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## ISF response to Productivity Commission inquiry on circular economy opportunity for Australia

### About UTS-ISF

The UTS Institute for Sustainable Futures (ISF) is an applied research institute. We work in partnership with governments, industry and community organisations to identify and evaluate opportunities to promote sustainable consumption and production and the adoption of circular economy business models and policies. See more about our work at [www.isf.uts.edu.au](http://www.isf.uts.edu.au).

We are pleased to make a submission to this inquiry. Below we have outlined key issues and enablers, as well as research outputs and examples of approaches that are furthering the circular economy in Australia.

## 1. Circular economy success stories and measures of success

### 1.1. Circular Economy Metrics and indicators

Measuring success in the circular economy requires the development of well thought out and implemented data collection schemes that can support the quantification of performance metrics to track progress and improvement overtime.

NSW Circular commissioned ISF to undertake a review and provide recommendations on the best practice use of metrics for measuring and reporting NSW's progress towards a circular economy. This review was wide ranging, considering five categories of metrics and 47 metrics in total. 31 circular economy metrics were then assessed for their applicability in NSW considering a range of criteria that were developed through consultation. This included their alignment with both NSW and national policy. Following this process, ultimately shortlisted six key areas and metrics for measuring progress in NSW towards circular economy:

1. Carbon dividend of recycling materials
2. Planned new investment in recycling capacity
3. Green public procurement
4. Industrial symbiosis
5. Circular employment for reuse, repair and recycling
6. Circularity gap

Using NSW as a case study, the research identified a suite of circular economy metrics addressing materials, water, nature, energy and emissions, and jobs and investment (Figure 1).

See the full report and associated outputs at <https://circularaustralia.com.au/circular-economy-metrics-creating-a-national-dialogue/>

Materials						
Waste generation	Waste per material consumption	Material recycled into new products	Recycling & collection rates	EIP & industrial symbiosis	Local material recycling rate	Share of waste recovered for energy
Food production and waste	Repair economy	Green public procurement	Longevity indicator for EE products	Products sold for reuse	Sharing economy	Vehicle sharing – km travelled
Water and nature						
Water use per capita	Water reuse and recycling per capita	Litter volume	Soil Organic Carbon (SOC) stocks	Landcover change rates	Nutrient reuse – phosphorus	Ecological footprint per capita
Energy & emissions				Jobs & investment		
Energy from renewable sources	Electricity consumption per capita	Greenhouse gas emissions per capita	Carbon dividend of recycling materials	Employment in recycling, repair, reuse	Planned new investment in recycling	

Figure 1: Long list of circular economy metrics using New South Wales as a case study

## 1.2. Methodologies to measure emissions in the context of a circular economy

ISF put forth potential methodologies to measure emissions (including their data requirements and tools), their benefits and limitations, and their use elsewhere by other jurisdictions and/or organisations. Some findings:

Short-term (1-3 years) focus on

- Defining responsibility for GHG emissions (i.e., production or consumption).
- Setting sector-based targets for GHG emissions reductions.
- Defining circular economy interventions to suit needs and interests of different stakeholder groups
- Defining relevant metrics for monitoring the impact of interventions and sector-based targets.

Mid-term (3-5 years) & long-term (5-10 years) focus on

- Monitoring production vs consumption responsibility GHG relationship to avoid the increase in ‘offshoring’ of responsibilities.
- Developing relationships with low and high emitting producers external to jurisdictions so as to influence GHG intensity of consumption activities within the jurisdiction.
- Educating stakeholders using sector-based targets and optimal CE business models

See the full report at <https://www.uts.edu.au/sites/default/files/2022-04/NSW-Circular-NSW-Government-Rapid-Review-2022.pdf>

### 1.3. Measuring carbon benefits of a circular economy

ISF is currently undertaking a study on the carbon benefits of a circular economy. Academic and grey literature both report wide benefits of applying circular economy measures to reduce greenhouse gas emissions (GHG). In 2022, the International Panel on Climate Change identified circular economy as a relevant strategy for GHG reduction, stating that 46% of the anthropogenic GHG result from the production of goods and management of land<sup>1</sup>. In Australia, majority of the GHG are associated with energy use, but 24% result from sectors related to production of goods and management of land<sup>2</sup>. An overview of industrial sector emissions in Australia (excluding emissions from energy and transport), conducted using One Earth Climate Model developed at ISF<sup>3</sup>, identifies aluminium, agriculture, cement, residential and commercial buildings, and steel as main sectors contributing to GHG. Therefore, applying circular economy measures which reduces demand for resources in these sectors, also reduces associated GHG emissions.

The most impactful circular economy measures found in literature include strategies that reduce generation of food waste, especially if unmanaged and landfilled; material substitution of materials that utilise fossil fuels or include energy intensive processing, such as concrete or steel; switch to share models, from transport to equipment; extending product life through reuse and repair; resource recovery including recycling.

Recently released Sector Pathways Review report<sup>4</sup> by the Climate Change Authority also identifies circular economy measures to play a significant role in the proposed pathways for the sectors to achieve net zero emissions.

In our study we aim to identify and quantify the most impactful circular economy measures in terms of reduction of GHG emissions but also associated costs and benefits. This study will be completed by mid 2025.

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<sup>1</sup> P. R. Shukla et al., Climate Change 2022: Mitigation of Climate Change, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change Mitigation of Climate Change. 2022. [Online]. Available: [www.ipcc.ch](http://www.ipcc.ch)

<sup>2</sup> Australian Government, 'National Inventory Report 2022, Volume I', 2024

<sup>3</sup> [https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/09/climate-change-mitigation-scenarios-for-financial-sector-target-setting-and-alignment-assessment\\_b077f56a/bcd25b82-en.pdf](https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/09/climate-change-mitigation-scenarios-for-financial-sector-target-setting-and-alignment-assessment_b077f56a/bcd25b82-en.pdf)

<sup>4</sup> <https://www.climatechangeauthority.gov.au/sites/default/files/documents/2024-09/2024SectorPathwaysReview.pdf>

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## 2. Priority opportunities to progress the circular economy

### 2.1. Support research to quantify the impacts of higher order circular activities

Research to date is heavily technocentric and is focused on incumbent systems of production and consumption. Funding for research and development is predominantly driven by industry and results in individualised solutions to systemic problems. For example, there are large investments currently focused on process efficiency innovation and impact assessment for battery technologies at end of life. Research intensity of this nature results in a flurry of innovation for incumbent technologies and business models and reinforces the dominant economic environment.

A lack of funding towards research into higher order circular economy activities has resulted in scarce evidence on the scale of benefits, costs, and exploration of impacts.

**Funding is needed to quantitatively, qualitatively, and holistically research the impacts, benefits and costs of higher order circular practices.** Higher order circular activities, such as refuse, rethink, and reduce, incentivise smarter product consumption and production practices. We need research that explores the material demand implications for whole of system changes in consumption. For example, how could we reduce demand for critical minerals in Australia if a percentage of the population moved towards public transport, cycling, walking or car share, instead of every internal combustion engine vehicle in Australia being replaced with an electric vehicle.

### 2.2. Circular economy workforce development

Skills and workforce shortages are already occurring in Australia driven by transitions in energy, transportation and the built environment. Individual occupations, such as electricians, are experiencing very high demand across multiple sectors.

**Investment in circular economy skills and workforce development via the Future Made in Australia package** must be tied to the skills and occupations required in the circular economy. Workforce development occurs over long time frames and so circular skills and occupations must be incorporated at the outset. An efficient and low impact Australian circular economy is at high risk of not eventuating if Australian workers are not appropriately prepared with the skills to participate.

### 2.3. Product repairability

A **repairability index** enables consumers to make informed decisions when purchasing new products. France has implemented a repairability index for washing machines, smart phones, laptops, TVs/monitors and electric lawn mowers. The index scores products according to 5 criteria: availability of technical documentation, ease of disassembly, spare parts availability, spare parts cost, product specific sub-criteria (e.g., product usage counters and information inclusions such as part replacement notifications).

**Repair vouchers** reduce the burden of the costs of repair and incentivise consumers to seek repair over replacement. Repair vouchers and other repair funding models have been introduced in many countries including Germany, Austria, and France.

### 2.4. Product reuse

More products and materials should be diverted from landfill.

Product reuse directly through resale or through small interventions (e.g., cleaning, repairing or restoration) is big business in Australia, contributing significantly to national GDP and jobs. Reuse employs between 25 to 81 times more workers than recycling and landfill per tonne, according to a recent report released by NSW EPA in collaboration with Charitable Reuse Australia.

A significant proportion of reusable product in Australia is dumped on curb sides and ends up crushed in trucks and sent to landfill. This happens despite programs for diverting products from landfill such as item donation information, and furniture and white goods collection services provided by reuse centres. Recent

reports from community groups have provided examples of products that are still in new packaging being dumped out for rubbish collection having never been used.

**More research is needed into drivers of ‘throwaway culture’**, including the barriers to adopting available services and the opportunities for providing better access.

Space needs to be designated for reuse. Reuse centres out-competed economically when it comes to space, particularly in high density urban areas. Industrial areas in our cities are being converted to new apartments, commercial buildings and other uses that generate a high financial return. As urban use changes, reuse centres and creative spaces are being pushed to the periphery or closing altogether. Leaving new residents and businesses with little option but to discard usable items in waste streams.

Material reuse is space intensive and so areas should be designated as hubs for second hand products and materials to be sorted, stored, and resold/rehomed. These hubs need to be close to where people live, work or shop so that convenience is no excuse to rehoming a usable second-hand product.

## 2.5. Product sharing

Product sharing services are expanding in Australia, but progress is slow. These include car share networks, ‘tool libraries’ and ‘libraries of things’, and bike sharing. Innovative ownership models that promote the sharing of goods across many people could serve to reduce individual consumption if they are truly optimised to meet the needs of users.

## 2.6. Circular Finance and Investment

ISF conducted a literature review of initiatives to define circular assets, asset classes and metrics relevant to the finance and investment sector, particularly, but not confined to the EU, UK, Asia-Pacific and North America. It also proposed a program of work to give effect to the findings of the review, including comments on current initiatives relevant to the sector, industry actions that would impact the trajectory of circular finance, and an education, data and research agenda to address any identified gaps in knowledge and practice. Key recommendations for scaling up circular finance and investment:

1. Develop a common understanding and language for circular economy finance relevant to Australia.
2. Develop linear (and circular) risk identification and evaluation tools.
3. Improve company reporting and disclosure of circularity, including reporting standards for linear risks and learning from climate disclosure.
4. Build an evidence base for circular economy finance, including identifying and addressing barriers.
5. Implement circular economy professional development for the finance and investment sector, including sharing good practice to encourage implementation and case studies.
6. Examine evidence of financial and non-financial benefits of circular initiatives in the built environment at the meso level.

See the full report at <https://www.uts.edu.au/sites/default/files/2022-04/NSW-Circular-Finance-Investment-Rapid-Review-2022.pdf>

## 2.7. Circular Organics

ISF investigated opportunities for a circular organic waste economy in the Western Sydney Parklands (Figure 2). The main opportunities of extending co-digestion to the Western Sydney Parklands using an anaerobic digester were:

1. Diversion of up to 165,000 tonnes of organic waste from landfill, annually, by 2036
2. Creation of up to 300 ongoing direct jobs
3. Saving of almost \$40 million from electricity generation, annually by 2036
4. Revenue of almost \$14.4 million from biosolids production
5. The co-digestion process could generate enough electricity to power an extra 120,000 homes by 2036 and reduce emissions annually by 70,000 tonnes per year, with cumulative emissions savings of 651,000 tonnes by 2036.

6. In the wider economy, there would be \$155 million of value added for each construction year, and \$40 million of value added in each year of operation.



Figure 2: Circular organics opportunity for co-digestion in the Western Parkland City

See full report at <https://www.sydneywater.com.au/content/dam/sydneywater/documents/unlocking-the-value-of-food-waste.pdf>

ISF is currently conducting a collaborative research project “Optimising Organic Waste and Cultivating Circularity for Australian Agriculture. This project aims to collaboratively define what a successful circular economy will look like for Australian agriculture and equipping rural businesses with tools to identify, implement and monitor acceleration of circular economy projects and programs. It will deliver user-friendly outputs, such as case study videos and a toolkit to assist with identifying opportunities and transition to a more sustainable and decarbonised agriculture system.

A special focus is given to the organic waste that has been recently quantified, seeking to identify higher value-adds and more sustainable solutions using circular economy principles. These novel solutions will be scrutinised from regulatory and financial perspective, yet technology agnostic, in addition to the impact in waste diversion and carbon abatement. Australian rural businesses will be provided with case study demonstrating proof of concepts and assisting them in finding solutions for their special situations.

This project is funded by AgriFutures, Hort Innovation, Australian Pork, Australian Eggs and is due to be completed by the end of May 2025.

## 2.8. Circular economy in the resources sector

ISF has been working with the Queensland Department of Resources to conceptualise and test the circular economy potential within the resources sector. Figure 3 provides a lifecycle approach towards seeking circular economy actions at different stages of the mining and metals sector, looking at opportunities right from planning and feasibility stages, then on to the mine site and down the supply chain across refining, manufacturing, use, recovery and disposal. Such a systems perspective is needed across sectors to be able to map the circular economy opportunities and potential, and to identify targeted approaches and metrics to implement holistic solutions that minimise trade-offs.



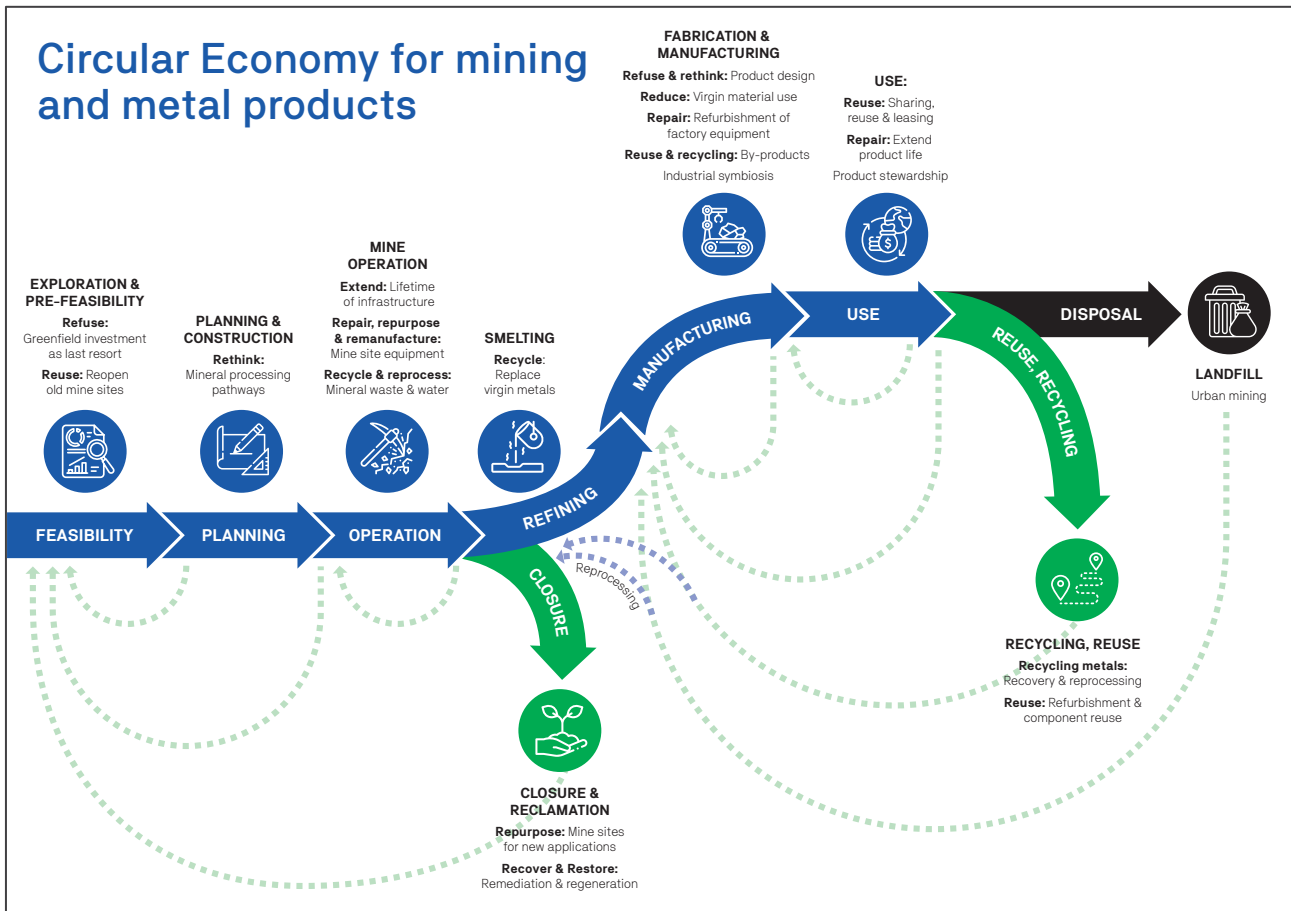


Figure 3: Conceptual mapping of circular economy actions across different stages of the resources lifecycle

## 2.9. Main opportunities for investment to drive the circular economy in Australia

The potential value and opportunities of moving to a more circular economy in Australia are significant. Recent reports by the CEFC, PwC and KPMG have valued circular opportunities in terms of infrastructure outlook and economic benefits of the transition in the billions:

- A\$4-7.8 billion five-year infrastructure investment outlook for Australia’s waste, bioenergy, recycling and resource recovery sectors;<sup>5</sup>
- A\$1,860 billion direct economic benefits by 2040 across the key areas of built environment, mobility, community and industry;<sup>6</sup>
- A\$210 billion economic benefit by 2048 of transition in three key sectors of food, transport and built environment;<sup>7</sup>

As Australia is still in the relatively early stages of adopting the circular economy, sector initiatives are still largely considered in terms of waste reduction and recycling. As Australia is one of the largest global waste producers on a per capita basis, it is important to determine which sectors and materials will lead to the most impact in particular in terms of reductions in waste generation. The studies by PwC, KPMG and CEFC mentioned above, as well as from CSIRO, Circular Australia and ACE Hub, have identified key sectors that have the most opportunity for the circular economy transition, as follows:<sup>8</sup>

<sup>5</sup> <https://www.cefc.com.au/insights/market-reports/energising-resource-recovery-the-australian-opportunity/>

<sup>6</sup> <https://www.pwc.com.au/assurance/esg/building-a-more-circular-australia.pdf>

<sup>7</sup> <https://kpmg.com/au/en/home/insights/2020/05/potential-economic-pay-off-circular-economy-australia.html>

<sup>8</sup> <https://circularaustralia.com.au/key-sectors-that-will-catalyse-the-australian-circular-economy/>;

[https://acehub.org.au/knowledge-hub/industries](https://acehub.org.au/knowledge-hub/industries;); <https://www.csiro.au/en/research/natural-environment/circular-economy>

- Built environment – including both property and infrastructure (masonry materials, and as users of industrial materials such as cement and steel)
- Food and agriculture - including organics, community food waste, forestry and other land use;
- Transport – including electric vehicles and public transport;
- Industry and manufacturing – including business and consumer products:
  - Production of cement, steel and aluminium (also refer Built Environment above)
  - Renewable energy – including solar PV and battery storage;
  - Plastics and packaging
  - Tyres, glass and paper
  - Textiles – including clothing and other products; and
- Waste, water, resource recovery/management, recycling and bioenergy.



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### 3. Hurdles and barriers to a circular economy

#### 3.1. Barriers to achieving circular economy investments

Some of the known barriers to achieving circular economy investments are:

- Lack of standard circular economy definitions, metrics and data on circularity performance
- An uneven playing field for circular businesses, limited value chain collaboration, and limited end-user/consumer participation to avoid waste – leading to circular business models and projects often seen as having higher financial risk
- Lack of pricing of externalities of the current linear economy
- Limited government incentives to drive change, including harmful products not being outlawed and circular products promoted
- Limited understanding of the circular economy within the financial services sector
- Lack of equity and scale-up capital for circular SMEs

Further, according to two recent surveys of Australian business leaders by the Australian Circular Economy Hub (ACE Hub), the lowest level of correct knowledge of the circular economy is in the financial sector, and the main barrier for businesses in implementing the circular economy is related to accessing finance.<sup>9</sup>

These barriers are relatively common both globally and in Australia. In UTS ISF led research for Circular Australia on global initiatives to finance the circular transition, some of these barriers were also considered. Scientifically sound circular economy definitions, metrics and practices that are standardised to ensure appropriate financial decision making, as well as commonly accepted definitions of circular business models/projects and circular economy measurement methodologies, are important for investment and credit risk assessment.<sup>10</sup> Addressing some of these barriers to circular economy investment could form a key part of the ASFI Sustainable Finance Taxonomy project. It is important however to note that implementation of the circular economy in sustainable finance taxonomies has particular challenges.<sup>11</sup>

#### 3.2. Potential risks of not moving to a more circular principles in business models

In research at UTS ISF, we have increasing evidence to suggest circular economy considerations are becoming more mainstream for businesses, and those that are more effective in achieving greater environmental, social, economic outcomes and consumer engagement understand and embed circular economy principles in the core business strategy.

In research led by UTS ISF for Circular Australia (2022), it was recommended that linear risks should also be considered by Australian businesses, as well as circular economy as a de-risking strategy.<sup>12</sup> Linear risks are the risks that a business is exposed to as a consequence of following the conventional “take-make-use-waste” linear economic model including business-as-usual use of non-renewable resources, prioritising sales of new products and failing to collaborate and adapt. A first step is to understand differences between linear and circular business models and their risks, with linear risks ranging from market (resource scarcity) and operational (supply chain) to legal (plastic bans) and reputational risks. Adopting circular approaches can help businesses insulate themselves against linear risks.

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<sup>9</sup> <https://acehub.org.au/knowledge-hub/research>

<sup>10</sup> <https://circularaustralia.com.au/wp-content/uploads/2022/03/NSW-Circular-Finance-Investment-Rapid-Review-2022.pdf>

<sup>11</sup> <https://www.chathamhouse.org/2023/06/making-sustainable-finance-taxonomies-work-circular-economy>

<sup>12</sup> <https://circularaustralia.com.au/wp-content/uploads/2022/03/NSW-Circular-Finance-Investment-Rapid-Review-2022.pdf>

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## 4. Governments' role in the circular economy

### 4.1. Economic levers needed to drive the circular economy in Australia

UTS ISF research into the international circular economy context has identified a number of policy and business levers that can accelerate uptake of circular business models by business and consumers. A circular economy will enhance Australia's resource security and enable localised industry and demand, technology and innovation, improved recovery of products and materials for higher value materials to be used back into new products, increased sharing and leasing business models, innovations in industry and markets to shift to low embodied carbon products, create new economic opportunities and jobs. Some recommendations to drive the circular economy in Australia include:

1. A single policy framework and implementation plan for the circular economy, with sectoral pathways and opportunity assessment.
2. Scaling up green and circular public procurement policies, fiscal and tax incentives to create demand for recycled content in new products.
3. Standards, certification and verification mechanisms for greater transparency and responsibility from producers to avoid greenwashing.
4. A suite of circular economy metrics that provide a clear framework and guidance to different actors including businesses, government at different levels, consumers and community, to provide standardised definitions, methodologies and best practice reporting guidelines, datasets, sectoral metrics and guidance.
5. Lifecycle approaches and investment in research to create a stronger evidence base for policymaking.
6. Sector-specific research and action plans to provide clear guidance and resources to industry, and to encourage investment in circular business models beyond improved waste collection and recycling.
7. Invest in waste exchange platforms and marketplaces to create cost-efficiency for business generating, collecting, and reusing waste materials.
8. Recognise and reward good business practices such as participation in product stewardship schemes, better information and labelling, repair services, buy-back programs, product as a service/leasing model.
9. Integrated approach to product stewardship and extended producer responsibility (EPR), incentives, standards, finance and tax, to facilitate standardised information, targets, monitoring and reporting, and timely evaluation of progress.
10. The provision of incentives (e.g. tax or import duty deductions, or product stewardship scheme fee differentiation) for products that are durable, repairable, upgradable, or more easily recycled.
11. The use sustainable procurement guidelines to drive circular economy and product stewardship activities.

Product stewardship is an important approach for business in implementing circular economy objectives.<sup>13</sup> Mandated product stewardship requirements for businesses placing targeted products, packaging and materials on the market would help to drive industry-wide participation in the transition. We acknowledge that regulatory reform and development is in progress targeting packaging and e-products including solar panels. Other problematic product classes include tyres, mattresses, and commercial and office furniture.

Further, ensuring that the forthcoming federal Circular Economy Strategy/Roadmap and Sustainable Finance Strategy are aligned in their support of the transition to a circular economy will be an important lever to help drive the systems change required to achieve a more circular economy. The ASFI-led Sustainable Finance Taxonomy (refer below) should also incorporate the transition to a circular economy as a key objective. Further, these levers and policies should be supplemented by appropriate regulations, such as corporate reporting/disclosure.

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<sup>13</sup> <https://stewardshipexcellence.com.au/resources/#benefits>

## **4.2. The right policy settings can speed up the pace of a circular economy transition**

ISF was commissioned by the NSW Government to provide research to develop a discussion paper and draft Circular Economy Policy Statement “Too Good to Waste”. ISF partnered with international expertise from Ricardo (UK consultancy) to undertake a review of international best practice for circular economy policies, principles and case studies, and its application in NSW. This included expert stakeholder input and review to develop recommendations for the NSW government. Key recommendations were:

1. Government should consider innovation funding to support circular economy businesses
2. Incorporate circular principles into sustainable public procurement to stimulate end market demand
3. Prioritise resource “quality” through revised, consistent system design, guidance, and communication measures
4. Eliminate biodegradable waste to landfill and maximise the value from biological resources
5. Strengthen national product stewardship through Extended Producer Responsibility and local uptake in NSW
6. Actively support ambitious targets to improve the sustainability of plastics and packaging
7. Stimulate and support the re-use and repair industry in NSW, creating skilled local jobs and social benefits
8. Better design: advocate for the development of national design product rating, labelling and standards

## **4.3. Stimulate demand for secondary materials through circular public procurement**

ISF worked with NSW EPA to inform the development of a public procurement program. The aim of this research was to provide information regarding the scope of potential green and circular procurement programs and research some case studies of best practice approaches internationally. Key findings:

1. Circular public procurement principles can support waste and resource efficiency while also achieving energy and climate benefits.
2. Key steps in expanding detailed procurement criteria for each priority sector include selecting priority sectors, conducting market analysis of products and consulting with relevant stakeholders.
3. Creating supportive programs for training staff and informing consumers will be essential in pursuing the goal of a circular economy in NSW. Other critical success factors include attaining support from senior management, setting targets and undertaking monitoring.

## **4.4. Circular economy for water is a crucial opportunity**

ISF assisted the Water Services Association of Australia (WSAA), to investigate the building blocks for a utility to transition from a linear economy. Fifteen case studies were collated to showcase the current state of the urban water industry (nationally and internationally), and the future possibilities in this sector. Urban water utilities manage an essential part of the water cycle that creates healthy, liveable communities and simultaneously manage a significant proportion of the waste created by those urban communities. Findings:

1. In addition to facilitating regenerated and liveable environments for our cities and communities, urban water utilities need to proactively position themselves as resource recovery enterprises.
2. WSAA can support a transition to a circular economy through leadership, partnerships and planning, knowledge and capacity building, and by measuring benefits. For more details, see Figure 4.

<b>LEADERSHIP</b>	<ul style="list-style-type: none"> <li>Facilitating a sector-wide visioning process for the circular economy approach.</li> <li>Showcasing leadership within the water industry on circular economy innovation and initiatives.</li> </ul>	<p>The following actions are suggested as some of the ways in which WSAA could support water utilities to transition to a circular economy.</p>
<b>PARTNERSHIPS AND PLANNING</b>	<ul style="list-style-type: none"> <li>Facilitating collaboration between urban, water and other planning professionals.</li> <li>Developing and sharing best practice information with other sectors.</li> <li>Develop collaborative policy and research opportunities with government agencies and initiatives, such as Queensland Circular Economy Lab, NSW Circular, Waste Authority WA and the newly announced National Food Waste Governance entity.</li> <li>Supporting members in opportunities and planning for hydrogen production, including evaluating renewable hydrogen technologies, access to water supplies, oxygen generation and working with government agencies such as the Technology Investment Advisory Council, ARENA and the Clean Energy Regulator.</li> </ul>	
<b>KNOWLEDGE AND CAPACITY</b>	<ul style="list-style-type: none"> <li>Establishing a circular economy special interest group within WSAA.</li> <li>Developing circular economy materials that provide guidance for water utilities transitioning to a circular economy approach.</li> <li>Investigating opportunities under the Australian Government's new Product Stewardship Investment Fund, including working with water utilities' supply chains to better understand material flows, and to support the recycling of products used and produced.</li> <li>Funding and commissioning collaborative research on current circular economy knowledge gaps, opportunities and challenges including ways to assist in circular economy decision making, evaluation and measurement at multiple scales.</li> <li>Capturing and publishing case studies and lessons learnt that illustrate broad circular economy innovations, including technological advances, governance approaches, and institutional and financial models.</li> <li>Building capacity in the urban water industry on the circular economy.</li> </ul>	
<b>MEASURING BENEFITS</b>	<ul style="list-style-type: none"> <li>Developing a comprehensive set of circular economy indicators for water utilities that include natural and social capitals.</li> <li>Liaising with regulators to recognise the opportunity cost, capital offsets, and triple bottom line benefits associated with circular economy.</li> <li>Continuing to engage with customers to understand their preferences and willingness to pay for circular economy outcomes.</li> </ul>	

Figure 4: Taking action in the water sector to transition to a circular economy. Source: Jazbec M, Mukheibir P and Turner A, 2020, *Transitioning the Water Industry with the Circular Economy*.

See the full report at

<https://www.wsaa.asn.au/sites/default/files/publication/download/Transitioning%20the%20water%20industry%20with%20the%20circular%20economy%20FINAL%2012102020.pdf>

#### 4.5. Circular Taxation and Fiscal Policy changes

ISF was commissioned by NSW Circular to investigate opportunities for taxation and fiscal policy to enable more circular economy outcomes. The main findings were:

- At the Commonwealth level, reforms to the GST and resources tax have significant potential to drive change.
- Within states, there are opportunities to reduce or remove payroll tax and increase land tax and mining royalties. Transport levies are well aligned with the circular economy in encouraging public transport and service use over private transport.
- In local government, strategic planning could be designed to enable the delivery of circular economy precincts. These would need to be harmonised with local Council costs and income rates, fees, and charges.
- Fiscal policies must be accompanied by other policy instruments.

See the full report at <https://www.uts.edu.au/sites/default/files/2022-04/NSW-Circular-Industry-Rapid-Review-2022.pdf>

#### 4.6. Funding research

Funding for research needs to address circularity:

- Holistically: Modelling the complex relationship between industries, practices and circular solutions.
- With emphasis on higher order Rs: explainer
- Quantifying the impacts, benefits and potential trade-offs of circular practices.

#### 4.7. Seeking co-benefits across circular economy, carbon and nature

ISF is working with Australian states and territories to investigate the intersections between circular economy, climate change and biodiversity, so as to identify areas of synergies and gaps towards achieving an integrated approach. The research identifies conceptual intersections and leading approaches, to put forth an evidence base of best practice examples and international case studies. These are intended to expand the ambition and thinking around circular economy in Australian policy, to also consider the social dimensions, which are often overlooked. The overarching objective is to promote a systems-thinking approach within policymaking and to help inform jurisdictional priorities for a circular economy that is regenerative.

Some early findings about the intersection between the circular economy, climate mitigation and biodiversity are identified around six themes:

1. Reducing material consumption
2. Recycling metals
3. Bioeconomy
4. Renewable energy: wind, solar and lithium-ion batteries
5. Regenerative agriculture
6. Nature-based solutions

This research is still underway. The findings and recommendations are intended to inform jurisdictional priorities in Australia, to develop practical solutions for integration and co-benefits. This will enable policymakers and government stakeholders to support the development of a holistic circular economy agenda, considering the scope for integration with climate change and biodiversity goals and trade-offs.

#### 4.8. Policy can drive better integration of social dimensions needed to steer behaviour change in a circular economy

A circular economy can drive behaviour change as people and systems operate within their social context and are influenced by political, cultural and technical factors. From a systems perspective, an understanding of the ethical and equity issues that may arise from the implementation of the circular economy practices is needed. Thus, the focus of circular economy policy needs to shift beyond market incentives towards creating systems that enable the shift from linear to circular practices, i.e., making practices such as sharing, leasing, reuse as mainstream, accessible to all social groups and part of the business as usual. There are opportunities in transport, buildings, consumer products that can be scaled up quickly and efficiently.

#### 4.9. Reducing consumption as the highest priority in a circular economy

Thus far, circular economy approaches have focused on resource efficiency, resource recovery and material productivity. While advancing these, it is imperative that demand reduction be driven through enabling policy settings, whereby, the costs and taxes associated with goods and services support a shift away from an extractive economy. The potential for a circular economy rebound necessitates the need to support resource sufficiency strategies over efficiency gains.

Business models that promote avoidance and reuse are found to offer greater opportunities for resource utilisation and demand reduction. Sitra (2018) in their Material Economics report, found that circular business models are one of three major strategies for decarbonising hard to abate sectors in the EU<sup>14</sup>. For example, sharing models in the built environment and transport, otherwise material- and energy-intensive sectors, had the potential to reduce 62 Mt carbon emissions annually. Sharing provides higher utilisation of buildings and vehicles, thereby lowering demand for virgin metals and plastics.

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<sup>14</sup> Material economics, "The circular economy: A powerful force for climate mitigation. Transformative innovation for prosperous and low-carbon economy." <https://www.sitra.fi/app/uploads/2018/06/the-circular-economy-a-powerful-force-for-climate-mitigation.pdf>





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