeholders are making progress on circular economy measurement, but are disconnected from one another, stifling progress.**

Measurement of the circular economy in Australia is still in the early stages, with waste management data dominating the narrative and assessment of performance to date. However, an array of relevant data sets with the potential to form a more holistic view of circular economy performance already exist in Australia beyond the waste space. Progress on circular economy measurement is being limited by the complexity of integrating these data sets and a lack of collaboration among stakeholders.

2.1 CURRENT MEASUREMENT IS WASTE-CENTRIC

The circular economy in Australia is generally seen narrowly as a waste management solution. This is reflected in the awareness, funding and focus of decision-makers in measuring waste management in comparison to other aspects of the circular economy, as captured by this participant quote:

> ***There is a need to shift our focus on measuring 'waste' streams and products to a more strategic focus on keeping 'materials' circulating in the economy at [their] highest value for as long as possible.***

2.1.1 Waste focus across all levels of government

At the local level, survey responses reinforced waste-centric measurement as their primary focus. However, higher order measurement and policy pursuits, albeit minimal in some jurisdictions, were noted. These included: attention to material flows, change in procurement practices, business education, material reuse and, in limited cases, design practices. In one example of commitment to the circular economy model, Lake Macquarie City Council has launched their Circular Economy Policy[6] and Framework.[7]

Similarly, survey respondents at the state level indicated progress in measurement centred on policy and indicator development for waste, landfill diversion, resource recovery and, in some cases, changes to greenhouse gas emissions. Only one authority, Sustainability Victoria, is in the process of developing a comprehensive circular economy measurement framework that will knit together data sets from across departments and disciplines to form a view of Victoria's circularity performance and progress beyond waste.[8]

The recent change of regulations by several of Australia's waste trading partners has triggered increased attention from federal policymakers and industry on the waste sector. For example, several unprocessed waste streams have been banned for export from Australia.[9,10]

6. Lake Macquarie City Council (2021), *Circular Economy Policy*
7. Lake Macquarie City Council (2021), *Circular Economy Framework*
8. SV (2021), *About us*, Sustainability Victoria
9. NSW EPA (2018), *Response to the enforcement of the China National Sword Policy*, NSW EPA
10. Australian Government (2021), *Waste exports*

Elements of waste management that align with circular economy principles, such as reducing waste generation and greater utilisation of recycled products, appear within the National Waste Policy[11] and National Waste Policy Action Plan[12] and in state and local government plans and strategies, such as Western Australia's *Waste Avoidance and Resource Recovery Strategy 2030*[13] and NSW's *Waste and Sustainable Materials Strategy 2041*.[14]

The circular economy is also starting to gain a small mention in government strategies other than waste, such as in the *NSW Hydrogen Strategy*[15] where it is mentioned in relation to clean manufacturing precincts capitalising on sharing resources among tenants. However, a missed opportunity remains to connect the circular economy agenda more strongly with achieving other objectives, such as decarbonising the economy, future-proofing industries and creating jobs.

2.1.2 Circular economy literacy

The waste-centric measurement focus is partially due to education and awareness of the circular economy being in its infancy in Australia. For example, in a recent ACE Hub report[16] an impressive 81% of business decision makers said they felt knowledgeable about the concept of the circular economy. However, only 27% could correctly identify the definition of circular economy when presented with a list of options.

Participants in this current study identified that communication regarding the benefits of a circular economy in Australia is generally focused on improved waste management outcomes. The other benefits around material efficiency, climate change mitigation and adaption, biodiversity enhancement, economic benefits and jobs creation are less well understood. For example:

> ***[There is a] low level of understanding of what circular economy is, and [a need to elevate] the conversation above recycling rates. The current focus on SDGs can be leveraged to articulate circular economy but this has not been done yet.***

11. Australian Government, state and territory governments and the Australian Local Government Association (2018), *National Waste Policy 2018*
12. Australian Government, state and territory governments and the Australian Local Government Association (2019), *National Waste Policy Action Plan 2019*
13. Waste Authority (2019), *Waste Avoidance and Resource Recovery Strategy 2030*, Government of Western Australia
14. NSW Government Department of Planning Industry and Environment (2021), *Waste and Sustainable Materials Strategy 2041*
15. NSW Government Department of Planning Industry and Environment (2021), *NSW Hydrogen Strategy*
16. ACE Hub (2021), *Circularity in Australian Business 2021: Awareness, knowledge and perceptions*, Planet Ark

2.1.3 Limitations of the waste-centric narrative

Focusing on waste avoidance or waste reduction is an important part of the transition. This can be achieved through new business models promoting dematerialisation and greater resource optimisation.

However, a strong waste-centric narrative alone fails to build a sense of urgency to transition Australia to a circular economy. Action is required to measure where we are now, define where we would like to be (supported by meaningful targets), start implementing initiatives to change behaviours, track progress and accelerate the transition at scale. Focusing on waste as an 'end-of-pipe' narrative limits the achievement of significant GHG emissions savings as well as new economic and social opportunities.

2.2 DATA SETS ARE AVAILABLE BUT NEED CONSISTENCY

Despite current measurement of the circular economy remaining focused on waste, Australia already has relevant available data across the private and public sectors in other aspects of the circular economy that can be readily utilised.

2.2.1 Available Australian data sets

In addition to waste, existing Australian data sets measure domestic cultivation and extraction of materials, internationally traded products (using Harmonised System trading codes),[17] land use, environmental health and impacts, economics, jobs and inputs and outputs across sectors. These data sets are not currently integrated. However, to do so offers great potential to form a more holistic view of circular economy in Australia. In particular, participants noted the opportunity to integrate and leverage existing data sets on social and economic measures to capture employment data relating to or enabling a circular economy.

> ***You could consider … not just looking at circular economy related metrics, but also at alternative ways to measure progress, like the inclusive wealth index.***

17. Australian Government (n.d.), *What is my HS Code?*

Multiple indicators are already in use for the measurement of waste outflows, focusing on absolute waste generation, waste intensity, landfill avoidance and recycling across a range of materials. However, there is a lack of sector-by-sector accounts of material inflows and outflows, and movement of materials across the country. If data capture was expanded, insights into the use of materials, values across their lifecycles and demand across different sectors could be provided. As noted by one participant:

> ***There are partial measures evolving in this space, though not well defined nor with a sustainable measurement basis.***

One data set recently released by NSW Circular is the Australian Circular Benchmarks Dashboard. The dashboard provides analysis of publicly available global data sets and compares these to Australian data. The goal is to help understand how Australia is tracking against historical data and our peers (see case study 1).

CASE STUDY 1

AUSTRALIAN CIRCULAR BENCHMARKS DASHBOARD

NSW Circular has developed the *Australian Circular Benchmarks Dashboard*. The dashboard aims to provide a single reference point for a range of benchmarks. These include sustainability and circular economy benchmarks ranging from material consumption and material productivity, to how resources are generated and used, including energy. These benchmarks are delivered as interactive data visualisations that allow users to engage with the data at the global, state and territory levels. It also includes free downloads of all the data used. The Dashboard will continue to be updated as further benchmarks are evaluated and added. NSW Circular aims to support policymakers, businesses and communities with this tool as they track their progress in their circular economy pathways.

2.2.2 Current reporting frameworks limit the scope of measurement

Current reporting frameworks and regulations in Australia provide good visibility over materials that are processed by licensed waste facilities, generally including residual waste treatment facilities, sorting and recycling facilities above an annual tonnage threshold. However, there is low visibility of materials that are processed by an entity (including organisations and civil society) engaging in an R-strategy higher than recycling on the R-ladder.[18] Currently, there is reliance on specific studies with voluntary disclosure for data on higher R-strategies. For example, charitable recyclers track their material flows and social and environmental impacts to some degree. The Gumtree *Trading in the Circular Economy*[19] report provides data on finished goods circulating in the economy through reuse. An Australian expert shared:

> ***The higher R-value materials and products … that's all completely opaque [but] really worthwhile to note in a circular economy … if we want to mobilise those sharing, reuse, repair loops, we need to know a lot more about them.***

2.2.3 Poor harmonisation exists across waste and recycling data

In the waste and recycling space, data collection methodologies have not been harmonised across the states and territories. While participants recognised the need for harmonisation, there is yet to be a framework or mechanism to manage and integrate data across jurisdictions and at different scales.

Harmonising the waste data from different states and territories is currently a highly manual process undertaken annually for the National Waste Report[20] funded by the Australian Government. Government respondents widely identified disparity in data sets and collection methodologies as a barrier to progressing the measurement of circular economy (referring to the current manual review and analysis). Participants noted a need for consistency across all states/territories, which could collectively build a harmonised data set for agreed measures at the minimum.

One expert suggested that while Australia needs harmonisation across jurisdictions and agreed measures, there is also benefit in harmonising measures with other countries/regions where possible, such as the EU, to allow comparisons of circular economy transitions. The EU adopts a harmonised approach to monitoring, yet also provides for country-level monitoring of locally appropriate data sets.

18. The R-ladder presents a hierarchy of 'R-strategies' for resource consumption and management. In general, the higher on the ladder a strategy, the lower the resource related environmental burden and the more circular it is. R-strategies range from refuse and reduce at the top of the ladder, to recover and re-mine at the bottom of the ladder. Further information is available from the publication by The Netherlands Environmental Agency
19. Gumtree (2021), *Trading in the Circular Economy*, Gumtree Australia
20. Department of Agriculture, Water and the Environment (2021), *Waste Reports, Data and Tools*, Australian Government

2.2.4 Progress is hindered in the absence of a defined measurement framework

Lacking a defined framework and methodologies for circular economy measurement leaves us unclear on current efforts and unaware of potential areas for activating circularity. These limitations also stall progress towards improving data collection, analysis and communication. Multiple interviewees expressed that the current lack of visibility of quality data and measurement in circular processes beyond waste generation and management leaves a knowledge gap on how circular Australia is currently.

Coordinated investment is required for data collection, measurement and management infrastructure at all levels. Such investment can help to achieve higher quality data, greater data coverage across the value chain and at different scales, and enable greater insights to focus targeted actions and unlock opportunities, as summarised by one Australian participant:

> ***The quality of data is tied to monetary investment in conjunction with prioritisation of data infrastructure.***

2.3 INCREASED LEADERSHIP IS NEEDED FOR PROGRESS

There are isolated examples of progress emerging in the measurement of the circular economy across jurisdictions at all levels of government and within research institutions. Working in isolation, however, creates a missed opportunity to collaborate and accelerate progress. One participant said:

> ***Some circular economy metrics require data from multiple government areas and currently there is not enough collaboration to be able to measure those.***

2.3.1 Progress is emerging on measuring the circular economy

Some governments recognise the need to develop circular economy metrics beyond the current measures but are unsure how to progress and/or require support to get started. Several states and some local governments are measuring partial indicators relating to circular economy. These include material flow analyses focused on part of the value chain or specific materials across the whole value chain, the environmental impact of procuring recycled content in roads and buildings and the economic and environmental impact of select circular economy initiatives.

Some states are at the stage of research and policy development, examining how circular economy principles can be integrated across their operations and functions. The Victorian Government is progressing work to finalise a comprehensive circular economy measurement framework focusing on gaining a whole-of-economy view, including impacts on societal needs. The work being conducted provides an example of a cross-departmental approach to engaging with the circular economy. Such an approach will help to understand what metrics are available now and those that are needed for the future (see case study 2).

CASE STUDY 2

SUSTAINABILITY VICTORIA CIRCULAR ECONOMY MEASUREMENT FRAMEWORK

Sustainability Victoria developed a draft circular economy measurement framework, launched in November 2021. The draft framework development included several stages. The first stage saw consultation across government departments, research institutions, industry, not-for-profits and technical experts in circular economy. This was undertaken to understand what was important for measuring the circular economy for Victoria.

The next stages included a strategic review of metrics being used around the world and a feasibility assessment on a suite of indicators for Victoria. The latter included a review of available data sets and who owns them, which indicators can be measured now, and which indicators require new data sets to measure in the future.

The recommendations of this process were a circular economy measurement framework for Victoria, covering headline, impact and transition indicators.

The three **headline indicators** encompass whole-of-economy measures of material and economic circularity and awareness of circular economy. Numerous **transition indicators** aim to provide a more nuanced picture of the economy tracked against societal needs. Five **impact indicators** measure the effect of the economy on greenhouse gas emissions, biodiversity, employment, health and wellbeing.

At the time of writing, the framework was being refined following consultation on the draft with industry. The final circular economy measurement framework for Victoria is expected to be released in early 2022 and will be operationalised soon after, using three years of retrospective data to establish a baseline and immediately commence observing trends over time.

A Victorian representative explained:

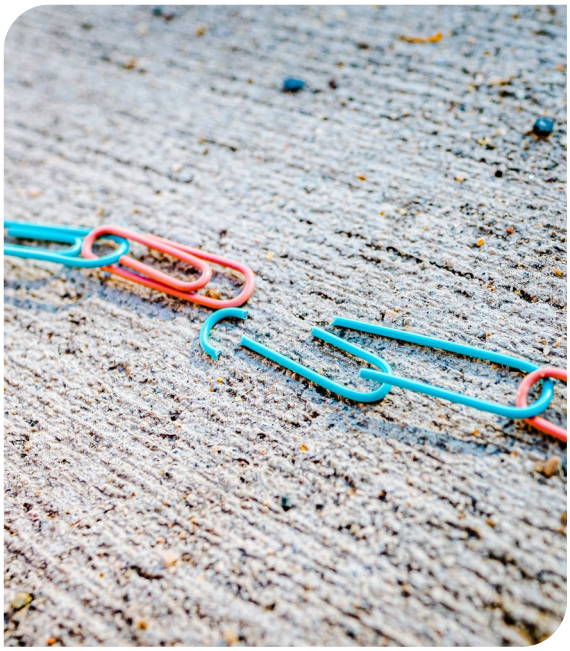
> ***We are at the early stage of our circular economy measurement journey, mostly still using traditional waste measurement indicators like diversion from landfill and resource recovery rate. But with our new strategy [SV2030] and Recycling Victoria, we are starting to measure more circular economy specific indicators. These include the amount of grant funding provided to circular economy initiatives, measuring the impact of our education campaigns and the number of clean economy jobs our projects deliver.***

2.3.2 Leaders in circular economy measurement are disconnected from one another

While some jurisdictions are making progress on measuring the circular economy beyond waste, isolated work streams miss the opportunity to share knowledge, reduce the risk of duplicated efforts, gain efficiencies and accelerate progress.

Intentions for collaboration are emerging with sponsorship, endorsement and coordination at the federal level providing opportunities to scale up collaboration efforts. However, a dedicated mechanism to convene stakeholders has yet to emerge.

Outside of government, several research institutions in Australia have developed deep expertise in highly relevant fields and analysis techniques that can measure aspects of circular economy. One example is the Industrial Ecology Virtual Laboratory, described in case study 3 below.[21] These experts could be mobilised alongside government leaders to play an important role in shaping and delivering circular economy measurement for Australia.



21. IELab (2021), *Industrial Ecology Virtual Laboratory*

CASE STUDY 3

THE INDUSTRIAL ECOLOGY VIRTUAL LABORATORY

The Industrial Ecology Virtual Laboratory (IELab)[22] is a collaborative platform for multi-region input-output modelling and research. IELab is hosted by a team of research institutes across Australia including CSIRO, University of Sydney and University of New South Wales. It processes and analyses economic, environmental and social data from any sector, country or region. Input-output tables used in such analysis describe the sale and purchase relationships between producers and consumers within an economy, showing the flows of final and intermediate goods and services defined according to either industry or product outputs. These flows are commonly described through financial value, but can also be described in environmental or social values such as volume of materials, carbon emissions or number of jobs.[23]

2.3.3 Opportunities for government leadership

Participants identified missing factors from government institutions that could enable more widespread and coordinated measurement of the circular economy, including:

1. Government-led leadership.
2. Strategic direction.
3. Dedicated resources to coordinate across multiple stakeholders, jurisdictions and levels of government who are making progress on circular economy measurement.

22. IELab (2021), *Industrial Ecology Virtual Laboratory*
23. OECD (2015), *Input-Output Tables*

To address this absence, the ACE Hub has convened experts and government representatives into a Metrics Working Group to share their experience and competencies in this space on a voluntary basis (see case study 4). However, a formal body with sufficient powers and funding to drive a coordinated approach to measuring the circular economy in Australia remains necessary. One participant said:

> ***There is currently no leadership in place to drive circular economy principles, business models and measures.***

CASE STUDY 4

THE CIRCULAR ECONOMY METRICS WORKING GROUP HOSTED BY THE AUSTRALIAN CIRCULAR ECONOMY HUB

The ACE Hub identified the need to collaborate with and convene the Australian research and policy community to develop metrics, data and tools to measure Australia's circularity. A Metrics Working Group (MWG) was developed in early 2021 to facilitate this, with members drawn from across a range of technical expertise and state government representatives in various stages of implementing circularity initiatives.

The MWG meets regularly on a voluntary basis to share information in support of achieving its four objectives:

1. **Establish an understanding of best practice circularity measurement.**
2. **Support a process to develop circularity measurement for Australia.**
3. **Establish regular reporting for circularity and sustainable materials management for Australia.**
4. **Contribute to global reporting on circularity.**

The group is currently working on a set of principles for measuring circularity in Australia for governments and agencies at all levels and developing a common definition of circular economy activities to assist with harmonisation of reporting across the country.

Continued next page >>

CASE STUDY 4 CONTINUED

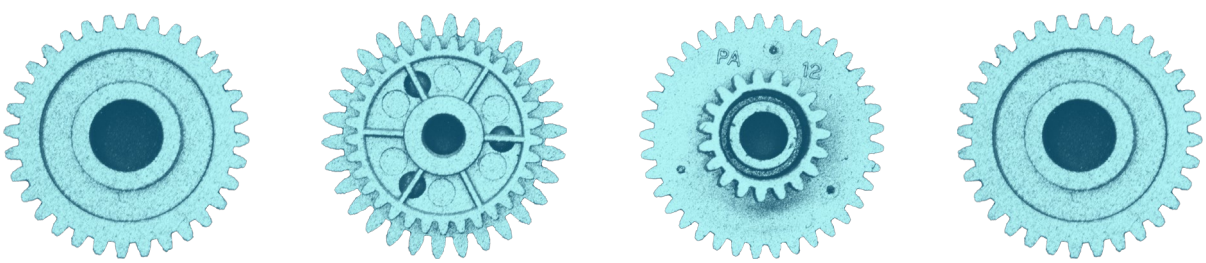
While the MWG is focused on metrics for government, the development of a business-focused subcommittee is underway with the objective to support the delivery of circularity measurement tools and systems for Australian businesses. The MWG and business subcommittee would also interact to address the interplay between government and business circularity measurement.

The MWG functions through volunteer time and has exemplified the benefits of collaboration and knowledge sharing. This highlights the opportunity to establish dedicated resources to amplify the MWG's function in support of accelerating policy development, coordination of systems and realising the benefits of a circular economy.

The challenges identified by participants in this study resonate with international experience captured by the OECD in their publication, The Circular Economy in Cities and Regions, including:

- Lack of an agreed definition of the circular economy;
- Lack of harmonisation of indicators;
- Incomplete information;
- Lack of integration at the macro-micro-meso levels;
- Strong focus on waste;
- Most available indicators are primarily data-driven rather than objective-driven, meaning that cities use available indicators to measure circular related aspects, rather than broader objectives (e.g. waste-related indicators); and
- Lack of a systemic approach of the circular economy indicators.

Future efforts in measuring the circular economy in Australia need to consider the challenges identified by participants in this study and those from international studies to design a framework that captures a mix of available data and aspirational, objective-driven data.



3. POTENTIAL

FOR ACCELERATED CHANGE IN MEASURING THE CIRCULAR ECONOMY

KEY VISIONS FOR THE FUTURE STATE OF MEASURING THE CIRCULAR ECONOMY IN AUSTRALIA:

1. **Australia will have a national circular economy measurement framework tailored to our context and objectives.**
2. **Australia will have a sophisticated data collection, integration and management system underpinned by strong governance.**
3. **Effective measurement will create shared value and accelerate Australia's transition to a circular economy.**

The vision for Australia is to develop a circular economy measurement framework that caters to its economy, its objectives for measurement and tracks progress on the transition to a circular economy. Such a framework could be founded on a comprehensive system of data collection and management that captures inputs across all levels of government, alongside the private sector, to provide an integrated, widely accessible platform of knowledge that can inform and drive the transition to circularity.

Developing a coordinated national approach is a significant opportunity to progress the efforts of pioneering jurisdictions and highly skilled research institutes in this space. It could also maximise on the emerging interest in circular economy across independent departments and explore suitable governance mechanisms to collate and manage data across jurisdictions. This coordinated approach would provide a level of commonality and confidence in measurement across jurisdictions, spurring accelerated change.

> Developing a coordinated national approach is a **significant opportunity.**

3.1 AN AUSTRALIAN CIRCULAR ECONOMY MEASUREMENT FRAMEWORK

3.1.1 Tailoring for unique contexts while providing confidence and allowing for comparison

Every economy and its objectives for transitioning to a circular model is unique. Therefore, the circular economy metrics used for each needs to be tailored to some degree, while also allowing for consistency and comparison with other economies.

For example, every economy presents its own profile of sectors, trading relationships, natural resources, policy settings and consumptive culture. There is complexity around determining what suite of indicators are best suited to a given economy, to provide both tailored insights to the specific context, achieve robustness and allow for comparison with peers. Coupling strong leadership and a governance framework to coordinate data collection and sharing across government levels and departments is also necessary. Government respondents noted they need clarity on what to measure, for example:

> ***[There is a] lack of clear information about an appropriate approach/methodology that should be adopted to measure circular economy outcomes.***

Globally, there are several established measurement frameworks in use, including the circular economy monitoring framework developed by the European Union[24] and The Circularity Gap Reporting Initiative.[25] The EU monitoring framework, for example, permits member countries to have their own adapted system to reflect the needs and specificities of their economies, while feeding data into the higher-level framework. As noted in section 2.2.3 above, a similar system in Australia would permit the states and territories to have nuanced monitoring systems for their reporting and feed consistent data into the national circular economy measurement framework.

Several nations have taken this tailored approach to developing a circular economy measurement framework. The Netherlands is one such example discussed in further detail in case study 5.

24. EU (2021), *Circular Economy Indicators*, European Commission
25. Circle Economy (2021), *Circularity Gap Report 2021*

CASE STUDY 5

CIRCULAR ECONOMY MEASUREMENT IN ACTION – THE NETHERLANDS

The Netherlands is a leader in circular measurement using a collaborative approach, with participation from both government and research institutes. This approach enabled the development of the inaugural *Netherlands Integral Circular Economy Report*[26] in January 2021. The report tracks progress towards a 2050 goal of a fully circular economy. A government-led initiative, measurement in the Netherlands adopts a three-pronged approach focusing on trends in material resource use, social and economic impacts and progress towards circularity by government and social activities.

Table 1: Example indicators adopted by the Netherlands

Material Resource Use	Social & Economic Impacts	Progress Towards Circularity
Domestic Material Input (Mt)	Water footprint consumption (km^3)	Lifespan (yet to be developed)
Domestic Material Consumption (Mt)	National GHG emissions ($MtCO_2$ eq)	Value retention (yet to be developed)
Recycled waste in the Netherlands (Mt)	Circular employment (no. FTE)	
	Added value of circular activities (EUR billion)	

This reporting framework has allowed the Netherlands to capture successful transition, e.g., an 8% increase in businesses adopting R-strategies,[27] alongside providing a baseline of progress towards circularity, noting the current economic state still demonstrates "little attention for socio-economic reform and phasing out of the existing [linear] system."[28]

The Netherlands' measurement framework highlights the importance of government-wide support and government-led change in the transition to circularity. The framework emphasises the need for social change to realise circularity and the social benefits it can generate.

This report follows their 2018 publication *Circular economy: what we want to know, and can measure*,[29] which laid out their intention to develop a monitoring system to track against the 2050 target. This report presents an evolving approach for establishing baseline indicators and developing more as knowledge of and progress towards circularity grows.

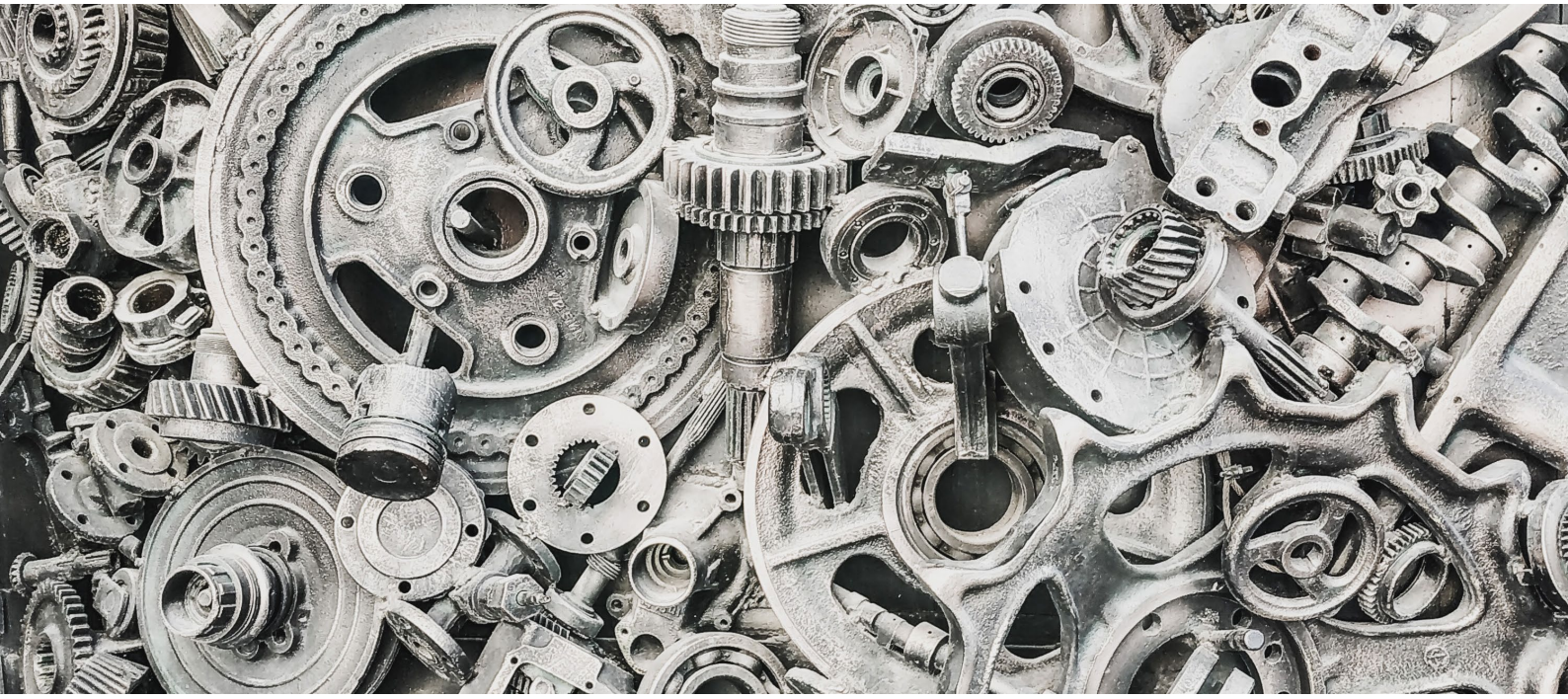
26. Hanemaaijer, A. et al. (2021), Netherlands Integral Circular Economy Report 2021
27. Hanemaaijer, A. et al. (2021), Netherlands Integral Circular Economy Report 2021, p.13
28. Hanemaaijer, A. et al. (2021), Netherlands Integral Circular Economy Report 2021, p.5
29. Hanemaaijer, A. et al. (2018), Circular economy: what we want to know and can measure

3.1.2 Objectives for measuring the circular economy in Australia

Experts suggested the objectives for measuring the circular economy in Australia are likely to include:

- Communicating to a wide audience to raise awareness;
- Trigger actions where evidence is gathered to gain buy in and support to set policy priorities;
- Identifying areas for prioritised action to inform investment in attractive opportunities;
- Monitoring Australia's progress over time; and
- Comparing the performance of jurisdictions within Australia and with peer nations.

Several experts also highlighted the need for an Australian circular economy measurement framework to be multi-level, integrated, interoperable and be used to drive positive change. For example, a framework driven at the national level can allow for measurement that cascades down to state and local government levels to provide the detail and depth required to drive tangible initiatives.



3.1.3 Envisioning an Australian circular economy measurement framework

This study did not undertake a comprehensive visioning process, however research participants did share elements they envision for an Australian circular economy measurement framework. These are presented in Figure 1 (see next page) and **provide a sense of the indicators that could be included. They do not form a comprehensive suggestion** for a circular economy measurement framework for Australia. The design of such a framework requires more extensive study outside the scope of this report.

SUGGESTED INDICATORS:

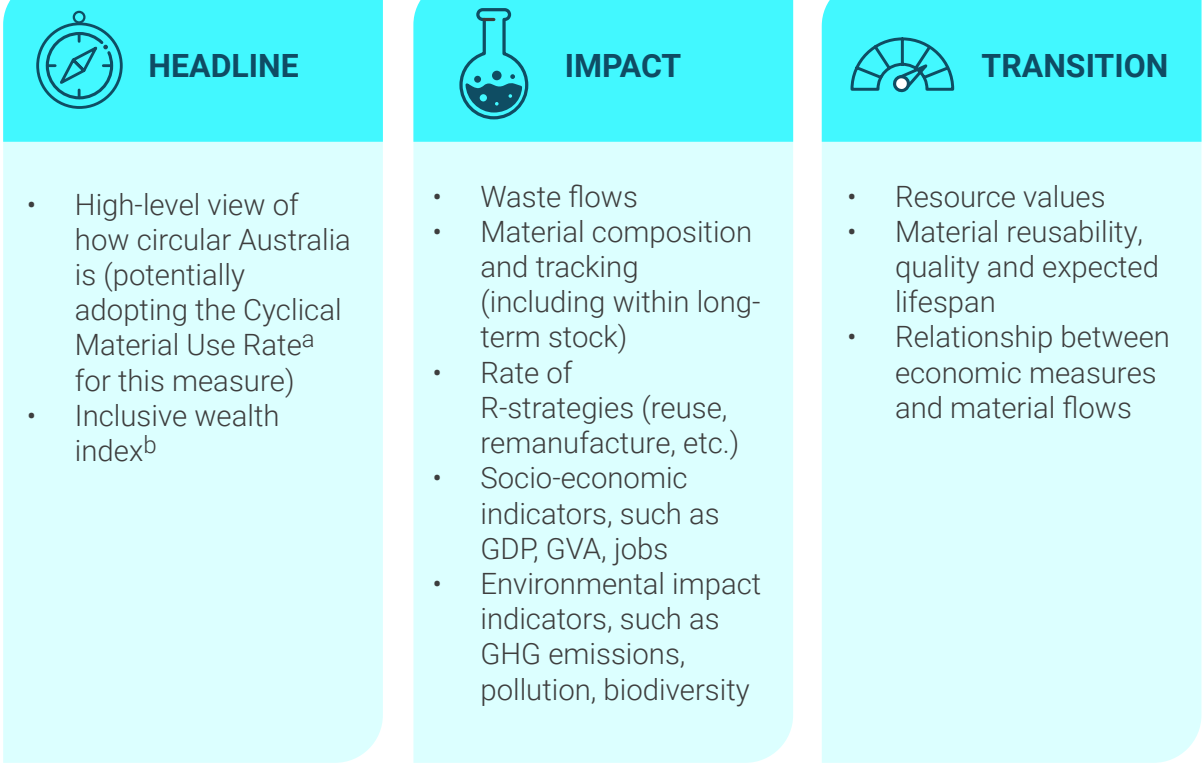


Figure 1: Envisaged indicators for an Australian circular economy measurement framework

a: Shows the proportion of waste that has been recovered weighed against the material demands of the economy as a whole (Source: The Monitoring and Statistics Directorate (SOeS),(2017))
b: An index that measures wealth using countries' natural, manufactured, human and social capital (Source: UNU-IHDP and UNEP (2012))

3.1.4 Driving long-term improvement

Long-term alignment on a circular economy vision and targets covering environmental, social and economic value creation could underpin the objectives of a circular economy measurement framework for Australia. An evaluation and iteration mechanism to drive improvement of the measurement framework over time can be built into the progress tracking program. This could consider, for example, new data becoming available and usable through digitisation, improvements in measurement technology and data sharing and any new consumption models that emerge as the economy and society become more circular over time.

3.2 DATA COLLECTION, INTEGRATION AND MANAGEMENT WITH STRONG GOVERNANCE

A functional, multi-tiered and interoperable data management system underpinned by robust data collection methodologies and governance mechanisms could provide strong foundations to observe meaningful insights at multiple scales. As one participant suggested:

> ***Data is key to the success of a circular economy transition. [Data collection] needs dedicated resources and a willingness to collaborate, not compete — that includes academia, business and government.***

3.2.1 Harmonised and robust data

Existing data collection methodologies, primarily relating to waste flows, across Australia will benefit from harmonisation to allow for simple integration nationally and enable direct comparison across states and territories and their local governments. Improving national waste data accessibility and reporting is already identified as a priority within the National Waste Policy.[30] Infrastructure Australia also notes the need to improve data: "A clearer understanding of volume and flows of materials through the system will provide better problem identification and support investment in quality waste infrastructure. It will result in more informed end markets, identify the areas in need of research and development and support accessible, targeted waste collection and processing services", as referenced in their Reform Priority List in their 2021 *Australian Infrastructure Plan*.[31]

To provide access to centralised waste data, the Department of Agriculture Water and the Environment is developing a tool called the Waste Data Visualisation Platform.[32] The project is due for completion in 2024. The platform will help consumers, manufacturers and policy makers to find opportunities for recycling, expose gaps for new solutions, and inform investment in the sector.

> ***Like collecting data on waste and resource recovery, circular economy metrics are most useful when they are collected in a standardised way.***

30. Australian Government (2018), *National Waste Policy* 2018, p 16
31. Infrastructure Australia (2021), 2021 *Australian Infrastructure Plan-Reform Priority List*, p.64
32. Department of Agriculture, Water and the Environment (2021), *Waste Data Visualisation Platform, Australian Government*

3.2.2 Future-focused data management systems

A sophisticated digital data management system that is interoperable, integrating robust and harmonised data from multiple sources and at multiple scales would be an important part of the vision. For example, data will be integrated across local governments at the smallest scale to national measurements at the largest scale, and across public and private sector data sets. Ideally, indicators could be calculated at all scales, maximising the insights and usability of the results.

The data management system could be designed to accommodate and adapt to growing and evolving data sets, allowing for the calculation of new indicators. A comprehensive review of existing information can inform what additional data should be prioritised and integrated into the system. Plugging identified data gaps — such as across the value chain, with higher R-strategies (such as reuse and remanufacture) and with geographical movement of materials across Australia — can be prioritised and addressed by leveraging emerging digital technologies such as material passports and blockchain. As one participant suggested:

> ***Technology has a huge role to play in measuring the circular economy.***

3.2.3 Governance mechanisms

Robust governance mechanisms able to handle such a sophisticated data management system would be needed, both across government departments and at different scales. The system would allow greater data sharing from the private sector.

The OECD identified roughly one-third of their circular economy indicator inventory relates to governance, highlighting its importance for measurement.[33] These indicators cover awareness-raising, innovation, strategy, public procurement, capacity building, regulation, education, stakeholder engagement, collaboration, monitoring and evaluation and financing. By leveraging action across these facets of governance, both public and private sector stakeholders can be equipped to actively participate, share and develop their capacities in implementing circular economy initiatives.

33. OECD (2021), *The OECD Inventory of Circular Economy Indicators*

One example of leveraging action is from the collaboration between the European Environment Agency, the Italian Institute for Environmental Protection and Research, and an advisory group with representatives from several European nations. The collaboration developed the Bellagio Principles in 2021 to capture the essential elements of a monitoring framework for the transition to a circular economy. Principle No. 5 supports the importance of governance, stating: "Monitoring should capture changes happening across all levels of the economy. It should address both public and private sector stakeholders, and different governance levels from global to local."[34]

3.2.4 Stakeholders will be empowered to play their role in measurement

Experts and government representatives envisage that supporting education and tools are necessary to guide stakeholders through respective data collection and management roles in support of operationalising the circular economy measurement framework. Empowered and equipped government stakeholders across all levels can participate and contribute to a digital data integration and management system through a streamlined user experience.

It is envisaged that governments across all levels would benefit from a centralised and transparent data infrastructure that provides insights far surpassing their own capacities to measure and analyse. Establishing this sophisticated system will require investment across the measurement lifecycle, from digital instruments to collect high quality data in the first instance, to a highly capable digital data integration platform, to a well-designed user interface and reporting outputs.

34. EPA Network (2021), *Bellagio Declaration*, pg.5

3.3 TOWARDS SHARED VALUE AND ACCELERATED CIRCULAR ECONOMY TRANSITION

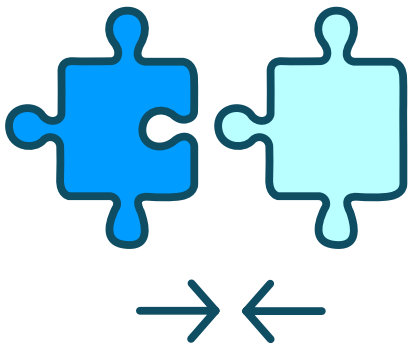
Australia has the opportunity to unlock a wealth of information and insights across all levels of government. These insights will provide evidence to support informed decisions and drive system changes to accelerate progress towards a circular economy. Such decisions and changes would provide policy options, helping governments decide where to focus public investment or incentivise private investment, guiding education and communication tools and designing circular economy initiatives.

Transparency and interoperability will see greater access to knowledge and informed action by government stakeholders at all levels. The framework will not only be designed for effectively capturing progress towards circularity, but also to allow scenario modelling and observation of possible results to inform future actions on the circular economy transition, such as testing the impact of policy interventions, investments or system changes. Similarly, the benefits of collaboration across measurement, actions, continuous improvement and education will be an evident outcome of system design. Important insights can result, as one participant suggested:

> ***[Policy is] not the only lever, but it's one of the key levers that will accelerate us, and getting those policy settings right … evidence-based policy is very, very important.***

3.3.1 Transparency and collaboration creating shared value

Measuring the circular economy in the future would benefit from an interplay between government and the private sector. For example, private sector data on the composition and movement of material flows within the economy and the use of higher R-strategies will plug important data gaps to form the national picture on circular economy progress. With uptake of higher R-strategies, we may observe a future trend of less material volumes appearing in waste data and more volumes reported through these strategies. The recent Productivity Commission report, the *'Right to Repair'*,[35] for example, may inspire greater uptake of higher value R-strategies in the future.



35. Productivity Commission (2021), *Right to Repair*, Productivity Commission

Another tool that could support transparent measurement data is the increased adoption of product stewardship in Australia. The recent investment by the federal government,[36] with support from industry, offers a range of schemes that will require transparent data collection and sharing to enable scheme functionality.

Additionally, reporting of circular economy indicators by government can have great impact on business operations, strategies and plans. The impact could be particularly useful if the indicators drill down to the sector and local government level.

Transparent performance measurement and broadscale reporting at the business level was suggested by one Australian expert to benchmark against industry averages and create healthy pressure for all businesses to improve. Another expert reflected on when mandatory public disclosure was introduced in relation to discharging specific pollutants, which received push-back at the outset but after a socialisation and transition period, created pressure amongst industries to improve. If carbon emissions, materials consumption and waste generation, for instance, were seen in the same light as discharging pollutants in warranting greater measurement and transparent disclosure at the business level, it would create an even playing field in terms of reporting and result in improvement across the board.

In addition to transparent reporting, measurement at the business level should be coupled with business advisory to support improvement in performance over time. This approach is adopted in Belgium where a government-led approach to mandatory waste reporting also provides businesses with value in return, as described here by one participant:

> ***Companies reporting their waste products are benchmarked against different circular economy indicators and [they] actually get feedback on how they're performing against others in the area as well. If [businesses] report data, [they're] getting some kind of value back.***

36. Department of Agriculture, Water and the Environment (2021), *National Product Stewardship Investment Fund*, Australian Government

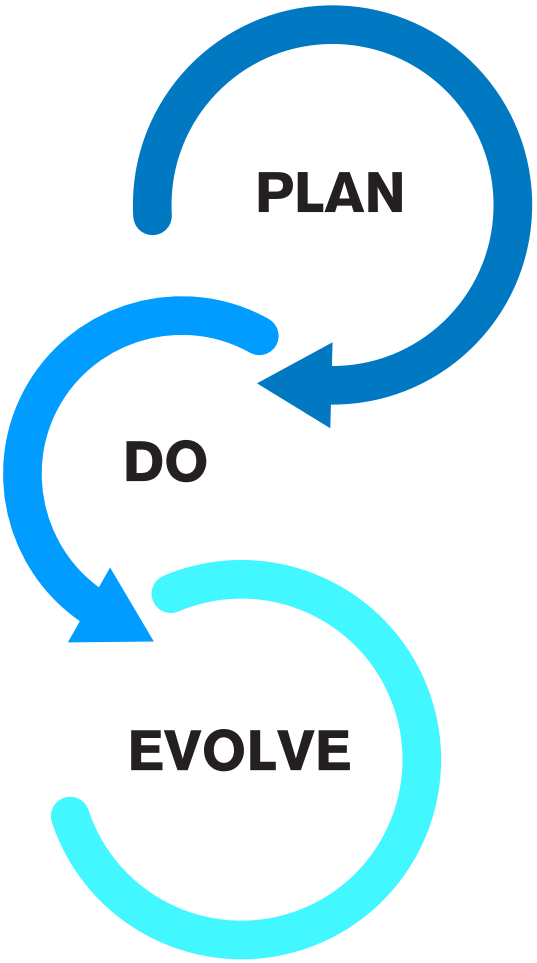
4. ESTABLISHING

AN EFFECTIVE CIRCULAR ECONOMY MEASUREMENT FRAMEWORK

KEY RECOMMENDATIONS

1. **Plan — agree on the objectives and particulars of an Australian circular economy measurement framework.**
2. **Do — calculate the circular economy baseline for Australia.**
3. **Evolve — evaluate, iterate, set a long-term vision and targets and drive long-term improvement in how the circular economy is measured.**

The shift from the current state to the desired future state of measurement of the circular economy in Australia requires an iterative journey, however there is opportunity for action now. The three main pillars of this journey are **plan, do,** and **evolve** (see Figure 2). It is important to establish a direction for measurement to suit Australia's needs, quantify current performance and leverage this performance to develop a continuously improving and expanding approach to measuring the circular economy.



PLAN

- Collaboration across stakeholders
- Align objectives
- Establish a circular economy measurement framework including available data evaluation and indicator selection
- Assign roles

DO

- Calculate baseline
- Identify areas for action
- Share and educate

EVOLVE

- Evaluate and expand indicators
- Set long-term strategy
- Improve data infrastructure and collection

Figure 2: The three main pillars to measuring the circular economy in Australia

"It is important to establish a direction for measurement to suit Australia's needs, quantify current performance and leverage this performance to develop a continuously improving and expanding approach to measuring the circular economy.

4.1 PLAN – ALIGN OBJECTIVES

Establishing a clear direction and approach to progressing the measurement of circular economy in Australia should build upon the emerging progress across the country. It should provide a platform to identify and align objectives for measurement and determine clear roles for stakeholders to take action across all government levels.

As suggested in previous sections, stakeholders should be engaged across government departments and at different levels of government to understand the specific needs and objectives for measuring the circular economy in Australia. Such engagement offers collective identification of a suite of indicators that meets these objectives and ambitions. Dedicated resources should be responsible for coordinating activities and collaboration across stakeholders, as one participant explained:

> ***Transitioning to a circular economy is incredibly complex, so making sure that all of our work is pointing in the same direction is a good start.***

4.1.1 Leveraging international frameworks while tailoring for domestic needs

Consideration should be given to circular economy measurement frameworks in place overseas and in development in Australia to learn from their experience and explore which aspects and indicators should be considered appropriate locally. Australia's geography as well as the social and economic environment are important considerations:

> ***It's tempting to use an off-the-shelf indicator, but existing approaches oversimplify.***

Examples of existing frameworks from overseas include the European Commission's ten macro-economic circular economy monitoring indicators and specific approaches adopted by The Netherlands, France and Colombia.

Domestically, Sustainability Victoria's experience in developing a circular economy measurement framework should be leveraged heavily. Domestic research institutions and experts working in relevant fields such as industrial ecology, material flow and waste accounting and economics should be engaged to understand what measurement is feasible from an analytical perspective, noting the view that Australia has the expertise to develop a world-leading approach to circular economy measurement.

4.1.2 Review existing data

A comprehensive data review should be undertaken to understand and collate currently available data sets across governments, departments and the private sector, as well as future plans for relevant measurement and the creation of new data sets. Data gaps and harmonisation issues across jurisdictions and scales should be identified and explored in detail. The review should conclude with recommendations on which indicators can be calculated immediately and which require improvements to data collection, reporting, or governance mechanisms to allow data sharing before they can be calculated.

4.1.3 Assign roles to mobilise stakeholders

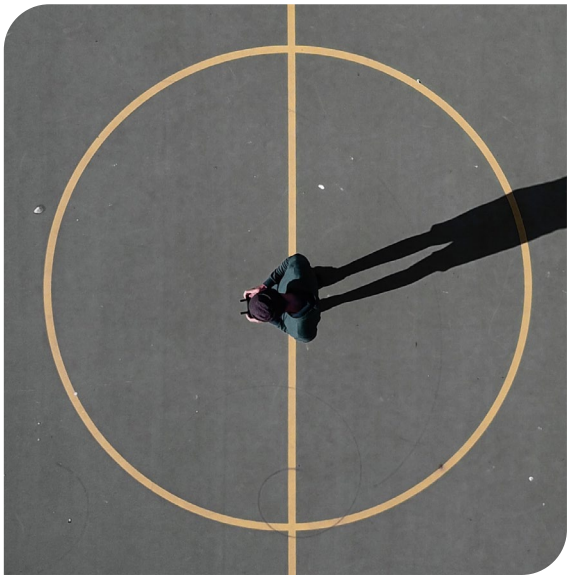
Mobilising stakeholders and allocating roles and responsibilities across different levels of government and departments will be key in operationalising the Australian circular economy measurement framework. Collectively, this process could bring to life a multi-level, multi-sector collaboration responsible for measuring and collating data, implementing suitable data governance and communicating measures of performance and progress to a range of audiences. Enabling roles will include, for example, designers and managers of digital data infrastructure, analysts in a range of technical fields and communications designers and developers. As one participant suggested:

> ***The circular economy is a shared responsibility … it cannot just be the responsibility for the local government … they need to involve all the stakeholders.***

Consultation across departments and government levels, review of available data sets and feasibility analysis of calculating each indicator will help form a baseline Australian circular economy measurement framework. This will set the stage to drive the development of a comprehensive circular economy strategy, and continuous improvement on the measurement framework.

4.2 DO – CALCULATE THE CIRCULAR ECONOMY BASELINE FOR AUSTRALIA

Momentum has been building on measuring circular economy performance and progress. Several stakeholders expressed the urgency for Australia to just get started on measuring circular economy indicators with what data is available. Calculating a baseline across the indicators within the Australian circular economy measurement framework for which data is already available is an important starting point. This will establish a quantified understanding of how Australia is currently performing, where gaps in measurement remain and insights into where effort is needed to aid the transition to a circular economy for Australia.



4.2.1 Use data to educate

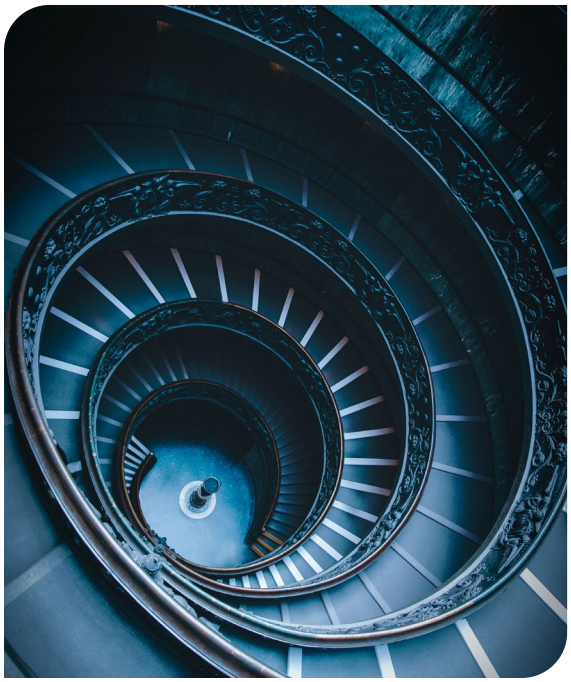
The results of a baseline study in Australia could be used to identify areas for action. Action could include policy changes that direct a shift in consumption behaviours, inform strategy development at all levels of government and inform investment in specific initiatives or sectors. The results can inform the development of an educational tool to demonstrate opportunities. Such a tool can assist in strengthening the narrative on circular economy and build a sense of urgency over time. Behaviours could be shifted through stakeholder participation in the measurement process. With a lack of knowledge reported by participants as noted below, an educational tool developed collaboratively could address this gap.

> ***There is a lack of understanding about what a circular economy means and so part of it is about education of governments, members of Parliament, industry and the broader community to develop good measurement standards for the circular economy.***

4.3 EVOLVE – EVALUATE AND ITERATE

The urgency to get started was made clear by participants. However, equally important was an emphasis placed on continual improvement and establishing a review mechanism to evolve and iterate the Australian measurement of the circular economy over time.

4.3.1 Evaluate and evolve over time



Participants suggested regular reviews of the measurement framework should be included in the plan to evaluate the effectiveness of the baseline indicators in meeting the objectives of circular economy measurement and guide future development and evolution. As Australian stakeholders develop a sophisticated understanding and approach to measurement, and circularity becomes more prominent, the potential and ease for expanding and improving measurement will come to the fore. Future iterations of circular economy measurement could encompass, for example, behaviour change and social psychology influences (e.g., consumption culture and marketing culture).

4.3.2 Expand the scope of measurement to gain additional insights

Evaluating the effectiveness of current data infrastructure in measuring, managing and integrating data sets from across stakeholders is necessary to inform actions that can progress the scope of circular economy measurement, data infrastructure and fill data gaps. As emerging technology, such as material passports,[37] becomes more widespread, the opportunities for measurement of the circular economy will increase, and the framework and approach should be designed to capitalise on these prospects.

Attention should also be given to investigating suitable approaches to integrating private sector data with public records underpinned by suitable governance and reporting structures. This may include a consideration of policy instruments, such as mandatory reporting regulations, or co-regulatory mechanisms such as those in place with APCO,[38] and subsequently, an evaluation of the impacts of the introduction of such instruments.

37. Resource (or material) passports is a standard format that registers a certain product or material stream, capturing information such as product composition, origin, volumes, and quality (Source: Excess Materials Exchange (2021) *Resources passports*)
38. Australian Packaging Covenant Organisation (2021), *About APCO*

4.3.3 Establish a strategy to drive long-term improvement

Establishing a national circular economy strategy could leverage the important work achieved on measuring the baseline for circular economy in Australia. Such a strategy encourages alignment of stakeholders, including civil society, across Australia. This strategy could include a long-term vision tied with meaningful targets to drive improvement and ongoing monitoring of progress delivered through the framework. The federal government or a coalition of state governments would be well-placed to lead this strategy development.

5. CONCLUSION

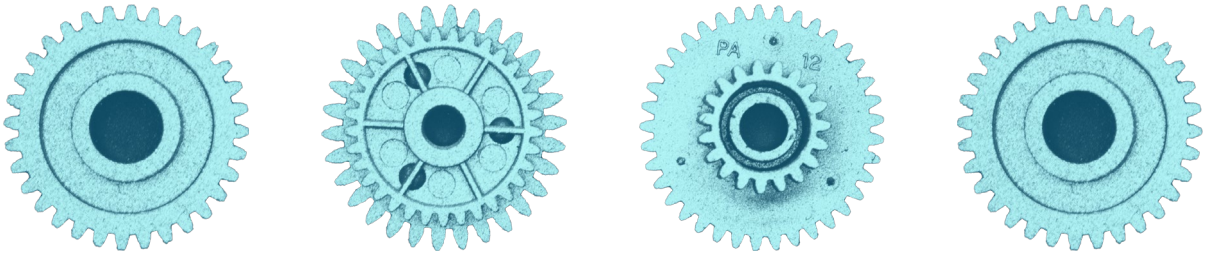
Engagement with experts, both internationally and locally, and government stakeholders at all levels has informed a clear case for Australia to implement a circular economy measurement framework to support government.

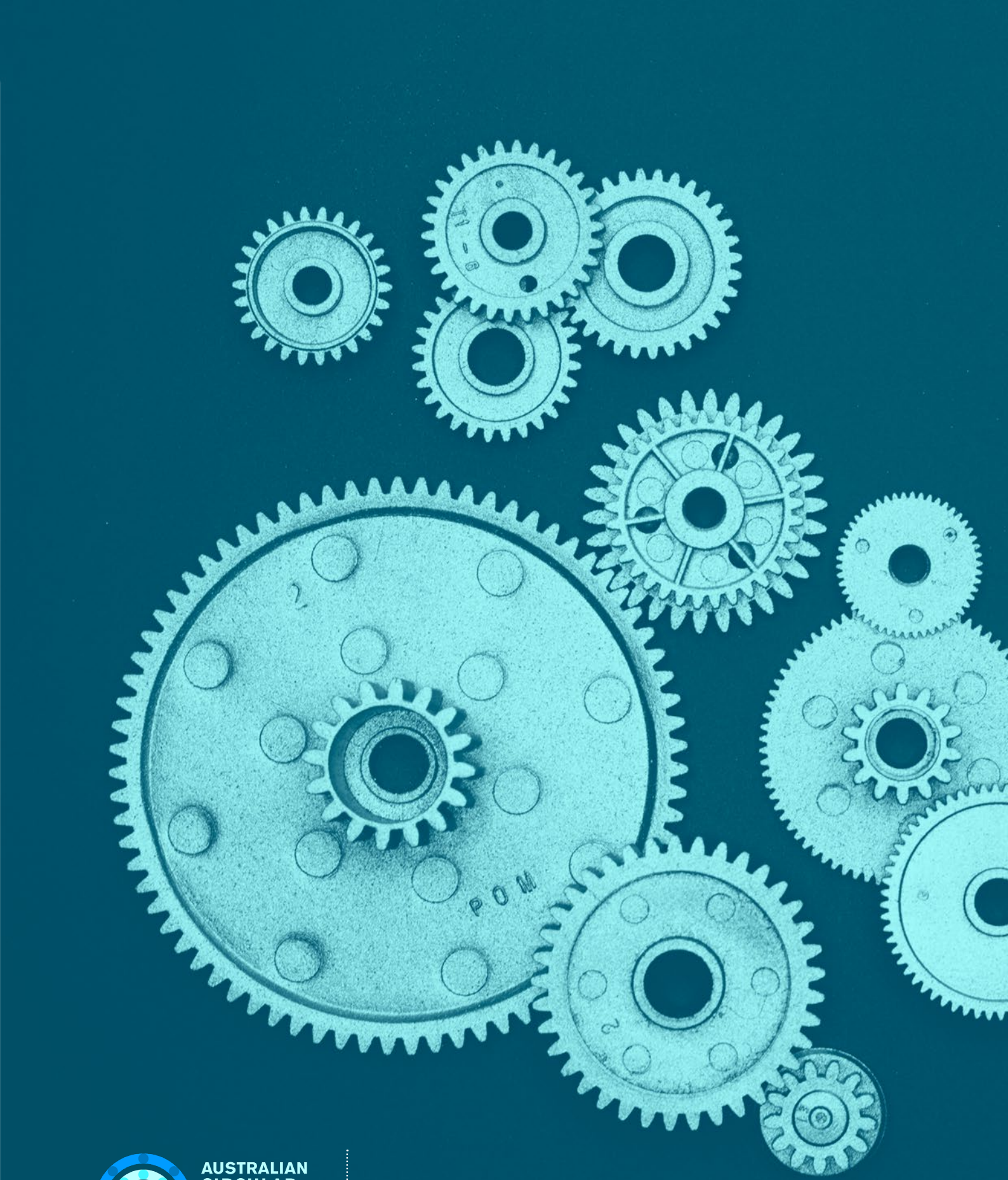
Interest in the measurement of the circular economy in Australia is already gaining traction across the private sector and in selected governments and their departments across all levels. Australia is suitably positioned to leverage this emerging interest, accelerate national progress on circular economy measurement, and demonstrate leadership in the Asia-Pacific region.

Several relevant yet currently independent data sources are already available to create a more integrated view of performance, shifting away from the current waste-centric focus. Tapping into domestic technical expertise will support the design of a world-leading approach to measuring the circular economy in Australia. Dedicated resources, including strategic investment whether by government or the private sector, are required to mobilise stakeholders, plan a coordinated approach tailored to Australia's context and objectives, and operationalise a circular economy measurement framework to understand baseline performance and progress over time.

Ongoing evaluation and iteration of the measurement framework can drive improvements in data capture, accessibility and maturity in the scope of measurement over time.

Measuring the circular economy in Australia offers the potential to drive meaningful change across scales and sectors. The availability of such measurement data could provide the evidence-base to inform policy changes, attract and direct public and private investment and guide behaviour changes in consumption. Solid foundations for measurement of the circular economy are present in Australia. The time is now to capitalise on these to support the realisation of the social, economic and environmental benefits of transitioning Australia to a circular economy.





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