

# Challenge Brief

# Circular Economy

## Smart City Innovation Challenges

March 2022

### Background

The Smart City Innovation Challenges are looking for leading edge technology and data solutions to problems. Through the challenges, the NSW Government is setting new pathways to work with the emerging technology sector to drive solutions for places and people. Increasing the commercialisation of NSW Government-funded innovation for smart cities will increase the number of smart city products, services and solutions.

### Challenge summary

The NSW Department of Planning and Environment is seeking **innovative data technology solutions** to enable the planning, implementation, and adoption of circular economy (CE) initiatives across NSW.

Comprehensive and accessible data insights on circular economy initiatives are needed to measure, benchmark and track material usage, recycling and disposal across industries and to visualise the impacts and benefits of interventions across the entire product lifecycle.

Solutions improving the quality and availability of data reporting on circular economy initiatives could include, but are not limited to:

- Data as an enabler for innovation and collaboration opportunities, focusing on patterns and opportunities for dematerialisation, waste capture, upcycling and re-use;
- Data linkages between real-time movement of materials and policy/regulatory initiatives to measure the impact of interventions and quantify investment returns;
- Data-driven standards and accreditation for businesses, utilities and other CE participants;

- Enabling culture change and user-centric platforms for participants to reduce financial, reporting, and administrative burden;
- Emerging technologies such as blockchain and machine learning to increase visibility through the product lifecycle, and undertake predictive modelling of usage at precinct levels.

### Challenge statement

How might we generate, model and access precinct-level **material usage, reuse, recycling and disposal** data to support circular economy initiatives?

### Overview of the problem

A circular economy is all about valuing and adding value to our resources by getting as much use out of products and materials as possible while reducing the amount of waste generated. For example, using recycled materials in manufacturing, repairing household goods before buying new ones, or repurposing items that are no longer used.

While most waste and recycling facilities in NSW need to report on their material flows to the NSW Environmental Protection Authority, little data is collected on material flows across the material lifecycle before it reaches a waste facility. There are few incentives for businesses to track and report material input and output and a perceived administrative and financial burden for such activities.

At present, a lack of data and insights limits efforts to identify and quantify opportunities across the material lifecycle. Longitudinal and real-time Australian-relevant data are needed for investors, businesses, utilities and Governments to have visibility of CE opportunities, evaluate the impact of past and current initiatives and identify meaningful interventions.

## Benefits of a solution

For all stakeholders – from individual consumers to businesses and manufacturers, through to regulators and policymakers – standardised and accessible datasets will increase the visibility of current material usage and output and will drive circularity through reliable measurement and evidence-based modelling.

A central, accessible, and real-time application of circular economy data that incorporates product cost and usage data, predictive modelling, and precinct-level visualisation will deliver significant value for NSW. Solutions addressing this information gap have great potential to transform the policy, regulatory and commercial landscape.

Benefits will be demonstrated to businesses and government during this challenge at precinct level and will inform decisions on investment and state-wide implementation following program evaluation.

## Solution requirements

Data technology solutions should be online platforms affording access to all participants in the circular economy, exchange information to meet their requirements and identifying new revenue opportunities. Solutions should provide for standard metrics and quality assurance.

Solutions should provide an overview of circular economy activity within a specific precinct. Precincts should be nominated from:

- [The Western Parkland City](#)
- [Wagga Wagga](#) and [Parkes](#) Special Activation Precincts

Solutions will be prioritised that are applicable to multiple sites across the State, address the goals and pain points of potential users and align with broader NSW Government waste and infrastructure objectives.

Solution user	Goal	Pain points
NSW Government (DPE, WPCA, RGDC)* 	I want to quantify the benefits of circular economy investments to support planning, decision making and benefit realisation	<ul style="list-style-type: none"> <li>• Attracting the right industrial tenants</li> <li>• Promoting synergy between business-suitability assessments</li> <li>• Understanding the economic benefits</li> <li>• Managing and measuring circularity performance</li> </ul>
Businesses 	I want to access, track and share waste and consumption data to understand and plan circular economy activities for my business	<ul style="list-style-type: none"> <li>• Understanding business opportunities in CE</li> <li>• Understanding the economic benefits of more efficient resource use and designing out waste</li> <li>• Managing and measuring circularity performance</li> <li>• Lack of data on available resource streams</li> </ul>
Utilities 	I want to access information on waste availability to inform waste-to-energy initiatives, including waste water recycling and bioenergy	<ul style="list-style-type: none"> <li>• Understanding innovation opportunities through waste requires data on waste and resource availability</li> <li>• Managing and measuring circularity performance through technology/data</li> <li>• Incentive costs and benefits to participating in CE initiatives</li> </ul>
Local Councils 	I want to adopt smart asset and waste management principles informed by meaningful and up to date data sources	<ul style="list-style-type: none"> <li>• Recognising opportunities to improve the asset management and disposal lifecycle</li> <li>• Lack of data on consistency of supply and timing of available resource streams</li> <li>• Lack of clarity on role in waste management (collect, transport, store)</li> </ul>

\* DPE – Department of Planning and environment WPCA – Western Parkland City Authority  
 RGDC – Regional Growth Development Corporation

## Relevant Strategies and Government Priorities

### Circular Economy and Waste

- [NSW Waste and Sustainable Materials Strategy 2041 Stage 1: 2021-2027](#)
- [NSW Net Zero Plan Stage 1: 2020-2030](#)
- [NSW Circular Economy Policy Statement: Too Good to Waste \(2019\)](#)

### Data and Technology

- [NSW Government Open Data Policy](#)
- [NSW Government Internet of Things \(IoT\) Policy Guidance](#)
- [NSW Government Smart Infrastructure Policy](#)

Participants should refer to and complete all documents listed on the [buy.nsw website](#) in preparing a response.

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